MINISTERIO DEL AMBIENTE Y AGUA

# NATIONAL ACTION PLAN

## on the use of Mercury in Artisanal and Small Scale Gold Mining in Ecuador, in accordance with the Minamata Convention on Mercury



May 2020

Lenín

Toda una Vida

EL GOBIERNO DE TODOS

# National Action Plan

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**Note on Translation**
This version of the National Action Plan on the use of Mercury in Artisanal and Small Scale Gold Mining in Ecuador, In accordance with the Minamata Convention on Mercury has been translated from the original version in Spanish. All efforts have been made to ensure the accuracy of the translation, however for any discrepancies, the original Spanish should be referred to.

The National Action Plan was developed with the support of the following partners and institutions.

MINISTERIO DEL AMBIENTE Y AGUA

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# PREFACE

The Government of Ecuador is firmly committed to addressing environmental pollution that results from inadequate industrial development, unrestrained use of resources, or lack of knowledge in the management and use of chemical substances, as well as hazardous waste, through the design and implementation of policies and regulations that address the issue from a national perspective and under international guidelines such as the ratification of global environmental conventions.

Ecuador is a hugely diverse country in which several ecosystems coexist, divisible into four main regions: the marine coast, the Andean highlands, the eastern Amazon and the Galapagos Islands. It is throughout this diversity present in various places of the national territory, where mineral resources have been used by groups of people through generations who have dedicated themselves to the exploitation and use of these resources.

Mining in Ecuador has mainly been developed since the previous century in an artisanal way or as small-scale mining. One of the worst practices implemented as part of these activities has been the use of mercury, for the amalgamation process and subsequent recovery of gold.

This activity, recognized by the World Health Organization as one of the worst, threatens human health as well as the environment, has been widely applied for years and years not only in this country, nor only in the Latin American region, but globally in places as remote as Southeast Asia, the Middle East, and Central Africa, to name a few. For this reason, in a global effort and after a process of more than a decade of development, in October 2013 the Minamata Convention on Mercury was adopted among 128 signatory countries. It represents a global treaty to protect human health and the environment from the adverse effects of mercury, and which Ecuador ratified in July 2016. The current Constitution is the first in the history of humanity that grants rights to nature and recognizes the need to guarantee a healthy and balanced ecosystem for future generations. To fulfill these rights and safeguard diversity, health and the environment, the Ecuadorian State through the Ministry of Environment and Water (MAAE) works on the implementation of measures and the execution of projects focused on the adequate management of chemical substances, as well as its corresponding waste, in an integrated way with other governmental, private, NGO and civil society actors involved in this type of management.

With the entry into force of the Minamata Convention in August 2017, Ecuador has launched several projects of national interest, including in the year 2018 an initial evaluation of the presence of mercury in different areas and its main applications, including gold mining, and most importantly the following document that contains the "National Action Plan (NAP) on the use of mercury in Artisanal and Small Scale Mining (ASGM) of Gold in Ecuador", which represents a road map with responsible parties,

strategies and specific lines of action, which together allow the country to comply with the provisions of Article 7 of the Minamata Convention, which establishes measures to reduce and, when feasible, eliminate the use of mercury and mercury compounds in ASGM gold.

This Ministry expresses its appreciation to all the institutions and people who contributed to the elaboration of this plan, especially to the United Nations Industrial Development Organization, and the Artisanal Gold Council, as implementing and executing agencies, as well as to the Public Health Ministry, Ministry of Energy and Non-Renewable Natural Resources and the Institute of Geological and Energy Research as members of the project's National Executive Committee. The National Action Plan is an example of the country's commitment and capacity to work in coordination with the different levels of Government and other sectors of civil society in the face of the challenges posed by the presence of mercury in artisanal and small-scale gold mining activities in Ecuador.

Mgs. Paulo Arturo Proaño Andrade
Minister of the Environment and Water

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# ABBREVIATIONS AND ACRONYMS

| | |
|---|---|
| **AGC** | Artisanal Gold Council |
| **ARCOM** | Mining Regulatory and Control Agency |
| **ASGM** | Artisanal and small-scale gold mining |
| **Au/$Au_{24k}$** | Gold (chemical symbol) /Twenty-four carat gold |
| **CIATOX** | Toxicological Information and Guidance Center |
| **CIRDI** | Canadian International Resources and Development Institute |
| **COPs** | Persistent Organic Pollutants |
| **FFAA** | Armed Forces |
| **g** | grams |
| **GDP** | Gross Domestic Product |
| **GEMA** | Special Mobile Antinarcotics Group |
| **Hab/hab** | Inhabitants (Spanish) |
| **HDI** | Human Development Index |
| **Hg** | Mercury (chemical symbol) |
| **Hg:Au** | Mercury-gold relationship |
| **IESS** | Ecuadorian Institute of Social Security |
| **IIGE** | Geological and Energy National Research Institute |
| **INEC** | National Institute of Statistics and Censuses |
| **INIGEMM** | Mining Metallurgic Geological and Energy National Research Institute (now IIGE) |
| **INSPI** | National Public Health Research Institute |
| **kg** | kilograms |

| | |
|---|---|
| **lb** | pounds |
| **LSM** | Large-scale mining |
| **MAE** | Ministry of the Environment |
| **MERNNR** | Ministry of Energy and Non-Renewable Natural Resources |
| **MIA** | Minamata Initial Assessment |
| **MM** | Ministry of Mining (now Vice Ministry of Mining within the MERNNR) |
| **MSP** | Ministry of Public Health |
| **NAP** | National Action Plan |
| **NGO** | Non-governmental organization |
| **oz** | ounces |
| **PN** | National Police |
| **PRODEMINCA** | Mining Development and Environmental Control Program |
| **RAISG** | Amazon Geo-Referenced Socio-Environmental Information Network |
| **SENAGUA** | National Department of Waters |
| **SENPLADES** | National Secretariat for Planning and Development (now Planifica Ecuador Technical Secretariat) |
| **SIS ECU 911** | Integrated Security System ECU 911 |
| **SNS** | National Health System |
| **ton/t** | tons |
| **UNDP** | United Nations Development Program |
| **UNEP** | United Nations Environmental Program |
| **UNIDO** | United Nations Industrial Development Organization |
| **WHO** | World Health Organization |





# EXECUTIVE SUMMARY

Artisanal and small-scale gold mining (ASGM) of gold in Ecuador has been carried out in the country for more than a century, and is currently active in several areas of the national territory, with the use of mercury as an intrinsic part of its gold production processes. In this sense, Ecuador, a ratifying party of the Minamata Convention, and in compliance with the stipulations of Article 7 and Annex C of the convention, has committed to the development of a National Action Plan to approach the strategies and activities necessary for reducing, and in a best case scenario, eliminating the use of mercury from ASGM. This project, which started with a diagnostic study of ASGM, began in July 2018, and in this first phase, recorded the presence of gold ASGM activities in twelve provinces: two in the Costa region, two in the Amazónica region, and eight in the Sierra region. The aforementioned diagnostic study was mainly based on the production of an inventory of mercury use, and a quick evaluation of the public health system's institutional capacity for caring for cases related to mercury poisoning. In these provinces, the study identified 25 mine sites, which include primary deposits production zones, secondary deposits (alluvial deposits) production zones, and gold processing areas.

The ASGM sector in Ecuador has mechanized the processes related to the processing of ore. Ore crushing (chancado) processes, which in the past were carried out in an artisanal manner throughout the country, have been described in old testimonies from miners as a common practice. Currently, gold ASGM includes a sector devoted to the provision of processing services for miners in each of the identified mine sites. This sector offers differentiated services based on the volume of ore that requires processing, from amalgamation cylinders for women in precarious mining labor, known as jancheras, to Chilean mills for small mining companies and processing plants that include cyanidation processes and even concentration by flotation for mine owners and licensees. To obtain the mercury baselines used in gold ASGM, version 1.0 of the technical guide "Estimating Mercury Use and Documenting Practices in Artisanal and Small-scale Gold Mining (ASGM)" was used. This document was produced by the Artisanal Gold Council (AGC) in collaboration with UNEP's Global Mercury Partnership, 2017 (PNUMA, AGC, 2017).

According to data obtained through this inventory analysis, Ecuador produced approximately 23.6 tons of gold ($Au_{24K}$) in 2018 through ASGM activities, of which around 40% was obtained through amalgamation techniques (10.1 t $Au_{24K}$). In regards to the use and discharge of mercury in ASGM activities, it is calculated that 29.6 tons of mercury were released into the environment. The diagnostic study indicates that the gold ASGM sector in Ecuador employs between 11,500 and 20,000 miners directly and indirectly, of which 10% are women. The use of mercury in mining is forbidden by law, and in spite of the corresponding control measures, mercury is used clandestinely throughout the ASGM sector and by trafficking-based supply chains that introduce the chemical into the country through unknown and uncontrolled border areas. This constitutes both a problem and a challenge to be tackled by competent authorities. The use of mercury has brought about consequences related to health and the environment

that are often not circumscribed to the sites where the operations take place, but have a noticeable effect within the areas of indirect influence of ASGM operations.

The collected information and data constituted the basis for the development of the National Action Plan (NAP), whose objective is to reduce, and in a best case scenario, eliminate altogether the use of mercury in the gold ASGM sector through the definition of strategic lines of work, actions and activities.

On the basis of the information collected and analyzed in the gold ASGM diagnostic study in Ecuador, several workshops and work meetings were carried out together with key actors in the reduction and elimination of mercury in mining, from both state institutions and the private sector, and from the civil society, academic circles, and non-governmental organizations. The discussions revolved around the issues related to the use of mercury, or that are somehow related to its use, especially in the fields of regularization, environment, health, gender inequalities, and illegal mining, among other aspects related to the development of gold ASGM activities.

As a result, several actions were proposed for channeling possible solutions to the presented issues, which were debated and grouped by strategies based on their affinities. In this way, seven strategies have been proposed, from formalization and regularization of activities, capacity development, and technology transfer, to social and gender inclusion, within which 21 specific objectives have been defined together with more than 40 lines of action. The corresponding strategies and actions, presented in this document, can be taken as a whole to represent a roadmap, or foundation, to guide the national efforts towards the reduction and elimination of mercury in gold ASGM activities in Ecuador.


ASOCIACIÓN DE PRODUCCIÓN MINERA
NAMBIJA LEGENDARIA
ÁREA MINERA ASONAMBILE
CÓDIGO EO1423
SOCIEDAD MINERA "LOS PINOS"
ESTRATO CARBÓN - CÓDIGO 164
USO OBLIGATORIO DE E.P.P.

# INTRODUCTION AND BACKGROUND

The potential for mining in Ecuador is huge, and has caught the attention of several business sectors and social groups interested in the development of these resources. Gold, the mineral that has attracted the most interest, has been mined throughout the territory for hundreds of years. The indigenous population of Ecuador has been extracting precious metals at a small scale for centuries. However, current mining practices began after 1896, with the operations located in the Zaruma – Portovelo area (PRODEMINCA, 1999).

According to several studies and monitoring efforts carried out in the country, artisanal and small scale mining has developed mostly in the south of the country, in the provinces of Azuay, El Oro and Zamora Chinchipe. The emergence of artisanal and small scale mining (ASGM) took place in the El Oro province at the end of the 1970s, when mining companies such as South American Development Company (SADCO) and Compañía Industrial Minera Asociada (CIMA), which had been working since the XIX century, terminated their activities. Since then, ASGM activities have extended throughout the whole Ecuadorian territory (Ministry of Mining, 2016).

Mercury has been one of the main materials used in gold ASGM in Ecuador for the procurement of mineral through the amalgamation process, in spite of a ban on mercury use in this sector issued in 2015 due to its toxicity and impact on health and the environment. Furthermore, practices such as the direct use of mercury in ore grinding and the burning of amalgams in work sites and even in homes, represent an imminent risk to human health and the environment due to the permanence characteristics of this substance, which can trigger a series of diseases and/or effects that are irreversible for both human health and ecosystems in general.

With the aim of establishing mechanisms for monitoring and managing mercury as a hazardous substance, the international community and different countries invested significant efforts in the production and launching of the Minamata Convention, whose objective is to protect human health and the environment from the trading, use and disposal of mercury.

Ecuador, well aware of the fact that mercury poses a threat to human health and the environment resulting from its use and application in several industrial sectors, especially in gold ASGM, joined the Minamata Convention on October 10, 2013. In April 2016 Ecuador ratified the treaty and in July 2016 it provided its instrument of ratification. The Convention came into force in August 2017, 90 days after the ratification of 50% plus one party (country) out of the total signing parties.

Article 7 of the Convention establishes that the Parties that have informed that gold ASGM activities in their countries are more than insignificant will develop and apply a National Action Plan in accordance with Annex C of the Convention, with the objective of reducing, and where possible, eliminating the use

of mercury and mercury compounds, improving the national capacity for prevention and management of mercury use in artisanal and small scale gold mining.

The present document represents a national effort in response to what the Minamata Convention requires from its signing parties, and in the specific case of Ecuador, an instrument which, acting as a road map, will pursue the primary objective of reducing, and in an optimal scenario, eradicating the use of mercury in artisanal and small scale gold mining practices throughout the country.





# 1. NATIONAL OUTLOOK

## 1.1 Previous experiences related to the problem of mercury use in ASGM

In Ecuador, the use of mercury and its consequences on the environment was first approached in the year 2008, when the first national inventory[1] was carried out. The results of this study identified the two main sources of mercury discharge into the environment: products that contain mercury and the primary production of metals (artisanal and small scale gold mining - ASGM).

In 2013, the project "Plan Zero Mercurio" was formulated and approved, a project first proposed by the Ministry of the Environment (MAE) with the support of other state entities, such as the Ministry of Mines (now Ministry of Energy and Non-Renewable Natural Resources - MERNNR) and the Mining Metallurgic Geological and Energy National Research Institute (INIGEMM)[2]. Its objective was to reduce and eliminate the use of mercury, mainly in mining activities, but also in products that contain mercury and are intended for industrial use or mass consumption. This plan established seven components, among which we could highlight: Strengthening of the legal framework; capacity building and technical support; environmental tracking and monitoring; environment remediation; application of incentives; and environmentally adequate management of waste with mercury content or contaminated by it (Ministry of the Environment, 2013).

Related to the strengthening of the legal framework, a key step ahead was Ministerial Agreement 003, issued in January 2013 by the Ministry of the Environment (MAE), defining the "List of hazardous chemical substances whose use is severely restricted in Ecuador", and indicating metallic mercury as a part of this list of substances.

In this same line of strengthening the legal framework within the "Plan Zero Mercurio", in July 2013, the Mining Bill reform was issued with new measures, such as Article 17, which establishes a ban on the use of mercury in mining operations. Noncompliance with this disposition would result in the revocation of mining rights and other corresponding sanctions. As a transitory disposition, a two-year window period was established for the search of alternatives and for the elimination of mercury from these activities, which meant that by 2015 (National Assembly, 2013), mercury would have been eradicated from ASGM activities in the national territory, and event that never happened due to widespread proliferation of illegal use.

In September 2013, the Foreign Trade Commission (COMEX) issued Resolution No. 108, establishing restrictions for import activities of metallic mercury, and requested the MAE to develop guidelines to execute environmental control mechanisms and authorized the Public Imports Company (EPI) as the

exclusive importer of this substance. This allowed the public sector to retain total control over the formal import of metallic mercury to be able to comply with the current environmental policy.

Within the framework of compliance with the Plan Zero Mercurio, capacity building activities were organized around the Ministerial Agreements issued by the MAE related to mercury import and utilization permits, directed at state entities with influence over mining activities and ore processing plants, located mainly in the provinces of Zamora Chinchipe, El Oro, Azuay and Loja.

In relation to the tracking and monitoring component of the plan, the number of formalization processes for artisanal miners and processing plans increased, as well as the number of water and sediment sampling campaigns in sites located near processing areas and artisanal gold mining zones.

Later, within the application framework of the Minamata Convention, ratified by Ecuador in July 2016, the MAE implemented the Minamata Initial Assessment (MIA) project, which due to implementation factors, was known in Ecuador as the "Development of plans for managing mercury-related risks in Ecuador"[3] project, which was mainly focused on updating the mercury inventory at a national level. The categories showing the higher level of discharges in the maximum scenario were: the primary production of metals (gold ASGM), with 16.4 annual tons; the burning and incineration of waste, with a maximum of 9.2 tons; and mass consumption products with deliberate mercury content, with 7.3 tons (UNEP, 2019). On the basis of this data, a plan was proposed for managing mercury-related risk that included short-term, medium-term and long-term measures for the reduction of mercury emissions in all the identified sectors, including ASGM. The results of this project were very important, as they have constituted the foundations for establishing which mining sites are more relevant to the problem of using mercury for processing gold.

In parallel, through the support of the United Nations Industrial Development Organization (UNIDO), the Sin Mercurio project was carried out in the 2013 - 2016 period, aimed specifically at the establishment of integral measures for the mitigation of mercury emissions in the Puyango-Tumbes basin located in the provinces of El Oro and Loja in Ecuador and Tumbes in Peru, and backed by INIGEMM in Ecuador, with the collaboration of the Peruvian Ministry of the Environment, the Canadian International Resources and Development Institute (CIRDI) and the United Nations Development Programme (UNDP) in Ecuador. The project was based on the development of a working strategy, which included awareness workshops and training related to the use of mercury and its reduction strategies, as well as the execution of communication and dissemination actions of mercury-free gold extraction techniques, reaching around one thousand miners in Ecuador and Peru.

After the experience of the Sin Mercurio project, a new initiative was developed for the Transformation of Artisanal and Small Scale Gold Mining and Social Learning (TRANSMAPE), co-created by the Canadian International Resources and Development Institute (CIRDI), the University of British Columbia, the Universidad Técnica de Machala, and the Vice Ministry of Mining, between 2016 and 2019. The project, divided into three phases, was geared around the professionalization of artisanal and small scale mining practices, for which time was devoted to review gold production processes, especially in the southern areas of Ecuador. This project involved miners associations, processing plants, state entities, universities and training centers as active participants. A wide range of research-based educational and technical ideas were created from this initiative, all useful for approaching the challenges and practices of

3 UNEP, 2019. Development of plans for mercury-related risk management in Ecuador. Extracted from: http://ccbasilea-crestocolmo.org.uy/wp-content/uploads/2019/08/folleto_minamata_2019_esp-doble-2-1.pdf

ASGM. A series of events took place that can be divided into three key areas: a critical assessment of sector-specific existing knowledge and environmental knowledge related to ASGM; knowledge creation and exchange; and the "translation" of the generated knowledge that allowed these entities to construct a relevant curriculum and pilot training modules for the ASGM sector.

Another interesting initiative that has been in place since 2018 is the national program for the environmentally sound management of chemical substances throughout their life cycle, which proposed the development of activities focused on the management of Persistent Organic Pollutants (POPs) and mercury within the implementation framework of the Stockholm and Minamata Conventions, respectively. The project is implemented by the UNDP in Ecuador, with MAE as the partner responsible for the project and MERNNR as executing co-partner. The efforts for reducing mercury in ASGM are focused mainly on the development of capacity building programs for artisanal and small-scale miners that would result in a conceptual change towards ore processing, with an emphasis on shifting to mercury-free technologies. Another relevant action is the formalization of artisanal miners, such as jancheras. The results of the program will be seen throughout its implementation, until the year 2023.

Efforts to approach the issue of mercury use in ASGM have been varied at a national level. However, mercury use is widespread throughout the country and the prohibition that is currently in place in the territory has intensified the informal market and contraband of this substance, which adds new irregularities and negative effects in social, economic and environmental spheres.

Within the Mining Sector Development Plan, issued in 2016 as a short-term measure, a regularization process for artisanal mining was launched in 2018 through a plan that intends to regularize, control and promote the implementation of good practices in artisanal mining activities in Ecuador. Additionally, the initiative promotes the association of artisanal miners so that they are able to access the small-scale mining regime. (Agencia de Regulación y Control Minero, 2018).

## 1.2 Geographical distribution of ASGM

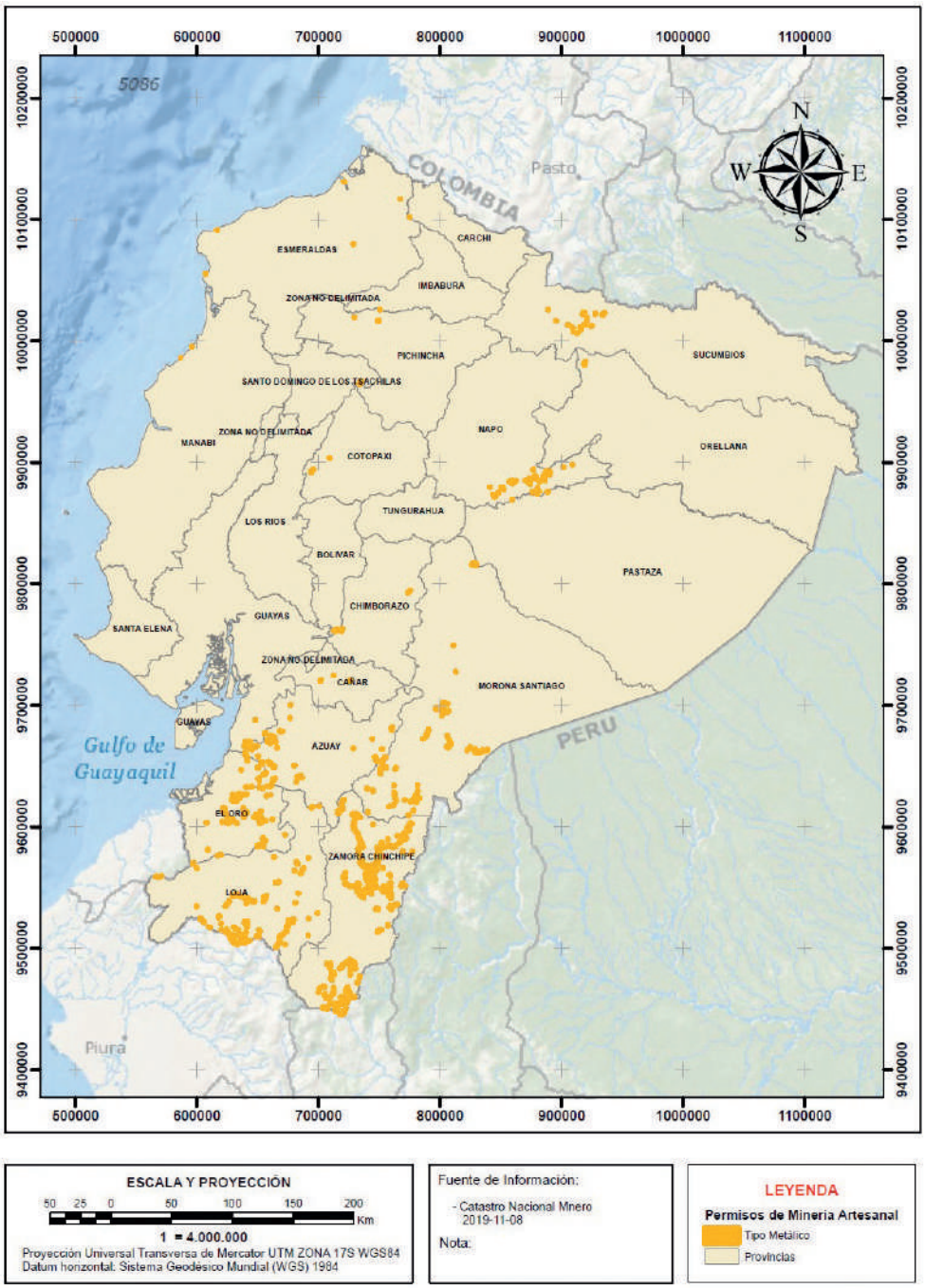
### 1.2.1 Artisanal Mining

In accordance with the provisions of Article 134 of the Mining Law, and the National Plan for the Development of the Mining Sector (2016), artisanal mining is considered a subsistence activity for thousands of people and their families, and has at the time the highest number of operational units. In regards to the territorial distribution of artisanal mining activities in 2015, the Plan mentions 1821 permits for metallic ores, distributed primarily in the southern areas of the country in the following way: Zamora Chinchipe, with 744 concessions; Loja, with 297 concessions; El Oro, with 226 concessions; Morona Santiago, with 219 concessions; Azuay, with 165 concessions, and the rest located in different provinces. The map in Figure 1 shows the location of artisanal mining activities for metallic ores carried out in Ecuador until 2019.

### 1.2.2 Small-Scale Mining

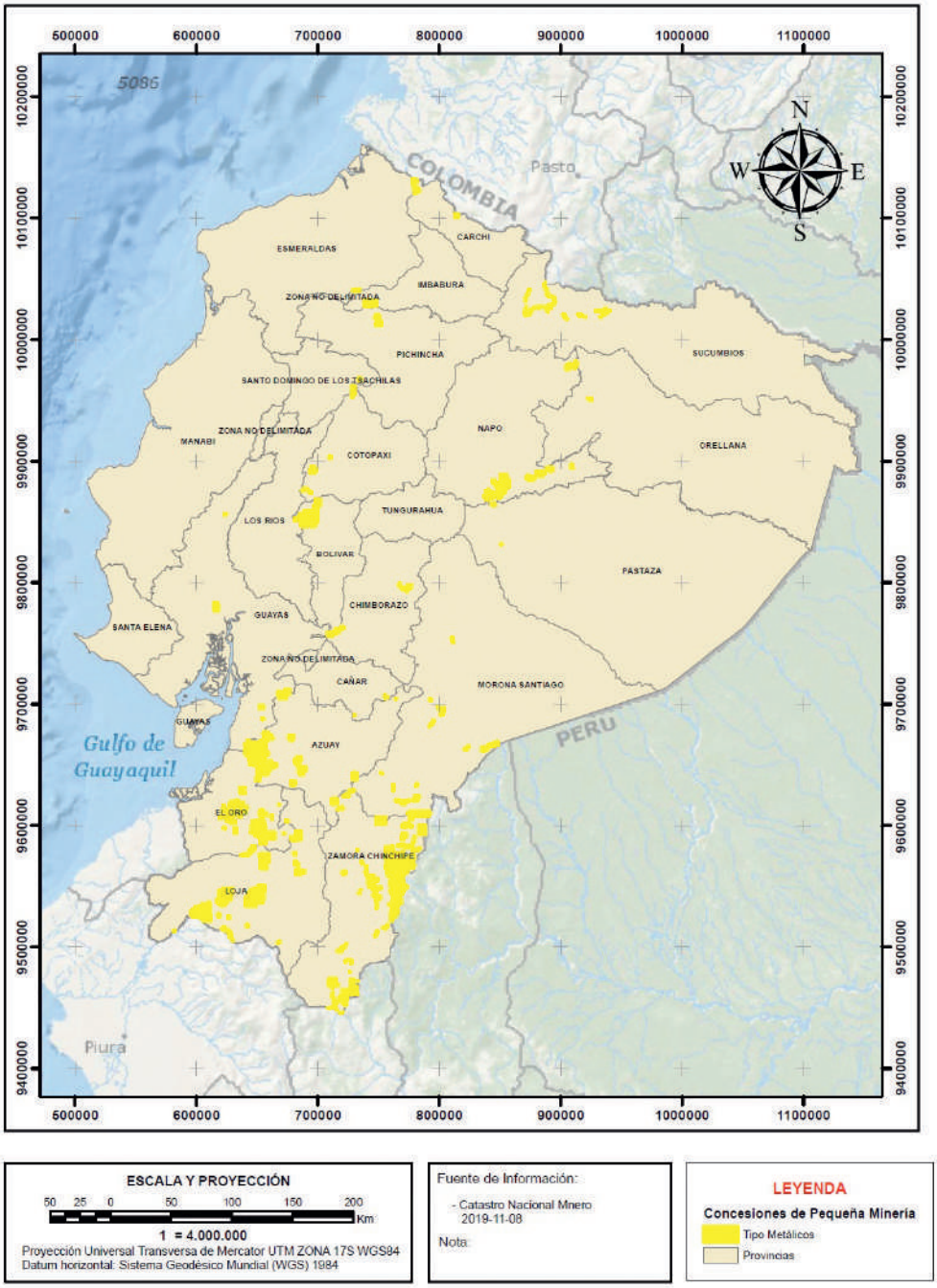
According to the National Plan for the Development of the Mining Sector (2016), small-scale mining activities related to metallic ores were concentrated primarily in the southern provinces such as Azuay, El Oro, Loja, Zamora Chinchipe and Morona Santiago, and in a smaller number in the provinces of Esmeraldas, Pichincha, Imbabura, Sucumbíos, Cotopaxi, Napo, Bolívar, Chimborazo and Cañar. Figure 2 shows the distribution of concessions for small-scale mining throughout the national territory.

**Figure 1: Location of artisanal mining activities in Ecuador.**




**Source:** Ministry of Energy and Non-Renewable Natural Resources, 2019.

**Figure 2: Location of small-scale mining activities in Ecuador.**




**Source:** Ministry of Energy and Non-Renewable Natural Resources, 2019.

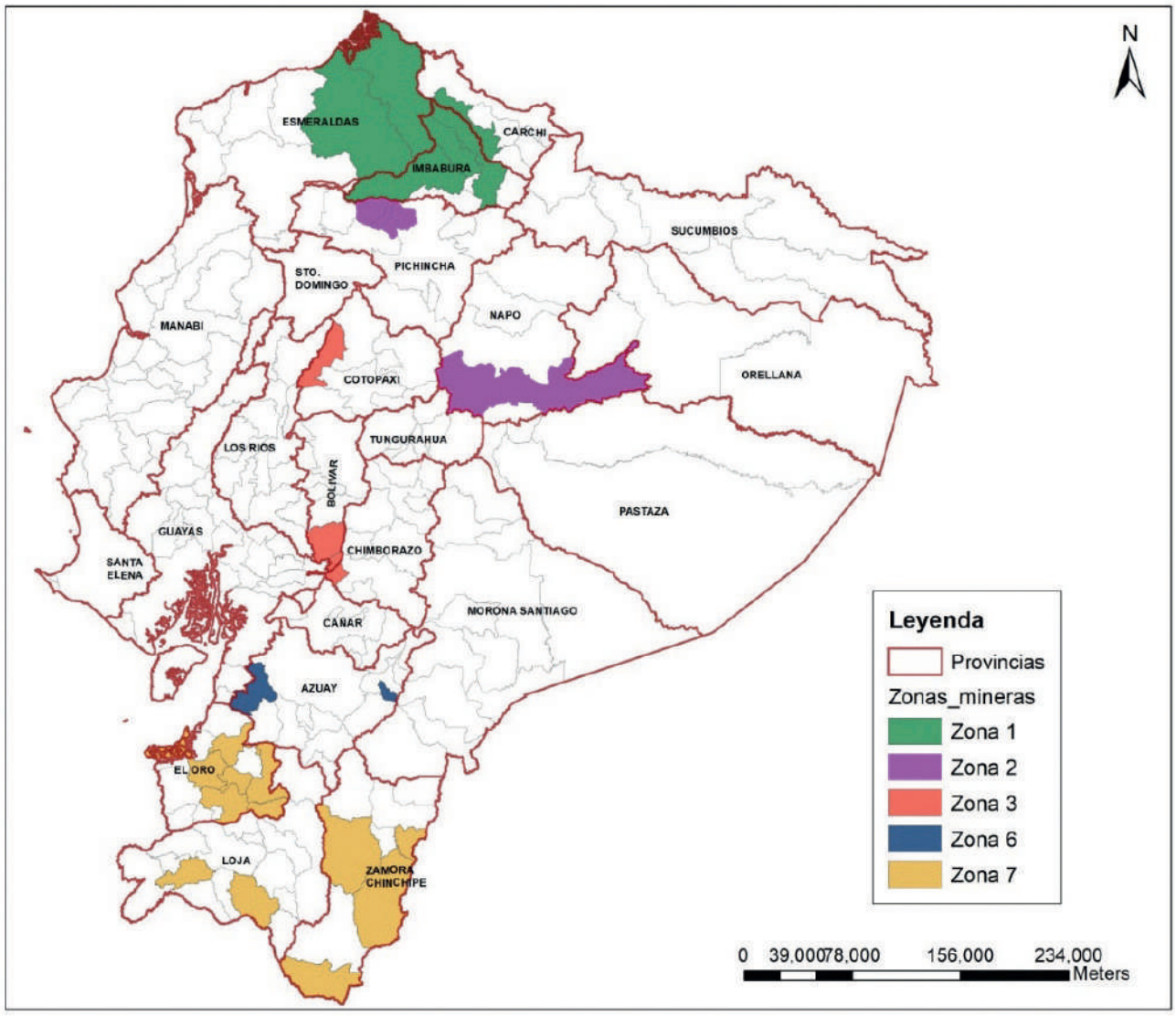
### 1.2.3 Results of the ASGM diagnostic study for the NAP

As a starting point for the establishment of a National Action Plan for mercury use, a study was conducted on the gold artisanal and small scale mining (ASGM) sector that included an inventory of mercury use in different sites identified with ASGM activities. The field work stage of the project recorded the presence of both formal and illegal gold ASGM activities in twelve provinces: two in Costa, two in Amazonica and

eight in Sierra. In these provinces, the study identified 25 mine sites, which include primary deposits production zones, secondary deposits (alluvial deposits) production zones, and gold processing areas.

Figure 3, "Gold ASGM areas map in Ecuador", highlights the cantons and areas where ASGM mining sites are located in the country. It is worth pointing out that according to preliminary meetings conducted with key actors, it was decided not to enter two provinces (Sucumbíos and Morona Santiago) due to security concerns related to the data collection team. However, with the twelve provinces which were included in the study, at least 85% of mining sites in the country were covered, a value significant enough to consider as a national total.

**Figure 3: Gold ASGM areas map in Ecuador.**




**Source:** Ecuador National Action Plan, 2019.



In 2012, the National Secretariat for Planning and Development (SENPLADES)[4] organized the country into nine planning zones spanning different provinces, cantons and parishes with the objective of decentralizing public administration and coordinating public entities strategically through planning management for the design of policies in their corresponding areas of jurisdiction[5] (SENPLADES, 2012). In order to ensure concordance, the present analysis was carried out on the basis of Ecuador's administrative distribution, that is, 25 mine sites were grouped by planning zones[6].

Table 1 represents mine sites within the planning zones they belong to, together with the province and canton where they are located, which enables geographical identification of each mine site. However, there are mine sites that are located in several cantons, such as the Zaruma-Portovelo mine site located in four different cantons in the El Oro province, and the Cumandá mine site in Chimborazo and Bolívar, located in two cantons from different provinces. In addition, three mine sites within a single canton have been identified for the Tena canton in Napo province.

Additionally, three sites with ASGM activities have been identified in river basins, where each mine site takes on the name of the corresponding river:

1. Nangaritza Alto, located in the high areas of the Nangaritza river, province of Zamora;
2. Mira, located in the binational Ecuador-Colombia river basin that runs on the limit of the Imbabura and Carchi provinces; and
3. Santiago, located in the Santiago river basin in the province of Esmeraldas.

The names of the mine sites presented in Table 1 were taken from the name of the locality or community (parish) where they are located, or from the name which the community has given to the area.

**Table 1: Gold ASGM mine sites and zones in Ecuador, identified within the national inventory**

| Senplades Zone | Province | Canton | Mine Site |
|---|---|---|---|
| ZONE 1 | Imbabura | Cotacachi | 1. Íntag |
| | | San Miguel de Urcuquí | 2. Buenos Aires |
| | | Ibarra | 3. Carolina |
| | | | 4. Lita |
| | Carchi | Mira | 5. Cielito |
| | Esmeraldas | Eloy Alfaro | 6. Río Santiago |
| | | San Lorenzo | 7. Río Bogotá |
| ZONE 2 | Napo | Tena | 8. Ahuano |
| | | | 9. Misahuallí |
| | | | 10. Arosemena Tola |
| | Pichincha | Quito | 11. Pacto |
| ZONE 3 | Chimborazo | Cumandá | 12. Cumandá |
| | Bolívar | Chillanes | |
| | Cotopaxi | La Maná | 13. La Maná |
| | | | 14. California |
| ZONE 6 | Azuay | Ponce Enríquez | 15. Ponce Enríquez |
| | | Chordeleg | 16. Chordeleg |
| ZONE 7 | Zamora | Paquisha | 17. Chinapintza |
| | | Zamora | 18. Nambija |
| | | Nangaritza | 19. Alto Nangaritza |
| | | Chinchipe | 20. Chito |
| | Loja | Célica | 21. Célica |
| | | Cariamanga | 22. Cariamanga |
| | El Oro | Portovelo | 23. Zaruma-Portovelo |
| | | Atahualpa | |
| | | Zaruma | |
| | | Piñas | |
| | | Santa Rosa | 24. Santa Rosa |
| | | Pasaje | 25. Pasaje |

## 1.3 Mining and ore processing

According to the latest amendment to the Ecuador Mining Law in 2018, four types of mining are identified: artisanal, small-scale, medium, and large-scale mining, and articles 134 and 138 establish a categorization of artisanal and small scale mining (National Assembly, 2018)[7].

The ASGM sector in Ecuador has mechanized procedures for the processing of ores. The ore crushing (chancado) processes that in the past were carried out in a manual manner as a standard practice throughout the country have been described in testimonies from old miners as a commonplace. Currently, gold ASGM includes a sector devoted to the provision of processing services for miners in each of the identified mine sites. This sector offers differentiated services based on the ore volume that requires processing, from amalgamation cylinders for jancheras, to Chilean mills for small mining companies and processing plants that include cyanidation processes and even concentration by flotation for mine owners and licensees.

During the data collection field phase, different manners of ore processing were identified based on the observation of activities and interviews with workers and other personnel involved in the operations at the primary mining, alluvial mining and processing plants levels.

According to collected data, processing plants in Ecuador are located primarily in the provinces of Zamora, Azuay and El Oro, as corroborated by information from the National Plan for the Development of the Mining Sector (2016), which indicates a participation of 1%, 42%, and 58% respectively by province, and amounting to a total of 142 legally established processing plants. Due to the fact that the mining cadastre has been closed since January 2018, no new registration or regularization processes have been filed for processing plants.

Generally speaking, based on field work experience, four different basic processes have been identified for primary mining and one for alluvial mining:

1. Primary mining (subterranean) / Primary deposits
    a) Amalgamation in grinding cylinders – Chanchas
    b) Amalgamation with a gravimetric concentrator – Chanchilla
    c) Amalgamation and cyanidation
    d) Concentration by flotation
2. Alluvial mining / Secondary deposits
    a) Concentration with vibratory sieve - Zeta

7 "Article 134.- Artisanal Mining. - (…) includes and is applied to popular economic units, one-person, family and domestic endeavors that are based on outdoor activities. Artisanal mining activities are characterized by the use of machinery and equipment with limited load and production capacities, based on the instructions approved by the board of the Mining Regulation and Control Agency for mineral procurement, whose production in general is aimed at covering the needs of the community, person or family unit which carries out the work, solely within the territorial circumscription for which the corresponding permit has been awarded (…)" "Article 138: Small-scale mining - Small-scale mining is that which, according to the geological and mining characteristics and conditions of metallic, non-metallic mining substances and construction materials, and economic and technical parameters, make their direct rational operation viable, notwithstanding any previous exploration work, or any exploration and production activities occurring simultaneously. (…)".

A detailed description of the processes can be found in the annex corresponding to the inventory report for mercury use in ASGM in Ecuador; Annex B in this document.

### 1.3.1 Primary Mining

#### *a) Amalgamation in grinding cylinders – Chanchas*

Amalgamation tanks or cylinders, known locally as chanchas, represent the most basic and extended processing practice in gold ASGM in Ecuador. The chancha is a metallic barrel of about 350 cc (Image 1) which rotates over its horizontal axis powered by an electric engine and a belt system, with a processing capacity of 100 to 150 kg of material and an average grinding time of 3 to 4 hours in places where mineral hardness is lower, and 6 to 12 hours where ores are hard and low-quality, such as in Chinapintza. The basic operation of this process consists in grinding and reducing the size of the ore so that the gold that is associated to other minerals is released. About 100 kg of material is loaded, together with 0.06 to 1 kg of mercury (2 to 35 ounces - the purpose of the mercury is to attract free gold and create an amalgam), 180 kg of metallic bars and approximately 200 liters of water. The grinded material is then collected in plastic tubs, where the gold-mercury amalgam is separated by means of a gravimetric process known as platoneo, a technique of widespread use in artisanal mining activities throughout the world. In this phase, the materials with no economic value are separated from the amalgam by differences in density, and the resulting concentration of mercury and gold is "choked" with a cloth (Image 2). The "choking" of the amalgam removes any excess water, and a semi-hard amalgam is obtained with less mercury content. Later, the semi-hard amalgam is burned to obtain gold, known also as sponge gold[8] (more information in Annex A: Gold ASGM-related mercury inventory in Ecuador, 2019).

**Image 1. Grinder and chanchas**



**Image 2. Panning and choking processes**



The burning of the gold-mercury amalgam, which occurred in a centralized manner in processing plants, has been dispersed due to controls from regulatory authorities. There are testimonies of burning within homes at faraway sites to avoid these types of controls.

#### *b) Amalgamation with a gravimetric concentrator – Chanchillas*

The process of gravimetric concentration constitutes a technological improvement exclusively applied in the Nambija mine site. The implementation of this technological advance minimizes the discharge of

mercury at a level of unit operations. Unfortunately, this process has not been implemented fully, which means that most of the mercury used in the process is eventually discharged into the environment.

The grinding system used is known as a wheel mill, or popularly as the "Chilean mill" (Image 3). These grinders can process between 8 and 20 tons of ore in one day. The wheels rotate over a strip to which water and rock are added constantly, and in some cases mercury. The wheels crush the rocks, reducing their size until they become sandy and releasing the gold that is associated with other minerals. In this process, the heavier part of the ore is driven to the back of the grinders (strip), while the lighter material flows through the gutters (Image 4) to the cloths or carpets where the released gold is collected and separated from the rest of the deposited material. The material that passes through the gutters is redirected towards sedimentation tanks, where it is slowly accumulated for selling to processing plants that will incorporate it into their own cyanidation processes. This production process by means of the Chilean mill only recovers a portion of the total gold content of the original matrix.

The material that is deposited in the mill's strip is known for its high concentration of gold. This material is collected and then directed towards the gravimetric concentrator (known locally as chanchilla), which also receives the leftover material from the gutters and an addition of mercury and water for a total concentration period of 2 hours, on average. At the end of the process, the ore and the water is discharged through a lateral siphon, which allows the amalgam to settle at the base of the chanchilla. The amalgam is then collected, panned and choked, and later burned to obtain sponge gold. In mine sites other than Nambija, a chancha is used instead of a chanchilla for gold concentration (More information in Annex: Gold ASGM-related mercury inventory in Ecuador).

In these processes, it has not been observed that the water used for the described activities receives any previous treatment, and its discharge is done through a tubing system that leads directly to rivers and ravines, causing alarming environmental effects.

**Image 3. Wheel mill - Chilean mill**



**Image 4: Gutters of the Chilean mill**



### *c) Cyanidation of material sourced from amalgamation processes*

Cyanidation is a process that has slowly gained pace in the country in the last two decades, and currently constitutes an extended practice in the gold ASGM sector at a national level. It is based on size reduction

through crushing and grinding processes by means of ball mills until particle size is around 100 µm. Then, high volumes of grinded material is processed in cyanidation tanks, where cyanide dissolves gold, forming stable compounds of gold cyanide. The use of cyanidation requires additional processes such as desorption with activated carbon or cementation with zinc in order to recover gold. After this, the recovered gold will be sent through a refining process.

The material accumulated in the Chilean mill strip undergoes an amalgamation process. The cyanidation process requires high operating volumes, that is, a minimum flow of five daily tons for processing, an amount that an artisanal miner cannot reach (Image 5).

The amalgamation-cyanidation process is the result of two different methods: the first of them occurs when the owners of ore processing plants (chanchas and Chilean mills), who don't have the capacity to process materials through cyanidation, accumulate grinding and amalgamation tailings for their subsequent sale to processing plants that possess cyanidation facilities. The second occurs when the same processing plant includes cyanidation facilities. There are no differences in the treatment of produced tailings; that is, tailings generated through a grinding process and tailings recovered after amalgamation (with mercury content) are stored in the same deposits. All the accumulated ore is processed by cyanidation. Mercury is already present in amalgamation tailings, which are known as amalgamated sands and contain non-amalgamated gold.

During field interviews, in general, owners of processing plants and workers were aware that the material accumulated in the belt strip of the Chilean mill can go directly to cyanidation without the need to use mercury. However, due to reasons related to tradition and time, mercury is used for obtaining gold in the described processes, as the gold accumulated in the mill strip is coarse gold, which subject to a cyanidation process would prolong dissolution times.

**Image 5: Cyanidation plant**



**Image 6. Tailings of a Chilean mill**



The problem lies in the fact that the material discharged after the amalgamation process contains traces of mercury, and most of this material will be transferred to a cyanidation facility. Here is where one of the most problematic practices of ASGM occurs: the cyanidation of tailings with mercury content (Image 6).

### *d) Concentration by flotation*

Concentration by flotation is also used in processing plants, and consists in reducing the mineral using crushers (ball mills) before incorporating it to flotation cells, which together constitute a continuous system. Through continuous strips, the ore is fed into processing tanks where floating reactants are applied to facilitate separation between sulfured minerals that contain gold and sterile material (matrix). This process makes use of the hydrophobic characteristics of the reactants, and through the addition of air makes sulfides float. The process is carried out in serrano-type cells (Image 7) or Denver-type cells (Image 8). The floating material (ore concentrate) is moved to the pools for its accumulation and packaging for export, while the material that settles in the cells is sent to the tailing ponds.

This system is used with high and low grade ore, and even with tailings from cyanidation processes. However, this process is relevant when there are sulfides in the ore to be processed. Mercury is not used, as this is a continuous cycle process and it is not possible to obtain doré. In this country, gold obtained from flotation concentrates is not recovered; these concentrates are sold and sent abroad to undergo gold recovery processes in other countries.

**Image 7: Flotation – Serrano cells**



**Image 8: Flotation – Denver cells**



## 1.3.2 Alluvial Mining

### *a) Gravimetric concentration using zeta-style gravimetric concentrators*

Mining activity devoted to the recovery of gold from secondary alluvial deposits uses zeta-type gravimetric concentrators, almost exclusively. This procedure recovers free gold through a physical process based on density differences. The cycle begins when the material extracted from different cuts is placed in the charging hopper of the Z, and then washed by a continuous flow of water, which separates the gold from the material with no economic value. The Z is structured into sieves of two or three segments each, located one beneath the other in a disposition that allows a continuous flow. In order to make the process more fluid, pressurized water is introduced for cleaning the ground and homogenizing the distribution of the ore on the sieve. The washed rock comes out of the sieve from the opposite side of the loading point, and the gold is accumulated at the base of the same in a locked box.

"Light" gold and impurities are also collected in the sieve box, so mercury is applied in the entry channel to this compartment with the aim of promoting the formation of gold-mercury amalgams. The amalgam is separated from the concentrate by panning and then burned for the production of sponge gold.

**Image 9: Loading of ore to the zeta-type sieve**



**Image 10: Alluvial mining**



## 1.4 Reference estimates of the amount of mercury used in ASGM

Baseline estimates of the use and discharge of mercury were carried out taking 2018 as a reference and using the technical guide "Estimating Mercury Use and Documenting Practices in Artisanal and Small-scale Gold Mining (ASGM)", produced by the Artisanal Gold Council (AGC) in collaboration with UNEP's Global Mercury Partnership, 2017.

According to data obtained through this inventory analysis, Ecuador produced approximately 23.6 tons of gold ($Au_{24K}$) during 2018 through ASGM activities, of which around 40% was obtained through amalgamation techniques (10.1 t $Au_{24K}$). The study also showed that 29.6 tons of mercury are used annually in the ASGM sector. The mercury:gold (Hg:Au) relationship varies between 0.45:1 for mine sites that use retorts, to 11.79:1 for alluvial mining sites where the use of mercury is not controlled.

Based on the inventory information, the amalgamation of whole ore is present throughout the national territory. This practice goes hand in hand with the burning of the amalgam, which frequently occurs within the homes of the miners without any safety precautions, due to the prohibition of mercury use. During the data collection phase, it was determined that the provinces with the highest levels of mercury use and discharge were the following: Zamora, Imbabura, Esmeraldas, and Azuay. The Imbabura province is not historically recognized as a mining province, but as of late is experiencing an illegal mining boom, mainly in the site known as Buenos Aires. In the year 2019, after an intervention, the National Government dismantled a network of gold exploitation and production in the Buenos Aires site through an intelligence operation, and took control of the area in order to evict people who were involved in gold ASGM activities, considered illegal.

Cyanide leaching in tailings to which mercury has been added represents a persistent environmental risk, especially in Zaruma-Portovelo and Ponce Enríquez, which have the highest ore processing capacity in the country.

From the results analyzed during the September to December 2019 period, there was an estimated 11,500 people directly involved in gold ASGM activities at a national level. This data has been inferred from field survey information. A crucial aspect to be taken into account is that a high percentage of workers who are involved in ASGM are considered floating workers, as they can be located in a mine site seasonally, but after a week could move to any other site within the national territory. Taking this information into account, the total population involved in the ASGM sector could rise to 20,000. The provinces with the highest number of people involved in gold ASGM activities are: Imbabura (5,000 approximately), Zamora (3,500) and Azuay (2,245).

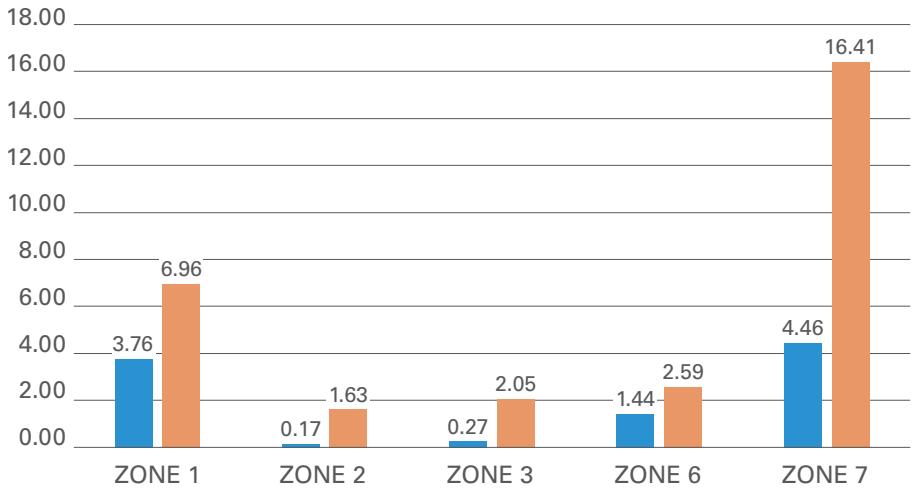
**Table 2: Key results from the gold production and mercury use inventory study carried out in Ecuador, with 2018 as a base year**

| Zone | Provinces | No. workers (approximate) | Annual Gold Production (kg Au/year) | Annual Gold Production by Amalgamation (tons Au/year) | Mercury lost to the environment (water, soil, air) (tons Hg/year) |
|---|---|---|---|---|---|
| Zone 1 | Imbabura, Carchi, Esmeraldas | 5,420 | 8,156.98 | 3.76 | 6.96 |
| Zone 2 | Napo, Pichincha | 168 | 165.18 | 0.17 | 1.63 |
| Zone 3 | Chimborazo, Bolívar, Cotopaxi | 119 | 271.39 | 0.27 | 2.05 |
| Zone 6 | Azuay | 2,245 | 3,265.78 | 1.44 | 2.59 |
| Zone 7 | Zamora, Loja, El Oro | 3,516 | 11,698.82 | 4.46 | 16.41 |
| **Total** | | **11,468** | **23,558.15** | **10.09** | **29.64** |

**Source:** Ecuador National Action Plan

It is important to highlight, as well, that the presence of mercury was not confirmed in every site where ASGM activities have been identified. From the 25 study sites, the presence of mercury was detected in 12 sites, shown in different zones in the following figure.

**Figure 4: Gold production and use of Hg in ASGM in Ecuador, by zone**




**Source:** Ecuador National Action Plan

## 1.5 Legal and regulatory framework for ASGM and mercury use

In Ecuador, the application of regulatory measures for the artisanal and small scale gold mining sector has been attempted since the past century. The first Mining Law was issued in 1937, and ruled that subsurface minerals were property of the state. The full code for the same law was passed in 1961.

In 1974, the Mining Promotion Law[9] was passed to ratify state ownership of the subsoil and its metals, and defined the characteristics necessary for production efforts to be identified as corporate mining, small-scale mining, and alluvial mining (IFA, 2016, p. 128). In 1985, the Mining Promotion Law was repealed and the Mining Law[10] was decreed instead, which ratified the inalienable and indefeasible ownership of mineral deposits, and created the Ecuadorian Mining Institute (INEMIN) as the agency in charge of mining policy in the country.

In 1991, the Mining Law was amended, and mining was identified for the first time as an activity of public interest and utility at a national level. During the same year, the first General Regulation was issued for the General Mining Law, an instrument that designed the procedure for the allocation of concessions and established the fiscal and economic directives applicable to mining investments, according to each type of mining. In 2001, the Regulation was modified to incorporate norms that defined mining administration as a national interest activity, a priority, and essential for development, and included a section on environmental protection regulations.

In 2008, with the issuance of the new Constitution of the Republic of Ecuador (CRE), nature was recognized for the first time as a subject of rights (National Assembly, 2008). In 2009, the mining industry was given a boost with the issuance of a new Mining Law and its Regulation, thus breaking the traditional ideas of mining as a destructive activity and creating a new economic development model focused on a responsible and organized mining industry for the management of this strategic sector according to

the principles of sustainability, prevention and efficiency, and differentiating distinct mining types: large-scale, medium-scale, small-scale and artisanal.

Artisanal and small scale mining is recognized and defined in the text of the Mining Law, and the legal framework describes, as well, what is known as ore processing plants associated to the small-scale mining regime.

The current legal framework establishes certain requirements, as well as rights and obligations enabling natural or legal persons can carry out artisanal and small scale mining activities within the national territory, as indicated in tables 3 and 4.

**Table 3: Summary of the legal and regulatory framework of gold ASGM in Ecuador and mercury use in these activities**

| Legal/ Regulatory Body | Article | Importance/Relevance |
|---|---|---|
| **Mining Law** | Art 21 - National mining activity | Describes the way mining activities are carried out in Ecuador, and the role of the State. |
| | Article 134 - Artisanal mining | Establishes that artisanal mining is that whose commercialization allows involved people to cover their needs. It also establishes that this kind of activity is not subject to payment of royalties nor patents, although it must adhere to the tax regime.<br>Issued permits will have a 10-year validity and can be renewed for equal periods on the basis of an approval report by the Mining Regulatory and Control Agency (ARCOM).<br>Production capacities for artisanal mining of metallic ores are the following: up to 10 tons per day for underground mining and 120 cubic meters per day for alluvial mining. |
| | Art. 138 - Small-scale mining | The application of the small-scale mining standard is considered only in compliance with the conditions described in the article, that is, that ore deposits allow for small-scale operation.<br>Production capacity for the small-scale mining regime of metallic ores covers the following ranges: up to 300 tons per day in underground mining; up to 1000 tons per day in open pit mining; and up to 1500 tons per day in alluvial mining. |
| | Art. 45 - Processing plants | For small-scale mining, the State will authorize the operation of ore processing plants, constituted exclusively by crushing and grinding, with an installed capacity of 10 tons per day, and processing plants that include crushing, grinding, flotation and/or cyanidation with a minimum capacity of 50 tons per day. |
| **Organic Law reforming the Mining Law and others** | Art. 17 - Prohibition of mercury use | The use of mercury is prohibited in mining activities throughout the country.<br>As a transitory disposition, from the effective date of this bill (July 2013), a period of two years was given for alternative methods to be applied and for mercury to be removed progressively from mineral recovery processes. |

**Table 3.** *Continued*

| Legal/ Regulatory Body | Article | Importance/Relevance |
|---|---|---|
| **Regulation of the Special Regime for Small-Scale Mining** | Art. 2 - of the right of association | This article states that the association of natural persons will be promoted in artisanal and small-scale mining under the cooperative, association, condominium and micro-enterprise modalities.<br>Every partner will be responsible for complying with any acquired commitments. |
| | Art. 14 - Small-scale mining and Art 25 - Artisanal mining | Establish that the contracts entered into by owners of mining rights with operators or third parties for the execution of mining activities will include explicit stipulations regarding social and environmental responsibilities, as well as state participation, labor, taxes, mining safety and mediation and arbitration. |
| | Art. 37 - of restrictions in the use of toxic substances | Establishes that the owners of mining rights must adopt procedures through which the use of mercury is avoided, or develop systems for recovering the metal. |
| **Regulation for the Regularization of Artisanal Mining Activities** | Art 3. - Request for regularization of activities | Indicates the requirements that must be fulfilled by artisanal miners interested in becoming regularized within the Artisanal Mining Regime. |
| **Environmental Regulation of Mining Activities** | Art 7 - National mining regularization | Environmental regularization for the mining sector indicates that:<br>- artisanal mining projects will require registration; and<br>- small-scale mining projects where exploration and production activities are carried out simultaneously must have an environmental license in order to operate. |

The following table shows a comparative summary of the different kinds of mining and their key characteristics and obligations, included those related to tax, according to the national regulatory framework:

| Table 4: Comparison of different types of metallic ore mining and their fiscal and environmental obligations | | | | |
|---|---|---|---|---|
| **Type of mining** | **Production volumes*** | **Payment of royalties*** | **Payment of taxes and utilities*** | **Environmental permits**** |
| Artisanal Mining | **Underground mining**: up to 10 tons per day<br>**Alluvial mining**: up to 120 cubic meters per day | Concessionaires do not pay royalties | There is no payment of VAT<br>There is no payment of income tax<br>Natural persons whose income does not exceed USD 60,000 can adhere to the simplified fiscal regime (RISE), paying an annual quota according to income, which oscillates between USD 1.43 and USD 21.48[11] | Environmental registry |
| Small-scale Mining | **Underground mining**: up to 300 tons per day<br>**Open pit mining**: up to 1000 tons per day<br>**Alluvial mining**: up to 1500 cubic meters per day | Concessionaires will pay 3% of sale value of primary and secondary minerals | Payment of VAT<br>Payment of income tax<br>Payment of the percentage of labor charges corresponding to the state | Environmental license |
| Medium-scale mining | **Underground mining**: from 301 to 1000 tons per day<br>**Open pit mining**: from 1001 to 2000 tons per day<br>**Alluvial mining**: from 1501 to 3000 cubic meters per day | Concessionaires have to pay royalties equivalent to a percentage of the sale of primary mineral and secondary minerals, between 4% and 8% of the sale value of said minerals | | Environmental registry (only initial exploration)<br>Environmental license (advanced exploration, production and processing) |
| Large-scale mining | **Underground mining**: more than 1000 tons per day<br>**Open pit mining**: more than 2000 tons per day<br>**Alluvial mining**: more than 3000 cubic meters per day | | | Environmental registry (only initial exploration)<br>Environmental license (advanced exploration, production and processing) |
| *Mining Law (2018)<br>** RAAM (2019): Environmental Regulation for Mining Activities | | | | |

11 SRI: https://www.sri.gob.ec/web/guest/regimen-impositivo-simplificado-rise

### 1.5.1 Current regulatory status of the gold ASGM sector

One of the main lines of action of the National Plan for the Development of the Mining Sector is to promote association processes among small miners and artisanal miners, for mining-metallurgic production, processing, sale and waste management. This proposal, framed within the general plan, has enabled the inclusion of other social and environmental actions in the regularized gold ASGM sector, such as access to financing. However, artisanal miners usually don't want to associate, because of lack of knowledge or lack of trust in the process, as this would entail changing category from artisanal miner to small-scale miner, which means acquiring obligations in the fiscal area (Quintuña, 2018). In the long term, this kind of action would allow authorities to maintain a data base of regularized miners. But in fact, this process will take a long time, and many miners will remain illegal and with no access to the benefits currently offered by the Ecuadorian State through the office of the Vice Minister of Mining.

In order to invigorate the ASGM regularization processes, it will be necessary to put the mining cadastre, which is closed since 2018, back into operation. The Vice Minister of Mining, as the national authority for mining affairs, together with the Mining Regulatory and Control Agency, have planned to operationalize the mining cadastre in 2020, including gold ASGM activities, provided all necessary reforms have been implemented for continuing the formalization and regularization processes. Without the mining cadastre as a foundational instrument for regularization it will not be possible to achieve the desired order in the gold ASGM sector. The mining cadastre will allow involved actors to differentiate permits and registries at a national level between small-scale mining and artisanal mining, and through this data undertake a process of review and reform of public policies with the aim of boosting the sector in compliance with the current legislation and under a coherent environmental, social and sanitary approach.

### 1.5.2 Illegal Mining

According to the Mining Law, the classification of illegal mining is applicable to the following cases:

a) Illicit activity with mineral resources;
b) Proprietors who allow illegal mining activities in their areas;
c) Authorization for free exploitation used for other ends;
d) Non-observance of the prohibition of child labor in all mining activities;
e) Non-observance of ASGM prohibitions in certain areas;
f) Financing or provision of machinery for the illicit extraction of mining resources;
g) Non-observance of the prohibition of mercury use;
h) Crimes against water;

In August 2014, with the enactment of the Integral Organic Penal Code (COIP), a new series of crime modalities were classified together with their incidence over different protected legal assets, among them, nature as threatened by crimes against non-renewable resources, such as crimes that affect mining resources.

> ***Article 260.*** *- Illicit activity in mining resources. - The person who, without authorization of competent authorities, extracts, exploits, produces, transforms, transports, sells or stores mining resources will be prosecuted through a custodial sentence of five to seven years. In the case of artisanal mining, it will be prosecuted through a custodial sentence of one to three years. If through these illegal actions the person causes damage to the environment, prosecution will involve custodial sentences of seven to ten years.*

Illegal mining activities have expanded throughout the whole region in a scenario of increased international prices of raw materials and a lack of effective regulations at a national and local level to respond to the actual state of the sector and the social and economic dynamics behind it[12].

The Amazon Geo-Referenced Socio-Environmental Information Network (RAISG) and InfoAmazonía, in coordination with eight other Latin American institutions, presented recently the map of illegal mining in six Amazon countries, which identified 2,312 sites with illegal mining activities and 245 non-authorized extraction areas in which gold, diamonds and coltan are exploited in Bolivia, Brazil, Colombia, Ecuador, Peru and Venezuela[13].

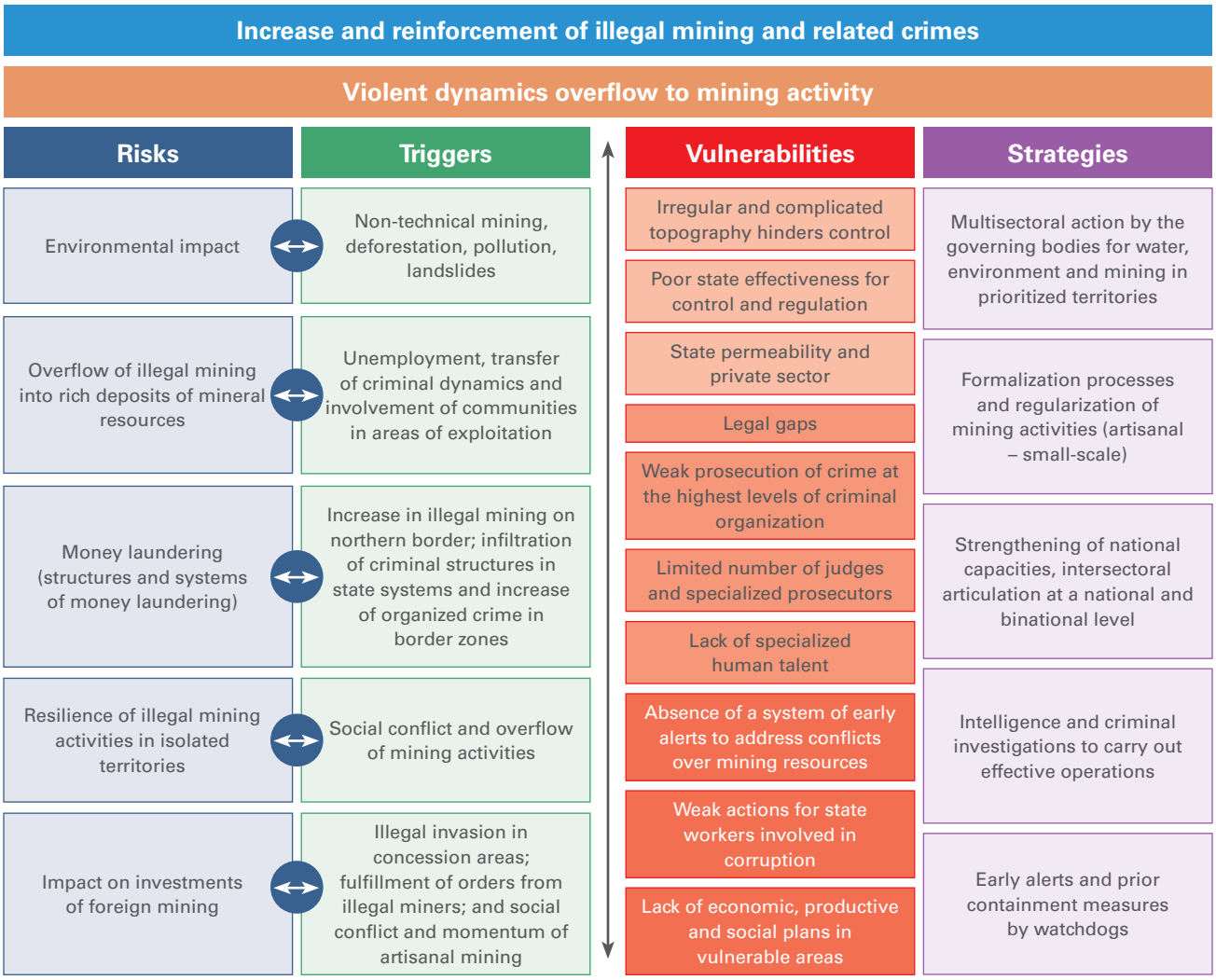
At a national level, there are territories with important metallic and mineral resources, highly valued in the mining industry, but also by organized crime groups and illegal mining activities related to the exploitation of these non-renewable resources.

In Ecuador, mining has been historically defined by a weak industrialization of the sector and a preponderance of artisanal and small-scale mining, understood broadly as any mining exploitation activity with low level of technical capacities, an intensive use of unskilled labor, and low production margins in the corresponding deposits (Hentschel, Hruschka, & Priester, 2002).

It is important to point out that mining, both legal and illegal, occurs generally in remote areas where the State's presence and footprint is weak or reduced: mining activities are carried out not only near borders, rural areas, mountains and rivers, but also underground (from a few meters to hundreds of meters below ground). This entails a considerable challenge for people in charge of monitoring and control with the purpose of responding to and prosecuting illicit activities against mining resources and other related crimes in these areas, geographically isolated and relatively inaccessible, but highly attractive due to their mining potential.

Crime dynamics:

- Upsurge in illegal mining sites due to a scenario of growing gold prices: increase in profitability and return on investment of illegal capital.
- Diversification of illegal mining sites, especially in the provinces of Morona Santiago and Zamora Chinchipe - in the oriental mining belt.
- The State of Ecuador does not yet possess an updated mining cadastre to identify the mining development profile with a territorial approach, such as places were the exploitation of mineral resources should not occur.
- Asymmetry between the resources available for illegal mining operations and those available for control and security actions.
- Increase in risk levels related to the overflow of illegal mining activities into first and second generation mining projects.




**Source:** CECMI, 2020

### 1.5.3 Leadership and organization of gold ASGM at a national and local levels

#### *Governance at a national level*

The Ecuadorian mining sector is governed by a managing institution, the Vice Ministry of Mining, which is a part of the Ministry of Energy and Non-Renewable Natural Resources (MERNNR). It also includes the Mining Regulatory and Control Agency (ARCOM), which carries out tasks related to inspection, auditing, intervention, and penalties, and the Geological and Energy National Research Institute (IIGE), in charge of creating, systematizing, and managing the geological-mining-metallurgical information in the country. Both institutions are affiliated to the Vice Ministry of Mining and together complete the Ecuadorian mining institutional map. These three entities work closely and triangulate tasks in order to attain sector objectives.

Moreover, these self-contained actors work in coordination with other government entities, especially the Ministry of the Environment (MAE) and Ministry of Labor, the Department of Waters (SENAGUA), the National Customs Service (SENAE), the Internal Revenue Service (SRI), Autonomous Decentralized Governments (GADs) and other entities, for example, of the education sector, such as the Department

of Higher Education, Science, Technology and Innovation (SENESCYT) and the Technical Department of Professional Training (SETEC), which handles educational initiatives.

The Ministry of the Environment (MAE), maximum authority concerning environmental matters, is in charge of issuing environmental licenses, for which it requires Environmental Impact Studies from small, medium and large-scale miners for the exploration and processing stages, and an environmental registry for artisanal miners. The Department of Waters (SENAGUA), in close relationship with the latter, articulates with the MAE (with which it coincides at a hierarchical level under the Sector Council for Habitat and the Environment) and the Vice Ministry of Mining for managing rights to water access in mining territories.

The Ministry of Labor, in coordination with the Ministry of Energy and Non-Renewable Natural Resources (Vice Ministry of Mining) and the Ecuadorian Institute of Social Security (IESS), is in charge of issuing technical regulations related to occupational health and safety for the mining sector, whose compliance is verified in the field by ARCOM. The IESS, in particular, through the Occupational Hazards Insurance, covers contingencies related to labor activities (compensations, disabilities, pensions, etc.) for all affiliates of the Universal Mandatory Insurance which, in the case of the mining zones analyzed in this document, is presented as the Farmer's Social Security (Seguro Social Campesino).

The ARCOM, together with the National Customs Service (SENAE) and the Internal Revenue Service (SRI) work in coordination in order to maintain effective control over the sale and export of minerals from Ecuador.

The following table shows the institutional map at a national level for the administration of mining activities, especially related to the artisanal and small scale mining of gold.

**Table 5: Institutional map for ASGM management in Ecuador**

| Organization/Institution | Role |
|---|---|
| **Ministry of the Environment (MAE)** | National Environmental Authority, which establishes the national environmental regulatory framework. Focal Point for the implementation of the Minamata Convention. |
| **Ministry of Energy and Non-Renewable Natural Resources (Vice Ministry of Mining)** | Maximum authority in the establishment of national policy regarding the management (utilization) of mining (metallic and non-metallic) and energy resources. |
| **Geological and Energy National Research Institute (IIGE)** | Entity affiliated to the Vice Ministry of Mining, in charge of generating, systematizing and managing geological-mining-metallurgical information in the country. |
| **Mining Regulatory and Control Agency (ARCOM)** | Entity affiliated to the Vice Ministry of Mining and in charge of inspection, auditing, intervention and penalties in the mining sector. |
| **Ministry of Public Health (MSP)** | National authority for the management of Public Health, and in charge of providing guidelines for assistance and monitoring of diseases at a primary level (local level). |

**Table 5.** *Continued*

| Organization/Institution | Role |
|---|---|
| **Ministry of Government (Armed Forces and National Police, CECMI)** | The Armed Forces (FFAA) and National Police (PN) are affiliated to this entity. |
| | Entity responsible for articulating with the Armed Forces the handling permits for explosives in the mining sector, and with the local authorities for their control. |
| | It also coordinates tasks related to fighting illegal mining, an aspect in which the Special Commission for Control of Illegal Mining (CECMI), spearheaded by the Ministry of the Interior, plays a crucial role. |
| **National Department of Waters (SENAGUA)** | Sole Authority on Water, responsible for managing this resource and issuing appropriate directives for industrial sectors. |
| **National Department for Risk Management (SNGR)** | Entity in charge of risk management at a national level, both in cases of natural cause or by human actions/activities. |
| **Ministry of Labor (MT)** | Authority in charge of issuing directives for hiring and labor relations. In addition, it is responsible for issuing technical regulations related to occupational health and safety for the mining sector, whose compliance is verified in the field by ARCOM. |
| **Internal Revenue Service (SRI)** | Entity responsible for compliance with tariffs for productive activities. In addition, it works in coordination with the National Customs Service (SENAE) and ARCOM for maintaining effective control over the sale and export of minerals from Ecuador. |
| **Ecuadorian Institute of Social Security (IESS)** | This entity, in particular, through the Occupational Hazards Insurance, covers contingencies related to labor activities (compensations, disabilities, pensions, etc.) for all affiliates of the Universal Mandatory Insurance which, in the case of the analyzed mining zones, is presented as the Farmer's Social Security (Seguro Social Campesino). |
| **Ecuador Central Bank (BCE)** | An entity that possesses a preferential option for buying gold produced through small-scale and artisanal mining since 2009. A relevant actor due to its high potential for catalyzing positive change in the sector through access to fair price and fair markets. |

### *Governance at a local level*

As stipulated in Article 2 of the Special Regime for Small-scale Mining, the State will promote the artisanal mining and small-scale mining regimes through the association of natural persons under the cooperative, association, condominium and micro-enterprise modalities.

Regarding groups in the ASGM community, in the year 2000, 50% of them corresponded to concessionaires, 20% to cooperatives, 12% to condominiums, 10% to legal associations and 8% to de facto associations (Sandoval, 2001). In 2015, according to the National Plan for Mining Development, there was a

total of 859 formalized associations of small-scale miners and the target to be reached by 2020 was 2,559 associations (Ministry of Mining, 2016).

There is a Chamber of Small-scale Mining in Ecuador, located in the La Providencia Parish in Machala. This organization attempts to channel natural and legal persons involved in exploration, exploitation, processing, concentration, smelting, refining and commercialization of metallic and non-metallic minerals. Additionally, it provides information services for legal, technical and environmental queries related to the development of small-scale mining, and channels (through the Chamber) socio-organizational, technical, legal, and environmental counseling, institutional collaboration, project creation, and access to credit from national and multilateral institutions. It is also responsible for organizing trade fairs, expositions and related actions geared towards the fusion of mining and geological activities.

## 1.6 Commerce and demand for mercury

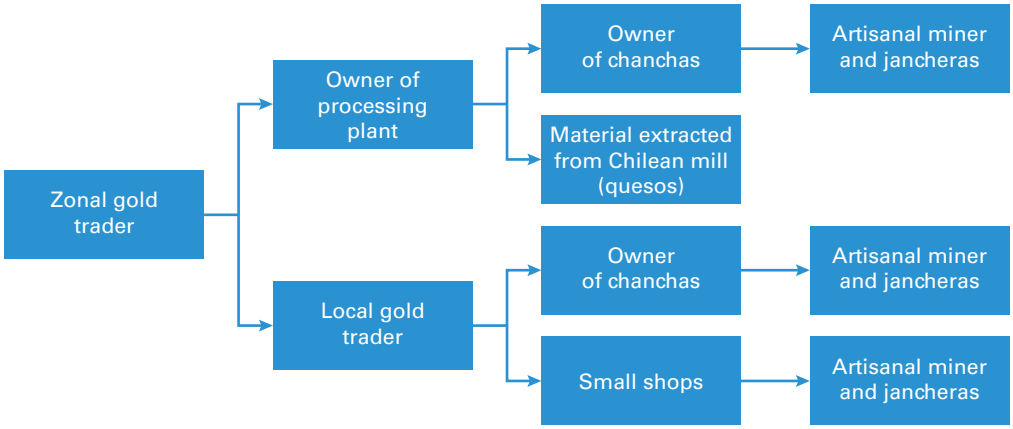
Although the use of mercury is forbidden in mining operations in Ecuador, the substance is sold and used throughout the sector by means of a black market. It is thought that most of the mercury that enters Ecuador illegally comes from the southern border, originating in Bolivia, passing through Peru, and finally reaching Ecuadorian territory. However, the original source of this mercury would be Mexico, where there is a primary extraction industry for this substance. Mercury is sold in different mine sites through local establishments such as shops and hardware stores. In these sites, small amounts are sold for local use, especially in grinding processes involving chanchas. At this level, usual expenditures are between one ounce (28.35 g) and one pound (453.6 g) of mercury at a price of USD 8 to USD 10 per ounce of mercury (USD 280 to USD 320 / kilogram). It is a common practice in mine sites with access to cyanidation processes that owners of chanchas provide mercury free of charge in exchange for the tailings that remain after the grinding is completed, resulting in one of the worst practices identified by the Minamata Convention, which is the cyanidation of tailings with mercury contents, that should be forbidden at a national level.

It is also common to find that district and zonal gold traders are also suppliers of mercury. Their roles as local intermediaries facilitate the distribution logistics, as they are located in convergence areas for both wholesale suppliers and retail distributors. At this level, usual expenditures are between one pound (453.6 g) and one-liter bottles (13,500 g) of mercury at a price of USD80 to USD120 per pound of mercury (USD170 to USD250 / kilogram). In some cases, mercury sellers are also jewelers: they smelt the sponge gold and recover mercury, which they then proceed to resell to the local market.

Finally, zonal and national traders sell what is known as a pipa[14], which can weigh up to 22 kg and has a cost ranging from USD4000 to USD6000 (USD180 to USD270 / kilogram). Some testimonies point towards the possibility of district and zonal officials being involved in mercury trafficking; however, this information could not be ascertained.

14 Mercury pipe: cylinder package with mercury content for a total weight of around 22 kg

**Figure 5: Mercury distribution model**




**Source:** Ecuador National Action Plan

From a general perspective, and as shown in Figure 5, the mercury market follows the same logistics as the storing and recollection of gold for distribution. That is, it is the mining sector itself that ensures artisanal miners and small-scale miners are supplied with mercury in order to guarantee the availability of this basic input for their extraction and processing model. Therefore, it can be inferred that mercury is entering the country following the same route as the money that finances these activities.

## 1.7 Economic aspects

For decades, mining in Ecuador has been characterized mainly by small-scale mining and artisanal mining activities. In the year 2014, the total metallic production of gold in Ecuador had a total participation of 78% from small-scale mining, and the other 22% from artisanal mining. These figures are different from the general global context, in which large and medium-scale mining represent 80% of gold production (Ministry of Mining, 2016). This scenario will change soon, as large-scale projects such as Fruta del Norte (LudinGold) and Mirador (Ecuacorrientes) in the province of Zamora have started their production phase in 2019.

According to the 2016 Mining Development Plan, it is estimated that 80% of revenue from small-scale gold mining is invested directly in the country. The remaining 20% is used to acquire machinery, spares and inputs in the international market.

Officially, the Ecuador Central Bank reports that, related to ASGM gold production, between 2000 and 2012, the mean gold production level was 4,450 kg/year, and between 2013 and 2016, it reached an annual average of 7,620 kg (Ecuador Central Bank, 2015). Nonetheless, the Ecuador Central Bank (BCE) estimated a strong decline in production for 2016, and particularly for 2017, which recorded 6,368 kg, jumping to 8,213 kg in 2018. The explanation given for this decline is a stronger control by the Mining Regulatory and Control Agency (ARCOM) over the production of small-scale mining, which tried to prevent contraband gold coming from Peru being included in registries as national production (Ecuador Central Bank, 2020). The price of gold increased sharply during the period of the "Raw Materials Boom"

(2003 to 2012), reaching its highest value of USD 1,875 per troy ounce[15] in August 2011, after which it descended to USD 1,529 in December 2019[16].

The relationship between mining exports and total exports was low until 2010, when it represented a mere 0.5%, and after which it began to grow until it reached a maximum level of 3.9% in 2014, decreasing thereon to 2.0% in 2016. Gold exports showed an unusual level of growth in 2014, with 28,573 kg, and 2015, with 20,801 kg, after which it descended strongly and was recorded at only 7,007 kg from January to November, 2019. The main destination for gold exports in the January - November 2019 period was the United States of America, with a participation of 87%, followed by Italy, with 10%, Switzerland, with 2%, and India, with 1% (Ecuador Central Bank, 2020).

As can be seen from this data, there is a significant difference in what is reported as production and what is reported as exports, especially in 2014 and 2015. This difference is caused mainly by the fact that not everything that is produced or exported is reported as expected. On the one hand, artisanal mining is not subject to royalty payments to the State nor any tax declarations, which means many miners use this shield to be able to produce with no limitations, in spite of the control mechanisms applied by corresponding competent authorities. On the other hand, according to the information collected during the field study, there is a high volume of processed mineral that enters the country through uncontrolled border crossings, especially from Peru, and goes directly into export driven processes, thus inflating values as compared to the amounts reported from the production sector.

In relation to income for those who are involved in gold ASGM activities, according to a study conducted by the TRANSMAPE project, and to the information that was corroborated in the field, 60% of the mining population has a monthly income between USD 500 and USD 1000, which exceeds the basic salary of USD 394[17]. More than 60% of miners have at least 10 years of experience and about 45% feel satisfied with their work and the money they receive for their labor.

In relation to access to financing, the gold ASGM sector shows huge deficiencies, with access to credit not surpassing 11% and the rest of the money coming from the sector's own capital. This is due mostly to the fact that many ASGM working roles are not formalized, or are pending formalization, especially in artisanal mining, which represents a serious obstacle for access to credit. For this reason, it is important that the mining cadastre becomes operational once again.

## 1.8 Demographic and social information

According to the field work conducted during the realization of the diagnostic study of ASGM in Ecuador in 2018, there was an estimated 11,500 people directly related to gold ASGM tasks in Ecuador. However, the number of ASGM-related individuals could grow to 20,000 when taking into account that many of these activities are seasonal, and miners working in sites such as Nambija or Chinapintza can move to different sites, such as Buenos Aires or Esmeraldas, depending on the demand for labor in each site. That is, there is a community of roving miners which makes it hard to ascertain the actual number of people who are devoted to ASGM activities as their life-sustaining jobs (INEC, 2010).

15 A troy ounce is equal to 31.1034 grams

16 https://es.investing.com/commodities/gold-historical-data

17 Basic Unified Salary for the year 2019.

The most current information related to the life conditions of miners was presented by the TRANSMAPE project carried out by CIRDI in 2018. From the various studies available, information was gathered for the Ponce Enríquez mine site, located in the south of the country, which reflects a situation that is replicated in other mine sites visited during field work activities related to the present document.

In regards to the number of workers present in a mine site, artisanal concessions have an average of 35 workers, while small-scale concessions reach an average of 200 workers (Alliance for Responsible Mining & CIRDI, 2018). Of these figures, only 0.7% of partners and 1.7% of workers are women.

In regards to the miner's educational level, there are two different scenarios. From the universe of artisanal miners, about 61% have completed their primary school studies, and of this number, about 30% completed their secondary studies. On the other hand, for small-scale miners, 65% completed their secondary studies and 32% have pursued and finished their tertiary and fourth-level studies.

For artisanal miners, especially the jancheras, the social security situation is also precarious, with only 25% of individuals affiliated to social security and working jobs that are not regularized by contract, but only by a permit from mine owners. The income of jancheras is below $500 per month (Alliance for Responsible Mining & CIRDI, 2018).

### 1.8.1 Women working in ASGM

During data collection for the ASGM inventory in Ecuador, it was found that around 10% of the gold ASGM work force corresponds to women, that is, an approximate number of 1,500 persons. A high percentage of these women who work in ASGM do it for household livelihood, and supplement their income with other activities, such as agriculture or commerce. Although mining produces negative impacts, especially for those who work in mining operations, there are differentiated impacts and additional loads affecting women due to the role and status ascribed to them. In field work visits, it was noted that women continue to carry out activities that are traditionally assigned to their gender, such as administrative roles and other related work. On the other hand, gender inequalities in mining are interrelated with and amplified by ethnic and territorial inequalities, a fact demonstrated by the deep gaps in social conditions of miner, indigenous, and rural women.

The small-scale mining sector takes in women as contract work or through unpaid work, with a lack of social security and in deplorable working conditions. In many cases, women miners are not paid because they are the wives, concubines, daughters or family members of the mine operator and therefore, helping in production tasks is considered their duty. Their usual responsibilities related to taking care of the household and children are maintained, which means their daily workload is increased considerably (Chaparro, 2005).

Although men and women are exposed to similar health hazards due to exposition to heavy metals released in metallurgic processes, especially mercury, there could be additional dangers affecting women, especially if they come in contact with mercury, which can lead to health problems for the fetus or for infants in the breastfeeding period. Even when they don't work in the mines, the risk of mercury poisoning is higher among women than among men, as they remain at home for most of their tasks, and this is the place where the mercury amalgam is usually burned. Men, on the other hand, spend most of their time in the only place that is not contaminated: the mine (Proyecto minería, minerales y desarrollo sustentable, pp. 439-440).

It is important to point out that in some mine sites, such as Ponce Enríquez or Zaruma - Portovelo, there is a significant presence of female jancheras, people that collect rocks with low mineral content from dumps, some of which have managed to get formally associated, although they haven't been regularized as artisanal miners (Ministry of Mining, 2016). This activity, known as *jancheo*, has been affected by an optimization of processes that has resulted in extraction material for jancheras being scarcer.

Apart from this activity, the presence of women was recorded in other types of roles, such as processing plants administrators, ore processing technicians, materials lab technicians, and sales supervisors.

Another important aspect of ASGM mining is that mining sites do not offer educational facilities catering to underage persons of school age. The only type of facility present is daycare, where women working in ASGM leave their children while they work, although some of them go to work in mining dumps with small children as they cannot leave them behind alone in their lodgings.

## 1.9 Environmental information

Since the beginning of artisanal and small scale mining activities more than a century ago, Ecuador has witnessed a timeline of extraction and processing activities through the application of rustic methods and a lack of technological support, which together have propitiated environmental degradation, leading to different levels of impact over different physical mediums, such as soil, water, air and biodiversity.

In the sites visited during the data collection phase and identified as gold ASGM locations, there is a deficient (or null) treatment of effluents that result from gold production processes. A large portion of these effluents contain heavy metals, specifically metallic mercury (Hg°) as a result of the amalgamation process, whose discharge enters in direct contact with water resources and is deposited in the surface and sediments of water bodies, becoming a part of the local aquatic trophic chain, such as in the case of Nambija. In many cases, household effluents are combined with those from mining processes, and are discharged directly, such as in Chinapintza or Buenos Aires.

In the same way, the practice of burning mercury is done without proper knowledge of the risks involved in mercury exposition, and without the necessary personal protection equipment. This process triggers the emission of mercury vapors ($Hg_{vap}$) to the air in the local environment around ASGM activity areas. These emissions can also travel to other neighboring localities and affect the respiratory tract of its inhabitants. Even more detrimental to health is the implementation of this practice within the miners' improvised households in sites such as Buenos Aires, Chinapintza, and Ponce Enríquez, corroborated during the field data collection stage of the National Action Plan.

The re-leaching of amalgamated tailings is practiced extensively, that is, the incorporation of "sands" or "tailings" from amalgamation processes into cyanidation processes. This practice is included within the "environmental worst practices", as it discharges mercury in soluble forms, such as methyl mercury, increasing the possibility of bioaccumulation in water bodies that receive mine discharges and has been identified mainly in the Zaruma-Portovelo sites and in Ponce Enríquez.

The different water bodies and ravines close to mine sites are also affected by the discharge or storage of solid waste considered dangerous or special, such as that which results from ASGM activities.

Alluvial mining activities in the country are mostly illegal, have no exploitation or mining models, and operate with minimum technical conditions. Environmental liabilities resulting from this type of mining have altered river banks and beds through dredging activities (high Nangaritza, San Carlos, La Maná) and have created large extensions of land which have not been rehabilitated (San Gerardo, Río Santiago).

Deforestation and vegetation grubbing are additional consequences of the expansion of the mining frontier, a result of the need to extend fronts in both exploration and exploitation. This has led to negative impacts on local ecosystems, which are altered by these activities and suffer loss of biodiversity, migration and loss of species, landslides, and eutrophication of waters, among other consequences, all common occurrences in known mining sites.

## 1.10 Health information

The ASGM diagnostic study conducted in 2018 included a health diagnosis with two different approaches: a) Evaluation of the institutional capacity of the health sector to respond to ASGM personnel needs directly or indirectly; and b) Quick health assessment for miners. The results obtained from these two approaches served as a foundation for the development of the Public Health Strategy defined in this document.

Works published by the World Health Organization on exposure to mercury and related impacts (World Health Organization, 2013), as well as general sanitary considerations related to artisanal mining (World Health Organization, 2017) were used as strategic support for the collection and processing of information.

### a) Evaluation of the institutional capacity of the health sector to respond to ASGM personnel needs directly or indirectly

The Ecuadorian health system, characterized by an approach that seeks to strengthen primary healthcare, uses first-level health centers as entry points for patients into the health system, who are then escalated to different levels based on the detected pathology. Primary healthcare facilities are present in all ASGM communities. In fact, these structures (health posts and health centers) are an integral part of the local social dynamics in their corresponding areas, and thus, there is an active participation through prevention and control programs (IFA, 2016).

According to the assessment carried out in 2018, there are healthcare programs that provide nationwide coverage in Ecuador and include diseases related to ASGM work. However, no specific public program was found for the prevention and control of diseases affecting the ASGM sector. In addition, it was found that no database exists for the health and morbidity conditions of ASGM miners and their families.

From the review of the information recorded at a health center level, it was noted that the most frequently reported diseases were of the respiratory type, such as rhinopharyngitis, pharyngitis, and bronchitis, and of the gastrointestinal type. Both respiratory and gastrointestinal ailments are diagnosed at a primary level and can respond to several causes or etiologies. Many of these causes are specific to the mining population, such as lack of hygiene, consumption of contaminated water, and inadequate sewer systems, issues which are present and common in each and every one of the covered ASGM sites.

Other pathologies identified during the health diagnosis included muscular pain, and more frequently, lumbago (lower back pain). There was also evidence of patients with kidney problems, especially in zones 3, 6 and 7[18].

The collected data indicates that the El Oro province has the highest number of disabled persons (1,128 people as reported by medical centers) and a large quantity of children born with malformations. Patients were also found in nearby communities with symptoms of damage by methyl mercury, such as tingling of the extremities and, to a lesser extent, limitations in the field of vision, especially in the provinces of El Oro and Loja.

Furthermore, there have been cases of mental retardation recorded, with the provinces of El Oro and Loja registering the highest number of cases (1,128), followed by Azuay (215) and Chimborazo, Cotopaxi and Bolívar (92). There could be several reasons for explaining the high level of mental retardation cases in these zones. It is imperative and urgent to carry out a study for determining if the presence of mercury contributes to a high prevalence of mental development issues, as well as tingling of the extremities and loss of vision.

As an average, a patient has to travel 40 minutes from the sites where the mines are located to the closest primary healthcare center. On the other hand, the time a patient has to travel from a primary healthcare center to a higher level facility varies, with an average of 1 hour 30 minutes.

Regarding the capacity of medical staff in different medical centers surveyed, 29% of respondents declared that they had knowledge related to mercury poisoning and that they were trained for care and emergencies. The remaining respondents declared that they did not have any specific training related to ASGM diseases and mercury use, which makes it harder to diagnose the corresponding pathologies.

## b) Quick health assessment of miners

During field visits conducted for the collection of health-related data for the ASGM diagnostic study, evidence of lack of care was found in the use, handling and transport of mercury. Lack of personal protection equipment means that contact with mercury and mercury compounds is direct.

Diseases faced by miners and the ASGM community in general appear seasonally, such as acute respiratory failure and acute diarrheal disease. There are also other work-related diseases such as lumbago and middle back pain. However, this evaluation showed that miners were not aware of any diseases caused by mercury use or mercury poisoning (elemental or in its methyl mercury form).

Some ASGM workers are formally registered through associations covering exploitation and processing jobs in processing plants. In these employment modalities, workers can make use of healthcare coverage in the form of the seguro campesino, or by voluntary affiliation. But many workers are also informal, and associated loosely for working in dump sites or concession sites with no authorization.

When people cannot find and adequate response, they resort to private care, with the cost thereof being covered by the miners themselves. All surveyed health establishments have admitted difficulties in diagnosing, treating, and notifying about diseases present in the ASGM sector, including cases of acute and chronic mercury poisoning. The lack of locally-corroborated data related to mercury exposure and use in sites with active ASGM activities means that it is not possible to know the extent to which mercury poisoning affects the population.

18 Zone 3: Cotopaxi, Tungurahua, Chimborazo, Pastaza. Zone 6: Cañar, Azuay, Morona Santiago. Zone 7: El Oro, Loja, Zamora Chinchipe.



# 2. NATIONAL REDUCTION OBJECTIVES AND TARGETS

## 2.1 National objective

"Reduce, and, as far as possible, eliminate the use of mercury in artisanal and small scale gold mining (ASGM) in Ecuador, on the basis of the current regulations and legislation, through continuous monitoring of health and the environment and through the application of innovations and technological transfer and the development of capacities in the community involved in ASGM activities".

The national objective is contained within the regulatory frameworks of the mining, environmental and health sectors, established in the National Constitution since 2008, and sector-specific laws such as the Mining Law and the Organic Environmental Code (COA), the Toda una Vida Development Plan (2017-2021), the Mining Public Policy and the ministerial agreements and regulations issued around the subject of mining in general and gold ASGM in particular, as well as their impact on health and the environment.

## 2.2 Principles

In order to achieve the proposed national objective, 7 different action principles have been established and identified to be put into practice by the key actors identified for the implementation of the National Action Plan (NAP).

### a) Legality

The NAP, together with all actions that have been defined for its implementation, must take into account and respect the current legal and regulatory framework: the Constitution of the Republic of Ecuador, international treaties ratified by Ecuador, the country's laws, rules and regulations, and any relevant ministerial agreements.

### b) Right to work

The National Action Plan recognizes that both men and women, and marginalized groups within ASGM activities, have the right to a job that is fair and acknowledged; to equal payment for work of equal value, provided this work does not affect nature and the environment. Members of the mining community have the right to fair legal processes, guaranteed from the State so that their activities can take place in a

just and favorable manner. The access to worker rights is closely related to the formalization of informal activities, a crucial aspect in the arrangement and operation of the gold ASGM sector.

### c) Transectorality

The actions identified in the present plan, as well as other support activities that may take place, shall be coordinated and articulated by public agencies under the umbrella of Central Government, public enterprises, and decentralized autonomous governments (GAD), and in cooperation with companies, associations or groups devoted to ASGM activities, through an integral intervention approach in specific spaces, optimizing resources and boosting results.

### d) Results-based management and continuous improvement

All actions carried out by public entities identified as key actors shall be oriented towards a results-based management that includes progress or monitoring indicators and corrective actions to ensure an adequate effort in the attainment of the expected results.

### e) Public-private cooperation

Artisanal and small scale gold mining affects the nation as a whole, which means that the resources invested by the State and other cooperating entities could prove insufficient against the magnitude of needs identified in the sector. For this reason, the involvement and participation of the private sector must be promoted, especially in relation to technological exchange, knowledge transfer, technical assistance and financing of responsible operations.

### f) Constructive participation

Artisanal and small scale miners and their communities shall be taken as the main actors within the implementation of the present plan, so they can act as agents of change and continuous improvement. For this purpose, any established lines of action shall focus on promoting an effective and constructive participation of the community involved in gold ASGM.

### g) Fight against corruption

The actions identified in the plan, especially those aimed at controlling illegal mercury in the national territory, are vulnerable to the effects of corruption, negatively affecting the attainment of the proposed objectives and targets. For this reason, it is crucial that these actions, and the actors that carry them out, are framed within the policies and mechanisms established at a national level for fighting corruption.

## 2.3 Strategies

On the basis of the information collected and analyzed in the gold ASGM diagnostic study in Ecuador, presented in the previous section, several workshops and work meetings were carried out together with key actors in the reduction and elimination of mercury in mining, from both state institutions and the private sector, and from the civil society, academic circles, and non-governmental organizations. The discussions revolved around the issues related to the use of mercury, or that are somehow related to

its use, especially in the fields of regularization, environment, health, gender inequalities, and illegal mining, among other aspects related to the development of gold ASGM activities.

As a result, several actions were proposed for channeling possible solutions to the presented issues, which were debated and grouped by strategies based on their affinities. In this way, seven strategies have been proposed, from the formalization and regularization of activities, capacity development, and technology transfer, to social and gender inclusion, within which 21 specific objectives have been defined together with more than 40 lines of action, summarized in the following table and explained in sections 2.5 and 3:

**Table 6: Key strategies and objectives for approaching the issue of reduction / elimination of mercury from ASGM Ecuador**

| National strategies | | |
|---|---|---|
| **Strategy** | **Specific objectives** | **Lines of action** [19] |
| Miner formalization/regularization | Review and strengthen the regulatory and procedural framework for the formalization and regularization of miners devoted to ASGM activities. | 3 |
| | Develop and reinforce institutions for managing the formalization and regularization of activities related to gold ASGM. | 2 |
| | Accompany and strengthen the capacities of mine producers for general improvement and compliance with their obligations. | 2 |
| | Identify, develop and promote incentives for formalization/regularization. | 3 |
| | Strengthen control over activities related to ASGM. | 1 |
| Reduce discharges and risks related to mercury exposure, and correct worst practices. | Promote the adoption of efficient mercury-free technologies for the extraction and processing of gold. | 3 |
| | Verify the feasibility of establishing mining industrial parks. | 2 |
| | Review and reinforce the regulation of zones and sites devoted to gold ASGM activities. | 3 |
| | Control and eradicate cyanidation for processing tailings contaminated with mercury. | 2 |

19 Lines of action: set of activities involved in attaining a specific objective

**Table 6.** *Continued*

| National strategies | | |
|---|---|---|
| **Strategy** | **Specific objectives** | **Lines of action [19]** |
| Control the illegal trade and use of mercury. | Review and strengthen the regulatory and procedural framework related to the restriction of mercury use in mining activities. | 1 |
| | Strengthen the monitoring and control systems for mercury trade and use. | 2 |
| | Promote regional or bilateral agreements for the cross-border control of mercury. | 2 |
| Minimization of illegal mining. | Increase the national capacity to prevent and combat illegal mining. | 3 |
| | Intensify efforts for combating and eradicating illegal mining. | 2 |
| | Strengthen post-intervention actions. | 2 |
| Public health strategy for the provision of services to the population exposed to mercury due to ASGM activities (artisanal and small scale miners, their communities and vulnerable populations). | Strengthen the institutional capacity of the public health care system in order to develop healthcare services (promotion, prevention, curing, rehabilitation) for people exposed to toxic substances such as mercury (differentiated by gender) and their effects on the community related directly or indirectly to the gold ASGM sector. | 4 |
| | Enhance the capacity of the system to notify cases of mercury poisoning for the creation of statistics and the development of studies and research. | 1 |
| Strategy pertaining to gender issues and child labor in ASGM. | Improve working conditions and reduce risk factors for women. | 2 |
| | Eradicate child and adolescent labor in ASGM. | 1 |
| Participation and information transfer among all interested parties in the implementation and continuous development of the action plan. | Institutionalize communication among relevant actors within gold ASGM. | 1 |
| | Development of capacities and means for dialog and communication. | 2 |

## 2.4 National targets

Data collection in the field constitutes a key factor for the establishment of the objectives and targets contained in the present plan. Thanks to these efforts, it was estimated that approximately 30 tons of mercury were discharged into the environment annually in the national territory due to ASGM activities. Its use is limited mostly to activities that have not been formalized/regularized, or that are undergoing formalization/regularization processes, and is clandestine in nature.

As described in the preceding section, the fact that mercury use is forbidden by law in ASGM makes it difficult to access miners and obtain information from them, as they are afraid of reprisals such as the suspension of their activities or economic sanctions. In this sense, all identified reduction targets are geared towards technological improvements and the capacity building of the mining community, taking into account the state of their activities and whether they are formalized or not.

The following table shows national targets related to the objective of reducing and eliminating mercury from ASGM activities, supported by the strategies, lines of action and activities presented in section 1.5. Reduction targets are based on data collected during the diagnosis phase and are represented by estimated periods of time, ending in 2030.

**Table 7: National targets for the reduction of mercury use and discharges in ASGM**

| National targets for the reduction of mercury use and discharges in ASGM | | | | |
|---|---|---|---|---|
| **Types of action** | **Targeting (identified sites)** | **Short term (2020 – 2022)** | **Medium term (2023 – 2026)** | **Long term (2027 – 2030)** |
| Control of mercury use in secondary deposits (alluvial mining) | Alto Nangaritza; Chito; Tena (Ahuano, Misahuallí); Esmeraldas (Río Bogotá and Río Santiago) | 10% reduction in mercury use | 40% reduction in mercury use | 80% reduction in mercury use |
| Technological adoption and improvements that foster the mercury-free production of gold in primary deposits (primary/ underground mining) | Chinapintza, Nambija, Ponce Enríquez, Zaruma Portovelo, La Maná, Buenos Aires | 15% of gold production is mercury-free | 50% of gold production is mercury-free | 85% of gold production is mercury-free |

There is a primordial difference between alluvial mining and primary mining. The former type was identified as using higher amounts of mercury for gold production: a more urgent reinforcement of monitoring and surveillance by state authorities is required.

## 2.5 Development of strategies

The following section provides in-depth details about the strategies mentioned in **Table 6**, which include specific objectives and their corresponding lines of action and activities. Section III describes indicators, established targets, parties that are directly responsible and parties that act as support, as well as the estimated budget and possible source for each established activity and line of action.

### 2.5.1 Miner formalization/regularization strategy

#### Main objective

Encourage miners related to gold ASGM activities to formalize/regularize their activities, in compliance with the established regulations and under a program that would facilitate such process.

The regularization/formalization process is carried out under a continuous improvement and results-based approach, taking into account a territorial outlook where special attention is paid to identified ASGM sites and to the specific needs of each area.

#### Specific objectives

a) **Review and strengthen the regulatory and procedural framework for the formalization/regularization of miners devoted to ASGM activities**

The strengthening of the regulatory framework aims to facilitate the formalization process through the revision of the current framework, introducing procedural improvements and establishing parameters based on previously identified obstacles that will allow miners devoted to ASGM activities to formalize their labor.

**a1.** Review of formalization/regularization rules and procedures

The aim of reviewing the rules and procedures related to formalization/regularization is to turn this process into one that is friendly and of easy access to miners and to the ASGM community as a whole. For this purpose, the following lines of action are proposed:

- Updating of the rules, procedures and instruments related to the formalization/regularization of artisanal and small scale gold mining activities, distinguishing between primary or underground mining and alluvial or secondary mining (taking into account any possible bottlenecks in the process). The process will be carried out with a participative consultation of the ASGM mining sector.
- Administrative simplification of formalization/regularization procedures and the standardization of technical procedures, without disregarding obligations and responsibilities.
- Study and launching of an automated system for the formalization/regularization process and the review of these processes.

**a2.** Implementation of a mining census and updating of the cadastre, in both cases with information disaggregated by gender

In order to optimize the regulatory and procedural framework for the formalization/regularization of ASGM activities, it is necessary to possess an information base that is solid and up-to-date and includes the mining registry and cadastre (instrument operated by the Vice Ministry of Mining

together with the Mining Regulatory and Control Agency - ARCOM), and knowledge of illegal activities in the mining sector. For this purpose, the following measures are suggested:

- Updating of the mining registry and cadastre based on ASGM-related mining titles that are allotted or in process of being granted. The cadastre shall include appropriate georeferenced information, legal status, production volumes, description of extraction and processing modalities, supplementary descriptions, and information disaggregated by gender, among other relevant data points. This activity is intended to supplement the current system governing the operation of the mining cadastre.
- Development of a Mining Census that includes data collection relative to legal (formalized or pending a formalization process) and illegal activities, and that will allow subsequent monitoring and tracking. The census shall cross-reference information with the updated mining cadastre and will include information disaggregated by gender.
- Monitoring and updating of the cadastre and activity census as related to ASGM, biannually.

**a3.** Inclusion of excluded vulnerable sectors and populations within the ASGM sector and development of regulations

This line of action is primarily concerned with the development of regulations and procedures for parties considered key actors and for vulnerable populations in the ASGM sector that have been excluded from the current regulatory framework. Groups dedicated to the collection of ore, known in Ecuador as *jancheo*, which are made up of 90% women, have been marginalized when identifying artisanal mining activities, when in fact these activities sustain their households. Their rights are not guaranteed and they have no recognition or support from the State. For this reason, the following measures are proposed:

- Acknowledgment of their ore collection activities, or *jancheo*, as a part of artisanal mining.
- Definition of procedures for the formalization/regularization of groups of people dedicated to the collection of ore (*jancheo*), under the protection of the regulations established by the Ministry of Energy and Non-Renewable Natural Resources and the Ministry of Labor, or other similar institutions.
- Promotion of incentives that will encourage mine owners related to ASGM activities to grant access rights to ore collection groups, composed mainly of women, and to guarantee equal payment for work of equal value.
- Promotion of formalization/regularization of these groups into associations engaged in ore collection, preferably composed partially or totally by women.

**b) Develop and reinforce institutions for managing the formalization/regularization of activities related to gold ASGM**

In order to establish an adequate regulatory framework and comply with the dispositions related to formalization/regularization, monitoring and tracking of ASGM activities, it is crucial that the entities in charge of these processes can do it in an organized, efficient, effective and above all coordinated manner, responding to the needs of the ASGM community. The following lines of action are proposed:

**b1.** Strengthening of professional teams for the facilitation of formalization/regularization processes

The idea of strengthening professional teams is to train and maintain competent technical personnel at a regional and local level to assist formalization and regularization from the technical side, as well

as monitor and control such procedures. Among the most important measures, the following can be highlighted:

- Identification of the technical personnel that will conform regional and local teams and that will be in charge of facilitating formalization and regularization processes, and the subsequent verification of activities.
- Development of internal training for these technicians with the aim of unifying and establishing technical criteria and standards. For this purpose, standard technical sheets and formats will be established and then shared with the mining community in general.
- Creation of a training schedule and plan to be delivered in coordination by the Vice Ministry of Mines, ARCOM, and IIGE for the benefit of the mining community, and including the required budgetary allocations and a results-based evaluation system.

**b2.** Planning of formalization/regularization actions

After the updating of the regulatory framework, the implementation of the mining cadastre and census, and training of technical personnel in charge of facilitating the formalization/regulatory framework process, adequate planning is required for achieving formalization or regularization targets for ASGM. For this purpose, the following is proposed:

- Elaboration of a formalization/regularization plan that takes into account priority areas for formalization/regularization needs based on a previous study of conflicts and economic, social and environmental needs.

**c) Accompany and strengthen the capacities of mine producers for general improvement and compliance with their obligations**

In order to attain formalization targets for ASGM activities, it is necessary to build the capacity of the mining community to approach formalization/regularization processes and in general all activities related to artisanal and small scale mining. It is important that the mining community understands that the formalization/regularization process is more than a mere administrative procedure, and in fact constitutes an opportunity to improve operations by integrating sound business management and complying with the regulatory framework, and adding a social and environmental vision. Some of the main measures proposed are the following:

**c1.** Capacity building conducted by the State

- Design and implementation of a technical assistance program for miners involved in artisanal and small scale mining, including *jancheo* activities. The program will encompass different regulatory, procedural and technical-productive aspects, new technologies, environmental, and work safety and workplace health issues. The program will include all key entities, which will coordinate efforts to define their competencies clearly and to develop a consensual technical assistance program.
- Creation, updating and promotion of training profiles and evaluation instruments relevant to ASGM activities. On the basis of a needs assessment and according to the national situation, the Technical Secretariat of the National System of Professional Qualifications (SETEC) will be responsible for this work in coordination with other key entities. These profiles will be sourced from mine sites and areas devoted to ASGM activities. Additionally, agreements could be signed with public educational institutions that could supplement the work to be carried out by SETEC.


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**c2.** Technical assistance from the private sector

- Establishment of agreements with private educational institutions or research centers with the objective of creating technical assistance programs or services and training for the ASGM community, endorsed by SETEC, the Vice Ministry of Mines and IIGE.
- Development of a knowledge base of the gold ASGM community that includes the offer of services from entities related to consultancy and the supply of materials and machinery, among other services.

**d) Identify, develop and promote incentives for formalization/regularization**

This objective is based on the need to highlight the benefits of formalization for the artisanal or small-scale miner, which include productive improvements in different fields: legal, social, economic and environmental. The measures to be executed are the following:

**d1.** Associations of ASGM miners

The idea of this line of action is that ASGM miners can carry out their activities in an articulated and joint manner, with the possibility of accessing a market that offers a fair price and value for the obtained or produced gold. In this way, miners will have new opportunities to choose different incentives and access credit through the financial system or different cooperation efforts. For this purpose, the following measures are suggested:

- Promotion of associations of artisanal and small-scale miners, including *jancheo* activities, that will bring about social and economic benefits in the exploitation, processing and trade of gold, and in the management of mining and metallurgical waste (Mining Development Plan). With this in mind, instructional materials will be prepared to explain the process of setting up associations and the potential benefits of doing so.
- Identification of pilot groups that agree to undergo a process of formalization/regularization into a miners association, including associations for ore collection (*jancheo*), with which it will be possible to identify any potential bottlenecks and document a series of lessons learned that can be replicated in subsequent initiatives.

**d2.** Access to financing mechanisms

The main idea behind this action is to promote financial inclusion in the mining sector (investments and credit) and access to tax incentives in the ASGM sector for supporting their development. The following proposals have been identified:

- Identification and sharing of information on financial products available in the financial system (investments and credit) and existing tax incentives in Ecuador that could be accessed by formalized ASGM miners, as individuals or as established associations.
- Establishment of an evaluation and certification system for activities related to gold ASGM. The certification system will be attached to the formalization/regularization status, and will be a requirement for those interested in accessing some of the financial products in the market. For this purpose, it is possible to create alliances or agreements with private banks and public financial institutions such as BanEcuador, CONAFIPs or the National Financial Corporation.
- Development of a pilot Mechanism for Competitive Funds in priority sites for the support of the ASGM community, including ore collection (*jancheo*) associations, and for the development of their activities, with an economic, social and environmental approach, giving priority to projects spearheaded by women or that demonstrate key roles played by women in ASGM activities.

Clear instructional materials shall be developed with detailed descriptions of requirements and processes to be carried out by potential participants.

- Promotion of a capacity building program for creating business plans for miners in ASGM, so that the mining community can access training and knowledge on how to approach a project that could secure different incentives in the future.

**d3.** Gold certification for access to markets

- Identification of the different certifications available to ASGM miners and gold production, along with their requirements and benefits. Voluntary promotion of certifications that are deemed beneficial to the gold ASGM community, leveraging existing platforms for the promotion of formal and responsible gold.
- Promotion of a feasibility study for the establishment of a national certification for gold produced in sustainable manners.

**e) Strengthen control over activities related to ASGM**

Strengthening control over ASGM activities is a right step towards being able to determine compliance with the current regulatory framework and involving competent authorities related to ASGM activities in an ordered and coordinated fashion. For this purpose, the following measures are proposed:

**e1.** Inter-sector coordination for activity control

- Establishment of an online knowledge platform that integrates information from different control institutions and describes the specific scope of action of each institution and the extent of their competencies as related to the control of ASGM activities.
- Elaboration of control protocols for gold ASGM activities according to objectives and targets, identifying the competencies of each relevant institution based on the regulatory framework and the specific needs of each ASGM site.

### 2.5.2 Strategy for reducing discharges and risks related to mercury exposure and eliminating worst practices

#### Main objective

To promote the adoption of technologies and/or procedures for the processing of gold ore by ASGM miners, both transitively and definitely, but that will ultimately bring forth solutions for finding alternatives to the use of mercury, thus eliminating worst practices related to the use of this substance in ASGM.

#### Specific objectives

**f) Promote the adoption of mercury-free efficient technologies for the extraction and processing of gold**

This line of action seeks to promote technological solutions available for the processing of ores in the gold ASGM sector, and that can be accessed by the mining community with the support of the state and the private sector.

**f1.** Research and knowledge related to available technology for finding alternatives to mercury

- Searching the market for available technologies that can be applicable to the country's situation. For this action, entities such as IIGE shall be responsible for collecting information within their scope of competencies based on their own experience or on activities that are already being carried out in the country's identified gold ASGM sites.
- Development of events to promote available technological solutions applicable to ASGM, with the participation of companies providing goods and services and artisanal and small-scale producers of gold, in which parties can negotiate the acquisition, advisory services, and implementation of technology that is free from toxic substances such as mercury.
- Verification of the possibility of establishing incentives, such as tariff waivers, for importing technology and technical assistance related to alternatives to mercury.
- Development of pilot projects in priority territories, where technology or equipment can be put into practice for processing gold without mercury. For this purpose, it will be important to coordinate, with representatives from the mines and processing plants, the place, materials, miners and spaces necessary for carrying out these tests, in cooperation with state entities. It is important to incorporate all members of the mining community, regardless of whether they have used mercury in their operations or not.
- Promotion of agreements with universities and research centers, especially those located nearby ASGM activity sites, for launching research initiatives related to mercury-free alternative technologies within local developmental contexts.
- Verification of use of mercury recovery systems (retorts and extraction funnels). In spite of the ban on mercury use, it is important to ascertain whether this equipment is used clandestinely, in what way and how much, so users can be taught how to install and use them correctly.

**f2.** Training and information

As a result of previous work related to the adoption of alternative technologies, and based on recorded experiences, the following measures are suggested:

- Development of a training program, based on lessons learned and success cases registered in the pilot projects executed in the national territory. These projects will have promoted the adoption of new or improved mercury-free technologies, their results replicable in other ASGM activity sites at a national level.
- Development of guides and manuals that include efficient extraction and processing procedures through the application of the best available techniques and environmental best practices (BAT/BEP) relevant to the ASGM sector in Ecuador. These materials will also take into account different business models.
- Promotion of experience sharing platforms for ASGM actors that are in the process of applying new mercury-free technologies.

**f3.** Financing and incentives

Access to the financial mechanisms described in section d.2 would be subject to whether the miners have adopted mercury-free technologies and included BAT/BEP.

**g) Verify the feasibility of establishing mining industrial parks**

One of the most promising options for eliminating worst practices detected in the use of mercury in ASGM activities, and reducing other types of social and environmental impacts, is the establishment of industrial parks for the processing of ore, at specifically chosen locations and based on standards

defined by the regulatory framework, adopting the best possible techniques and technologies, in a controlled and organized manner, and with the support and backing of the mining community. For this line of action, the following measures are proposed:

**g1.** Incorporate the implementation and operation of mining industrial parks into the current regulatory framework

As explained in the diagnosis, two mine sites have been identified in Ecuador as being primarily dedicated to the processing of gold, Zaruma - Portovelo (El Oro) and Ponce Enríquez (Azuay). These sites concentrate the vast majority of processing plants (95%). However, these activities are not carried out in an adequate industrial park nor taking into account the appropriate technical and environmental considerations. For this reason, there is a need to develop specific regulations for sustaining the adaptation or creation of industrial parks for the mining sector. The following measures are proposed:

- Definition of a conceptual framework and administrative regime for the establishment of industrial estates for the mining sector, including procedures and requirements for their implementation.
- Development of technical specifications for the establishment and operation of industrial parks for the mining sector that include both technological and environmental aspects and with a focus on the reduction or elimination of mercury from all processes, as well as worst practices in general.
- Development of a pilot project for the establishment and operation of industrial estates for the mining sector. At the time of implementing this pilot project, it is important to take into account the creation and operation of state-owned processing plants.

**g2.** Accompaniment for the implementation of industrial parks for the mining sector

- Promotion of agreements between provincial and cantonal Decentralized Autonomous Governments (GADs), the Vice Ministry of Mines, and the Ministry of Production, Foreign Trade, Investments and Fisheries for the implementation and operation of industrial estates.
- Fostering of public - private alliances for supporting the implementation of industrial estates for the mining sector.

**h) Review and reinforce the regulation of zones and sites devoted to gold ASGM**

The idea is to provide basic guidelines to local GADs for the development of territorial planning initiatives, industrial parks, or for the relocation of activities related to gold production, processing and trade. For this specific target, the following activities are proposed:

**h1.** Strengthening the local territorial planning

- Promotion of information sharing and awareness campaigns targeting provincial and cantonal GADs about the importance of zoning ASGM-related industrial activities outside of urban perimeters.
- Revision of guides for the elaboration of Land-Use Plans (PDOT) to incorporate planning and zoning instruments related to ASGM activities. This review will be carried out, at the very least, with the participation of the Ministry of Urban Development and Habitat, the Vice Ministry of Mining, and the Consortium of Provincial Governments (CONGOPE). The guide will include regulations relative to land use rights allocation, operation, and control and penalty systems applicable to ASGM-related industrial activities according to the corresponding competencies.

- Development of a diagnostic study of urban centers where ASGM activities take place or that are within the sphere of influence of such activities, identifying needs and relocation potential based on urban and industrial zoning principles.

**h2.** Control of urban areas

Once each zone is clearly identified within an analyzed ASGM site, and whenever it is deemed necessary to relocate certain activities, it will be necessary to strengthen permanent inspection mechanisms by GADs, mainly by means of the following:

- Development of a technical assistance project for GADs that include ASGM activities, for the creation of regulations for land rights allocation, operation, control and penalty system applicable to ASGM-related industrial activities according to the corresponding competencies.

**h3.** Citizen awareness

For the purpose of establishing proper zoning and eliminating worst practices involving mercury use in ASGM, it is crucial to involve the general population. The following actions are suggested for this objective:

- Promotion of information and awareness campaigns about the importance of eradicating worst practices and their gender-specific effects derived from the use of mercury, and about the benefits of zoning initiatives.
- Promotion of citizen organization and surveillance for the detection and reporting of cases of mercury use and prevalence of worst practices.

**i) Control and eradicate cyanidation for processing tailings contaminated with mercury**

The cyanidation of tailings contaminated with mercury, considered the worst possible practice within the gold ASGM sector due to the fact that it promotes the formation and movement of methyl mercury (the most toxic form of this substance found in nature) represents one of the most important elimination objectives. The following measures are proposed:

**i1.** Development of a diagnostic study of contaminated sites

- Development of a national inventory of environmental liabilities that verifies the presence of cyanide tailings with mercury content. The inventory will include a classification based on the contamination level of each site, represented as a ranking.
- Promotion of agreements between universities and state institutions for the development of research projects for characterizing and treating mine tailings with mercury content, and for the remediation of contaminated sites.
- Development of a pilot project for researching, classifying and treating sites that process tailings with mercury content.

**i2.** Ban of cyanidation of tailings with mercury content

- Inclusion of a ban on cyanidation of tailings with mercury content in mining regulations.
- Field-based verification and control of cyanidation ban for tailings with mercury content according to an established plan for the control and monitoring of these activities.

### 2.5.3 Strategy for the control of illegal trade and use of mercury

#### Main objective

To establish lines of action that will lead to the elimination of informal trade and use of mercury within gold ASGM, identifying supply chains and increasing control efforts by competent authorities.

#### Specific objectives

**j) Review and update the regulatory and procedural framework related to the restriction of mercury use in mining activities**

The use of mercury in ASGM activities is banned by the Mining Law, and this ban is replicated in other subsequent legal instruments that refer to ASGM activities. In spite of this ban, and as described in the Diagnosis section of this document, the use of mercury is still prevalent, and contrary to what was expected with the introduction of the prohibition, has intensified, albeit illegally, a trend that has propitiated a black market for supply at a national level, often linked to other kinds of illegal activities such as drug trafficking and even human trafficking. The ban on this substance has also restricted access to information about its use, as miners who still do so are afraid they will be subject to fines or reprisals by the authorities. The following lines of action are proposed for the definitive elimination of mercury use from ASGM activities:

**j1.** Revision of the regulatory and procedural framework related to the restriction of mercury use in mining activities

According to legal dispositions, the use of mercury in the ASGM sector is restricted since 2015. From that date, and until today, the use of this substance is still widespread, although clandestine, and the fear of being subject to sanctions for recognizing its use means that it has not been possible to identify the actual amount used and discharged in ASGM sites. For this reason, it is imperative that certain measures are applied for the establishment of an organized process for the eradication of mercury use in ASGM. This could be achieved by means of the following:

- Review of the current regulatory framework and search for an adequate legal figure which, apart from a formal mercury ban, will actually lead to a total eradication of mercury from gold production and processing methodologies.
- Updating of the inventory of Hg use estimations in ASGM, presented in the National Action Plan.

**k) Strengthen the monitoring and control systems for mercury trade and use**

Strengthening monitoring and control of the illegal supply and use of mercury in ASGM is crucial for ensuring a definitive eradication of this substance. For this purpose, the following measures are suggested:

**k1.** Development of control procedures

As a supplement to the measures proposed in section e), apart from verifying the legality of mining activities, it is necessary to establish whether mercury is being used in work sites, identify its supply chain, and dismantle all networks devoted to the illegal trade of this substance.

- Planning and implementation of control procedures, in coordination with competent state institutions, for the verification of mercury use in ASGM activities, not only in identified ASGM sites but also in potential supply routes and roads.

- Implementation of an adequate environmental management of the seized or impounded mercury, including, at least, storage, treatment and/or final disposal, in compliance with the procedure approved by competent environmental authorities and with current regulations.

**k2.** Strengthening of control mechanisms in customs and ports

Personnel working in trans-border customs control and ports shall be trained to identify and prevent mercury contraband. The following measures are proposed:

- Development of a training and capacity building program for technical personnel involved in control, impounding and seizure processes of mercury intended for ASGM use.

**l) Promote regional or bilateral agreements for the cross-border control of mercury**

The idea behind this objective is to supplement the deployment and internal efforts necessary for controlling the illegal trade and use of mercury through the identification of platforms and other collaboration modes at a bilateral level or at the level of the Latin American continent:

**l1.** Promote the activities proposed by the *Observatorio Andino*

In May 2019, during a meeting of the General Secretariat of the Andean Community, member states decided to create the *Observatorio Andino* (Andean Observatory) for managing official information relative to mercury, and guaranteeing objective, trustworthy, updated and comparable information about the production, export, trade, transport and use of mercury, as well as exchanging regulatory and technical information about the final disposition of mercury and the amount of decommissioned or seized mercury. In this case, the following measures are proposed:

- Active participation in the *Observatorio Andino*, initially for the production of regulations for the application of the directives issued by the Andean Community, and later for the in-country application of any obligations established by the former.
- Promotion and dissemination of lessons learned among member countries of the *Observatorio Andino* relative to control, seizure, impounding and disposal procedures for mercury. This will be carried out according to what has been established in sections k.1 and k.2.

**l2.** Promote specific bilateral cooperation agreements for border control of mercury

Although Ecuador already participates in coordination platforms and bilateral agendas that have addressed the issue of illegal mining, especially in border areas, it is important to explicitly mention and work on the problem of mercury contraband and control mechanisms. For this purpose, the following is suggested:

- Inclusion, in bilateral agendas, of the issue of trans-border movement of mercury, and establishments of specific commitments and cooperation agreements for the prevention and strengthening of mercury trafficking. This measure could be incorporated into the corresponding regulations of the *Observatorio Andino*, if seen fit and applicable.


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## 2.6 Strategy for the reduction of illegal mining

### Main objective

To establish mechanisms for eradicating illegal ASGM from the national territory. All corresponding measures shall be taken in three stages: prevention, to avoid its spread into nearby areas; elimination per se; and post-eradication actions.

### Specific objectives

**m) Increase the national capacity to prevent and combat illegal mining**

Increasing the national capacity to prevent and combat illegal activities against mining resources and related crimes can stop them from extending towards areas close to other identified sites that are not qualified or where no concessions exist for these kind of activities:

**m1.** Regulatory review and updating

- Revision, updating or creation of a regulatory framework to address illegal mining activities and establishment of harsher sanctions for those who incur or finance this kind of crime. This review shall be in-line with the formalization/regularization actions proposed in section a) of this document.

**m2.** Monitoring and planning for prevention

In order to prevent the apparition and presence of illegal ASGM activities in vulnerable areas, it is important to intensify monitoring and control efforts. The following potential measures are suggested:

- A schedule of constant meetings for the purpose of verifying and planning the activities of the Special Commission for Control of Illegal Mining (CECMI), according to Executive Decree 754, in coordination with other relevant entities such as the Vice Ministry of Mining, IIGE, ARCOM, the Ministry of Government, MAE, Armed Forces, Judiciary Police, Prosecutor's Office, and provincial and cantonal GADs.
- Identification and intervention of areas vulnerable to the expansion of illegal mining.
- Implementation of an early warning and intervention plan for areas vulnerable to the expansion of illegal mining.
- Execution of information sharing campaigns about social, environmental and health hazards connected to illegal mining, especially in identified vulnerable areas.

**m3.** Promotion of alternatives to mining in vulnerable areas

In some areas with ASGM activities, other productive activities have been identified with considerable development potential that could offer alternatives to mining activities, especially illegal mining. The objective is to identify these productive activities and promote them within communities and areas vulnerable to the expansion of illegal mining. The following measures are proposed:

- Development of an analytical study for the establishment of a priority listing of alternatives to mining in areas identified as vulnerable to the expansion of illegal mining, with an emphasis on people who work in ore collection, or *jancheo*.

- Creation of projects that could be supported by the national government or other cooperation agencies for the promotion of productive activities in areas identified as vulnerable to the expansion of illegal mining, with an emphasis on people who work in ore collection, or *jancheo*.

**n) Intensify efforts for combating and eradicating illegal mining.**

The idea is to channel activities and manage current resources for a more efficient eradication of mercury.

**n1.** Coordinated campaign for surveillance and control of illegal mining

The surveillance and control of illegal mining requires a dedicated attention and a coordinated effort between different competent authorities. Although these kind of operations have been carried out in recent years, it is important to take into account the following measures:

- Development of protocols based on a preliminary plan prepared by different entities with control and inspection competencies together with law enforcement agencies. It is also important to conduct intelligence activities that could shed light on potential evasion strategies by illegal miners.
- Establishment of an information platform that can be fed by key entities related to the surveillance and control of ASGM activities. This platform will be linked to the other platform proposed in section e.1, which is focused on information access and exchange for formalization processes.
- Planning and execution of coordinated operations against illegal mining and related crimes, based on the enhancement of intelligence and criminal investigations.

**n2.** Empowerment in the fight against money laundering and organized crime

Illegal mining, as other activities that are outside the regulatory and legal framework, is often organized and sustained by related illegal activities. For this reason, it is important to increase efforts in fighting against money laundering and organized crime for the purpose of identifying the actors who manage and sustain the illegal supply chain and trade of gold, and its industrial inputs such as mercury. Ecuador has a specific bill, the "Law for Prevention of Money Laundering and Crime Financing", which defines strategic actions to control money laundering. However, illegal mining is not mentioned explicitly within specific strategies, and different measures can be taken in this line of action:

- Explicit inclusion of illegal mining within the Law for Prevention of Money Laundering and its corresponding regulations, so that specialized teams can be formed for prevention, detection and research related to illegal mining crimes.

**o) Strengthen post-intervention actions**

Once areas with illegal mining or areas vulnerable to the expansion of these activities have been intervened, it is crucial to prevent the reintroduction of illegal operations, follow up on any penal processes that could have been launched, and monitor ongoing investigations. The following lines of action are proposed:

**o1.** Strengthening of surveillance actions

In places that have been intervened due to the presence of illegal mining, or where it is suspected that such activities occur, it is important to implement surveillance mechanisms for reducing the risk

of reintroduction of illegal mining activities in the future. For this purpose, the following measures are proposed:

- Promotion of community-level coordination for monitoring of illegal mining and the development of early warning and surveillance mechanisms, in-line with the proposals of section h.3.
- Implementation of control and surveillance mechanisms is places that have already been intervened (cleared) due to illegal mining activities, based on the deployment of criminal investigations and intelligence (related to section n.1).

**o2.** Promotion of alternatives to mining in cleared areas

In order to ensure total eradication of illegal mining in intervened areas, it is important that local communities become aware and familiar with opportunities for developing other types of productive activities to replace the direct or indirect benefits these communities were obtaining from illegal mining activities. The following measures are proposed, in-line with the propositions of point m.3:

- Execution of an analytical study to determine a priority listing for alternatives to mining in areas that have been cleared of illegal mining.
- Creation of projects that could be supported by the national government or other cooperation agencies for the promotion of productive activities in areas that have been cleared of illegal mining.

### 2.6.1 Public health strategy for the provision of services to the population exposed to mercury due to ASGM activities

#### Main objective

To design a Public Health strategy for the provision of health services to the ASGM population at different levels, strengthening promotion, prevention, cure and rehabilitation actions, references and counter-references, and enhancing the technical capacity of healthcare professionals.

#### Specific objectives

**p) Strengthen the institutional capacity of the public health care system in order to develop healthcare services (promotion, prevention, curing, rehabilitation) for people exposed to the use of toxic substances such as mercury (differentiated by gender) and their effects on the community related directly or indirectly to the gold ASGM sector.**

According to the diagnosis of the sanitary sector, where a quick analysis was carried out of the institutional capacity for responding to possible episodes of mercury poisoning derived from ASGM activities, there are clear opportunities for strengthening public management in this area. Some initiatives are already in place, and new ones can be anchored on the existing ones, or created separately for specific needs related to the use of the mentioned substance. Among the main lines of action, the following can be highlighted:

**p1.** Capacity building of the National Healthcare System (SNS)

Training of SNS personnel is the foundation of institutional strengthening. This training must address promotion, prevention, cure, rehabilitation and palliative care activities for communities at risk of being affected by gold ASGM activities. For the attainment of this objective, the following measures are proposed:

- Creation of regulations for standardizing health procedures such as treatment protocols and monitoring of acute and chronic poisoning by organic and inorganic mercury.
- Preparation and dissemination, by responsible areas, of a training program for the SNS that will address the diagnosis, treatment and monitoring of diseases present in ASGM communities, with a focus on those caused by mercury exposure, differentiated by gender.

**p2.** Strengthening of diagnostic and analytical capacities

Apart from capacity building, it is important to acquire the necessary equipment and procedures to support the diagnosis of possible health effects derived from mercury. INSPI is a flagship national laboratory, annexed to MSP, that could be used to carry out studies for the identification of mercury in different matrices. However, a single operation is not enough for covering and analyzing the totality of the national territory. Thus, the following is proposed:

- Studying the existing technical capacity of all state-run and private laboratories that can offer services for identifying or determining mercury content in any matrix (water, soil, sediments, tissue, blood, urine, etc.), including research and academic entities and international laboratories.
- Constitution of a network of laboratories and institutes that can offer support to studies and research related to the presence and effects of mercury, through the execution of working agreements.

**p3.** Strengthening of the Medical Emergency System

An important aspect of emergency response is the role of primary level healthcare, as most of the accidents and incidents that occur during mining activities are treated at this level. For this reason, it is important to strengthen the capacity of primary level care in coordination with local communities, and through the following actions:

- Consolidation of a contingency and emergency plan proposed by the Ministry of Public Health for the SNS, in all its levels of operation. Promotion and prevention activities will include topics related to the possibility of poisoning by mercury exposure, together with other risks specific to working in ASGM. The médico del barrio (neighborhood doctor) initiative could be an ideal platform for the consolidation and dissemination of the Contingency Plan in the community.
- Execution of a territorial analysis to determine requirements for more ambulances and emergency routes for the transport of patients from the ASGM communities.
- Strengthening of the emergency network with large-scale mining companies located nearby previously identified ASGM sites.

**p4.** Structure and implementation of a health surveillance system in the workplace

With the aim of maintaining records of pathologies and treatments related to ASGM workers, it is necessary to create a system that will enable monitoring of the community's health status, especially for those communities in which possible mercury poisoning cases have been detected. The following measures are suggested:

- Structure and implementation of a health surveillance system in the workplace that will help identify pathologies suffered by workers in ASGM sites, differentiated by gender. This data will enable an adequate surveillance, monitoring and sanitary response in different ASGM sites and

workers, taking into account vulnerabilities to chemical exposure differentiated by gender. Case notifications make authorities aware of:

- people exposed to occupational hazards;
- populations potentially affected by exposure to chemical substances, especially mercury;
- risks derived from working in mines;
- identification of vulnerable personnel;
- reporting of signs and symptoms;
- reporting of potential occupational hazards, or those made worse by work; and
- the possibility of creating a data base of personnel exposed to mercury from work in the mining sector.

**q) Enhance the capacity of the system to notify cases of mercury poisoning for the creation of statistics and the development of studies and research**

The idea is to create and maintain a data base of all monitoring activities in areas subject to mercury concentrations, for the development of studies and research initiatives to act as foundations for the generation of policies, regulations and action plans, as needed. For this purpose, the following is required:

**q1.** Establishment of a biomonitoring system

In order to be able to structure and launch a monitoring system, the following actions shall be implemented:

- Identification of points of interest for monitoring. These points can be identified on the basis of the mining census described in section a.2 of this document, which would provide geographical coordinates for the identification of direct and indirect spheres of influence.
- Establishment of a biomonitoring system, based on priority monitoring points and information needs, which would cover, at the very least, monitoring data for soil, water and sediments, as well as tissue, hair, blood or urine (for people in monitoring points, if there are any). The network of laboratories and institutes mentioned in section p.2 could be used for the implementation of these activities. At least two annual monitoring campaigns will be executed, from which respective technical reports will be created.

### 2.6.2 Strategy pertaining to gender issues and child labor in ASGM

#### Main objective

Consider and improve the conditions through which women carry out their activities within the ASGM community, and eradicate child and adolescent labor in mining activities.

#### Specific objectives

**r) Improve working conditions and reduce risk factors for women**

The role of women in mining activities in the country has not diversified in decades, and still corresponds to work related to the administrative or domestic side of the ASGM community. However, there is evidence of more representative roles for women, such as the formation of associations for ore collection (*jancheo*), leadership of mining consortiums, work as technicians in charge of gold

production and processing, laboratory technicians, and other positions of greater relevance within a traditionally hermetic community such as that of gold ASGM.

**r1.** Improve working conditions of women ore collectors

Groups of women devoted to the gathering of residue material from mining processes, known as jancheras, represent an especially vulnerable group whose income could be improved by the creation of certain ventures, and which require social and sanitary protection. In this line, the following measures are proposed:

- Identification of women collecting residue material for the purpose of recording their activities. This identification is related to the census proposed in section a.2.
- Development of a National Gender Study for the mining community, based on focal groups and focused on gender-specific challenges and needs, for the purpose of identifying opportunities for incorporating gender perspectives in national regulations.
- Design of specific trainings for women who collect ore, based on environmental good practices and best practices for the recovery of mineral without using toxic substances such as mercury.
- Training of groups of jancheras and their families on the occupational hazards related to ore gathering and processing activities.
- Promotion of the formalization of associations of women ore collectors, in-line with the proposals of section a.3.

**r2.** Promotion of alternative activities to ore gathering

As alternatives to ore collection activities, certain groups of women have organized to participate in alternative productive activities, such as organic orchards, handicrafts and other businesses with the objective of increasing their income and sustaining their homes, thus improving their economic autonomy:

- Awareness and knowledge of success cases where women dedicated to ore gathering activities have been able to incorporate other productive work to their daily routines, so that these experiences can be replicated in other communities throughout the country.
- Creation of projects that could be supported by the national government or other cooperation agencies for the promotion of productive activities among groups or associations dedicated to the collection of residue minerals, in-line with the propositions of sections m.3 and o.2.

**s) Eradicate child and adolescent labor in ASGM**

As indicated by the Constitution of Ecuador, and well as by the Mining Law and other related legal dispositions, child and adolescent labor in Ecuador is forbidden. It is necessary to intensify surveillance of ASGM activities, as the sector is susceptible to the incorporation of minors. Related to this aspect, and in order to ensure the dissociation of children and adolescents from mining jobs, the following measures are proposed:

**s1.** Strengthening of surveillance and prevention of child and adolescent labor in gold ASGM activities

- Development and implementation of a children and adolescents program for the purpose of detecting their presence within ASGM activities and dissociating them from these activities, in agreement with the regulatory framework against child labor.

- Inclusion of ASGM sites as focal points in planning instruments or mechanisms for including children and adolescents dissociated from ASGM in alternative activities, such as regular schooling or technical training, as needed. For this purpose, necessary resources will have to be allocated to the implementation of local and regional planning instruments.
- Instruction of police stations, which are the institutions handling the reception of reports, on the need of establishing a roadmap for intervention, and the implementation of a special office to handle reports of forced labor in mining activities within the main identified ASGM sites.

### 2.6.3 Strategy for participation and information transfer between all interested parties in the implementation and continuous development of the action plan

#### Main objective

To create and put into practice communication channels so that miners that are dedicated to the artisanal and small scale mining of gold can be active participants in the planning and execution of activities carried out by different national and local institutions for the implementation of the present National Action Plan, encouraging women to participate in decision making.

#### Specific objectives

**t) Institutionalize communication among relevant actors within gold ASGM**

With the aim of ensuring participation of the ASGM community in the implementation and monitoring of the National Action Plan, it is mandatory to establish working plans that include spaces for dialog and coordination for the discussion of any implemented measures and their progress, as well as limitations and opportunities for improvement. For this purpose, the following measures are proposed:

**t1.** Coordination of dialog and communication from the central government, for local governments and mining communities

The state, through competent entities related to guaranteeing the development of activities in compliance with the current regulatory framework, shall coordinate interaction mechanisms with local institutions and miner organizations or associations. The following actions are suggested:

- Create a Permanent Multisector Commission with the objective of monitoring formalization/regularization processes, and for the surveillance and control of ASGM throughout the national territory, with the cooperation of local competent entities that can facilitate communication platforms with mining communities. The creation of CECMI can be used as a model, although in this case the objective will be to take care of the needs of the gold ASGM community.
- Creation of annual Working Plans within the Permanent Multisector Commission for fostering dialog and information dissemination.

**u) Development of capacities and means for dialog and communication**

As has been mentioned in the gold ASGM diagnostic study, there are several groups and associations of mining producers that are not really visible, due to lack of resources or support, and in many cases are not even formalized, and are therefore excluded from participation and dialog. One such example are associations of jancheras. For this reason, it is important to identify these groups and strengthen them:

**u1.** Strengthening and visibility of mining organizations

- Creation of a data base of mining organizations, both formally and informally established, especially those which are less visible or not consolidated and with which it is possible to commence communication and dialog processes. This measure shall be in-line with any formalization/regularization processes to be carried out.
- The Permanent Multisector Commission will foster spaces for dialog and communication using the necessary equipment and teams.

**u2.** Capacity development and enhancement of communication channels

This objective is focused on strengthening communication and information mediums and channels connecting with the ASGM community, so that both miners and the society at large can access veracious, real, up-to-date and articulated information related to their areas of interest. The idea is that all initiatives or activities that need to be shared by each one of the entities relevant to ASGM management can be funneled into the same communication channels. For this purpose, the following measures are suggested:

- Revision and reactivation of the mining services portal mentioned in the National Plan for Mining Development to describe the services rendered by each one of the entities involved in control, surveillance and monitoring of ASGM mining activities.
- Establishment of a telephone support line and social network channels so that users connected to the ASGM sector can clarify doubts and receive relevant information for the development of their activities.
- Design and dissemination of training campaigns in different areas of interest, focused on the technical, environmental, social, and sanitary aspects of ASGM sites and their spheres of influence. To be consolidated with previously mentioned training aspects.
- Establishment of agreements with physical and digital media outlets, such as local radio, television, and social networks, for the dissemination of information campaigns related to ASGM activities.

# 3. IMPLEMENTATION PLAN

## 3.1 Miner formalization/regularization strategy

### a) Review and strengthen the regulatory and procedural framework for the formalization/regularization of miners devoted to ASGM activities

| Action/measures | Indicator | Verification mode/ Expected result | Targets | | | Authorities | Estimated budget | Possible source of resources |
|---|---|---|---|---|---|---|---|---|
| | | | 2022 | 2026 | 2030 | | | |
| **Line of action a1** – Review of formalization/regularization rules and procedures | | | | | | | | |
| Updating of regulations, procedures and instruments for formalization/regularization of gold ASGM activities | Proposal for regulations that include the formalization/regularization process of ASGM activities | Updated legislation (Law and regulations) | Updated regulatory framework | Review of the regulatory framework and requirements for updates | | Main: Vice Ministry of Mining, ARCOM Support: IIGE, ENAMI, MAE, SENAGUA | N/A | Central Government |
| Administrative simplification of formalization procedures and standardization of technical criteria | Simplified formalization/regularization process | Guide or regulation establishing administrative simplification and standardization of technical criteria for formalization/ regularization | Guide or regulation that includes a simplified formalization/ regularization process | | | Main: Vice Ministry of Mining, ARCOM Support: MAE | N/A | Central Government |
| Study and launching of an automatized system for the formalization and regularization process | Automated system for formalization and regularization | Instructions for the use of the automated system | Study and implementation of the automated system | Operational automated system | | Main: Vice Ministry of Mining, ARCOM Support: MAE, SENAGUA | 336,000 | IDB (EC-L1257) |
| **Line of action a2** – Implementation of a mining census and updating of the cadastre, in both cases with information disaggregated by gender | | | | | | | | |
| Updating of the mining cadastre and registry based on allotted mining titles; the registries will contain information disaggregated by gender | Data base of activities that are already formalized and pending formalization, and need to be registered | Publishing of the reopening of the mining cadastre | Updated mining cadastre and registry | | | Main: Vice Ministry of Mining Support: ARCOM, IIGE | N/A | Central Government |
| Updating of the mining census, including both legal and illegal activities, with information disaggregated by gender | Data base of formal and illegal mining activities included in the Mining Census | Agreement or decree calling for the implementation of a mining census | | Updated mining census | | Main: Vice Ministry of Mining, ARCOM Support: IIGE, GADs, ENAMI | 56,000 | IDB (EC-L1257) |

| Action/measures | Indicator | Verification mode/ Expected result | Targets | | | Authorities | Estimated budget | Possible source of resources |
|---|---|---|---|---|---|---|---|---|
| | | | 2022 | 2026 | 2030 | | | |
| Monitoring and updating of the cadastre and activity census as related to ASGM, biannually | Updated census and cadastre | Agreement for the periodic review and monitoring of the census and cadastre | | At least one review of the mining cadastre and census has been carried out | The second review of the mining cadastre and census has been carried out | Main: Vice Ministry of Mining, ARCOM Support: IIGE, ENAMI | N/A | Central Government |
| **Line of action a3** – Inclusion of excluded vulnerable sectors and populations within the ASGM sector and development of regulations | | | | | | | | |
| Acknowledgment of ore collection activities, or *jancheo*, as a part of artisanal mining | Registration of ore gathering activities (*jancheo*) | Regulation, agreement or decree which recognizes residue material gathering as an activity within ASGM | Ore collection is recognized as a part of artisanal mining | | | Main: Vice Ministry of Mining, MAE (PNGQ) Support: MIES and MT International Cooperation | 26,880 | GEF – National Chemicals Management Program |
| Define procedures for the formalization/regularization of groups dedicated to ore gathering (*jancheo*) | Registration of various ore gathering activities in ASGM sites | Regulation, agreement or decree defining formalization processes for groups devoted to ore collection | Formalization procedures for ore gathering, defined and established | | | Main: Vice Ministry of Mining, ARCOM Others: Ministry of Labor | 26,880 | GEF – National Chemicals Management Program |
| Promotion of incentives that will encourage mine owners related to ASGM activities to grant access rights to ore collection groups, composed mainly by women | Meetings with mining company operators for encouraging hiring of work groups for ore gathering | Agreements with Mining Companies for defining service rendering of ore collection groups | Negotiations for the inclusion of ore collectors within the formal activities of mining companies | Ore collection groups are working for mining companies | | Main: Vice Ministry of Mining Support: MAE | 40,678 | GEF – National Chemicals Management Program |
| Promotion of formalization processes for turning groups into associations engaged in ore collection, preferably composed partially or totally by women. | Identification of number of women working in ore gathering in each group or association | Title of duly formalized association | Measures are taken for the recognition of associations | The first ore collection organizations are recognized as associations in the ASGM sector | | Main: Vice Ministry of Mining Support: MAE (PNGQ), ARCOM | 40,678 | GEF – National Chemicals Management Program |

## b) Develop and reinforce institutions for managing the formalization and regularization of activities related to ASGM

| Action/measures | Indicator | Verification mode/ Expected result | Targets | | | Authorities | Estimated budget | Possible source of resources |
|---|---|---|---|---|---|---|---|---|
| | | | 2022 | 2026 | 2030 | | | |
| **Line of action b1** – Strengthening of professional teams for the facilitation of formalization/regularization processes | | | | | | | | |
| Identification of the technical personnel that will compose regional and local teams and that will be in charge of facilitating formalization and regularization processes | Competent technical personnel identified | Established work groups | Work groups are duly formed | Work groups are working on a permanent basis | | Main: Vice Ministry of Mining Support: IIGE, ARCOM | N/A | Central Government |
| Development of internal training for these technicians with the aim of unifying and establishing technical criteria and standards. For this purpose, standard technical sheets and formats will be established and then shared with the mining community in general | Trainings for technical personnel designed | Attendance records for technician capacity building workshops | Training of internal technical personnel designed and launched | | | Main: Vice Ministry of Mining, ARCOM Support: IIGE | N/A | Central Government |
| Creation of a training schedule and plan | Agreement or meeting minutes that define the training contents and plan | Publishing of training schedule and plan | Training are carried out in the field for addressing formalization processes, especially in ASGM sites | Trainings are continued and updated as formalization processes change | | Main: Vice Ministry of Mining, ARCOM Support: IIGE | 40,678 | IDB (EC-L1257) |
| **Line of action b2** – Planning of formalization and regularization actions | | | | | | | | |
| Creation of an action plan for formalization/regularization, taking into account priority areas for formalization and regularization | Identification of activities in ASGM sites with formalization and regularization needs | Publishing of a formalization plan based on priorities given to each site | 30% of identified ASGM sites are formalized/regularized, or in the process of | 50% of identified ASGM sites are formalized/regularized, or in the process of | 95% of identified ASGM sites are formalized/regularized, or in the process of | Main: Vice Ministry of Mining, ARCOM Support: IIGE, ENAMI | N/A | Central Government |

## c) Accompany and strengthen the capacities of mine producers for general improvement and compliance with their obligations

| Action/measures | Indicator | Verification mode/ Expected result | Targets | | | Authorities | Estimated budget | Possible source of resources |
|---|---|---|---|---|---|---|---|---|
| | | | 2022 | 2026 | 2030 | | | |
| **Line of action c1** – Capacity building conducted by the State | | | | | | | | |
| Design and implementation of a technical assistance program for miners involved in artisanal and small scale mining, including *jancheo* activities | Design of a syllabus for the assistance program, based on identified needs | Document containing the technical assistance program description | The assistance program is shared internally among technicians and strategic institutions (2021). Program executed in the field in coordination with the mining community (2022) | | | Main: Vice Ministry of Mining, IIGE, MAE Support: SRI, SENAGUA, Ministry of Labor, Academia | 25,231 | GEF – National Chemicals Management Program |
| Creation, updating and promotion of training profiles and evaluation instruments relevant to ASGM activities | Study that describes possible technical profiles that can be created in the framework of the ASGM sector | Training profiles for ASGM activities approved and available | At least 10% of ASGM miners are accredited in training profiles | At least 35% of ASGM miners are accredited in training profiles | At least 60% of ASGM miners are accredited in training profiles | Main: SETEC, IIGE Support: Vice Ministry of Mining, NGOs, International Cooperation, Academia | N/A | Central Government and International Cooperation |
| **Line of action c2** – Technical assistance from the private sector | | | | | | | | |
| Establishment of agreements with private educational institutions or research centers with the objective of creating technical assistance programs or services and training for the ASGM community | A number of universities or research centers interested in establishing agreements | Cooperation agreements between academia and state institutions signed | At least 1 agreement signed between academia and public sector | At least 3 agreement signed between academia and public sector | At least 5 agreement signed between academia and public sector | Main: Vice Ministry of Mining, IIGE Support: SETEC, SENESCYT, Academia | 264,816 | IDB (EC-L1257) |
| Development of a knowledge data base of the gold ASGM community that includes the offer of services from entities related to consulting and supply of materials and machinery, among other services | List of companies or entities devoted to consultancy services, supply of equipment and machinery, and others | Publishing of the list | The list is available to the general public | The list is updated frequently | The list is updated frequently | Main: Vice Ministry of Mining Support: ARCOM, MAE, SENAGUA, IIGE | N/A | Central Government |

## d) Identify, develop and promote incentives for formalization/regularization

| Action/measures | Indicator | Verification mode/ Expected result | Targets | | | Authorities | Estimated budget | Possible source of resources |
|---|---|---|---|---|---|---|---|---|
| | | | 2022 | 2026 | 2030 | | | |
| **Line of action d1** – Associations of ASGM miners | | | | | | | | |
| Promote the formation of associations of artisanal miners and small-scale miners, including *jancheo* activities | List of ASGM miners interested in organizing into associations, or that have the potential to | Instructional material that explains the advantages and benefits of ASGM miner associations | Reception of requests for forming associations | | | Main: Vice Ministry of Mining, ARCOM Support: IIGE, MAE | N/A | Central Government |
| Identification of pilot groups that agree to undertake a formalization/ regularization process as a miners association | Group of miners interested in participating in the pilot test for formalization/ regularization | Association is legally recognized | At least 1 pilot group formally recognized as an association | | | Main: Vice Ministry of Mining, ARCOM Support: MAE, Superintendence of Popular and Solidarity Economy | N/A | Central Government |
| **Line of action d2** – Access to financing mechanisms | | | | | | | | |
| Identification and sharing of information of financial products available in the financial system (investments and credit) and existing tax incentives in Ecuador that could be accessed by formalized ASGM miners | List of identified financial products | Publishing of identified financial products | Formalized/regularized ASGM miners, or in the process thereof, are aware of financial products to which they have access | | | Main: Vice Ministry of Mining, MAE Support: SRI, International Cooperation, State Banks, Private Banks | 100 | GEF – National Chemicals Management Program |
| Establishment of an evaluation and certification system for gold ASGM miners | Design of formalized miner certification | Banks or financial entities request the submission of the mentioned certification as a requirement for accessing financial products | Certification is operational. It can be the result or the final part of the formalization/regularization process | | | Main: Vice Ministry of Mining, ARCOM Support: MAE, International Cooperation, State Banks, Private Banks | 26,880 | GEF – National Chemicals Management Program |
| Development of a pilot Mechanism for Competitive Funds in priority sites for the support of the ASGM community, including ore collection (*jancheo*) associations | Report on the interest of accessing a Mechanism for Competitive Funds in priority sites | Publishing of the Mechanism for Competitive Funds | At least two projects within the ASGM community accredited as beneficiaries of the mechanism | Monitoring of accredited projects | | Main: Vice Ministry of Mining, MAE Support: International Cooperation | 100,000 | GEF – National Chemicals Management Program |
| Promotion of a capacity building program for creating business plans for miners in ASGM, so that the mining community can access training and knowledge about how to approach a project that could secure different incentives in the near future | Mining community interested in being trained | Resolution approving the creation of a capacity building program for the development of business plans | Creation of the program approved | Training program implemented | | Main: Vice Ministry of Mining Support: MAE, International Cooperation | 70,246 | GEF – National Chemicals Management Program |

| Action/measures | Indicator | Verification mode/ Expected result | Targets 2022 | 2026 | 2030 | Authorities | Estimated budget | Possible source of resources |
|---|---|---|---|---|---|---|---|---|
| **Line of action d3** – Gold certification for access to markets | | | | | | | | |
| Identification of the different certifications available to ASGM miners and gold production, along with their requirements and benefits | List of countries and corresponding requirements for the purchase of gold and access to markets | Publishing of main certifications available to miners | The ASGM community is well informed about the main certifications available to them, especially those related to environmental, social and quality aspects | | | Main: Vice Ministry of Mining, MAE Support: Central Bank, IIGE, International Cooperation | N/A | Central Government |
| Promotion of a feasibility study for the establishment of a national certification for gold produced in sustainable manners | A number of mining producers interested in obtaining a national certification | Feasibility study for the establishment of a national certification for gold producers | The feasibility study is carried out | | | Main: Vice Ministry of Mining, MAE Support: Central Bank, IIGE, International Cooperation | 35,840 | GEF – National Chemicals Management Program |

## e) Strengthen control over activities related to ASGM

| Action/measures | Indicator | Verification mode/ Expected result | Targets 2022 | 2026 | 2030 | Authorities | Estimated budget | Possible source of resources |
|---|---|---|---|---|---|---|---|---|
| **Line of action e1** – Inter-sector coordination for control of activities | | | | | | | | |
| Establishment of an online information platform that centralizes information from different control institutions | Each institution has relevant data to share about ASGM activities | Publishing of a common platform for the shared exchange and discussion of information | The coordinated information exchange platform is operational | | | Main: Vice Ministry of Mining, ARCOM, MAE, SENAGUA, MSP, Ministry of Government Support: International Cooperation | N/A | Central Government |
| Elaboration of control protocols for gold ASGM activities according to objectives and targets, identifying the competencies of each relevant institution, and shared through the information platform | Control protocols for ASGM activities previously established by each relevant entity | Consolidation and publishing of the control protocols for ASGM activities | A consolidated protocol for the control of ASGM activities is in place | | | Main: Vice Ministry of Mining, ARCOM, MAE, SENAGUA, MSP, Ministry of Government Support: International Cooperation | N/A | Central Government |

## 3.2 Strategy for reducing discharges and risks related to mercury exposure and eliminating worst practices

### f) Promote the adoption of mercury-free efficient technologies for the extraction and processing of gold

| Action/measures | Indicator | Verification mode/ Expected result | Targets | | | Authorities | Estimated budget | Possible source of resources |
|---|---|---|---|---|---|---|---|---|
| | | | 2022 | 2026 | 2030 | | | |
| **Line of action f1** – Research and knowledge related to available technology for finding alternatives to mercury | | | | | | | | |
| Searching the market for available technologies that can be applicable to the country's situation | Mercury-free gold ASGM extraction and processing technologies are available | Publishing of available mercury-free technologies for the extraction and processing of gold, applicable to the Ecuadorian context | Knowledge transfer to the ASGM community of mercury-free technology with direct application in their activities | | | Main: IIGE, Vice Ministry of Mining Support: MAE | N/A | Central Government |
| Launch events for the promotion of technological solutions applicable to the ASGM sector with the participation of goods and services companies and artisanal and small-scale gold producers | List of companies providing goods or services related to a mercury-free technology for ASGM | Implementation of workshops with the ASGM population and goods and services companies for a mercury-free ASGM | At least 2 meetings or workshops have taken place | | | Main: Vice Ministry of Mining, IIGE, MAE Support: International Cooperation | 2,712 | GEF – National Chemicals Management Program |
| Verification of the possibility of establishing incentives, such as tariff waivers, for importing technology and technical assistance related to alternatives to mercury | Identification of equipment or materials used in ASGM and that need to be imported | Resolutions establishing incentives for the acquisition of equipment or materials for ASGM | At least one incentive has been put into place for the acquisition of mercury-free technology | | | Main: MPCEIP, Vice Ministry of Mining, MAE Support: SRI, IIGE, International Cooperation | N/A | Central Government |
| Development of pilot projects in priority territories, where technology or equipment can be put into practice for processing gold without mercury, and involving members of the mining community who use or are believed to use mercury | Pilot programs executed in the field with the participation of ASGM miners | Design and implementation of pilot projects | At least 1 pilot project carried out in a priority mine site | At least 3 pilot projects carried out in priority mine sites | | Main: IIGE Support: MAE, Vice Ministry of Mining, Academia | 498,333 | GEF – National Chemicals Management Program |
| Promote the establishment of agreements with universities and research centers for including research related to technologies that could act as alternatives to mercury | Universities and research centers devoted to research in metallurgy and gold processing | Cooperation agreements signed between the state, universities and research centers | At least 1 agreement signed for the development of research on mercury-free processing of ore in ASGM | | | Main: IIGE, Vice Ministry of Mining Support: SENESCYT, Academia, International Cooperation | 100,000 | IDB (EC-L1257) |

| Action/measures | Indicator | Verification mode/ Expected result | Targets | | | Authorities | Estimated budget | Possible source of resources |
|---|---|---|---|---|---|---|---|---|
| | | | 2022 | 2026 | 2030 | | | |
| Verification of use of mercury recovery systems (retorts and extraction funnels) | Existence of sites with mercury recovery systems in place | Status report about recovery systems and their operational conditions | 50% of sites with recovery systems have been identified | | | Main: ARCOM, Vice Ministry of Mining, IIGE Support: MAE | N/A | Central Government |
| **Line of action f2** –Training and information | | | | | | | | |
| Create a training program based on lessons learned and success cases recorded during the pilot projects phase | Pilot projects that show positive results in the application of technology to gold ASGM production processes | Training program published | At least 25% of miners present in identified ASGM sites have been trained | At least 50% of miners present in identified ASGM sites have been trained | | Main: IIGE Support: Vice Ministry of Mining, SETEC, Academia | 20,339 | GEF – National Chemicals Management Program |
| Create guides and manuals for extraction and processing procedures applying the best available techniques and best environmental practices (BAT/BEP) | Experiences of pilot projects for mercury-free technology applicable to ASGM | Launching of BAT/BEP guides and manuals | BAT/BEP guides and manuals have been disseminated | | | Main: IIGE Support: Vice Ministry of Mining, SETEC, MAE, Academia | 4,054 | GEF – National Chemicals Management Program |
| Promotion of experience sharing platforms for ASGM actors that are in the process of applying new mercury-free technologies | Number of miner groups or associations interested in knowing about and applying new technology in the ASGM sector | Promotion of events for the sharing of experiences | At least 1 event carried out for the sharing of experiences in technological innovation for gold ASGM processes | At least 2 event carried out for the sharing of experiences in technological innovation for gold ASGM processes | | Main: IIGE, Vice Ministry of Mining Support: SETEC, MAE, Academia | N/A | Central Government |

## g) Verify the feasibility of establishing mining industrial parks

| Action/measures | Indicator | Verification mode/ Expected result | Targets | | | Authorities | Estimated budget | Possible source of resources |
|---|---|---|---|---|---|---|---|---|
| | | | 2022 | 2026 | 2030 | | | |
| **Line of action g1** – Incorporate the implementation and operation of mining industrial parks into the current regulatory framework | | | | | | | | |
| Definition of a conceptual framework and administrative regime for the establishment of industrial estates for the mining sector | ASGM sites spread out over a single area that could be united into one industrial estate | Resolution, agreement or decree that defines a conceptual framework and administrative regime for the establishment of industrial estates for the mining sector | The resolution that defines the conceptual framework, competencies and administrative regime has been established | | | Main: Vice Ministry of Mining, ARCOM Support: IIGE, ENAMI, MAE, SENAGUA, GAD | 161,280 | IDB (EC-L1257) |
| Development of technical specifications for the establishment and operation of mining industrial estates that take into account both environmental and technological aspects | Preliminary design of the industrial parks Economic studies Pre-feasibility studies Existing procedures in processing plants | Publishing of technical specifications for the establishment and operation of industrial estates for the mining sector | The design phase of the technical specifications has started | Technical specifications have been produced | | Main: Vice Ministry of Mining, IIGE, MAE, GAD Support: ARCOM, ENAMI, International Cooperation | N/A | Central Government |
| Development of a pilot project for the establishment and operation of industrial estates for the mining sector. At the time of implementing this pilot project, it is important to take into account the creation and operation of state-owned processing plants | Final designs of the industrial parks Economic studies Miners of the ASGM sector interested in joining the industrial park | Creation and presentation of pilot project | Design of the pilot project complete | Construction and operation of the pilot project. Results from the first operational phase (not included in the estimated budget) | Project operation | Main: Vice Ministry of Mining, IIGE, ARCOM Support: Mining companies, ASGM community, ENAMI, MAE, Academia | 1,500,000 | IDB (EC-L1257) |
| **Line of action g2** – Accompaniment for the implementation of industrial parks for the mining sector | | | | | | | | |
| Promotion of agreements between provincial and cantonal Decentralized Autonomous Governments (GADs) and other key entities of the ASGM sector for the implementation and operation of industrial estates | Industrial parks dedicated to other types of industries have been implemented | Signing of cooperation agreement for the establishment of industrial parks for mining | A cooperation agreement has been implemented | | | Main: Vice Ministry of Mining, ARCOM, ASGM community, GADs Support: CONGOPE | N/A | Central Government |
| Fostering of public - private alliances for supporting the implementation of industrial estates for the mining sector. | Private consortiums interested in developing mining industrial parks | Cooperation document for the establishment of industrial parks for mining | Public-private alliance in place within a mining industrial park | | | Main: IIGE, Vice Ministry of Mining, mining community, GADs Support: MAE, Academia | 107,520 | IDB (EC-L1257) |

## h) Review and reinforce the regulation of zones and sites devoted to gold ASGM

| Action/measures | Indicator | Verification mode/ Expected result | Targets 2022 | Targets 2026 | Targets 2030 | Authorities | Estimated budget | Possible source of resources |
|---|---|---|---|---|---|---|---|---|
| **Line of action h1** – Strengthening the local territorial planning | | | | | | | | |
| Promotion of information sharing and awareness campaigns targeting provincial and cantonal GADs on the importance of zoning ASGM-related industrial activities | GADs maintain their territorial planning competencies, as well as those related to environmental regularization and monitoring of certain mining activities | Design of a campaign focused on zoning of industrial activities | The first awareness campaign has been carried out on the need and importance of zoning efforts for mining activities | | | Main: Vice Ministry of Mining, ARCOM Support: CONGOPE, AME, GADs, MAE | 35,840 | BdE (Mining Royalties Product) |
| Revision of guides for the elaboration of Land-Use Plans (PDOT) to incorporate planning and zoning instruments related to ASGM activities | Inclusion of updates in the PDOT implementation guide | Updated guide | The necessary discussions about how to update the guides have taken place | Updates guides are available to the public | | Main: Vice Ministry of Mining, GADs, Planifica Ecuador Technical Secretariat Support: CONGOPE, ENAMI, IIGE | 17,920 | BdE (Mining Royalties Product) |
| Development of a diagnostic study of urban centers where ASGM activities take place or that are within the sphere of influence of such activities, identifying needs and relocation potential | ASGM activities considered industrial in nature being carried out within urban perimeters, even inside residences | Preliminary study of ASGM sites that include activities in residential urban areas requiring relocation | | Relocation studies have been conducted for at least 2 of the main ASGM sites | | Main: Vice Ministry of Mining, GADs, Planifica Ecuador Technical Secretariat Support: CONGOPE | 143,360 | BdE (Mining Royalties Product) |
| **Line of action h2** – Control of urban areas | | | | | | | | |
| Development of a technical assistance project for GADs that include ASGM activities, for the creation of regulations for land rights allocation, operation, control and penalty system applicable to ASGM-related industrial activities according to the corresponding competencies | ASGM activities considered industrial in nature taking place in areas that are unfit for this purpose | Technical assistance program designed | | 50% of miners involved in ASGM are made aware of the program | | Main: Vice Ministry of Mining, ARCOM, Planifica Ecuador Technical Secretariat Support: IIGE, CONGOPE, GADs | N/A | Central Government |

| Action/measures | Indicator | Verification mode/ Expected result | Targets | | | Authorities | Estimated budget | Possible source of resources |
|---|---|---|---|---|---|---|---|---|
| | | | 2022 | 2026 | 2030 | | | |
| **Line of action h3** – Citizen awareness | | | | | | | | |
| Promotion of information and awareness campaigns on the importance of eradicating worst practices and their gender-specific effects derived from the use of chemical substances such as mercury | Identification of worst practices related to mercury use in ASGM areas | Design and publishing of an information and awareness campaign for eradicating worst practices | Awareness campaigns on the eradication of mercury and worst practices have been carried out in 35% of ASGM sites | Awareness campaigns on the eradication of mercury and worst practices have been carried out in 60% of ASGM sites | Awareness campaigns on the eradication of mercury and worst practices have been carried out in 90% of ASGM sites | Main: MAE, IIGE Support: MSP | 112,000 | IDB (EC- 1257) |
| Promotion of citizen organization and surveillance for the detection and reporting of cases of mercury use and prevalence of worst practices in ASGM | Communities organized for surveillance | Campaigns to reinforce citizen surveillance activities | Community organizations are actively involved in the surveillance, detection and reporting of mercury cases | | | Main: ARCOM, MAE, Ministry of Government Support: GADs, Vice Ministry of Mining | N/A | Central Government |

## i) Control and eradicate cyanidation for processing tailings contaminated with mercury

| Action/measures | Indicator | Verification mode/ Expected result | Targets | | | Authorities | Estimated budget | Possible source of resources |
|---|---|---|---|---|---|---|---|---|
| | | | 2022 | 2026 | 2030 | | | |
| **Line of action i1** – Development of a diagnostic study of contaminated sites | | | | | | | | |
| Development of a national inventory of environmental liabilities that verifies the presence of cyanide tailings with mercury content | National inventory of environmental liabilities<br>A number of sites identified as discharging cyanide tailings with mercury content | Program designed for the survey of environmental liabilities | At least 30% of the national territory presumed to discharge tailings with mercury content has been surveyed | The totality of sites in the national territory presumed to discharge tailings with mercury content has been surveyed | | Main: IIGE, MAE Support: ARCOM, Vice Ministry of Mining, International Cooperation | 161,280 | IDB (EC-L1257) |
| Promotion of agreements between universities and state institutions for the development of research projects for the characterization and treatment of mine tailings | Universities or research centers devoted to research projects for the characterization and treatment of mine tailings | Document defining agreements for research projects | | At least one agreement signed for research | | Main: IIGE, MAE Support: Academia, SENESCYT | 56,000 | IDB (EC-L1257) |
| Development of a pilot project for researching, classifying and treating sites that use mining tailings with mercury content | Inventory with information relative to environmental liabilities (tailings with mercury content) | Pilot demonstration regarding the recovery of mercury from a contaminated site | Launching of the process for hiring an institution to carry out the project | Pilot project has been executed | | Main: IIGE, MAE Support: Academia, GADs | 161,280 | GEF - National Chemicals Management Program |

| Action/measures | Indicator | Verification mode/ Expected result | Targets 2022 | 2026 | 2030 | Authorities | Estimated budget | Possible source of resources |
|---|---|---|---|---|---|---|---|---|
| **Line of action i2** – Ban on cyanidation of tailings with mercury content | | | | | | | | |
| Inclusion of a ban on cyanidation of tailings with mercury content in mining regulations | Regulation for mining activities that bans inadequate practices in ASGM | Standard, agreement or regulation establishing a ban on cyanidation of tailings with mercury content | Regulation banning cyanidation of tailings with mercury content issued | | | Main: Vice Ministry of Mining, MAE Support: IIGE, ARCOM | N/A | Central Government |
| Field-based verification and control of ban on cyanidation of tailings with mercury content | ASGM sites that use cyanidation processing of tailings with mercury content | Field verification report | At least one campaign has been carried out in the 3 main ASGM sites utilizing cyanidation (Zaruma - Portovelo, Ponce Enríquez, Zamora) | | | Main: IIGE, MAE Support: ARCOM, Vice Ministry of Mining | N/A | Central Government |

## 3.3 Strategy for the control of illegal trade and use of mercury

### j) Review and update the regulatory and procedural framework related to the restriction of mercury use in mining activities

| Action/measures | Indicator | Verification mode/ Expected result | Targets 2022 | 2026 | 2030 | Authorities | Estimated budget | Possible source of resources |
|---|---|---|---|---|---|---|---|---|
| **Line of action j1** – Revision of the regulatory and procedural framework related to the restriction of mercury use in mining activities | | | | | | | | |
| Review of the current regulatory framework and search for an adequate legal figure which, apart from a formal mercury ban, will actually lead to a total eradication of mercury from gold production and processing | Review processes and updating of regulatory framework | Resolution that allows, within the adequate legal context, the updating of regulations related to the ban on mercury in mining | The resolution updating the ban on mercury in mining has been published | | | Main: Vice Ministry of Mining, MAE Support: ARCOM, IIGE | N/A | Central Government |
| Updating of the inventory of Hg use estimations in ASGM, presented in the National Action Plan | Inventory of Hg use and discharge estimations in ASGM | Resolution or document that promotes the updating of the inventory of mercury estimations in ASGM | | Inventory of Hg use and discharge estimations in ASGM has been updated | | Main: Vice Ministry of Mining, IIGE, MAE Support: ARCOM, GADs, International Cooperation | N/A | Central Government Support through International Cooperation |

## k) Strengthen the monitoring and control systems for mercury trade and use

| Action/measures | Indicator | Verification mode/ Expected result | Targets | | | Authorities | Estimated budget | Possible source of resources |
|---|---|---|---|---|---|---|---|---|
| | | | 2022 | 2026 | 2030 | | | |
| **Line of action k1** – Development of control procedures | | | | | | | | |
| Planning and execution of control procedures, in coordination with competent state institutions, for the verification of mercury use in ASGM activities | Planning and coordination of control procedures | Resolution or document defining the execution of coordinated control procedures related to mercury use | Control procedures have been carried out in at least 25% of ASGM sites | Control procedures have been carried out in at least 60% of ASGM sites | Control procedures have been carried out in at least 90% of ASGM sites | Main: ARCOM, Vice Ministry of Mining, IIGE, MAE, Ministry of Government Support: Law enforcement agencies (FFAA, PN), GADs | N/A | Central Government |
| Environmentally adequate management of seized or impounded mercury | Amount of mercury impounded during control procedures | Report on the environmentally adequate management of seized or impounded mercury | Environmentally adequate management of the mercury seized/ impounded during control procedures | Environmentally adequate management of the mercury seized/ impounded during control procedures | Environmentally adequate management of the mercury seized/ impounded during control procedures | Main: Ministry of Government, MAE, ARCOM Support: Environmental managers, Vice Ministry of Mining, SENAE | 67,200 | IDB (EC-L1257) |
| **Line of action k2** – Strengthening of control mechanisms in customs and ports | | | | | | | | |
| Development of a training and capacity building program for technical personnel involved in control, impounding and seizure processes of mercury intended for ASGM use | Training program addressing the handling of chemical substances, including mercury | Dissemination of the training program for mercury seizure procedures | The program has been shared with the main relevant actors in the impounding process | The program has been shared with the main relevant actors in the impounding process | The program has been shared with the main relevant actors in the impounding process | Main: MAE, ARCOM, Ministry of Government Support: MSP, Vice Ministry of Mining, IIGE, SENAE, FFAA, PN, Prosecutor's Office | N/A | Central Government |

## I) Promote regional or bilateral agreements for the cross-border control of mercury

| Action/measures | Indicator | Verification mode/ Expected result | Targets | | | Authorities | Estimated budget | Possible source of resources |
|---|---|---|---|---|---|---|---|---|
| | | | 2022 | 2026 | 2030 | | | |
| **Line of action I1** – Promote the activities proposed by the *Observatorio Andino* | | | | | | | | |
| Active participation in the *Observatorio Andino*, initially for the production of regulations for the application of the directives issued by the Andean Community (CAN) | Meetings at the CAN level for the organization of mercury trade and the definition of regulations | Document that accepts the regulations established by the CAN for nationwide adoption | Participation in meetings for creating the regulations. The regulations are being applied | | | Main: Foreign Affairs Ministry Support: Vice Ministry of Mining, MAE, Ministry of Government | N/A | Central Government |
| Promotion and dissemination of lessons learned among member countries of the *Observatorio Andino* relative to control, seizure, impounding and disposal procedures of mercury | Existing procedures for control, seizure, impounding or disposal | Report on lessons learned at a national level on mercury control, for sharing at the CAN level | Information related to mercury control procedures compiled and shared at the CAN level | Information related to mercury control procedures compiled and shared at the CAN level | Information related to mercury control procedures compiled and shared at the CAN level | Main: Foreign Affairs Ministry Support: Vice Ministry of Mining, MAE, Ministry of Government, CECMI | N/A | Central Government |
| **Line of action I2** – Promote specific bilateral cooperation agreements for border control of mercury | | | | | | | | |
| Include, in bilateral agendas, the issue of trans-border movement of mercury, and establish specific commitments and cooperation agreements for the prevention and strengthening of mercury trafficking | Bilateral commitments reached | Document or agenda defining problems and commitments related to the trans-border movement of mercury | Problems and possible actions defined in documents generated on the basis of bilateral meetings or commitments for trans-border mercury control | Verification of established actions and obtained results | | Main: Foreign Affairs Ministry Support: Vice Ministry of Mining, MAE, Ministry of Government, CECMI | N/A | Central Government |

## 3.4 Strategy for the reduction of illegal mining

### m) Increase the national capacity to prevent and combat illegal mining

| Action/measures | Indicator | Verification mode/ Expected result | Targets | | | Authorities | Estimated budget | Possible source of resources |
|---|---|---|---|---|---|---|---|---|
| | | | 2022 | 2026 | 2030 | | | |
| **Line of action m1** – Regulatory review and updating | | | | | | | | |
| Revision, updating or creation of a regulatory framework to address illegal mining activities and establishment of harsher sanctions for those who incur or finance this kind of crime | Reviews and updates of the regulatory framework governing illegal mining | Updated or created regulations related to illegal mining in the context of the Ecuadorian reality (law, regulations, agreements) | Regulatory framework has been updated, reviewed or created | Review of the regulatory framework and requirements for updates | | Main: Vice Ministry of Mining, ARCOM Ministry of Government Support: IIGE, ENAMI, MAE | 26,880 | IDB (EC-L1257) |
| **Line of action m2** – Monitoring and planning for prevention | | | | | | | | |
| A schedule of constant meetings for the purpose of verifying and planning the activities of the Special Commission for Control of Illegal Mining (CECMI), in cooperation with other relevant entities | Record of the creation of CECMI and its activities and attributions | Documents derived from meetings and agreements within CECMI | Work meetings in CECMI's framework of operation | Permanent CECMI activities | | Main: Vice Ministry of Mining, ARCOM Support: Ministry of Government, MAE, FFAA, PN, GADs | N/A | Central Government |
| Identification and intervention in areas where illegal mining exists | Identification and intervention in areas where illegal mining exists | Intervention program in illegal mining areas | Implementation of intervention activities in areas with illegal mining sites | Implementation of intervention activities in areas with illegal mining sites | Implementation of intervention activities in areas with illegal mining sites | Main: CECMI Support: Vice Ministry of Mining, ARCOM, Ministry of Government IIGE, MAE, GADs | N/A | Central Government |
| Implementation of an early warning and intervention plan for areas vulnerable to the expansion of illegal mining | Identification of areas vulnerable to the expansion of illegal mining | Presentation of the early warning and intervention plan in areas vulnerable to the expansion of illegal mining | The early warning and intervention plan is put into practice and verified in at least 35% of sites with potential for illegal mining | The early warning and intervention plan is put into practice and verified in at least 85% of sites with potential for illegal mining | | Main: CECMI Support: ARCOM, Vice Ministry of Mining, Ministry of Government IIGE, MAE | N/A | Central Government |
| Execution of information sharing campaigns on social, environmental and health hazards connected to illegal mining, especially in identified vulnerable areas | Campaigns related to the presence of mining activities in vulnerable areas | Launching of information campaign in areas vulnerable to the expansion of illegal mining | Campaigns are executed in at least 35% of sites with potential for illegal mining activities | Campaigns are executed in at least 75% of sites with potential for illegal mining activities | | Main: Vice Ministry of Mining, ARCOM, CECMI Support: MAE, ARCOM, IIGE, MSP, GADs | 134,400 | IDB (EC-L1257) |

| Action/measures | Indicator | Verification mode/ Expected result | Targets | | | Authorities | Estimated budget | Possible source of resources |
|---|---|---|---|---|---|---|---|---|
| | | | 2022 | 2026 | 2030 | | | |
| **Line of action m3** – Promotion of alternatives to mining in vulnerable areas | | | | | | | | |
| Development of an analytical study for the establishment of a priority listing of alternatives to mining in areas identified as vulnerable to the expansion of illegal mining, with an emphasis on people who work in ore collection, or *jancheo*. | Data collection related to addressing illegal mining | Analytical report | Analysis carried out for the identification of alternatives to mining in vulnerable areas | | | Main: CECMI Support: Vice Ministry of Mining, MAE, ARCOM, IIGE, MSP, GADs | 107,520 | GEF - National Chemicals Management Program |
| Creation of projects that could be supported by the national government or other cooperation agencies for the promotion of productive activities in areas identified as vulnerable to the expansion of illegal mining, with an emphasis on people who work in ore collection, or *jancheo* | Analysis carried out for the identification of alternatives to mining in vulnerable areas | Creation of project profiles | At least one project profile is presented for the promotion of productive activities in areas considered vulnerable to the expansion of illegal mining | At least one project profile is implemented for the promotion of productive activities in areas considered vulnerable to the expansion of illegal mining | | Main: Vice Ministry of Mining, MAE Support: MAE, ARCOM, IIGE, MSP, GADs, MPCEIP, Mining Community | 50,000 | GEF - National Chemicals Management Program |

## n) Intensify efforts for combating and eradicating illegal mining

| Action/measures | Indicator | Verification mode/ Expected result | Targets | | | Authorities | Estimated budget | Possible source of resources |
|---|---|---|---|---|---|---|---|---|
| | | | 2022 | 2026 | 2030 | | | |
| **Line of action n1** – Coordinated campaign for surveillance and control of illegal mining | | | | | | | | |
| Development of protocols based on a preliminary plan developed by different entities with control and inspection competencies | Implemented illegal mining control procedures | Creation of protocol for joint control and inspection actions | Protocol applied during a control procedure | | | Main: CECMI Support: Vice Ministry of Mining, ARCOM, IIGE, ENAMI, MAE, Ministry of Government, FFAA, PN | N/A | Central Government |
| Establishment of an information platform that can be fed by key entities related to the surveillance and control of ASGM activities | Existing interinstitutional information platforms | Publishing of the information platform | Project is prepared and pilot tests executed | The information platform is operational | | Main: CECMI Support: Vice Ministry of Mining, ARCOM, IIGE, ENAMI, MAE, Ministry of Government, FFAA, PN | N/A | Central Government |

| Action/measures | Indicator | Verification mode/ Expected result | Targets | | | Authorities | Estimated budget | Possible source of resources |
|---|---|---|---|---|---|---|---|---|
| | | | 2022 | 2026 | 2030 | | | |
| Planning and execution of coordinated operations against illegal mining and related crimes, based on the enhancement of intelligence and criminal investigations | Strategic posts for the control of illegal activities through operations carried out by criminal intelligence investigations | Coordinated operations reports for the control of illicit activities | Coordinated operations against illegal mining and related crimes | Coordinated operations against illegal mining and related crimes | Coordinated operations against illegal mining and related crimes | Main: CECMI Support: Vice Ministry of Mining, ARCOM, IIGE, ENAMI, MAE, Ministry of Government, FFAA, PN | N/A | Central Government |
| **Line of action n2** – Empowerment in the fight against money laundering and organized crime | | | | | | | | |
| Promote the explicit inclusion of illegal mining within the provisions of the Ley de Prevención de Lavado de Activos (Money Laundering Prevention Law) and its corresponding regulations | Illegal mining is considered a crime | Resolution to include illegal mining in the Money Laundering Prevention Law | The request for inclusion is made | Illegal mining is included as a part of the Money Laundering Prevention Law | | Main: Vice Ministry of Mining, CECMI Support: ARCOM, Ministry of Government, National Assembly | N/A | Central Government |

## o) Strengthen post-intervention actions

| Action/measures | Indicator | Verification mode/ Expected result | Targets | | | Authorities | Estimated budget | Possible source of resources |
|---|---|---|---|---|---|---|---|---|
| | | | 2022 | 2026 | 2030 | | | |
| **Line of action o1** – Strengthening of surveillance actions | | | | | | | | |
| Promotion of community-level coordination for monitoring of illegal mining and the development of early warning and surveillance mechanisms (In-line with section h.3) | Existence of community organization level in ASGM sites and their spheres of influence | Program that facilitates community organization for surveillance and early warning of illegal mining | Trainings are conducted in at least 35% of sites with potential for illegal mining and their spheres of influence on the incorporation of surveillance and early warning mechanisms | Trainings are conducted in at least 60% of sites with potential for illegal mining and their spheres of influence on the incorporation of surveillance and early warning mechanisms | Trainings are conducted in at least 90% of sites with potential for illegal mining and their spheres of influence on the incorporation of surveillance and early warning mechanisms | Main: Vice Ministry of Mining, ARCOM, CECMI, MAE Support: IIGE, ENAMI, Ministry of Government, FFAA, PN | 36,610 | IDB (EC-L1257) |
| Implementation of control and surveillance mechanisms is places that have already been intervened (cleared) due to illegal mining activities, based on the deployment of criminal investigations and intelligence (related to section n.1). | Strategic posts exist for the control of illegal activities in implemented operations | Post-intervention reports of control operations based on criminal intelligence and investigations | Coordinated surveillance and control operations in intervened sited | Coordinated surveillance and control operations in intervened sited | Coordinated surveillance and control operations in intervened sited | Main: CECMI Support: Vice Ministry of Mining, ARCOM, IIGE, ENAMI, MAE, Ministry of Government, FFAA, PN | N/A | Central Government |

| Action/measures | Indicator | Verification mode/ Expected result | Targets | | | Authorities | Estimated budget | Possible source of resources |
|---|---|---|---|---|---|---|---|---|
| | | | 2022 | 2026 | 2030 | | | |
| **Line of action o2** – Promotion of alternatives to mining in cleared areas | | | | | | | | |
| Execution of an analytical study to determine a priority listing for alternatives to mining in areas that have been cleared of illegal mining | Data collection related to addressing illegal mining | Analytical report | Launching of the studies | Analysis carried out for the identification of alternatives to mining in areas cleared of illegal mining | | Main: CECMI Support: Vice Ministry of Mining, MAE, ARCOM, IIGE, MSP, GADs | 26,880 | GEF - National Chemicals Management Program |
| Creation of projects that could be supported by the national government or other cooperation agencies for the promotion of productive activities in areas that have been cleared of illegal mining | Record of potential projects in areas that have been cleared of illegal mining | Creation of project profiles | At least one project profile is presented for the promotion of productive activities in areas cleared of illegal mining | At least one project profile is implemented for the promotion of productive activities in areas cleared of illegal mining | | Main: Vice Ministry of Mining, ARCOM Support: MAE, ARCOM, IIGE, MSP, GADs, MPCEIP, Mining Community | 35,840 | IDB (EC-L1257) |

## 3.5 Public health strategy for the provision of services to the population exposed to mercury due to ASGM activities

### p) Strengthen the institutional capacity of the public health care system in order to develop healthcare services (promotion, prevention, curing, rehabilitation) for people exposed to the use of toxic substances such as mercury and their effects on the community related directly or indirectly to the gold ASGM sector

| Action/measures | Indicator | Verification mode/ Expected result | Targets | | | Authorities | Estimated budget | Possible source of resources |
|---|---|---|---|---|---|---|---|---|
| | | | 2022 | 2026 | 2030 | | | |
| **Line of action p1** – Capacity building of the National Healthcare System (SNS) | | | | | | | | |
| Creation of regulations for standardizing health procedures such as treatment protocols and monitoring of acute and chronic poisoning by organic and inorganic mercury | Treatment and monitoring protocols for cases of mercury poisoning | Issuance of regulations for the standardization of treatment and monitoring protocols for cases of mercury poisoning | The process of creating the regulations has been initiated | Dissemination of approved regulations | | Main: MSP<br>Support: MAE, Vice Ministry of Mining | 39,908 | World Health Organization |
| Preparation and dissemination, by responsible areas, of a training program for the SNS that will address the diagnosis, treatment and monitoring of diseases present in ASGM communities, with a focus on those caused by mercury exposure, differentiated by gender | Training programs related to the diagnosis, treatment and monitoring of ASGM-related diseases | Document that describes the training programs related to the diagnosis, treatment and monitoring of ASGM-related diseases | 50% of ASGM sites and their spheres of influence trained | 100 % of ASGM sites and their spheres of influence trained | | Main: MSP<br>Support: CIATOX, INSPI | 20,339 | World Health Organization |
| **Line of action p2** – Strengthening of diagnostic and analytical capacities | | | | | | | | |
| Execute a study of installed technical capacity of all state or privately run laboratories that offer mercury identification or determination services from different matrices | Laboratories identified according to needs | List of potential laboratories with installed capacity for determining or investigating mercury presence | Detailed information is available about laboratories that have the capacity to determine or investigate mercury content | | | Main: MSP, INSPI, MAE<br>Support: IIGE, Academia, SAE | 71,680 | World Health Organization |
| Constitution of a network of laboratories and institutes that can offer support to studies and research related to the presence and effects of mercury | Laboratories identified for research networks and analysis of specific parameters | Resolution that establishes a network of labs and research institutes | Launching of review process for laboratory evaluation | Laboratory network established | | Main: MSP, MAE, SENAGUA<br>Support: INSPI, Academia | N/A | Central Government |

| Action/measures | Indicator | Verification mode/ Expected result | Targets | | | Authorities | Estimated budget | Possible source of resources |
|---|---|---|---|---|---|---|---|---|
| | | | 2022 | 2026 | 2030 | | | |
| **Line of action p3** – Strengthening of the Medical Emergency System | | | | | | | | |
| Consolidation of a contingency and emergency plan by the SNS healthcare personnel, at a primary level and in coordination with community members | Contingency and emergency plans present at a primary and secondary levels | Consolidated and/or updated plan for contingencies and emergencies in ASGM sites | The primary level care plan has been consolidated | The primary level care plan has been disseminated | | Main: MSP Support: INSPI, representatives of ASGM organizations or communities | N/A | Central Government |
| Execution of a territorial analysis to determine requirements for more ambulances and emergency routes for the transport of patients from the ASGM communities. | Sites identified as requiring the presence of emergency transport services | Presentation of the analytical report explaining the need for emergency evacuation routes in ASGM sites | Decision on the viability of deploying emergency care units in ASGM sites where these services are not available | | | Main: MSP Support: INSPI, representatives of ASGM organizations or communities | N/A | Central Government |
| Strengthening of the emergency network with large-scale mining companies that are located nearby previously identified ASGM sites | Existence of community relations and healthcare assistance by Mining Companies for the community | Resolution or agreement for the strengthening of emergency services in cooperation with large companies and ASGM associations or community members | | At least one agreement has been implemented for strengthening emergency services in ASGM communities | | Main: MSP Support: INSPI, representatives of ASGM organizations or communities, large-scale mining companies | N/A | Central Government |
| **Line of action p4** – Structure and implementation of a health surveillance system in the workplace | | | | | | | | |
| Structure and implementation of a health surveillance system in the workplace that will help identify pathologies suffered by workers in ASGM sites, differentiated by gender | Implemented surveillance systems | Resolution that establishes a coupling of the current surveillance systems and the identification of pathologies in ASGM site workers | Structured or improved surveillance system in pilot mode | Structured or improved surveillance system in permanent mode | | Main: MSP, MT Support: Representatives of ASGM organizations or communities | 26,880 | World Health Organization |

### q) Enhance the capacity of the system to notify cases of mercury poisoning for the creation of statistics and the development of studies and research

| Action/measures | Indicator | Verification mode/ Expected result | Targets | | | Authorities | Estimated budget | Possible source of resources |
|---|---|---|---|---|---|---|---|---|
| | | | 2022 | 2026 | 2030 | | | |
| **Line of action q1** – Establishment of a biomonitoring system | | | | | | | | |
| Identification of points of interest for monitoring of mercury in biotic and abiotic matrices (water, soil, air, sediments, tissue, blood, etc.) These points shall be identified within the mining census process | Creation of monitoring protocols that identify key study points | Document presenting the monitoring protocols according to an established network of points | Dissemination of the network and monitoring protocol | | | Main: MSP, MAE, SENAGUA Support: Academia, Research Centers | 168,000 | GEF - National Chemicals Management Program IDB (EC-L1257) |
| Establishment of a biomonitoring system, based on priority monitoring points | Previous biomonitoring efforts Established monitoring points | Launching of biomonitoring system in priority points for gold ASGM | Pilot biomonitoring project prepared | Results and analyses are available from permanent biomonitoring | | Main: MSP, MAE, SENAGUA Support: Academia, Research Centers | 250,000 | World Health Organization |

## 3.6 Strategy pertaining to gender issues and child labor in ASGM

### r) Improve working conditions and reduce risk factors for women

| Action/measures | Indicator | Verification mode/ Expected result | Targets | | | Authorities | Estimated budget | Possible source of resources |
|---|---|---|---|---|---|---|---|---|
| | | | 2022 | 2026 | 2030 | | | |
| **Line of action r1** – Improve working conditions of women ore collectors | | | | | | | | |
| Identification of women collecting residue material, so that their activities can be recorded. This identification is related to the census proposed in section a.2. | Registered activities of women dedicated to ore gathering | Document describing women or women associations involved in ore gathering | Women or groups devoted to ore collection activities have been identified | | | Main: Vice Ministry of Mining, MAE Support: International Cooperation | Budget considered in line of action a.2 | GEF - National Chemicals Management Program |
| Development of a National Gender Study for the mining community, based on focal groups, and focused on gender-specific challenges and needs, for the purpose of identifying opportunities for incorporating gender perspectives in national regulations | Identification of women groups in the mining sector | Terms of reference for the execution of the National Gender Study | Terms of reference for contracting are prepared | The National Gender Study for ASGM is carried out | | Main: Vice Ministry of Mining, MAE Support: International Cooperation | 107,520 | IDB (EC-L1257) |

| Action/measures | Indicator | Verification mode/ Expected result | Targets | | | Authorities | Estimated budget | Possible source of resources |
|---|---|---|---|---|---|---|---|---|
| | | | 2022 | 2026 | 2030 | | | |
| Design of specific trainings for women who collect ore, based on environmental good practices and best practices for the recovery of mineral without using toxic substances such as mercury | Trainings designed for women in mining | Dissemination of campaign designed for women ore gatherers, describing best available techniques for mineral processing | Campaign document ready to be put into practice Training conducted in at least 3 sites identified as having groups of jancheras | | | Main: Vice Ministry of Mining, MAE, IIGE Support: International Cooperation | 26,880 | GEF - National Chemicals Management Program |
| Training of groups of jancheras and their families on the occupational hazards related to ore gathering and processing | Trainings designed for women in mining | Training requests from women gatherers about risks and diseases related to their activities | Training document ready to be put into practiceTraining conducted in at least 3 sites identified as having groups of jancheras | | | Main: Vice Ministry of Mining, MAE, IIGE, MSP Support: International Cooperation | 4,068 | GEF - National Chemicals Management Program |
| Promotion of the formalization of associations of women ore collectors, in-line with the proposals of section a.3. | Initiated formalization processes of ASGM associations and activities | Material gathering is recognized as a part of ASGM, which leads to the creation of associations | The formalization process is started | At least one group of women material gatherers formalized | | Main: Vice Ministry of Mining, MAE, IIGE Support: International Cooperation | Budget considered in line of action a.3 | GEF - National Chemicals Management Program |
| **Line of action r2** – Promotion of alternative activities to ore gathering | | | | | | | | |
| Awareness and knowledge of success cases where women dedicated to ore gathering activities have been able to incorporate other productive work into their daily routines | Record of success cases of alternatives to ASGM or ore gathering | Publishing of success cases | Dissemination of success cases | | | Main: Vice Ministry of Mining, MAE, IIGE Support: International Cooperation, Mining Community | 41,440 | IDB (EC-L1257) |
| Creation of projects that could be supported by the national government or other cooperation agencies for the promotion of productive activities among groups or associations dedicated to the collection of residue minerals, in-line with the propositions of sections m.3 and o.2. | Record of potential projects for women ore gatherers based on the areas where they are located | Creation of project profiles | At least one project profile is presented for the promotion of productive activities with groups of women gatherers | At least one project is implemented for the promotion of productive activities with groups of women gatherers | | Main: Vice Ministry of Mining, MAE, IIGE Support: International Cooperation, Mining Community | 35,840 | IDB (EC-L1257) |

## s) Eradicate child and adolescent labor in ASGM

| Action/measures | Indicator | Verification mode/ Expected result | Targets | | | Authorities | Estimated budget | Possible source of resources |
|---|---|---|---|---|---|---|---|---|
| | | | 2022 | 2026 | 2030 | | | |
| **Line of action s1** – Strengthening of surveillance and prevention of child and adolescent labor in gold ASGM activities | | | | | | | | |
| Development and implementation of a children and adolescents program for the purpose of detecting their presence within ASGM activities and dissociating them from these activities | Program against the exploitation of children and adolescents | Support program for children and adolescents retired from ASGM-related work | Support program for children and adolescents retired from ASGM-related work disseminated | Support program for children and adolescents retired from ASGM-related work launched | | Main: Vice Ministry of Mining, MIES Support: MAE, ARCOM | 47,219 | UNICEF |
| Inclusion of ASGM sites as focal points for planning instruments or mechanisms for including children and adolescents dissociated from ASGM activities in alternative activities, such as regular schooling or technical training, as needed | Plans for the inclusion of children and adolescents dissociated from ASGM activities in schooling or technical training | Gold ASGM sites are part of local development plans | Local planning contemplates the inclusion of children and adolescents dissociated from ASGM activities in schooling or technical training | | | Main: Vice Ministry of Mining, MIES Support: Educational Centers | 17,920 | UNICEF |
| Instruction of police stations, which are the institutions handling the reception of reports, on the need of establishing a roadmap for intervention, and the implementation of a special office to handle reports of forced labor in mining activities within the main identified ASGM sites | Identified centers for reception of reports | Inclusion of ASGM sector and forced labor issues as a component of police station services | Reception of reports of forced labor and other ASGM issues is underway | | | Main: Vice Ministry of Mining, Judiciary Police Support: Mining Community | 17,920 | UNICEF |

## 3.7 Strategy for participation and information transfer between all interested parties in the implementation and continuous development of the action plan

### t) Institutionalize communication among relevant actors within gold ASGM

| Action/measures | Indicator | Verification mode/ Expected result | Targets 2022 | 2026 | 2030 | Authorities | Estimated budget | Possible source of resources |
|---|---|---|---|---|---|---|---|---|
| **Line of action t1** – Coordination of dialog and communication from the central government, for local governments and mining communities | | | | | | | | |
| Create a Permanent Multisector Commission with the objective of monitoring formalization/regularization processes, and for the surveillance and control of ASGM throughout the national territory, with the cooperation of local competent entities that can facilitate communication platforms with mining communities | Platforms for communication between the state and established ASGM communities | Resolution that establishes a multisector commission and dialog platforms | The first platform operated by the multisector commission is launched | | | Main: Vice Ministry of Mining, MAE<br>Support: IIGE, ARCOM, Ministry of Government, Mining Communities, Local Media, International Cooperation | N/A | Central Government |
| Creation of annual Working Plans within the Permanent Multisector Commission for fostering dialog and information dissemination | Work plans designed for the dissemination of information | Sharing of work plans | The activities established by at least one work plan have been put into practice | | | Main: Vice Ministry of Mining, MAE<br>Support: IIGE, ARCOM, Ministry of Government, Mining Communities, Local Media, International Cooperation | N/A | Central Government |

### u) Development of capacities and means for dialog and communication

| Action/measures | Indicator | Verification mode/ Expected result | Targets 2022 | 2026 | 2030 | Authorities | Estimated budget | Possible source of resources |
|---|---|---|---|---|---|---|---|---|
| **Line of action u1** – Strengthening and visibility of mining organizations | | | | | | | | |
| Creation of a data base of mining organizations, both formally and informally established, especially those which are less visible or not consolidated and with which it is possible to commence communication and dialog | ASGM organizations interested in becoming visible and acknowledged | Presentation of the data base | Dissemination of the data base | | | Main: Vice Ministry of Mining, ARCOM<br>Support: IIGE, MAE | N/A | Central Government<br>IDB Support (EC-L1257) |
| The Permanent Multisector Commission will foster spaces for dialog and communication using the necessary equipment and teams | Established spaces for dialog between the ASGM community and the state | Spaces for dialog established | | Spaces for dialog between the ASGM community and the state are operational | | Main: Vice Ministry of Mining, ARCOM<br>Support: IIGE, MAE, Mining Community | 4,068 | IDB (EC-L1257) |

| Action/measures | Indicator | Verification mode/ Expected result | Targets 2022 | Targets 2026 | Targets 2030 | Authorities | Estimated budget | Possible source of resources |
|---|---|---|---|---|---|---|---|---|
| **Line of action u2** – Capacity development and enhancement of communication channels | | | | | | | | |
| Review and reactivate the mining services portal mentioned in the National Plan for Mining Development | Active services to users | Sharing of reactivation of services portal | Services portal for mining users is active | | | Main: Vice Ministry of Mining, ARCOM<br>Support: IIGE, MAE, SENAGUA | N/A | Central Government |
| Establishment of a telephone support line and social network channels so that users connected to the ASGM sector can clarify doubts and receive relevant information for the development of their activities | Active services to users | Dissemination of reactivated support line and social networks | Support line and social network for mining sector users is active | | | Main: Vice Ministry of Mining, ARCOM<br>Support: IIGE, MAE, SENAGUA | N/A | Central Government |
| Design and dissemination of training campaigns in different areas of interest, focused on the technical, environmental, social, and sanitary aspects of ASGM sites and their spheres of influence | Developed information dissemination campaigns for the mining community and general public | Consolidation and launching of information campaigns for the ASGM community | The preparatory phase for the campaigns has been implemented | Technical, environmental, social and sanitary campaigns have been implemented in the main ASGM sites | | Main: Vice Ministry of Mining, MAE, MSP<br>Support: IIGE, ARCOM, SENAGUA | 71,680 | IDB (EC-L1257) |
| Establishment of agreements with physical and digital media outlets, such as local radio and television and social networks, for the dissemination of information campaigns related to ASGM activities | Agreements in place with media outlets for the dissemination of information | Agreement resolution for the dissemination of information related to the ASGM sector through local media | At least one agreement with a local media outlet has been signed and launched for the dissemination of information | | | Main: Vice Ministry of Mining, MAE, MSP<br>Support: IIGE, ARCOM, SENAGUA | 56,112 | GEF - National Chemicals Management Program |
| **Total Estimated Budget for the Implementation Plan** | | | | | | **USD 5,665,626 (UNITED STATES DOLLARS)** | | |

*N/A (not applicable): this denomination has been used for activities that are still under development, or could be implemented as part of the normal competencies of relevant actors, and refers especially to those activities covered by the general public budget and its allocations to different competent institutions.




UNIT
ON/OFF
Z/T

# 4. MONITORING AND EVALUATION

## 4.1 Monitoring of execution tasks

Article 7 of the Minamata Convention declares that member countries shall present, every three years, a report on the progress of the National Action Plan related to the use of mercury in the artisanal and small scale mining of gold. For this reason, a monitoring and evaluation mechanisms has been defined according to the competencies of each relevant institution within the plan's implementation processes:

| Entity | Competence/responsibility |
|---|---|
| **Ministry of the Environment** | General monitoring of the Minamata Convention implementation.<br>Validate the implementation report of the NAP in coordination with the Ministry of Energy and Non-Renewable Natural Resources (Vice Ministry of Mining) and the Ministry of Health<br>In coordination with the Ministry of Energy and Non-Renewable Natural Resources (Vice Ministry of Mining) and the Ministry of Health, propose adjustments to the implementation processes of the NAP and the corresponding evaluation mechanisms.<br>Monitoring of compliance with NAP strategies |
| **Ministry of Energy and Non-Renewable Natural Resources (Vice Ministry of Mining) and Ministry of the Environment** | Lead the systematization and general evaluation of the NAP<br>Monitoring and evaluation of the strategy for reducing discharges and risks related to mercury exposure and eliminating worst practices<br>Monitoring and evaluation of the strategy for participation and information transfer between all interested parties in the implementation and continuous development of the action plan |
| **Ministry of Energy and Non-Renewable Natural Resources (Vice Ministry of Mining)** | Monitoring and evaluation of the strategy for formalization/regularization of miners<br>Monitoring and evaluation of the strategy for the control of illegal trade and use of mercury and mercury compounds (ARCOM) |
| **CECMI and Ministry of Energy and Non-Renewable Natural Resources (Vice Ministry of Mining)** | Monitoring and evaluation of the strategy for the reduction of illegal mining |
| **Ministry of Public Health** | Monitoring and evaluation of the public health strategy |
| **National Council for Gender Equality** | Monitoring and evaluation of the strategy pertaining to gender issues and child labor in ASGM |

## 4.2 Impact indicators

Although the implementation plan describes each and every line of action and its corresponding activities together with its indicators and means of verification, it is also necessary to establish general indicators that enable an effective monitoring and evaluation of progress achieved in the National Action Plan. The following strategic impact indicators are thus established:

**Table 8. General impact indicators for different strategies**

| Strategy | General indicators |
|---|---|
| **Miner formalization/ regularization** | % of artisanal and small scale miners formalized/regularized |
| **Reduce discharges and risks related to mercury exposure, and correct worst practices** | % of gold production through improved methods or alternatives to mercury |
| **Control of the illegal trade and use of mercury and mercury compounds** | Amount of seized or impounded mercury (tons)<br>Number of annual control procedures |
| **Minimization of illegal mining** | % reduction of illegal mining (could be expressed in terms of reduction of number of illegal operations and/or production volumes of illegal gold) |
| **Public health strategy** | % of personnel trained at a primary level for the detection, monitoring and prevention of mercury-related diseases (heavy metals)<br>% of population treated for possible mercury poisoning by trained personnel |
| **Strategy pertaining to gender issues and child labor in ASGM** | Number of ASGM areas or sites where prevention and protection programs for women, adolescents and children are applied |
| **Participation and information transfer between all interested parties in the implementation and continuous development of the action plan** | % of ASGM population involved in information and participation mechanisms |


ENTRADA


ENTRADA A MINA

# 5. BIBLIOGRAPHICAL REFERENCES


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# ANNEX A: TERMS OF REFERENCES FOR THE WORK GROUP

**Términos de Referencia del Comité Directivo Nacional del Proyecto "Plan de Acción Nacional sobre el Mercurio en el Sector de la Minería Artesanal y Pequeña Escala de Oro en Ecuador"**

1. **Contexto del proyecto**
   El Plan de Acción Nacional sobre el Mercurio en el Sector de la Minería Artesanal de Oro y Pequeña Escala en Ecuador tiene como objetivo realizar un diagnóstico de las actividades de minería artesanal y de pequeña escala de oro en el País, y proponer medidas para mejorar la capacidad nacional con el fin de prevenir y eliminar paulatinamente el uso clandestino de mercurio, así como proponer medidas en al ámbito de salud dentro de las comunidades dedicadas a este tipo de actividades.
2. **Rol del Comité Directivo Nacional.** - El Comité Directivo Nacional tiene el mandato de revisar y aprobar el Plan de Acción Nacional conforme a lo señalado en el Anexo C del Convenio de Minamata. Así mismo, el Comité Directivo Nacional es el principal órgano estratégico y de toma de decisiones del proyecto. Formado por actores clave, el Comité Directivo Nacional evaluará el progreso del proyecto y tomará las medidas necesarias para garantizar el cumplimiento de sus metas y objetivos.

   El Comité Directivo Nacional tiene las siguientes funciones:

   1. Proporcionar orientación estratégica para la coordinación del proyecto y el nivel político;
   2. Definir los alcances y componentes del PAN, de acuerdo con las especificaciones señaladas en el Anexo C del Convenio de Minamata;
   3. Desarrollar los componentes del PAN en coordinación con el proyecto;
   4. Convocar e integrar a otros sectores e instituciones de acuerdo con los contenidos específicos a desarrollar en el PAN;
   5. Establecer la coordinación con los gobiernos autónomos descentralizados a diferente escala, para el desarrollo del PAN;
   6. Validar las herramientas metodológicas propuestas por el proyecto para el desarrollo del PAN;
   7. Identificar las autoridades competentes responsables de cada aspecto de la estrategia de implementación que formará parte del PAN;
   8. Identificar fondos potenciales que serán listados dentro del Plan de Acción Nacional para la implementación de estrategias y acciones que serán plasmadas en el plan, para así asegurar su perdurabilidad en el tiempo;
   9. En coordinación con el proyecto, implementar una estrategia de participación, comunicación e información durante la elaboración del PAN; teniendo como principal foco de atención la participación de los gremios mineros;
   10. El Comité Directivo Nacional incluirá a las partes interesadas relevantes que posean conocimientos e información preponderante, y cuya colaboración y cooperación serán necesarias para la formulación exitosa y la futura implementación del PAN.

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3. **Composición y estructura del Comité Directivo Nacional**

El Comité Directivo Nacional estará conformado por un presidente, los miembros permanentes y miembros invitados, de acuerdo con contenidos específicos o temas puntuales a definir.

**Presidente del comité**

1. Ministerio del Ambiente (Dirección Nacional de Control Ambiental)

**Miembros permanentes:**

1. Ministerio de Energía y Recursos Naturales No Renovables (Incluido el Instituto de Investigación Geológico Energético, como entidad adscrita)
2. Ministerio de Salud Pública, como ente rector del Sistema Nacional de Salud
3. AGC – Artisanal Gold Council
4. ONUDI - Organización de Naciones Unidas para el Desarrollo Industrial

**Miembros invitados:**

1. Ministerio del Interior
2. Asociación de mineros
3. Otros que se convoque por acuerdo del Comité Directivo Nacional (Academia, GADs)

**1. Responsabilidades**

**Presidente del comité**

1. Convocar a los miembros a las reuniones de trabajo que se programen.
2. Coordinar las actividades interinstitucionales con los actores involucrados para el desarrollo del PAN.
3. Presentar ante el Comité Directivo Nacional, los avances en el desarrollo del PAN.

**Miembros Permanentes:**

1. Hacer seguimiento de los avances de las tareas encomendadas y actividades programadas.
2. Validar el plan de trabajo del proyecto, de acuerdo a los contenidos específicos señalados en el PAN.
3. Validar los productos intermedios del proyecto.
4. Contribuir en el ámbito de sus competencias para el desarrollo del PAN.
5. Establecer los mecanismos de participación y comunicación para el desarrollo del PAN.

**El Proyecto (AGC):**

1. Administrar y coordinar los recursos financieros y humanos para la ejecución del Proyecto sobre la base de planes de trabajo y presupuestos aprobados.
2. Establecer las coordinaciones con los miembros del Comité Directivo Nacional para el desarrollo de las actividades previstas en el plan de trabajo aprobado.

3. Dar soporte técnico a los miembros del equipo del proyecto para el desarrollo de sus tareas.
4. Proponer herramientas metodológicas y métricas para el desarrollo del PAN.
5. Levantar información para la fase de diagnóstico (componente de salud, inventario de emisiones de mercurio y situación del sector).

**a) Coordinador nacional del proyecto**

1. Consolidar la información de avance del desarrollo del PAN para ser presentada a nivel intersectorial.
2. Consolidar el primer borrador del PAN para su validación a nivel intersectorial.
3. Llevar el archivo de acuerdos, actas y demás documentación relevante durante el proceso de elaboración del PAN.
4. Consolidar y sistematizar los avances en el desarrollo del PAN.
5. En coordinación con los miembros del Comité Directivo Nacional, generar información para la estrategia de comunicación durante el desarrollo del PAN.
6. Presentar ante el Comité Directivo Nacional, el plan de actividades del proyecto, así como los cambios claves en el presupuesto.

**2. Funcionamiento del Comité Directivo Nacional**

El funcionamiento del Comité Directivo Nacional se rige bajo los lineamientos establecidos en el Convenio de Minamata sobre el Mercurio y la legislación nacional vigente enmarcada en los componentes del PAN.

**a. Periodicidad de reuniones**

El comité directivo de proyecto deberá reunirse al menos dos veces más posterior a la primera reunión, y previo a la reunión final.

Al menos deberá haber una reunión para la validación del diagnóstico de la MAPE incluido el inventario de Hg en este sector. Posteriormente, una reunión para revisión de estrategias y acciones sobre el uso y eliminación paulatina de Hg en MAPE.

Otras reuniones podrán darse con previo aviso por parte del Presidente del Comité y bajo la aceptación de los miembros, siempre que exista la necesidad de hacerlo. De igual manera, cualquier miembro del comité puede proponer la necesidad de una reunión si el caso lo amerita.

**3. Comunicación entre miembros del comité**

**a. Revisión de productos e información relevante**

El comité directivo de proyecto deberá validar y revisar productos presentados por el equipo de proyecto, contratado por AGC.

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Para esto se compartirán dichos documentos o productos por correo electrónico, para que sean revisados por los miembros permanentes en un lapso máximo de 7 días hábiles, tiempo en el cual se deberá enviar las observaciones o su aceptación de así serlo.

**4. Representantes del Comité Directivo Nacional:**

| INSTITUCIÓN | ÁREA | DELEGADO | NOMBRE | FIRMA |
|---|---|---|---|---|
| Ministerio del Ambiente | Subsecretaría de Calidad Ambiental | **Subsecretaria** | Carlos Alberto Velasco | |
| Ministerio de Salud Pública | Subsecretaría de Promoción de la Salud e Igualdad | **Subsecretario** | José Leonardo Ruales | |
| Ministerio de Energía y Recursos Naturales No Renovables | Subsecretaría de Pequeña Minería y Minería Artesanal | **Subsecretario** | Enrique Gallegos | |
| | Instituto de Investigación Geológico Energético | **Director Ejecutivo** | Martín Cordovez | |
| Artisanal Gold Council | Delegado de AGC | **Gerente de Proyectos Minamata** | Milene Pacheco | 21/05/2019 |
| Organización de las Naciones para el Desarrollo Industrial (ONUDI) | Delegado de ONUDI | **Manager de Proyectos para el Desarrollo Industrial** | Jerome Stucki | 15/05/2019 |

Fecha, ___ de _____ de _____

# ANNEX B: NATIONAL BASELINE FOR GOLD ASGM IN ECUADOR

AGC/UNIDO. (2019). National Baseline for Gold Artisanal and Small-scale Mining in Ecuador, in conformity with the Minamata Convention on Mercury. Downloadable from: https://www.ambiente.gob.ec/wp-content/uploads/downloads/2020/06/NAP-Inventario-de-Mercurio-Ecuador.pdf



## LÍNEA DE BASE NACIONAL

### para la Minería Artesanal y en Pequeña Escala de Oro en Ecuador, Conforme la Convención de Minamata sobre Mercurio

MINISTERIO DEL AMBIENTE

fmam
FONDO PARA EL MEDIO AMBIENTE MUNDIAL

ONUDI
ORGANIZACIÓN DE LAS NACIONES UNIDAS PARA EL DESARROLLO INDUSTRIAL

ARTISANAL GOLD COUNCIL

Febrero 2020

# ANNEX C: GENDER STRATEGY

Gender equality is a crucial pillar for the construction of a tolerant, empathic society that is aware of the rights and benefits of men and woman in a just and equitable manner. In order to address this topic within the National Action Plan, a "Gender Strategy" was developed to guarantee that, during the implementation of the Plan, issues related to this approach are taken into account in an adequate, relevant and sensible manner.

The Gender Strategy is a document created exclusively for the NAP, focused on the gold artisanal and small scale mining sector in Ecuador, and made available by the Ministry of the Environment. With the objective of providing the most relevant information, some central elements of this strategy are presented to support the information described by the NAP:

## a) General objective

Embrace the transversal nature of the gender-based approach in the "National Action Plan for the use of Mercury in Artisanal and Small Scale Mining in Ecuador", in compliance with the Minamata Convention, and contributing to the sustainable and inclusive development of populations living in the plan's areas of intervention.

## b) The proposed specific objectives are the following:

### Specific objective 1:

Raise awareness, among the technical teams, of the different entities that will be implementing the NAP, and other key actors, about gender-based approach concepts for the attainment of a sustainable and inclusive development along the defined lines of action.

### Specific objective 2:

Promote specific activities to be included in the project to improve the economic autonomy and protect the health of men and women, taking into account their needs and different mercury exposure types based on gender.

### Specific objective 3:

Improve spaces devoted to governance and decision making for the reduction/elimination of mercury by boosting the participation and empowerment of women as agents of change.

### Specific objective 4:

Compile information and generate gender-disaggregated indicators on occupational exposure; measure the participation and empowerment of women and men, and the improvement of working conditions in ASGM.

## c) Expected benefits (Results)

Guaranteeing the participation and empowerment of women and men in all actions and activities proposed in the NAP will contribute to the strengthening of governance processes and a sustainable and inclusive development. In addition, it will improve working conditions, health, and gender-disaggregated information, especially in measures and actions taken at the field level.

## d) Lines of action or work

### Line of action 1:
**Capacity building for the transversality of gender issues**

Ensure that technical teams from different entities implementing the NAP have the necessary knowledge about gender-based approaches. This will guide other NAP actors and ensure that any implemented measures and actions protect men and women from mercury exposure in a differentiated manner, and promote gender equality issues.

### Line of action 2:
**Support for economic autonomy and protection from mercury exposure in ASGM, based on gender.**

The NAP will include specific activities for the purpose of strengthening economic autonomy and protecting the health of men and women in relation to gender-based mercury exposure. This will be achieved through positive measures/actions and specific projects that define directives related to gender issues, thus improving health and working conditions. Knowledge and capacities will be created for the reduction/elimination of mercury under sustainable, collaborative and networked activities.

### Line of action 3:
**Promotion of women participation and empowerment as agents of change for the reduction/elimination of mercury in ASGM.**

Governance and decision making will be improved through the participation and empowerment of women, as well as the generation of spaces for dialog that take into account needs and mercury exposure risks based on gender considerations.

### Line of action 4:
**Introduction of gender aspects in project monitoring, communication and evaluation activities.**

The monitoring, communication and evaluation mechanisms included in the NAP shall be based on sufficient information about the socio-demographic characteristics of ASGM communities as a key element in decision making and specific actions. The information will be disaggregated, at least, by gender, age, ethnicity, type of mercury exposure, and any other data points that contribute to effective decision making for the reduction/elimination of mercury from ASGM.

## e) Analysis of lines of action and activities proposed in the NAP's Implementation Plan, and its relationship with gender issues

- Miner formalization/regularization strategy

| Lines of Action | Actions/Measures | Relation to the Gender Strategy Objective | Gender-Based Line of Action | Gender-Based Activity Indicator | Gender-Based Baseline | Start | Finish | Budget |
|---|---|---|---|---|---|---|---|---|
| **Objective:** Review and strengthen the regulatory and procedural framework for the formalization/regularization of miners devoted to ASGM activities | | | | | | | | |
| **a2.** Implementation of a mining census and updating of the cadastre, in both cases with information disaggregated by gender. | Updating of the mining cadastre and registry based on allotted mining titles; the registries will contain information disaggregated by gender. | GSO4: Compile information and generate gender-disaggregated indicators on occupational exposure; measure the participation and empowerment of women and men, and the improvement of working conditions in ASGM. | GL4: Introduction of gender aspects in project monitoring, communication and evaluation activities. | The mining cadastre and registry contains information disaggregated by gender. | The mining cadastre and registry does not contain information disaggregated by gender. | 2020 | | - |
| | Updating of the mining census, including both legal and illegal activities, and with information disaggregated by gender. | GSO4: Compile information and generate gender-disaggregated indicators on occupational exposure; measure the participation and empowerment of women and men, and the improvement of working conditions in ASGM. | GL4: Introduction of gender aspects in project monitoring, communication and evaluation activities. | The mining census contains information disaggregated by gender. | The mining census does not contain information disaggregated by gender. | 2021 | 2023 | 56,000 |
| **a3.** Inclusion of excluded vulnerable sectors and populations within the ASGM sector and development of regulations | Acknowledgment of ore collection activities, or *jancheo*, as a part of artisanal mining | GSO2: Promotion of specific activities to be included in the project to improve the economic autonomy and protect the health of men and women, taking into account their needs and different mercury exposure types based on gender. | GL2: Support for economic autonomy and protection from mercury exposure in ASGM, based on gender. | Mining legislation recognizes ore gathering as a part of artisanal mining. | Mining legislation does not recognize ore gathering as a part of artisanal mining. | 2020 | 2020 | 26,880 |
| | Define procedures for the formalization/regularization of groups dedicated to ore gathering (*jancheo*). | GSO2: Promotion of specific activities to be included in the project to improve the economic autonomy and protect the health of men and women, taking into account their needs and different mercury exposure types based on gender. | GL2: Support for economic autonomy and protection from mercury exposure in ASGM, based on gender. | At least one formalization or regularization procedure for mineral collection activities. | Procedures for formalization or regularization do not account for mineral collection activities. | 2020 | 2021 | 26,880 |
| | Promotion of incentives that will encourage mine owners related to ASGM activities to grant access rights to ore collection groups, including women miners. | GSO2: Promotion of specific activities to be included in the project to improve the economic autonomy and protect the health of men and women, taking into account their needs and different mercury exposure types based on gender. | GL2: Support for economic autonomy and protection from mercury exposure in ASGM, based on gender. | At least two incentives for ASGM-related mine owners to grant access to work for women miners. | There are no incentives for ASGM-related mine owners to grant access to work for women miners. | 2021 | 2023 | 40,678 |
| | Promotion of formalization processes for turning groups into associations engaged in ore collection, preferably composed partially or totally by women. | GSO2: Promotion of specific activities to be included in the project to improve the economic autonomy and protect the health of men and women, taking into account their needs and different mercury exposure types based on gender. | GL2: Support for economic autonomy and protection from mercury exposure in ASGM, based on gender. | At least two jancheras associations have been formalized. | There are no formalized associations of women jancheras. | 2022 | 2024 | 40,678 |

| Lines of Action | Actions/Measures | Relation to the Gender Strategy Objective | Gender-Based Line of Action | Gender-Based Activity Indicator | Gender-Based Baseline | Start | Finish | Budget |
|---|---|---|---|---|---|---|---|---|
| **Objective:** Accompany and strengthen the capacities of mine producers for general improvement and compliance with their obligations. | | | | | | | | |
| **c1.** Capacity building conducted by the State | Design and implementation of a technical assistance program for miners involved in artisanal and small scale mining, including *jancheo* activities. | GSO2: Promotion of specific activities to be included in the project to improve the economic autonomy and protect the health of men and women, taking into account their needs and different mercury exposure types based on gender. | GL2: Support for economic autonomy and protection from mercury exposure in ASGM, based on gender. | Syllabus developed for *jancheo* activities. | There is no syllabus developed for *jancheo* activities. | 2021 | 2021 | 8,960 |
| | Design and implementation of a technical assistance program for miners involved in artisanal and small scale mining, including *jancheo* activities. | GSO2: Promotion of specific activities to be included in the project to improve the economic autonomy and protect the health of men and women, taking into account their needs and different mercury exposure types based on gender. | GL2: Support for economic autonomy and protection from mercury exposure in ASGM, based on gender. | At least one annual workshop about mining and gender issues. | PNGQ has started working with jancheras. | 2022 | 2022 | 16,271 |
| **Objective:** Identify, develop and promote incentives for formalization/regularization | | | | | | | | |
| **d1.** Associations of ASGM miners | Promote the formation of associations of artisanal miners and small-scale miners, including jancheo activities. | GSO3: Improve spaces devoted to governance and decision making for the reduction/elimination of mercury by boosting the participation and empowerment of women as agents of change. | GL3: Promotion of women participation and empowerment as agents of change for the reduction/elimination of mercury in ASGM. | At least two jancheras associations have been formed. | PNGQ is working towards the constitution of jancheo associations. | 2020 | 2022 | - |
| | Identification of pilot groups that agree to undertake a formalization/regularization process as a miners association | GSO3: Improve spaces devoted to governance and decision making for the reduction/elimination of mercury by boosting the participation and empowerment of women as agents of change. | GL3: Promotion of women participation and empowerment as agents of change for the reduction/elimination of mercury in ASGM. | At least two associations of jancheras agree to undertake a formalization/regularization process. | PNGQ is working towards the constitution of jancheo associations. | 2021 | 2021 | - |
| **d2.** Access to financing mechanisms | Development of a pilot Mechanism for Competitive Funds in priority sites for the support of the ASGM community, including ore collection (jancheo) associations. | GSO2: Promotion of specific activities to be included in the project to improve the economic autonomy and protect the health of men and women, taking into account their needs and different mercury exposure types based on gender. | GL2: Support for economic autonomy and protection from mercury exposure in ASGM, based on gender. | At least one Competitive Fund has been implemented for women in mining. | PNGQ is working towards the constitution of a competitive fund for women in mining. | 2021 | 2021 | 100,000 |

- Strategy for reducing discharges and risks related to mercury exposure and eliminating worst practices

| Lines of Action | Actions/Measures | Relation to the Gender Strategy Objective | Gender-Based Line of Action | Gender-Based Activity Indicator | Gender-Based Baseline | Start | Finish | Budget |
|---|---|---|---|---|---|---|---|---|
| **Objective:** Review and reinforce the regulation of zones and sites devoted to gold ASGM | | | | | | | | |
| **h3.** Citizen awareness | Promotion of information and awareness campaigns on the importance of eradicating worst practices and their gender-specific effects derived from the use of chemical substances such as mercury | GSO1: Raise awareness among the technical teams of the different entities that will be implementing the NAP, and other key actors, about gender-based approach concepts for the attainment of a sustainable and inclusive development along the defined lines of action. | GL1: Capacity building for the transversality of gender issues | At least 1 information and awareness campaign about the gender-differentiated effects of mercury use. | PNGQ has carried out an information and awareness campaign about women in mining. | 2021 | 2030 | 112,000 |

- Strategy for the reduction of illegal mining

| Lines of Action | Actions/Measures | Relation to the Gender Strategy Objective | Gender-Based Line of Action | Gender-Based Activity Indicator | Gender-Based Baseline | Start | Finish | Budget |
|---|---|---|---|---|---|---|---|---|
| **Objective:** Strengthen actions for the prevention of illegal mining. | | | | | | | | |
| **m3.** Promotion of alternatives to mining in vulnerable areas | Development of an analytical study for the establishment of a priority listing of alternatives to mining in areas identified as vulnerable to the expansion of illegal mining, with an emphasis on people who work in ore collection, or jancheo. | GSO2: Promotion of specific activities to be included in the project to improve the economic autonomy and protect the health of men and women, taking into account their needs and different mercury exposure types based on gender. | GL2: Support for economic autonomy and protection from mercury exposure in ASGM, based on gender. | At least two alternatives to jancheo have been identified and analyzed. | PNGQ is working with jancheras to identify alternative economic activities. | 2022 | 2022 | 107,520 |
| | Creation of projects that could be supported by the national government or other cooperation agencies for the promotion of productive activities in areas identified as vulnerable to the expansion of illegal mining, with an emphasis on people who work in ore collection, or jancheo. | GSO2: Promotion of specific activities to be included in the project to improve the economic autonomy and protect the health of men and women, taking into account their needs and different mercury exposure types based on gender. | GL2: Support for economic autonomy and protection from mercury exposure in ASGM, based on gender. | At least two business plans for alternatives to jancheo have been developed. | PNGQ, in cooperation with BanEcuador, is working on a financial product for alternatives to jancheo. | 2023 | 2026 | 50,000 |

- Public health strategy for the provision of services to the population exposed to mercury due to ASGM activities.

| Lines of Action | Actions/Measures | Relation to the Gender Strategy Objective | Gender-Based Line of Action | Gender-Based Activity Indicator | Gender-Based Baseline | Start | Finish | Budget |
|---|---|---|---|---|---|---|---|---|
| **Objective:** Strengthen the institutional capacity of the public health care system in order to develop healthcare services (promotion, prevention, curing, rehabilitation) for people exposed to the use of toxic substances such as mercury and their effects on the community (gender-based) related directly or indirectly to the gold ASGM sector. | | | | | | | | |
| **p1.** Capacity building of the National Healthcare System (SNS) | Creation of regulations for standardizing health procedures such as treatment protocols and monitoring of acute and chronic poisoning by organic and inorganic mercury, differentiated by gender. | GSO2: Promote specific activities to be included in the project to improve the economic autonomy and protect the health of men and women, taking into account their needs and different mercury exposure types based on gender. | GL2: Support for economic autonomy and protection from mercury exposure in ASGM, based on gender. | At least one treatment and monitoring protocol for acute and chronic mercury poisoning developed for women. | Protocols are general and do not take into account mercury exposure and effects based on gender. | 2022 | 2022 | 35,840 |
| | Creation of regulations for standardizing health procedures such as treatment protocols and monitoring of acute and chronic poisoning by organic and inorganic mercury, differentiated by gender. | GSO2: Promote specific activities to be included in the project to improve the economic autonomy and protect the health of men and women, taking into account their needs and different mercury exposure types based on gender. | GL2: Support for economic autonomy and protection from mercury exposure in ASGM, based on gender. | At least one treatment and monitoring training workshop for acute and chronic mercury poisoning developed for women. | Protocols are general and do not take into account mercury exposure and effects based on gender. | 2023 | 2024 | 4,068 |
| | Preparation and dissemination, by responsible areas, of a training program for the SNS that will address the diagnosis, treatment and monitoring of diseases present in ASGM communities, with a focus on those caused by mercury exposure, differentiated by gender. | GSO1: Raise awareness among the technical teams of the different entities that will be implementing the NAP, and other key actors, about gender-based approach concepts for the attainment of a sustainable and inclusive development along the defined lines of action. | GL1: Capacity building for the transversality of gender issues | At least 2 workshops addressing the issue of gender-specific mercury exposure and its effects. | Protocols are general and do not take into account mercury exposure and effects based on gender. | 2022 | 2026 | 20,339 |
| **p4.** Structure and implementation of a health surveillance system in the workplace | Structure and implementation of a health surveillance system in the workplace that will help identify pathologies suffered by workers in ASGM sites. | GSO2: Promote specific activities to be included in the project to improve the economic autonomy and protect the health of men and women, taking into account their needs and different mercury exposure types based on gender. | GL2: Support for economic autonomy and protection from mercury exposure in ASGM, based on gender. | One document describing the results of the workplace health surveillance system, specifying exposure of men and women to mercury. | The workplace health surveillance system does not take into account gender differences in mercury exposure. | 2021 | 2024 | 26,880 |

- Strategy pertaining to gender issues and child labor in ASGM.

| Lines of Action | Actions/Measures | Relation to the Gender Strategy Objective | Gender-Based Line of Action | Gender-Based Activity Indicator | Gender-Based Baseline | Start | Finish | Budget |
|---|---|---|---|---|---|---|---|---|
| **Objective:** Improve working conditions and reduce risk factors for women | | | | | | | | |
| **r1.** Improve working conditions of women ore collectors | Identification of women collecting residue material, so that their activities can be recorded. This identification is related to the census proposed in section a.2. | GSO2: Promote specific activities to be included in the project to improve the economic autonomy and protect the health of men and women, taking into account their needs and different mercury exposure types based on gender. | GL2: Support for economic autonomy and protection from mercury exposure in ASGM, based on gender. | The mining census contains disaggregated information of the working conditions of women. | The mining census does not contain information about the working conditions of women material collectors. | 2021 | 2022 | - |
| | Development of a National Gender Study for the mining community, based on focal groups, and focused on gender-specific challenges and needs, for the purpose of identifying opportunities for incorporating gender perspectives in national regulations. | GSO2: Promote specific activities to be included in the project to improve the economic autonomy and protect the health of men and women, taking into account their needs and different mercury exposure types based on gender. | GL2: Support for economic autonomy and protection from mercury exposure in ASGM, based on gender. | A National Gender Study for the mining community, based on focal groups, and focused on gender-specific challenges and needs, for the purpose of identifying opportunities for incorporating gender perspectives in national regulations. | No study has been conducted to identify opportunities for incorporating gender perspectives in national mining legislation. | 2022 | 2024 | 107,520 |
| | Design of specific trainings for women who collect ore, based on environmental good practices and best practices for the recovery of mineral without using toxic substances such as mercury. | GSO2: Promotion of specific activities to be included in the project to improve the economic autonomy and protect the health of men and women, taking into account their needs and different mercury exposure types based on gender. | GL2: Support for economic autonomy and protection from mercury exposure in ASGM, based on gender. | At least 2 workshops implemented for jancheras related to results and lessons learned and environmental good practices that do not use mercury or other chemical substances. | No workshops have been delivered for jancheras about good practices for mineral recovery that do not use toxic substances such as mercury. | 2021 | 2022 | 26,880 |
| | Training of groups of jancheras and their families on the occupational hazards related to ore gathering and processing | GSO2: Promotion of specific activities to be included in the project to improve the economic autonomy and protect the health of men and women, taking into account their needs and different mercury exposure types based on gender. | GL2: Support for economic autonomy and protection from mercury exposure in ASGM, based on gender. | At least 2 workshops addressing the issue of gender-specific mercury exposure and its effects on health. | No workshops have been delivered to address the issue of gender-specific mercury exposure and its effects on health. | 2022 | 2022 | 4,068 |
| | Promotion of the formalization of associations of women ore collectors, in-line with the proposals of section a.3. | GSO2: Promotion of specific activities to be included in the project to improve the economic autonomy and protect the health of men and women, taking into account their needs and different mercury exposure types based on gender. | GL2: Support for economic autonomy and protection from mercury exposure in ASGM, based on gender. | At least one formalization or regularization procedure for mineral collection activities. | Procedures for formalization or regularization do not account for mineral collection activities. | 2022 | 2024 | - |

| Lines of Action | Actions/Measures | Relation to the Gender Strategy Objective | Gender-Based Line of Action | Gender-Based Activity Indicator | Gender-Based Baseline | Start | Finish | Budget |
|---|---|---|---|---|---|---|---|---|
| **r2.** Promotion of alternative activities to ore gathering | Awareness and knowledge of success cases where women dedicated to ore gathering activities have been able to incorporate other productive work into their daily routines | GSO2: Promotion of specific activities to be included in the project to improve the economic autonomy and protect the health of men and women, taking into account their needs and different mercury exposure types based on gender. | GL2: Support for economic autonomy and protection from mercury exposure in ASGM, based on gender. | One document that includes results and lessons learned from the implementation of demo projects. | PNGQ has created a video where groups of women jancheras show some of their alternative economic activities. | 2021 | 2022 | 41,440 |
| **Objective:** Eradicate child and adolescent labor in ASGM | | | | | | | | |
| **s1.** Strengthening of surveillance and prevention of child and adolescent labor in gold ASGM activities. | Development and implementation of a children and adolescents program for the purpose of detecting their presence within ASGM activities and dissociating them from these activities. | GSO2: Promotion of specific activities to be included in the project to improve the economic autonomy and protect the health of men and women, taking into account their needs and different mercury exposure types based on gender. | GL2: Support for economic autonomy and protection from mercury exposure in ASGM, based on gender. | Eradication program for child and adolescent work in the mining sector. | The Ministry of Labor has a program for eradicating child labor, but none specific to the mining sector. | 2021 | 2022 | 26,880 |
| | Development and implementation of a children and adolescents program for the purpose of detecting their presence within ASGM activities and dissociating them from these activities | GSO2: Promotion of specific activities to be included in the project to improve the economic autonomy and protect the health of men and women, taking into account their needs and different mercury exposure types based on gender. | GL2: Support for economic autonomy and protection from mercury exposure in ASGM, based on gender. | At least 2 workshops addressing the issue of mercury exposure and its effects on children and adolescents. | The Ministry of Labor has a program for eradicating child labor, but none specific to the mining sector. | 2023 | 2024 | 20,339 |
| | Inclusion of ASGM sites as focal points for planning instruments or mechanisms for including children and adolescents dissociated from ASGM activities in alternative activities, such as regular schooling or technical training, as needed | GSO2: Promotion of specific activities to be included in the project to improve the economic autonomy and protect the health of men and women, taking into account their needs and different mercury exposure types based on gender. | GL2: Support for economic autonomy and protection from mercury exposure in ASGM, based on gender. | Guide for local planning to include children and adolescents dissociated from ASGM activities in schooling or technical training. | The Ministry of Labor has a program for eradicating child labor, but none specific to the mining sector. | 2022 | 2022 | 17,920 |
| | Instruction of police stations, which are the institutions that handle the reception of reports, about the need to implement a special office to handle reports of forced labor in mining activities within the main identified ASGM sites. | GSO2: Promotion of specific activities to be included in the project to improve the economic autonomy and protect the health of men and women, taking into account their needs and different mercury exposure types based on gender. | GL2: Support for economic autonomy and protection from mercury exposure in ASGM, based on gender. | Intervention roadmap for police stations for dealing with reports about child and adolescent labor in mining. | Police stations have no roadmap for intervening in reports of child labor in mines. | 2022 | 2022 | 17,920 |

- Strategy for participation and information transfer between all interested parties in the implementation and continuous development of the action plan

| Lines of Action | Actions/Measures | Relation to the Gender Strategy Objective | Gender-Based Line of Action | Gender-Based Activity Indicator | Gender-Based Baseline | Start | Finish | Budget |
|---|---|---|---|---|---|---|---|---|
| **Objective:** Institutionalize communication among relevant actors within gold ASGM | | | | | | | | |
| **t1.** Coordination of dialog and communication from the central government, for local governments and mining communities | Create a Permanent Multisector Commission with the objective of monitoring formalization/regularization processes, and for the surveillance and control of ASGM throughout the national territory, with the cooperation of local competent entities that can facilitate communication platforms with mining communities | GSO3: Improve spaces devoted to governance and decision making for the reduction/elimination of mercury by boosting the participation and empowerment of women as agents of change. | GL3: Promotion of women participation and empowerment as agents of change for the reduction/elimination of mercury in ASGM. | Number of women miners working in the Permanent Multisector Commission for formalization/ regularization. | PNGQ is encouraging women miners to participate in spaces for dialog for mining formalization/ regularization. | 2021 | 2022 | - |
| **Objective:** Development of capacities and means for dialog and communication | | | | | | | | |
| **u1.** Strengthening and visibility of mining organizations | The Permanent Multisector Commission will foster spaces for dialog and communication using the necessary equipment and teams. | GSO3: Improve spaces devoted to governance and decision making for the reduction/elimination of mercury by boosting the participation and empowerment of women as agents of change. | GL3: Promotion of women participation and empowerment as agents of change for the reduction/elimination of mercury in ASGM. | At least two workshops delivered for empowerment and leadership of women miners. | No workshops have been delivered for empowerment and leadership of women miners. | 2023 | 2024 | 4,068 |
| **u2.** Capacity development and enhancement of communication channels | Design and dissemination of training campaigns in different areas of interest, focused on the technical, environmental, social, and sanitary aspects of ASGM sites and their spheres of influence | GSO1: Raise awareness among the technical teams of the different entities that will be implementing the NAP, and other key actors, about gender-based approach concepts for the attainment of a sustainable and inclusive development along the defined lines of action. | GL1: Capacity building for the transversality of gender issues | At least three dissemination instrument for mining and gender issues. | PNGQ is developing communication instruments about women in mining. | 2021 | 2025 | 71,680 |
| **u2.** Capacity development and enhancement of communication channels | Establishment of agreements with physical and digital media outlets, such as local radio and television and social networks, for the dissemination of information campaigns related to ASGM activities | GSO1: Raise awareness among the technical teams of the different entities that will be implementing the NAP, and other key actors, about gender-based approach concepts for the attainment of a sustainable and inclusive development along the defined lines of action. | GL1: Capacity building for the transversality of gender issues | Number of agreements with physical and digital media outlets, such as local radio and television and social networks, for the dissemination of information campaigns related to ASGM activities. | PNGQ is developing communication instruments about women in mining. | 2021 | 2022 | 56,112 |

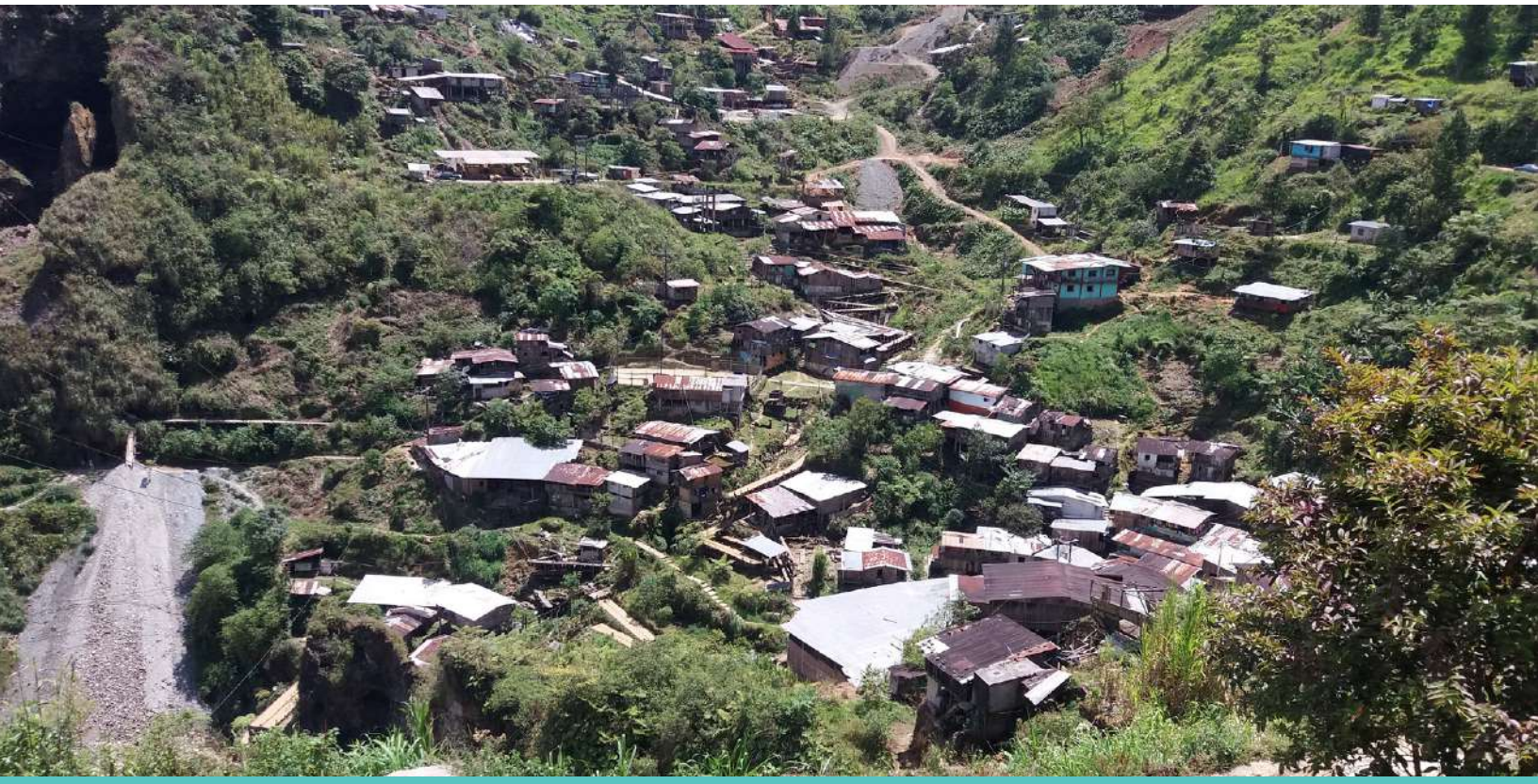


# ANNEX D: CONFORMITY WITH ANNEX C OF THE MINAMATA CONVENTION

The following table describes the requirements for compliance of the National Action Plan with the Minamata Convention, and explains how this compliance is reached:

| National Action Plan requirement based on Annex C of the Minamata Convention on Mercury | Corresponding sections of the National Action Plan |
|---|---|
| 1. National objectives and reduction targets | 2.1 National Objective<br>2.4 National Targets |
| 2. Actions to eliminate: | |
| 2a. Whole ore amalgamation | 2.5.2 Strategy for reducing discharges and risks related to mercury exposure and eliminating worst practices |
| 2b. Open burning of amalgam or processed amalgam | 2.5.2 Strategy for reducing discharges and risks related to mercury exposure and eliminating worst practices |
| 2c. Burning of amalgam in residential areas | 2.5.2 Strategy for reducing discharges and risks related to mercury exposure and eliminating worst practices |
| 2d. Cyanide leaching in sediment, ore or tailings to which mercury has been added without first removing the mercury | 2.5.2 Strategy for reducing discharges and risks related to mercury exposure and eliminating worst practices |
| 3. Steps to facilitate the formalization or regulation of the artisanal and small-scale gold mining sector | 2.5.1 Miner formalization/regularization strategy<br>2.5.4 Strategy for the reduction of illegal mining |
| 4. Baseline estimates of the quantities of mercury used and the practices employed in artisanal and small-scale gold mining and processing within its territory | 1.4 Reference estimates of the amount of mercury used in ASGM;<br>1.3 Mining and ore processing |

| National Action Plan requirement based on Annex C of the Minamata Convention on Mercury | Corresponding sections of the National Action Plan |
|---|---|
| 5. Strategies for promoting the reduction of emissions and releases of, and exposure to, mercury in artisanal and small-scale gold mining and processing, including mercury-free methods | 2.5.2 Strategy for reducing discharges and risks related to mercury exposure and eliminating worst practices |
| 6. Strategies for managing trade and preventing the diversion of mercury and mercury compounds from both foreign and domestic sources to use in artisanal and small scale gold mining and processing | 2.5.3 Strategy for the control of illegal trade and use of mercury |
| 7. Strategies for involving stakeholders in the implementation and continuing development of the national action plan | 2.5.7 Strategy for participation and information transfer between all interested parties in the implementation and continuous development of the action plan;<br><br>4.1 Monitoring of execution tasks |
| 8. A public health strategy on the exposure of artisanal and small-scale gold miners and their communities to mercury. Such a strategy should include, inter alia, the gathering of health data, training for health-care workers and awareness-raising through health facilities | 1.11 Health information<br><br>2.5.5 Public health strategy for the provision of services to the population exposed to mercury due to ASGM activities |
| 9. Strategies to prevent the exposure of vulnerable populations, particularly children and women of child-bearing age, especially pregnant women, to mercury used in artisanal and small-scale gold mining | 2.5.5 Public health strategy for the provision of services to the population exposed to mercury due to ASGM activities<br><br>2.5.6 Strategy pertaining to gender issues and child labor in ASGM |
| 10. Strategies for providing information to artisanal and small-scale gold miners and affected communities | 2.5.7 Strategy for participation and information transfer between all interested parties in the implementation and continuous development of the action plan |
| 11. A schedule for the implementation of the national action plan | III. Implementation Plan |



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