

SIERRA LEONE MIA 2019

Minamata Convention on Mercury Initial Assessment

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Foreword

Mercury is a chemical of global concern due to its long-range atmospheric transport, persistence in the environment, ability to bio-accumulate in ecosystems and its significant adverse effects on human health and the environment. Exposure to Mercury threatens our health, with many often irreversible toxic effects. Developing fetuses and young children are most at risk. Mercury pollution also harms wildlife and ecosystems. Recognizing Mercury pollution (due to anthropogenic releases) as a global problem that requires global action, in January 2013 a global treaty called Minamata Convention on Mercury was adopted to protect human health and the environment from the adverse effects of Mercury. The importance of human health and environmental protection was emphasized and reaffirmed at the 21st United Nations Environment Programme (UNEP) Inter-governmental Conference in 2001. Controlling these anthropogenic releases of Mercury throughout its lifecycle has been a critical factor in shaping the obligations under the convention.

Besides, the Sustainable Development Goals (SDGs) recognize the importance of promoting good health and well-being in general and particularly SDG 12 on sustainable consumption and production emphasizes sound chemicals management including safe disposal of toxic waste and pollutants. Various interventions have been undertaken by UNEP, which aimed at promoting mercury management. These include the global mercury assessment, preparation of a legally-binding mercury agreement and strengthening enforcement of environmental laws. The goal is to phase down and eliminate Mercury from products and processes. At the national level, the Government of Sierra Leone (GoSL) signed the Minamata Convention on Mercury in August 2013 and ratified it in November 2016. The Environment Protection Agency Sierra Leone (EPA-SL) Act No. 44 of 2008 amended 2010 is the principal legislation in Sierra Leone on environmental management in general and pollution prevention and control. Part VI, Section 58 of the EPA-SL Act, 2008 makes provision for toxic and hazardous substances management with an established chemicals control and management department in Section 17(2)(a).

Furthermore, there are other pieces of legislation, such as The Public Health Act, The Food and Drugs Act and the Mines and Minerals Act that have a bearing on hazardous chemicals management. The Government of Sierra Leone recognizing the harmful effect of Mercury and its derivatives in the environment and health of our citizenry has been engaging both local and international partners on the elimination of Mercury and its derivatives nationally through EPA-SL. Over the years, the Agency has implemented various projects aimed at improving mercury management in the country. These include; extensive engagement of artisanal and small-scale gold miners nationwide on the dangers of using Mercury in the Gold mining sector, Minamata Initial Assessment and Development of the National Action Plan on the use of Mercury in Artisanal and Small-Scale Gold Mining (ASGM) Sector in Sierra Leone. Results of studies conducted through these projects have identified Mercury sources in Sierra Leone from both natural and anthropogenic sources. Primary metal extraction (especially gold), consumer products, and waste incineration and deposition have been identified as significant contributors to mercury emissions and releases in the country. In response to these sources, the government remains committed to implementing interventions aimed at reducing and where feasible to eliminate the use of mercury and mercury compounds in the country. Government is, therefore, confident that these measures will enhance mercury management and sound management of chemicals in the country.

Evidently, as a small developing state, Sierra Leone is not a producer of Mercury, but nonetheless, we are exposed and remain vulnerable to impacts of the anthropogenic release of Mercury, particularly from other countries that are involved in Mercury related manufacturing and trade. We must also focus our attention at the national level and explore the means for reducing our mercury emission. We still at the moment very much rely upon and use mercury-containing devices and products in the health sector, laboratories, body lightening creams, etc. Positive and active partnerships are necessary between government, non-governmental organizations, developing partners, and the private sector, in a variety of sectors ranging from health to cosmetics. The safe disposal of mercury-containing products also presents some of the most significant challenges for us as a Developing State. It is where partnerships are required between states to facilitate the transfer of this waste to areas where it can be recycled or rendered safe. At the national level, we will continue to put in place proper disposal facilities and systems to deal with mercury waste. However, the responsibility lies on every stakeholder involved with, using or trading Mercury or products and items containing Mercury to make the switch to the alternatives. As a nation, fish is an important source of protein. As a result, the likelihood of fish contamination with mercury poses a health risk to our citizens. Therefore, steps towards reduction of global emission will also impact positively in reducing mercury risk within our marine species. To transit to a mercury-free society, there is a pressing need for education and sensitization on the subject of Mercury as an element, its uses but most importantly, the alternatives to it. Equally, there is a need for strengthening of the capacity of the relevant authorities so as to better monitor and manage the use of Mercury. The government commits itself fully towards the implementation of the National Action Plan (NAP), MIA recommendations and all the other obligations under the convention.

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Minister
Ministry of the Environment

His Excellency Rt. Brigadier Dr. Julius Maada Bio
President of the Republic of Sierra Leone

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List of ACRONYMS and UNITS

Symbol	Meaning
%	Percentage
*	Multiplied by
/	Divided by
<	Inferior to
<	Superior to
°C	Celsius degree (centigrade)
µg	Micrograms
ASGM	Artisanal and Small-scale Gold Minding
CBD	Convention on Biological Diversity
CBOs	Community Based Organisations
CED	Custums and Exercise Department
CHEC-SL	Commonwealth Human Ecology Council
CSSL	Conservation Society of Sierra Leone
DFO	Distillate Fuel Oil
ECOWAS	Economic Community of West African States
EFA	Environmental Foundation for Africa
EIA	Environmental Impact Assessment
ESD	Education for Sustainable Development
EPA-SL	Environment Protection Agency - Sierra Leone
GGDO	Government Gold and Diamond Office
GSD	Geological Survey Division
HFO	Heavy Fuel Oil
IMBO	Institute of Marine Biology and Oceanography
IPS	Institute for Population Studies
ISO	International Standards Organisation
Kg	Kilogram
KWh	Kilowatt k hour / Unit of energy
MDAs	Ministries, Departments and Agencies
MoEnv	Ministry of the Environment
MEST	Ministry of Education, Science and Technology
MFMR	Ministry of Fisheries and Marine Resources
MIA	Minamata Initial Assessment
MLGRD	Ministry of Local Government and Rural Development
MLSS	Ministry of Labour and Social Security
MMMR	Ministry of Mines and Mineral Resources
MoHS	Ministry of Health and Sanitation
MPSSL	Maritime Protection Services of Sierra Leone
MSW	Municipal Solid Waste
MTCA	Ministry of Tourism and Cultural Affairs

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Executive Summary

The Minamata Convention is a legally binding instrument with the objective to protect human health and the environment from the adverse effects of human activities using mercury and mercury compounds. It entered into force on 16 August 2017, the 90th day after the deposit of the 50th instrument of ratification, acceptance, approval or accession. Sierra Leone signed the Convention on 12 August 2014 and ratified it on 1 November 2016.

In support of the Convention, the Global Environment Facility (GEF) has funded Minamata Initial Assessment (MIA) and National Action Plan (NAP) projects, under which several activities have been implemented. The Sierra Leone National Action Plan was developed concurrently with this MIA and is the subject of a separate report. The objectives of the MIA are to provide an overview of each country's use, emissions and releases of mercury and mercury compounds. First, it identifies and quantifies flows of mercury and mercury compounds. It then proposes an analysis of the legal and institutional frameworks that may guide the implementation of the Minamata Convention at the national level. These main activities lead to the identification of at-risk populations, the development of strategies for effective advocacy and the identification of national priorities and the proposal of relevant intervention plans.

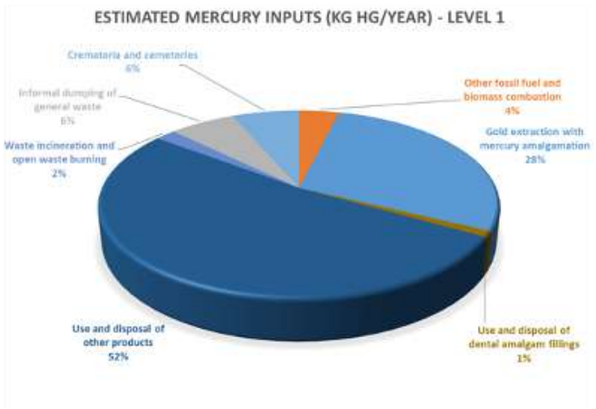


Figure i: Estimated mercury inputs (Kg Hg/year)

In Sierra Leone, the national inventory of mercury flows was conducted using the Toolkit for the identification and quantification of emissions and releases of mercury and mercury compounds. The results of the level 1 and 2 inventories are presented in figures (i) and (ii) below. As shown, the use and disposal of mercury-containing products, gold mining by mercury amalgamation and waste management (informal waste disposal and open burning) are the categories that contribute mainly to inputs (for mercury-containing products and gold panning), emissions and releases of mercury and mercury compounds in Sierra Leone.

The areas mainly impacted by these emissions and discharges due to anthropogenic activities are air, soil, general waste and water as shown in the figures below.

As shown in the figures, the main differences in the two levels are to be noted in the following categories: general waste (22% of emissions and discharges for level 1 compared to 25.57% for level 2) and air (52% of emissions for level 1 compared to 47.87% for level 2).

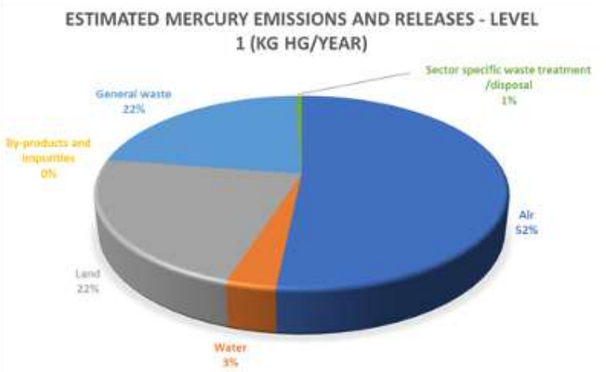


Figure ii: Estimated mercury emissions and releases from Levels 1 and 2 (kg Hg/year)

Furthermore, the preliminary desk study and sites' investigation, as part of the strategy for identifying and assessing mercury contaminated sites, helped identify the following as potential contaminated sites: dumpsites, the marine environment and Artisanal and Small-scale Gold Mining (ASGM) sites.

In order to improve the inventory carried out as part of this project, the recommendations include: (i) Produce reliable data for energy consumption, mercury containing products and domestic production of metals and raw materials; (ii) Conduct further investigation on each ASGM site across the country; (iii) Update Harmonized System (HS) codes for customs and (iv) Develop more accurate and recent data on waste management.

In terms of legislation and institutions, the analysis conducted showed that there are many legal instruments that could be relevant for the domestic implementation of the Minamata Convention. These instruments include the National Environmental Policy (1990), the National Environment Protection Act (2000), the Envi-

ronmental Protection Agency Sierra Leone Act (2008, amended in 2010), the Mines and Mineral Act (2009) and the National Health Policy (March 2012). All of these instruments have provisions relevant to the articles of the Convention and could also be updated to include the measures necessary for a full implementation of the Convention. Among the measures to be considered are the need to adopt a clause to limit the import of mercury, the prohibition of the production, export and import of products containing mercury, the development of a dental health policy (notably for dental amalgam), a mercury trade policy and adequate measures to formalize the gold panning sector (as it relates to ASGM). The development, revision and updating of standards for air, water and soil quality as well as the development of appropriate guidelines and regulations would also be necessary.

Among the institutions in charge of enforcing the laws are: The Environment Protection Agency Sierra Leone (EPA-SL), the National Minerals Agency (NMA), the Ministries of Mines and Mineral Resources (MMMR), of Health and Sanitation (MoHS), and of Water Resources (MoWR), as well as the Customs and Excise Department (CED). All these institutions, in addition to those described in Chapter 4 of this document, have the basic capacities to meet the requirements of the Minamata Convention. However, among other elements, the following are necessary to support implementation: (i) enhance training for both new and current staff of the relevant institutions on mercury and mercury-added products; (ii) train current and new staff regarding the monitoring of air, water and soil pollution; and (iii) enhance the training of current and new staff of the relevant institutions regarding the monitoring of health hazards, especially regarding the use of mercury-containing products and ASGM.

As part of this MIA project, various awareness-raising campaigns and information dissemination were organized, in particular to exchange with stakeholders and reach the populations in vulnerable situations identified following the national inventory. It is with this in mind that the inception workshop and training on the use of the mercury inventory toolkit were organized. In addition to these sessions, many public awareness campaigns and workshops for target groups were organized by EPA-SL in collaboration with UNITAR. Moreover, there were several sessions of national stakeholder consultations. In order to maintain a sufficient level of knowledge and information dissemination, such activities and sessions should be organized periodically in the coming years, among the population and stakeholders.

Finally, all the above-mentioned analysis contributed to the identification of national priorities and proposal of intervention plans to be implemented between 2020 and 2024:

1. Legal and institutional capacity building and/or strengthening for the integration of the requirements of the Minamata Convention into the national frameworks;
2. The phasing-out of the import, export and the production of mercury-added products;
3. Phasing down the use of dental amalgams;
4. The development of an environmentally sound management practice of waste, particularly mercury-containing waste;
5. Reduction and, where feasible, elimination of the use, emissions and releases of mercury and mercury compounds in and from Artisanal and Small-scale Gold Mining.

The total estimated budget for these intervention plans is USD 6,635,000 (Six million, six hundred and thirty-five thousand United States dollars).

Introduction

MERCURY: A PUBLIC HEALTH AND ENVIRONMENTAL CONCERN

Commonly known as quicksilver, mercury is a chemical element with symbol Hg and atomic number 80. It is a dense, silver-white metal that is liquid at ordinary temperatures. It occurs in the Earth's crust in its native form but is more commonly found in the form of mercury sulphide (HgS). It can also occur with other non-ferrous sulphide minerals (zinc, lead, arsenic, gold) in trace quantities or as an impurity in many other economically valuable materials like fossil fuels (coal, gas, and oil). Mercury combines with most metals to form alloys (amalgams), which decompose on heating, resulting in the volatilisation of the metallic mercury.

While liquid mercury expands and contracts very precisely in response to changes in temperature, it maintains its volume at varying atmospheric pressures. These unique properties have made it useful in devices designed to measure temperature and pressure.

Mercury is a persistent pollutant in the environment. It is released through natural processes such as volcanic eruptions, weathering of rocks, hydrological cycle forest fires and biological activities. While mercury release into the environment through such natural processes is perpetual, anthropogenic input accounts for the highest pollution sources, as consequence of activities since the industrial revolution. Anthropogenic activities that contribute to mercury release include metallurgy, combustion of fossil fuel, and the improper disposal of mercury-containing wastes. These activities have grown considerably since the industrial revolution, such that the Global Mercury Assessment estimates that while 10% of mercury emissions can be attributed to natural processes, 30% of mercury release into the environment can be attributed to human activity, with the remaining 60% being re-emissions, largely comprising mercury previously emitted from human activity (UN Environment, 2013a).

Mercury in air can circulate globally before being deposited on land or into water bodies and further transported or re-emitted to the atmosphere or transformed by a variety of biological processes. This global transport of pollutants makes it possible for regions with insignificant local releases of mercury, such as the Arctic, to become prone to pollution issues.

Mercury in the environment exists in three forms: elemental, inorganic and organic. Elemental mercury can combine with other elements to form inorganic mercury compounds (e.g. mercuric chloride, mercuric nitrate, mercuric oxide, mercuric sulphide). Furthermore, it may be subject to biotransformation by aquatic microorganisms into the organic forms such as methyl mercury and ethyl mercury.

Mercury is known to be present in various environmental media and food (especially in fish and seafood) globally. It can bioaccumulate in the food chain, at levels that adversely affect human health and wildlife.

1- http://www.who.int/news-room/fact-sheets/detail/mercury-and-health
2 - https://www.ncbi.nlm.nih.gov/pubmed/10789973

Furthermore, exposure to mercury may be magnified where current or past economic activities have resulted in landfills, mine tailings, factory sites, soils and sediments contaminated with mercury.

Mercury is considered by the World Health Organization (WHO) as one of the top ten chemicals or groups of chemicals of major public health concern. Elemental and methylmercury are toxic to the central and peripheral nervous systems. According to WHO (2017), the inhalation of mercury vapour can have harmful effects on the nervous, digestive and immune systems, lungs and kidneys, and may be fatal. The inorganic salts of mercury are corrosive to the skin, eyes and gastrointestinal tract, and may induce kidney toxicity if ingested[1]. Moreover, after exposure to mercury, neurological and behavioural disorders can occur, including tremors, insomnia, memory loss, neuromuscular effects, headaches and cognitive and motor dysfunction, as well as kidney failure.

Ecological effects of mercury include harmful effects on microorganisms even at low concentrations, toxicity to aquatic organisms and birds, and physiological, reproductive and biochemical abnormalities in fish exposed to sub-lethal concentrations of mercury. According to Boening (2000), a wide variety of birds fed inorganic mercury show a reduction in food intake and consequent poor growth. Other effects in avian receptors have been reported; increased enzyme production, decreased cardiovascular function, blood parameter changes, immune response, kidney function and structure, and behavioural change[2].

THE MINAMATA CONVENTION ON MERCURY

A global assessment on mercury and its compounds by UNEP in 2001 provided sufficient evidence of the sources, fate, transport, adverse effects on public health and the environment and remediation technology. The report also documented the need for global action for the reduction of mercury use in products and its direct release into the environment. This consensus led to Governments adopting national initiatives with set goals of reducing/eliminating mercury and mercury compounds using sound environmental practices. In 2009, the Governing Council of UNEP realised that voluntary actions had not been sufficient to address the concerns relating to mercury and thus decided to adopt more stringent and legally binding actions, including; the preparation of a global, legally-binding instrument. This led to the establishment of Intergovernmental Negotiation Committee (INC) tasked with the development of a global treaty in 2010. The INC concluded its fifth session in Geneva, Switzerland in January 2013 by agreeing the text of the Minamata Convention. The Convention was adopted and opened for country signature on 10 October 2013 at a Diplomatic Conference (Conference of Plenipotentiaries) held in Kumamoto, Japan.

The Minamata Convention on Mercury is a global treaty that protects human health and the environ-

ment from the anthropogenic emission/release of mercury and mercury compounds. The Convention draws attention to a global and ubiquitous metal that, while naturally occurring, has broad uses in everyday objects and is released to the environment from a variety of sources. Protecting human health and the environment by controlling the anthropogenic releases of mercury throughout its lifecycle is the goal of the Convention.

The convention was adopted to promote the use of alternatives, best available techniques and sound environmental practices across a wide range of products, processes and industries where mercury is used, released or emitted, and provides for the control and phasing out/ phasing down of mercury and mercury-added products (UNEP, 2013b).

The Convention entered into force on 16 August 2017, and the first conference of parties was held on the last week of September 2017. Sierra Leone signed the Convention in 2014 and deposited its instrument of ratification on 1 November 2016, thus becoming a Party to the Convention.

SUMMARY OF KEY PROVISIONS OF THE MINAMATA CONVENTION

Major highlights of the Minamata Convention include a ban on new mercury mines, the phase-out of existing ones, the phase-out and phase-down of mercury use in a number of products and processes, control measures on emissions to air and on releases to land and water, and the regulation of the informal sector of artisanal and small-scale gold mining. The Convention also addresses interim storage of mercury and its disposal once it becomes waste, sites contaminated by mercury and health issues.

THE MINAMATA INITIAL ASSESSMENT (MIA) AND NATIONAL ACTION PLAN (NAP)

The Global Environment Facility (GEF) has allocated funding to strengthen national decision making towards ratification of the Convention and to support its implementation. To support and strengthen decision-making and encouraging action to address mercury issues, the Global Environment Facility (GEF) allocated funding to conduct preliminary studies as part of a two-part project in Sierra Leone: a Minamata Initial Assessment (MIA) and a National Action Plan (NAP). The NAP, which focuses on the gold mining sector, is the subject of a complementary activity and report.

The MIA assesses existing national sources and uses of mercury, strengthens national decision-making and builds national awareness and capacity for implementation of its obligations.

The overall objective of the MIA is to assist the countries prepare for the implementation of the Minamata Convention by providing information for strategic decision-making and action planning.

MIA PROJECT IN SIERRA LEONE

The MIA project in Sierra Leone is part of the initial steps taken towards the ratification and future implementation of the Minamata Convention. At the national level, the executing agency, the Environment Protection Agency – Sierra Leone (EPA-SL) was in charge of:

- Component 1: National information exchange, capacity building and knowledge generation.
- Component 2: Strengthening of coordination mechanism and organization of project processes.
- Component 3: Assessment of the national infrastructure and capacity for the management of mercury, including national legislation.
- Component 4: Development of a mercury inventory and strategies to identify and assess mercury contaminated sites.
- Component 5: Identification of challenges, needs and opportunities to implement the Minamata Convention on Mercury.
- Component 6: Preparation, validation and endorsement of the MIA, implementation of awareness-raising activities and dissemination of results at the national level.

Under the direction of the EPA-SL and the National Project Coordinator, various exerts were hired for each activity based on their expertise and experience in the required areas.

Finally, the information gathered during the various assessments was compiled in this MIA report, whose structure (organization and content of chapters) is based on the model developed by the UNDP, in collaboration with the Inter-Organization Programme for the Sound Management of Chemicals (IOMC)[3].

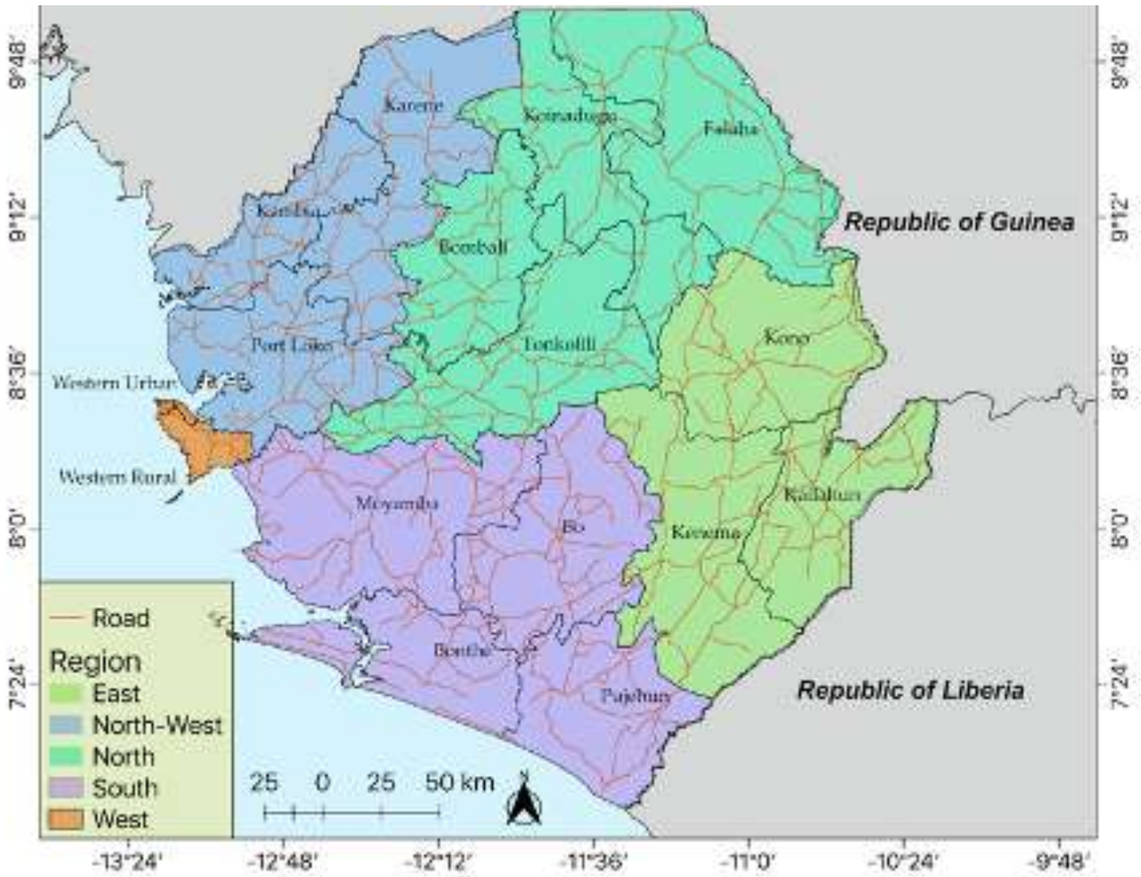
The United Nations Institute for Training and Research (UNITAR) executed components on training and support for project management, and the United Nations Environment Programme UNEP) was the GEF implementing agency coordinating the overall project.

1. National background information

1.1. GEOGRAPHY AND POPULATION

Sierra Leone is a country on the West African coast lying between latitudes 6-10o North and longitudes 10.27-13.30O West. It has an area of 71,170 square kilometres (km2) and a population of 7,092,113 (Statistics Sierra Leone, 2016)[4]. The country is bordered by Guinea in the North and North-East, Liberia in the South and South-East, and the Atlantic Ocean in the North-West and South-West. Sierra Leone is currently divided into five administrative regions (West, North-West, North, East and South) and 16 districts (Fig. 1.1), following the 2017 boundary delimitation process. The country's climate is divided into two distinct seasons: The dry season (November-April) and the wet season (May-October). The average temperature is about 27oC and average rainfall is approximately 2500mm in the North and North-East, 3000mm in the South and 5000mm in the Western Peninsular. Relative humidity is usually about 90 per cent in the wet season but drops to about 20 per cent in most part of the dry season.

Figure 1 – Map of Sierra Leone



1.2. POLITICAL, LEGISLATIVE AND SOCIO-ECONOMIC GOVERNANCE

1.2.1. Political Administration/Governance

Sierra Leone is a constitutional Republic with three arms of government (the executive, legislature and judiciary). The country is governed by a democratically elected President who heads the executive arm. The legislative arm is a unicameral parliament with the key responsibility of promulgating laws. The judiciary is responsible for the interpretation of such laws and the administration of justice. The enactment of the 2004 Local Government Act reintroduced local governance with the aim of broadening grass-root participation in national development through the devolution of certain state functions to local authorities.

- The Executive

The Executive is headed by the President, who is prin-

3- FAO, ILO, UNDP, UNEP, UNIDO, UNITAR, WHO, the OECD and the World Bank

4- https://www.statistics.sl/pdf, accessed on 24 August 2017.

Capital	Freetown
Area	71,170 square kilometres
Land boundaries	North/North-East: Guinea South/South-East: Liberia North-West/South-West: Atlantic Ocean
Coastline	402 km (sand beaches and Mangrove)
Climate	Tropical (Dry and Wet Seasons)
Land Use	Farming, Conservation and Residential
Natural hazards	Landslide, Flooding, Thunderstorms
Environmental Issues	Deforestation and Land Degradation
Geomorphology	Coastal Plain, Interior Lowland, Interior Plateau and the Peninsular
Population	7,092,113
Administrative	Five Regions; 16 Districts; 190 Chiefdoms
Age Structure	Youthful Population
Growth Rate	4.2% (2017)
Infant Mortality	96
Life Exoectancy	56.1 years
Fertility Rate	4.73
Major Ethnic Groups	Mende, Temne, Limba, Krio, Fullah
Religions	Islam and Christianity
Languages	English and Pidgin English
Literacy	48.1%
Independence	27th April, 1961
Local Currency	Sierra Leone Leone (SSL)
GNI per capita	1480 PPP dollares
Inflation rate	17.08% (2019)
GDP Growth Rate	5.7%
Human Development Index (rank / 188)	184

Table 1 - Summary of country profile data for Sierra Leone1mary

cipally assisted by an elected Vice President for a governing term of five years. Cabinet Ministers responsible for key decision making within the executive arm of government are appointed by the President and subject to vetting and approval by elected members of parliament. The work of cabinet (President, Vice President and Ministers) is supported by civil servants.

- The Parliament

The Parliament, which serves as the sole legislative organ, is constituted of elected representatives from 132 constituencies and a Paramount Chiefs' representative for each of the 14 provincial districts. Members of Parliament are elected for the same term as the President. Parliament is presided over by the Speaker and assisted by a Deputy, both of whom are elected by Parliamentarians. In addition to the plenary where bills are debated and laws enacted, there are Parliamentary Sub-Committees that serve as oversight bodies for various Ministries, Departments and Agencies (MDAs).

- The Judiciary

The judiciary is headed by the Chief Justice who is appointed by the President on the advice of the Attorney General and Minister of Justice. The judiciary is modelled on the British legal system and consists of the following courts: The Supreme Court, Courts of Appeal, High Courts, and Magistrate Courts. Judges and magistrates presiding over these courts are appointed by the President on the advice of the Chief Justice and subject to vetting and approval by Parliament. The Sierra Leone Law Reform Commission comprising legal experts, is tasked with the responsibility of reviewing laws of the state as and when necessary.

1.2.2. Legislation Formulation Process

The process of formulating national laws is initiated by the relevant ministries, agencies or commissions. A draft bill is circulated to various stakeholders for their inputs and validation at regional and national workshops. The validated bill is submitted to cabinet by the supervising ministry for concurrence and approval after deliberations. The cabinet-approved bill in the form of a white paper is sent to the Law Officers Department for scrutiny and final drafting. This drafted bill is submitted to Parliament for debate and is adopted as an Act of Parliament. The Act becomes law upon Presidential assent.

1.3. NATURAL RESOURCES OF SIERRA LEONE

Sierra Leone is endowed with a variety of natural resources including crop and range lands, forests, freshwater, wetland, rich biodiversity, fisheries and abundant mineral resources (such as Diamonds, Gold, Titanium, Bauxite, Iron Ore and Chrome Ore). These resources form the bedrock of the country's economic growth and development. The poor management of the environment and natural resources in the past has resulted in environmental degradation. In recent years, there have been huge efforts towards building institutions and capacity strengthening to address these problems. These efforts have led to the new laws and the creation of three key institutions: The National Protected Area Authority (NPAA), the Environment Protection Agency-Sierra Leone (EPA-SL) and the National Minerals Agency (NMA). These institutions work collaboratively, and their efforts have yielded dividends in the management of the country's natural resources.

1.3.1. Profile of Solid Mineral Deposits in Sierra Leone

Mercury can be found as a trace element in several deposits (especially in Titanium commonly called rutile and bauxite mining). It is also used in the extraction of gold minerals. The key mineral resources in Sierra Leone are diamonds, rutile, bauxite, iron ore, gold and small amounts of limonite. The diamond fields are concentrated in the Eastern and South-Eastern belt, mainly in the drainage areas of the Sewa, Bafi, Woa, Mano and Moa Rivers. Kimberlites, the primary host rocks for diamonds, are mostly found in Kono and Kenema districts. Alluvial diamonds occur in river channel gravels, flood-plain gravels, terrace gravels and gravel residues in soils and swamps in Kono, Bo, Kenema and Pujehun Districts. In most of these areas where diamonds deposits are found, gold deposits also exist because in most cases, diamonds and gold exist in parallel and can therefore be extracted simultaneously. Mercury is used to extract gold.

Alluvial and hardrock gold are found in most greenstone belts in the North, East and South of the Country. The most prominent gold deposits are found around Lake Sonfon, Kalmaro, Makong, Baomahun and Komahun. Main deposits of bauxite are in the Moyamba, Port Loko, Koinadugu and Falaba Districts. Mining of bauxite dates back as far as the 1960s, primarily in the Moyamba District. Sierra Leone has the largest rutile reserves in Africa and known as the world's largest producer of natural rutile. The distribution of this mineral in the country is in four major areas: the Gbangbama, Sembehun, Rotifunk and Kambia deposits.

Iron ore is mainly found in the Port Loko and Tonkolili districts. The Marampa iron ore deposits in Port Loko form part of a greenstone belt with massive beds of specularite schists interstratified with quartz-mica schists. The formation has been traced as far as Kukuna near the Guinea border and to the south at Toma and Makalawa. The other major stretch of iron ore includes the Tonkolili and Bagla Hill deposits.

Mining activities in Sierra Leone are the major cause of deforestation and land degradation. Typical impacts include soil erosion, siltation and contamination of river basins/tidal creeks and displacements of communities. Heavy siltation of riverbeds and tidal creeks reduce coastal coral, cause flooding and other social impacts.

1.4. COUNTRY ENVIRONMENTAL OVERVIEW

Environmental degradation in Sierra Leone mainly arises from demographic pressure through socio-economic activities. The major environmental challenges facing the country can be grouped into the following clusters:

- Deforestation

Deforestation is a major environmental problem in Sierra Leone caused by multiple factors including, rapid population growth, urban migration, mining, quarrying, overharvesting of timber, charcoal production and rudimentary farming practices (slash and burn). Between 1990-2005, Sierra Leone lost about 9.5 per cent of its forest cover, accounting for an estimated 290,000 hectares. This deforestation is a major threat to biodiversity conservation and food security. It holds the potential to exacerbate the effects of climate change. There are a number of ongoing national and regional programmes/projects which aim to restore lost forest.

- Coastal erosion

Coastal erosion in Sierra Leone is accelerated by human activities (e.g. sand mining, deforestation of mangroves) and poor planning of coastal infrastructure development, resulting in a huge impact on coastal ecosystems. Coastal communities become vulnerable to such impacts in diverse ways including loss of livelihood, reduced agricultural productivity, human induced disasters and increased vulnerability to climate change. The Government of Sierra Leone, with assistance from UNDP, helps coastal communities adapt to climate change through the project "Induced coastal risk management". This is a five (5) years programme which started in 2019.

- Biodiversity loss

According to the World Conservation Monitoring Centre, there are some 938-fauna species including amphibians, mammals, reptiles and birds and 2090 species of vascular plants in Sierra Leone. The level of habitat loss through deforestation, coastal erosion and urban expansion holds a direct threat to biodiversity loss. Other threats include poaching, over-harvesting of fishery resources, pollution issues, wildfires, and climate change effects. In an effort to restore the depleted biodiversity, the Government of Sierra Leone established the National Protected Area Authority with

a mandate, among others, to engage in biodiversity conservation. Efforts of NGOs include eco-tourism, agro-forestry, and essential environmental services. Priorities include developing sustainable use patterns and halting environmental degradation, protecting endangered species, and promoting and documenting traditional knowledge.

- Waste Management

Waste management remains a major challenge across the country. The local government councils that are charged with the responsibility lack the capacity to do so. The private sector has not attracted enough investment and the government's budgetary allocations for the sector could be increased. There are no sanitary landfills nor a sewage treatment facility in Freetown (the capital city). Municipal wastes (solid and sewage) are dumped at uncontrolled dumpsites posing significant a pollution threat to the environment. There is huge nutrient overload at hot spots along the Freetown estuary which has resulted in sporadic thriving of an invasive seaweed species causing severe damage to the coastal environment. Provincial capitals now have improved small-scale waste management system to collect and transport municipal waste. However, the poor state of waste management in general has direct impacts on the health and sanitation of residents , particularly slum dwellers. A government intervention, since 2018, declaring the first Saturday of every month as cleaning day with allocated resources has improved the general sanitation across the country.

- Urban Planning

Sierra Leone has experienced rapid urbanization especially in the last two decades with the regional cities becoming the worst affected. The decade long civil war (1991-2002) is considered as the major driver for rural to urban migration. Freetown has seen the largest growth, with a tenfold increase in its population in the last three decades. Land acquisition for housing is chaotic and remains a major problem for urban dwellers. This has resulted to illegal land grabbing, especially at hard-to-reach areas and the poor urban planning makes it difficult to access certain basic social services (water and electricity) in some peri-urban areas. Poor urban transport and the limited road infrastructure makes movement of people particularly challenging. Poor urban planning and indiscriminate dumping of solid waste into drainages due to inaccessibility to dumpsites or transit points and absence of waste collectors are major causes for the frequent incidences of flash floods in Sierra Leone.

- Climate change

Although Sierra Leone's contribution to global greenhouse gas emission is marginal, it is ranked third among the most vulnerable nations to the adverse effects of climate change. Coastal and mountainous communities are particularly at high risk with increased incidences of flooding and mudslides. The country has low capacity to adapt to climate change and depends on external interventions to deal with climate change related disasters. Rural communities that are mostly dependent on rain-fed agriculture and natural resource-based livelihoods are particularly at high risk. With the assistance of international development partners, the country has embarked on several projects aimed at addressing climate change ranging from coping mechanisms (alternative livelihoods), to early warning systems, and the establishment of appropriate policies and regulations.

- Land Degradation

According to UNDP, there have been severe land degradation problems in Sierra Leone mainly caused by the unsustainable use of forest resources, slash-and-burn farming methods and wildfires. This situation has resulted in reduced agricultural productivity, declining food security, deterioration of water and natural resources and increased vulnerability to disasters in in the country. This has negatively impacted community livelihoods with remarkable implications for health and nutrition in the country. The major singular cause for land degradation is deforestation and the recent overharvesting of timber has exacerbated the problem.

The table below presents the main international Conventions that Sierra Leone has signed and/or ratified. These accessions allow Sierra Leone to integrate international dynamics to address various environmental issues and to have legally binding instruments at the national level.

Convention/Protocol	Signed	Ratified
Basel Convention on Control of Transboundary Movement of Hazardous Waste and their Disposal	5 May 1992	1 November, 2016 (Ban amendment waiting for
Rotterdam Convention on the Prior Informed Consent Procedure for Certain Hazardous Chemicals and Pesticides in International Trade	Acceded	1 November, 2016
Nagoya Protocol on Access to Genetic Resources and the Fair and Equitable Sharing of Benefits arising from their Utilization to the Convention on Biodiversity	Acceded	1 November, 2016
Bamako Convention on the Ban of the Import into Africa and the Control of Transboundary Movement and Management of Hazardous Waste within Africa	9 December 2003	Not yet (waiting for deposition)
The Stockholm Convention on Persistent Organic Pollutants	Acceded	Acceded 26 September 2003
The Vienna Convention on Protecting the Ozone Layer	21 August 2001	29 August 2001
The United Nations Convention to Combating Desertification (UNCCD)	11 November 1994	25 September 1997
The United Nations Framework Convention on Climate Change (UNFCC)	11 February 1993	22 June 1995
Convention on the Prohibition of Chemical Weapons	15 January 1993	30 September 2004
Convention for Cooperation in the Protection and Development of the Marine and Coastal Environment of the West and Central African Region (The Abidjan Convention)	7 June 2005	7 June 2005
International Plant Protection Convention (IPPC)	23 June 1981	23 June 1981
United Nations Convention on the Law of the Sea (UNCLOS)	12 January 1995	12 January 1995
Ramsar Convention on the Conservation of Wetlands	15 January 2000	13 December 1999
Kyoto Protocol to the United Nations Framework Convention on Climate Change	Acceded	10 November 2006
The Paris Climate Agreement	26 September 2016	1 November 2016
Montreal Protocol on Substances that Deplete the Ozone Layer	Acceded	29 August 2001
United Nations Convention on Biodiversity (UNCBD)	12 December 1994	12 March 1995
Minamata Convention on Mercury	12 August 2014	1 November 2016
Stockholm Convention on Persistent Organic Pollutants	26 September 2003	1 November 2016
Convention for Cooperation in the Protection, Management and Development of the Marine and Coastal Environment of the Atlantic Coast of the West, Central and Southern Africa Region (Abidjan Convention)	Acceded	7 June 2005
African Convention on the Conservation of Nature and Natural Resources	15 November 1968	7 June 2005
Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES)	28 October 1994	26 January 1995
International Convention on Civil liability for Oil Pollution Damage	1973	13 August 1993
Convention on Fishing and Conservation of Living Resources of the High seas	Acceded	13 March 1962

Table 2 – List of Multilateral Environmental Agreements to which Sierra Leone is a Party

2. Mercury Inventory: Identification of Sources of Inputs, Emissions and Releases in Sierra Leone

INTRODUCTION

The national inventory on mercury was prepared by a team of experts under the supervision and guidance of the Environmental Protection Agency-Sierra Leone, the key implementing agency for the Minamata Initial Assessment (MIA) project. One of the main objectives of the inventory is to identify the key sources of environmental discharge of mercury in the country. The inventory process started in February 2017, with a training on toolkits and methodologies organized by UNITAR in Freetown, Sierra Leone. The training was facilitated by a team of experts on mercury inventories and attended by a wide range of stakeholders, including government institutions, civil society and the private sector.

2.1. METHODOLOGY

The inventory was conducted using the UN Environment Programme's "Toolkit for identification and quantification of mercury releases"[5]. The Level 1 toolkit was used for the initial inventory. This uses pre-determined factors for the calculation of environmental mercury input or release. These factors are derived based on data, as contained in available literature, on mercury input or release from the relevant mercury source types. The level 2 was later completed to enhance the initial findings. Since input and output factors could not be developed specifically for Sierra Leone under this project, the default factors proposed by the level 2 inventory were used. The benchmark year of these inventories is 2016, as the latest data on mercury discharges available in Sierra Leone. Where 2016 data were not available, the most recent data were taken. General descriptions and definitions of the output pathways identified for the inventory are given in the table below.

For all tables showing mercury inputs and mercury emissions and releases, it is important to note the following aspects for total calculations:

1. To avoid double counting of mercury inputs from waste and products in the input TOTAL, only 10% of the mercury input to waste incineration sources, waste deposition and informal dumping is included in the total for mercury inputs. This 10% represents approximately the mercury input to waste from materials, which are not quantified individually in the inventory level 1 of the toolkit. See Appendix 1 to the Inventory Level 1 Guideline[6] for more explanation.
2. The estimated quantities include mercury in products, which has also been accounted for under each product category. To avoid double counting, the release to land from informal dumping of general waste has been subtracted automatically in the TOTALS.
3. The estimated input and release to water include mercury amounts, which have also been accounted for under each source category. To avoid double counting, input to, and release to water from, wastewater system/treatment have been subtracted automatically in the TOTALS.
4. To avoid double counting of mercury in products produced domestically and sold on the domestic market (including oil and gas), only the part of mercury inputs released from production are included in the input TOTAL.
5. To avoid double counting, fossil fuel mercury contributions to cement production was subtracted automatically in the TOTALS.

Table 3: Description of the types of results of the National Inventory

Calculation result type	Description
Estimated Hg Input, Kg Hg/y	The standard estimate of the amount of mercury entering this source category with input materials, for example calculated mercury amount in coal used annually in the country for combustion in large power plants.
Air	Mercury emissions to the atmosphere from point sources and diffuse sources from which mercury may be spread locally or over long distances with air masses; for example from: · Point sources such as coal fired power plants, metal smelter, waste incineration; · Diffuse sources such as small-scale gold mining, informal burning of waste with fluorescent lamps, batteries, thermometers.
Water	Mercury releases to aquatic environments and to waste water systems; point sources and diffuse sources from which mercury will be spread to marine environments (oceans), and freshwaters (rivers, lakes) for example releases from: · Wet flue gas cleaning systems on coal fired power plants; · Industry, households and others to aquatic environments; · Surface run-off and leachate from mercury contaminated soil and waste dumps
Land	Mercury releases to the terrestrial environment: General soil and ground water. For example releases from: · Solid residues from flue gas cleaning on coal fired power plants used for gravel road construction. · Uncollected waste products dumped or buried informally · Local un-confined releases from industry such as on-site hazardous waste storage/burial · Spreading of sewage sludge with mercury content on agricultural land (sludge used as fertilizer) · Application on land, seeds or seedlings of pesticides with mercury compounds
By-products and impurities	By-products that contain mercury, which are sent back into the market and cannot be directly allocated to environmental releases, for example: · Gypsum wallboard produced from solid residues from flue gas cleaning on coal fired power plants. · Sulphuric acid produced from desulphurization of flue gas (flue gas cleaning) in non-ferrous metal plants with mercury trace concentrations · Chlorine and sodium hydroxide produced with mercury-based chlor-alkali technology; with mercury trace concentrations · Metal mercury or calomel as by-product from non-ferrous metal mining (high mercury concentrations)
General waste	General waste (also called municipal waste):Typically household and institutions' waste where the waste undergoes general treatment, such as incineration, landfilling or informal dumping. The mercury sources to waste are consumer products with intentional mercury content (e.g. batteries, thermometers, fluorescent tubes) as well as high volume waste like printed paper and plastic, with small trace concentrations of mercury.
Sector specific waste treatment / disposal	Waste from industry and consumers which is collected and treated in separate systems, and in some cases recycled; for example: · Confined deposition of solid residues from flue gas cleaning on coal fired power plants on dedicated sites. · Hazardous industrial waste with high mercury content which is deposited in dedicated, safe sites · Hazardous consumer waste with mercury content, such as separately-collected and safely-treated batteries, thermometers, mercury switches and removed teeth with amalgam fillings. · Confined deposition of tailings and high-volume rock/waste from extraction of non-ferrous metals

2.2. SOURCES OF MERCURY INPUTS TO SOCIETY IN SIERRA LEONE

The tables below show which anthropogenic mercury release sources were identified as present or potentially present in the country using both levels 1 and 2 of the inventory. Only source types positively identified and potentially present are included in the quantitative assessment of this report.

Mercury inputs to society should be understood here as the mercury amounts made available for potential release through economic activity in the country. This includes mercury intentionally used in products such as thermometers, blood pressure gauges and fluores-

Table 4 - Identification of mercury sources in the country; Sources present (Y), and possible, but not identified positively (?) – Level 1

Source category	Source present Y/?	Estimated mercury input (kg Hg/ year)
Energy consumption		
Combustion/use of petroleum coke and heavy oil	Y	2
Combustion/use of diesel, gasoil, petroleum, kerosene, LPG and other light to medium distillates	Y	2
Biomass fired power and heat production	Y	57
Charcoal combustion	Y	51
Primary metal production		
Gold extraction with mercury amalgamation – from concentrate	Y	832
Use and disposal of products with mercury content		
Dental amalgam fillings ("silver" fillings)	Y	29
Thermometers	Y	8
Electrical switches and relays with mercury	Y	120
Light sources with mercury	Y	7
Batteries with mercury	Y	1315
Polyurethane (PU, PUR) produced with mercury catalyst	Y	26
Paints with mercury preservatives	?	?
Skin lightening creams and soaps with mercury chemicals	Y	0
Medical blood pressure gauges (mercury sphygmomanometers)	Y	0
Other manometers and gauges with mercury	Y	4
Laboratory chemicals	Y	9
Other laboratory and medical equipment with mercury	Y	34
Production of recycled of metals		
Production of recycled ferrous metals (iron and steel)	?	?
Waste incineration		
Incineration and open burning of medical waste	Y	17
Open fire waste burning (on landfills and informally)	Y	552
Waste deposition/landfilling and wastewater treatment		
Informal dumping of general waste	Y	368
Wastewater system/treatment	Y	1
Crematoria and cemeteries		
Crematoria	Y	=
Cemeteries	Y	188

5- http://www.unep.org/hazardoussubstances/Mercury/MercuryPublications/GuidanceTrainingMaterialoolkits/ Mercury Toolkit/ tabid/4566/language/en-US/Default.aspx and UNITAR's mercurylearn platform

6- https://wedocs.unep.org/bitstream/handle/20.500.11822/14777/Hg-Toolkit-Guideline-IL1-January2017.pdf?sequence=1&isAllowed=y

cent light bulbs. It also includes mercury mobilized via extraction and use of raw materials, which contain mercury in trace concentrations.

The activity rate for each sub-source category has been established based on the available information. A simple mass-balance calculation has been used. It is worth noting that the Level 1 Toolkit uses pre-defined default input factors, which are defined using available scientific literature. However, the used default factors are also a source of uncertainty in this inventory, as these factors are known to vary from country to country.

The table also gives, for each source category, its total estimated mercury input to the environment. The source categories that contribute most to estimated mercury inputs to the environment can be considered as:

- Batteries with mercury;
- Gold extraction with mercury amalgamation – from concentrate;
- Open fire waste burning (on landfills and informally);
- Informal dumping of general waste;
- Electrical switches and relays with mercury.

It should be noted that some sub-categories vary between levels 1 and 2 of the inventory, it is therefore not possible to do an exact comparison between the two levels. However, in general, the subcategories of mercury input sources remain similar in both inventories. The difference in the total quantified sources between the two inventories is mainly due to differences in the results obtained with relation to extraction and use of fuels/energy sources.

Table 5 below shows the results of the Level 2 inventory.

Table 5 - Identification of mercury sources in the country; Sources present (Y), and possible, but not identified positively (?) – Level 2

Source category	Source present Y/?	Estimated mercury input
Extraction and use of fuels/energy sources		
Mineral oils - extraction, refining and use	Y	108
Biomass fired power and heat production	Y	108
Primary (virgin) metal production		
Gold extraction with mercury amalgamation – from concentrate	Y	352
Consumer products with intentional use of mercury		
Thermometers	Y	8
Electrical switches and relays with mercury	Y	119
Light sources with mercury	Y	3
Batteries with mercury	Y	1315
Polyurethane (PU, PUR) produced with mercury catalyst	?	26
Paints with mercury preservatives	?	0
Skin lightening creams and soaps with mercury chemicals	Y	0
Other intentional products/process use		
Dental mercury-amalgam fillings	Y	29
Manometers and gauges with mercury	Y	9
Laboratory chemicals and equipment with mercury	Y	43
Mercury metal use in religious rituals and folklore medicine	Y	0
Miscellaneous product uses, mercury metal uses, and other sources	Y	0
Production of recycled of metals		
Production of recycled ferrous metals (iron and steel)	?	?
Waste incineration		
Incineration of medical waste	Y	17
Informal waste burning	Y	552
Waste deposition/landfilling and wastewater treatment		
Controlled landfills/deposits	Y	0
Informal dumping of general waste	Y	368
Wastewater system/treatment	Y	1
Crematoria and cemeteries		
Crematoria	Y	0
Cemeteries	Y	188
TOTAL of quantified inputs (including adjustments made for double counting)		2294

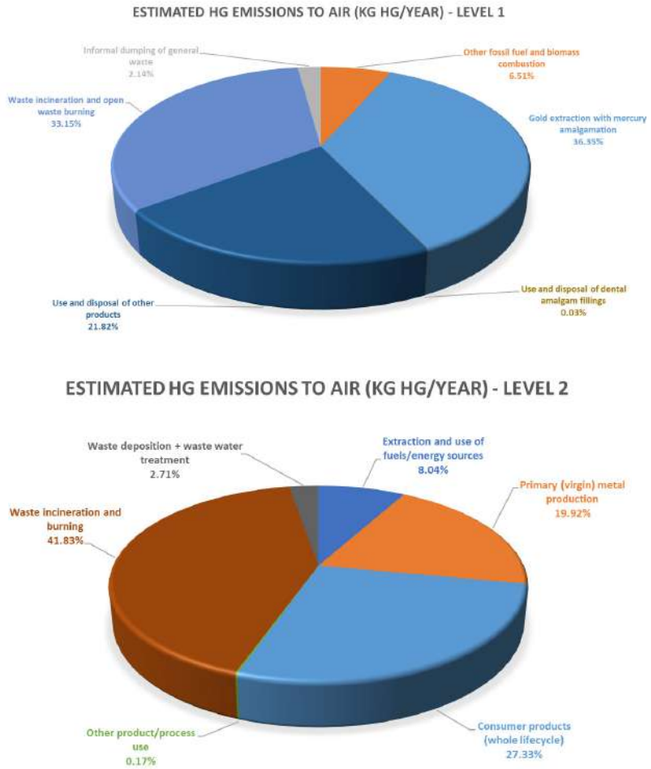
2.3. SUMMARY OF SOURCES OF MERCURY EMISSIONS AND RELEASE, STOCKPILES, SUPPLY AND TRADE IN SIERRA LEONE

Environmental discharge of mercury in the country notably occurs via air (atmosphere), aquatic (marine and freshwater bodies, wastewater systems), terrestrial (soil and ground water), municipal waste, and hazardous waste from specific sectors. Another possible output pathway may involve inputs through "by-products and impurities" which may channel unintentional mercury flow back into the market. Releases are calculated using pre-defined output distribution factors used in the Toolkit.

2.3.1. Mercury emissions to air

Estimates of mercury emissions to air are shown in Figure 2. Air emissions involve evaporation of mercury in the form of vapour, for instance, aerosols that may result from heating.

Figure 2: Estimated mercury emissions to air (levels 1 and 2)



Source: National mercury inventories in Sierra Leone, Level 1 (2018) and level 2 (2019)

As shown above, the most significant sources of emissions (using Level 1 figures) in Sierra Leone are:

- Gold extraction through mercury amalgamation (36.35% or 624.0 kg Hg/year);
- Waste incineration and open waste burning (33.15% or 552.2 kg Hg/year);
- The use and disposal of other products containing mercury (21.82% or 328.8 kg Hg/year);
- Other fossil fuel and biomass combustion (6.51%), including biomass fired power and heat production (57.4 kg Hg/year) and Charcoal combustion (50.6 kg Hg/year).

As for the inventory level 2, the most significant sources of emissions are:

- Waste incineration and burning (41.83% or 569 kg Hg/year);
- Consumer products (27.33% or 372 kg Hg/year);
- Primary (virgin) metal production (19.92% or 271 kg Hg/year), including gold extraction with mercury amalgamation.

2.3.2. Mercury releases to water

The categories considered for the estimation of mercury releases to water are presented in Figure 3, which includes all releases to aquatic environments, surface waters and wastewater systems. Sources of releases can be of two natures: sources located at a fixed point (for example a factory) or diffuse sources (for example dumped products) from which mercury can disperse and reach marine environments (oceans) and fresh waters (rivers and lakes).

The main source categories that contribute to mercury releases (Level 1) to water are:

- Gold extraction with mercury amalgamation (36.83% or 41.0 kg Hg/year);
- Informal dumping of general waste (33.05% or 36.8 kg Hg/year);
- Use and disposal of other products (18.27% or 12.7 kg Hg/year);
- Use and disposal of dental amalgam fillings (11.44% or 11.3 kg Hg/year).

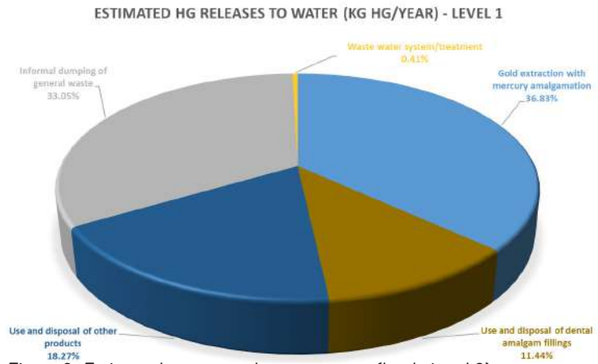
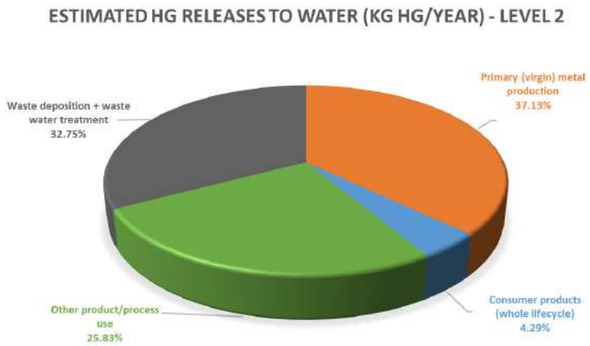


Figure 3: Estimated mercury releases to water (levels 1 and 2)

Regarding the level 2, the most important sources of releases into water are:

- Primary (virgin) metal production (37.13% or 42.2 kg Hg/year);
- Waste deposition and wastewater treatment (32.75% or 37.3 kg Hg/year);
- Other product/process use (25.83% or 29.4 kg Hg/year), including dental mercury-amalgam fillings, manometers and gauges with mercury and laboratory chemicals and equipment with mercury.



2.3.3. Mercury releases to soil

Estimates of mercury releases to soil and land are summarized in Figure 4. With respect to mercury in soils, all types of releases to soils are considered. Similar to water, sources of releases to land are of two natures: sources at a fixed point or diffuse sources from which mercury may disperse.

For the inventory level 1, the main source categories that contribute to mercury releases to land are:

- Use and disposal of other products (37.53% or 391,6 kg Hg/year);
- Informal dumping of general waste (28.22% or 294.5 kg Hg/year);
- Cemeteries and crematoria (18.03% or 188.2 kg Hg/year);
- Gold extraction with mercury amalgamation – from concentrate (16.00% or 167.0 kg Hg/year).

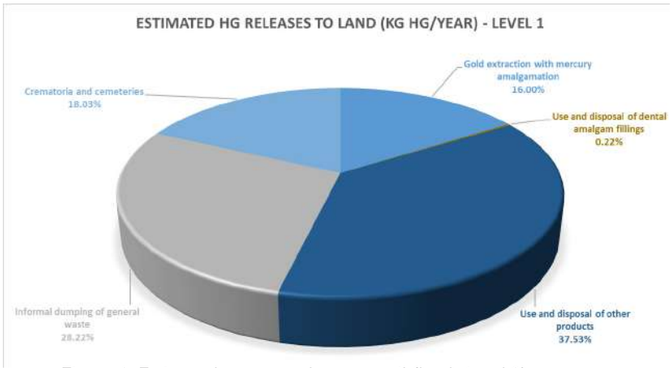
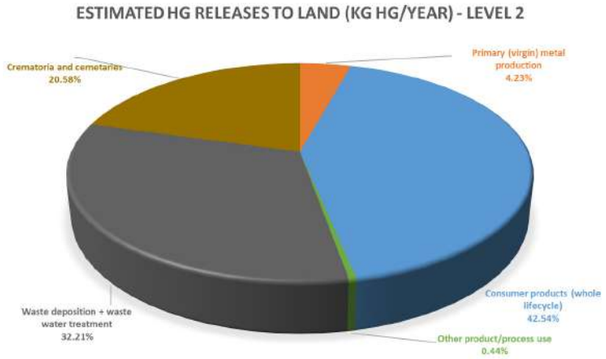


Figure 4: Estimated mercury releases to soil (levels 1 and 2)

Regarding the level 2, the sources that contribute the most to mercury releases into soil are the followings:

- Consumer products (42.54% or 388.9 kg Hg/year), including thermometers, electrical switches and relays, lights sources and batteries with mercury;
- Waste deposition and wastewater treatment (32.21% or 294.5 kg Hg/year);
- Crematoria and cemeteries (20.58% or 188.2 kg Hg/year).



As previously mentioned, when presenting the results of the level 1 and 2 inventories, the difference in the data is, given the current level of country-specific data, not very significant. As a result, the rest of this chapter, which includes descriptions of the different source categories, mainly presents the results of the level 1 inventory. However, since most source categories are similar for levels 1 and 2, the narrative descriptions are also valid for level 2 of the inventory.

2.4. DATA AND INVENTORY ON ENERGY CONSUMPTION

The data gathered for the different sub-categories related to energy consumption are presented in the table below.

2.4.1. Combustion / use of petroleum coke and heavy oil

This sub-category contributes 2 kg Hg/year. Several of the thermal plants that are scattered in different parts of the country use heavy fuel oil (HFO) as a fuel source. The total heavy fuel oil consumed in 2017 was 33,743 t. These constitute 27.2% of the total 141.61 MW installed capacity of power generation systems for the national grid. Table 7 gives the contribution from the different sources of electricity production in Sierra Leone for 2016.

2.4.2. Combustion / diesel use, diesel oil, petroleum, kerosene, LPG and other light to medium distillates

This sub-category contributes 2 kg Hg/year. Diesel, gasoil, petroleum and kerosene is used in power generation plants, transportation and industries. There are two main thermal power stations in Sierra Leone (Freetown and Bo) with several other smaller units distributed around major cities, as shown in table 7 above.

For this section of the inventory, the data was acquired from the Ministry of Finance (2017). The amount of imported fuel in Sierra Leone has increased over the years; this may be associated with how Sierra Leone has developed over the years with a high demand for energy consumption resources.

2.4.3. Biomass fired power and heat production

This sub-category contributes 57 kg Hg/year. The most typical biomass used for power and heat production is ordinary firewood used for cooking and drying of fish by local fishing communities. According to FAO data[7], a total of 1.914 million tons of firewood is burnt

Table 6 – Mercury in Energy consumption

Source category	Estimated Hg releases, standard estimates, Kg Hg/y						
	Estimated mercury input (kg Hg/year)	Air	Water	Land	By-products and impurities	General waste	Sector specific waste treatment /disposal
Energy consumption							
Combustion/use of petroleum coke and heavy oil	2	1.9	0.0	0.0	0.0	0.0	0.0
Combustion/use of diesel, gasoil, petroleum, kerosene, LPG and other light to medium distillates	2	1.8	0.0	0.0	0.0	0.0	0.0
Biomass fired power and heat production	57	57.4	0.0	0.0	0.0	0.0	0.0
Charcoal combustion	51	50.6	0.0	0.0	0.0	0.0	0.0

Table 7- Summary of National Generating Capacities /IPP Connected to the Grid

Plant	Installed capacity (MW)	Location	Type of fuel used
Bumbuna (Hydro)	50	Bumbuna	
Bo – Kenema Power Services (Thermal)	6.08	Bo	HFO
Bo-Kenema Power Services (Hydro)	6	Dodo, Kenema	-
Bo Kenema Power Services (I P P, THERMAL)	5	Bo/Kenema	DFO
Kingtom HFO	10	Kingtom, Freetown	HFO
Kingtom (DO)	25	Kingtom, Freetown	DFO
Blackhall Road (HFO)	16.5	Kingtom, Freetown	HFO
Makeni (DFO)	3.4	Makeni	DFO
Lungi (HFO)	6	Lungi	HFO
Kono(DFO)	8	Kono	DFO
Lunsar (DFO)	1.06	Lunsar	DFO
Charlotte Mini Hydro	2.2	Freetown	-
Bankasoka Mini Hydro	2.0	Port loko	-
Makalie Mini Hydro	0.12	Makalie	-
Yele Mini Hydro Project	0.25	Yele	-
Total	141.61		

7- FAO Yearbook for Forest Products 2014: http://www.fao.org/3/a-i5542m.pdf, accessed on 24 August 2017.

annually in Sierra Leone. The amount of firewood used to produce charcoal has been deducted from this number.

2.4.4. Charcoal combustion

This sub-category contributes 51 kg Hg/year. Based on FAO data, the amount of charcoal produced and consumed in Sierra Leone in 2014 was estimated at 422,000 metric tons. Charcoal is mainly produced in villages but predominantly used in urban areas for cooking. Its production involves burning of trees; a booming enterprise in recent years attracting men, women and children. The production of charcoal is undertaken in all regions of the country, though production in the Western Area, mostly concentrated in the Western Rural Area, is notably small compared to the other regions in the country.

2.5. DATA AND INVENTORY ON DOMESTIC PRODUCTION OF METALS AND RAW MATERIALS

The data gathered for the different sub-categories related to primary metal production are presented in the table below.

2.5.1. Large-scale production of metals

There is currently no large-scale production in Sierra Leone of metals and raw materials which would result in significant mercury emissions and releases[8,9], . However, it is worth noting that in two locations industrialized gold mining is about to start (as of 2019) and thus significant mercury emissions and releases may arise. In Baomahun community in Valunia chiefdom, Algom Resources Ltd has taken over a previously owned exploration license and is in the process of applying for a mining license to operate an open pit hard-rock gold mine. In Simiria Chiefdom in Tonkolili district, Kingho Investment Company (SL) Ltd has contracted Dayu Mining, to mine their deposit. This is planned to be underground hard-rock mining, where they are targeting quartz vein hosted gold.

Large-scale mining of gold and some non-ferrous metals may result in significant emissions and releases where any trace mercury contained in the ore is released during processing: for example, the smelting of processed ore, causes trace mercury contained in the ore being emitted to the atmosphere. Furthermore, exposed excavated rocks react with oxygen resulting acids (e.g. sulfuric acid) which leach heavy metals – including mercury – to the soil (ground water) and water bodies.

As these two are new sources of mercury emissions, according to the Article 8 of the Minamata Convention, the Government and stakeholders must note:

> *"For its new sources, each Party shall require the use of best available techniques and best environmental practices to control and, where feasible, reduce emissions, as soon as practicable but no later than five years after the date of entry into force of the Convention for that Party."*

The Secretariat of the Minamata Convention has released guidance material on the use of best available techniques and best environmental practices in smelting and roasting processes used in the production of non-ferrous metals[10].

2.5.2. Gold Extraction with Mercury Amalgamation – From concentrate

During the inventory process, a separate research on artisanal and small-scale gold mining was carried out and the following text is based on that research[11].

The figure below shows the geographical distribution of artisanal and small-scale gold mining activities in Sierra Leone.

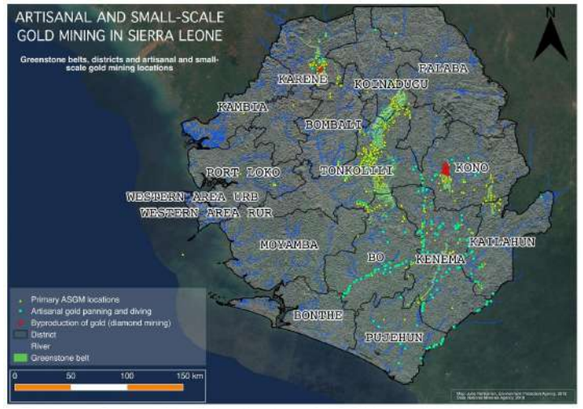


Figure 5: Geographical distribution of ASGM activities in Sierra Leone

This category contributes 352 kg Hg/year. Artisanal and Small-scale Gold Mining (ASGM) constitutes 37 per cent of the global anthropogenic atmospheric mercury emissions to the environment. The ASGM sector in Sierra Leone is divided distinctly into labour intensive artisanal mining, and small-scale mining, which utilizes more advanced machinery. The findings of the inventory mainly focused on artisanal mining (figure 6), as the nature and scale of small-scale mining only emerged during the field research[12]. The small-scale mining companies that were encountered largely operated without proper mining licenses, were secretive on the practices and production levels, and seemed to have political support (local political support), making them difficult stakeholders to engage with.



Figure 6: Alluvial artisanal open pit mining in Maranda
Photo: Juha Ronkainen/EPA-SL

The artisanal mining sector continues to provide many young people and single mothers in rural areas with economically viable livelihoods that enable them to feed their families and to pay their children's school fees. In addition, the sector injects cash into the local economy and creates a market for agricultural outputs and other goods and services, thereby catalysing elements of local development.

The report estimates that the current artisanal mining sector employs over 80,000 miners[13] (ca. over three per cent of the working age population in rural areas), who produce gold worth over USD125,000,000 by export value, on an annual basis. These findings clearly indicate the scale and significance of the artisanal mining sector for Sierra Leone. This places the national artisanal mining sector among the most fundamental extractive sectors in Sierra Leone by its export value, alongside well-acknowledged rutile and diamond production.

Mercury use has been observed in two AGM communities visited: Baomahun and Komahun (both hard rock sites). In Komahun, mercury was used only for processing mine tailings, which were re-processed once or twice (with sluices and pans, no whole ore amalgamation was observed) because they still contained gold that had not been recovered in the first treatment. In Baomahun, mercury was used for the primary ore recovered from the hard rocks. The miners in these two sites have been estimated to use on average 188 kg of mercury per year.[1] Based on the various measurements carried out both in Kumaru and Baomahun, and the information on the mercury price, the standard mercury:gold ratio for concentrate amalgamation of 1.3:1 was adopted for this study[2]. The figure below illustrates the mercury use that has commonly been observed in these sites.

In addition, a foreign SSGM company (M&S Ventures) operating with a 15 meter-long dredge on a river has been reported by its own workers to use mercury for treating ore tailings, although this was not observed in the short time that the researchers had available to visit the company.[3] Based on the data collected, the estimated average annual mercury use on this site is 165kg.[4]



Figure 7: Gold pits at Makali in the Tonkolili district

The total average estimate of mercury use in Sierra Leone's ASGM sector per year is 352 kg. This is fairly close to the relatively low estimate given by the 2013 UN Environment Global Mercury Assessment (225 kg), but much smaller than the high estimate given in the 2018 assessment (4,125-12,375 kg)[5].

The gold mining process in these two regions involved digging the earth from the suspected gold deposit areas and transporting it to a location where it is piled and then washed to remove clay materials and other debris, as shown in figures 7 and 8."

The washing is done on a rectangular wooden platform lined with a carpet. The dug-up material is placed on the platform and water at sufficient pressure passes through, leaving the gravel on the carpet.



Figure 8: Washing of earthy materials to retrieve gold gravel/tailings

The content of the carpet is then transferred into a metal head pan/plastic bowl containing water and taken for further, repeated washing in a pond (figure 9a) or stream (without the use of mercury, figure 9b), to separate the gold. In the case where mercury is used, the content is transferred onto the head pan

Table 8 – Primary Metal Production

Source category	Estimated Hg releases, standard estimates, Kg Hg/y						
	Estimated mercury input (kg Hg/year)	Air	Water	Land	By-products and impurities	General waste	Sector specific waste treatment /disposal
Primary metal production							
Gold extraction with mercury amalgamation – from concentrate	832	624.0	41.0	167.0	0.0	0.0	0.0

8- Large-scale rutile and diamond mining are not known to cause such emissions or releases.
9- Technically speaking, some artisanal miners excavate hard-rocks already in few locations, but the amount of ore processed and exposed can be considered small and the resulting leached mercury can be considered negligible. Furthermore, there is no clinker production in Sierra Leone, and only the last stage mixing of clinker with suitable aggregate materials such as sand or gravel to make ready-to-use cement.
10-http://mercuryconvention.org/Portals/11/documents/forms-guidance/English/BATBEP_nonferrous.pdf, accessed on 12 November 2018.
11- EPA-SL & UNITAR 2018. The ASGM Overview of Sierra Leone. Environment Protection Agency. Freetown, Sierra Leone
12- The term artisanal mining is therefore used much more often than ASGM.

13- The small-scale mining sector only employs approximately 100-200 miners
[1] The methods used for estimating gold production, ASGM workforce and mercury use are explained in section 3.1 of the ASGM overview report (see footnote 12)
[2] This 'standard estimate' applies to concentrate amalgamation and is based on the work done by Kevin Telmer and Marcello Veiga (Telmer, 2009)
[3] The company in question was extracting ore under an exploration license. In addition to this company, a handful of other companies were encountered in the field which were not operating under an (extraction) license. More information about this can be found in the full research report.
[4] Given the time constraints of the field study, as well as limited available information about small-scale gold mining companies operation in Sierra Leone, this is a rough estimate which needs further research
[5] UNEP Chemicals and Health Branch, 2013. Global mercury Assessment 2013: Sources, Releases and Environmental Transport. UNEP, Geneva; and UNEP Chemicals and Health Branch, forthcoming. Global mercury Assessment 2018: Sources, Releases and Environmental Transport. UNEP, Geneva (in preparation)

containing a small amount of water and the mercury is added to form the amalgam and repeatedly washed (in a relatively shorter time) in a small pit to separate the amalgam from the small stones.

Mercury use is more difficult to estimate because it is not a widespread practice in Sierra Leone. It is rather a relatively uncommon practice in artisanal mining, although is to some extent used in small-scale mining. In this context, it is important to reiterate that the research team had very limited access to the small-scale mining companies and that further research should urgently be conducted on small-scale mining. This point is made not only in view of mercury use, but also because the companies largely operate without licenses and cause tensions with artisanal miners and local communities.

(a) (b)



Figure 9: (a) washing of tailings in pond without use of mercury (in Makali); (b) pit for washing tailings with the use of mercury (in Baomahun)

However, based on secondary sources, it can be reported that mercury amalgamation appears to be practised to some extent. For the purpose of giving an upper limit of mercury use in Sierra Leone, a rough estimate has been made based on raw assumptions: it is possible that up to 676 kg of mercury is consumed annually, if indeed all of the encountered small-scale mining companies were using mercury. This is important to document, because the mentioned mining companies were operating without proper mining licenses. The indication serves as a warning that as illegal small-scale mining is increasing in Sierra Leone, the companies possibly engage in harmful practices, such as mercury amalgamation.

The estimates presented below are based on various applied methods: the mercury use in artisanal mining is based on the average estimates of gold production in the two locations where mercury use was detected, using the standard mercury:gold ratio of 1.3:1. The estimates for small-scale mining are more indicative and are based on rough extrapolation as explained previously. Due to the limitations of the methodology applied for small-scale mining, only a range has been given.

Mercury releases in soil, air and water

It is estimated that, on average, 352 kg of mercury is released to the environment from artisanal operations in Kumaru and Baomahun, and from dredging in rivers. Based on the various measurements carried out both in Kumaru (example of measurement shown in Table 9) and Baomahun, and the information on the mercury price, the standard mercury:gold ratio of 1.3:1 was adopted for this study[14].

Due to the high price of mercury, the miners typically handle mercury carefully avoiding spilling it to the ground. Therefore, the following assumption is made in order to establish mercury releases to land, water and atmosphere: 77 per cent of the mercury is assumed to be released to the atmosphere and 11 per cent of it is assumed to be released to land, and the rest (12%) to water (mainly from dredging).

It should be understood that the figures given in Table 10 are only indicative and only count the direct release pathways. A significant proportion of mercury released to land is believed to be re-released to the atmosphere later due to volatilization, but the rate of this is not well known[16].

In all other places, only simple gravitational methods such as sluicing and panning are used. Indeed, in its section on mining and processing, the NAP states the following:

> *"In those sites, ore was extracted with the use of hammers and wedges in open pits or in tunnels. Subsequently, the ore is crushed, which is typically done manually using a mallet or a hammer, and milled using a mortar or a stick with a steel tube. In certain mine sites, notably Komahun, Masumbirie and Maranda, mechanical Guinean-made hammer mills were used. Finally, the crushed and milled ore is concentrated through sluicing and panning.*
>
> *SSGM in Sierra Leone principally uses two methods of extracting and processing ore. In the first method, ore is extracted with the use of excavators. The ore is then washed in big, sometimes mechanized, sluices. The sluice carpets are washed and the concentrate is panned. In the second method, ore is extracted manually with shovels and is subsequently loaded on a dredge that rotates buckets of ore and drops them in a mechanized sluice. The carpets from the sluices are washed in a large bowl and gold is recovered by panning."*

Table 9 - Example measurement carried out in Kumaruof mercury

Mercury added	Mercury recovered[15]	Weight of amalgam	Weight of sponge gold (22K)	Weight of gold in 24K
29.820 g	30.142 g	0.375 g	0.192 g	0.176 g

Table 10 - Mercury releases to air, land and water. (Releases to land include possible releases to ground water, whereas direct releases to rivers and water bodies are considered as releases to water.)(in Baomahun)

Type of mining	Mercury released (kg)	Air (kg)	Water (kg)	Land (kg)
artisanal	352	271	42	39.0

14- This standard estimate applies to concentrate amalgamation and is based on the work done by Telmer and Veiga (Telmer, 2009).
15- There is a discrepancy here, which may be attributed to the micro droplets of mercury being present in the pond where mercury is happening. However, it also illustrates the fact that only a small fraction of mercury is lost to land and water, and most of it is released to atmosphere in the burning phase.
16- Telmer, 2019

2.6. DATA AND INVENTORY ON THE GENERAL CONSUMPTION OF MERCURY IN PRODUCTS, AS METALLIC MERCURY AND AS SUBSTANCES CONTAINING MERCURY

Mercury-added products are a source-category present in every country. They are also among the sources that are explicitly addressed in the Minamata Convention. According to Article 4, those mercury-added products listed in Annex A of the convention are to be phased-out by 2020, unless the Party notifies the secretariat of time exemptions as per article 6. Upon ratification, Sierra Leone had not registered any exemptions. Table 11 below shows the categories of mercury sources identified in the country.

The UN Comtrade database and population of the country (as applicable) has been used to estimate annual consumption of various mercury-added products in the table 2.10. UN Comtrade[17] is a database maintained by the UN, where countries report their import and export data according to the Harmonized System Code (HS). The main limitation is that UN Comtrade uses only 6-digit HS Commodity codes, which doesn't always offer the required specificity, meaning that it does not always distinguish between mercury-added and mercury-free variants of the same product categories, or that several product groups are counted together, of which only some are mercury-containing

Table 11 - Estimated Mercury Input from Mercury Containing Products

Source category	Estimated Hg releases, standard estimates, Kg Hg/y						
	Estimated mercury input (kg Hg/year)	Air	Water	Land	By-products and impurities	General waste	Sector specific waste treatment / disposal
Use and disposal of products with mercury content							
Dental amalgam fillings ("silver" fillings)	29	0.6	12.7	2.3	1.7	5.8	5.8
Thermometers	8	1.6	2.3	1.6	0.0	2.3	0.0
Electrical switches and relays with mercury	120	36.0	0.0	48.1	0.0	36.0	0.0
Light sources with mercury	7	2.1	0.0	328.8	0.0	657.5	0.0
Batteries with mercury	1,315	328.8	0.0	328.8	0.0	657.5	0.0
Polyurethane (PU, PUR) produced with mercury catalyst	26	5.1	2.6	10.3	0.0	7.7	0.0
Paints with mercury preservatives	?	?	?	?	?	?	?
Skin lightening creams and soaps with mercury chemicals	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Medical blood pressure gauges (mercury sphygmomanometers)	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Other manometers and gauges with mercury	4.0	0.9	1.3	0.9	0.0	1.3	0.0
Laboratory chemicals	9	0.0	2.8	0.0	0.0	2.8	2.9
Other laboratory and medical equipment with mercury	34	0.0	14.3	0.0	0.0	11.3	11.7

17- https://comtrade.un.org/data/

above background levels. For that specific reason, in Sierra Leone the data acquired from the UN Comtrade has been further analysed and adjusted to reflect the situation.

The HS codes consist of 6-digits; the first two digits designate the HS chapter, the second two digits designate the HS heading, and the last two digits designate the HS subheading. Import of products varies significantly due to the changing market prices and the possible existing stocks. Therefore, an average has been taken of the years 2011-2015, to provide a better estimate of annual consumption.

2.6.1. Mercury in Dental Amalgams

The use and disposal of dental amalgams account for 29 kg Hg/year. The use of dental amalgam is not common in Sierra Leone. A very common practice for dental restoration is the use of dentures made from plastic-like materials. The use of dental amalgam may by possible among wealthier sections of society, but the amounts are considered to be insignificant.

Mercury is released to the environment during preparation of the amalgam, from the process of wear and tear in the mouth, and by disposal of wastewater (from the preparation and removal stages) from dental clinics. It is also released from the cremation and burial of dead bodies with amalgam fillings (if teeth with fillings remain). About 40 % of all the amalgam prepared for a restoration is incorporated into the new filling in the mouth, the remainder is discarded into the drainage or smaller amalgam particles disposed in the trash.

2.6.2. Mercury in Thermometers

The use and disposal of thermometers account for 8 kg Hg/year. The types of thermometers identified in Sierra Leone are the following:

- Medical Hg thermometers: According to the information received from national stakeholders, mercury-filled thermometers are no longer sold in Sierra Leone. In all hospitals and health clinics, mercury thermometers have been replaced with digital thermometers. However, a net import of liquid filled glass thermometers of 31 kg has been reported in UN Comtrade. The exact type of thermometers is not known, neither is the division between mercury-filled and alcohol-filled thermometers. In order to provide a conservative estimate they are considered here as mercury-filled medical thermometers and, using the Toolkit unit conversion tab, the import corresponds in this case to an estimated 7400 thermometers used per year (since there is no local production).
- Other glass Hg thermometers: Most other glass thermometers are imported for educational purposes (research and science laboratories). The number of mercury thermometers in schools could not be quantified. It is important to note that mercury thermometers used for scientific purposes and calibration are excluded from the list of products to be phased out in 2020[18].

2.6.3. Mercury in Electrical switches and relays

The use and disposal of electrical switches and relays account for an estimated 120 kg Hg/year. The estimate is based on the population of Sierra Leone and adjusted according to the electrification rate of Sierra Leone (12%)[19]. The research team did not find any evidence that switches and relays with mercury are used in Sierra Leone. However, based on experience from other countries, their use is most likely present inside various applications, and thus the estimate has been included in the report.

2.6.4. Mercury in light sources

Light sources contribute an estimated 7 kg Hg/year. The use of Compact Fluorescent Lamps (bulbs) and fluorescent tubes has dramatically increased over the past few years through awareness-raising campaigns in relation to energy efficiency and climate change. Their appeal is due to their significantly increased energy efficiency compared with traditional, incandescent light bulbs, and their greater lifespan. However, fluorescent lamps are prone to breakage releasing some of the mercury they contain. For example, during the hour immediately following the break of a compact fluorescent light bulb, mercury gas concentrations near the bulb shards are between 200 and 800 µg/m3. Within four (4) days, a broken 13-watt compact fluorescent light bulb releases about 30 per cent of its mercury with the remaining mercury staying in the bulb debris (Bose-O`Reilly, 2010).

UN Comtrade net import numbers given in table 12 do not separate fluorescent tubes and compact fluorescent lamps (they are all included as Compact Fluorescent Lamp). Based on the discussion during the UNITAR training on inventories in February 2017, an estimate was made that 75% of the reported lamps are tubes and the rest are compact fluorescent lamps. The net import numbers are given in kg/year, and they were converted to units using the Toolkit conversion tab. The two types of fluorescent lamps and the data used for this inventory were:

- Compact Fluorescent Lamp (CFL single ended): estimate was made that 25% of the reported lamps are compact fluorescent lamps.
- Other Hg containing light sources: Small numbers of other mercury containing lamps, such as metal halide lamps or sodium vapour lamps, are consumed annually in Sierra Leone, according to the data available at the UN Comtrade.

2.6.5. Mercury in batteries

The use and disposal of batteries contributes an estimated 1,315 kg Hg/year. The types of batteries identified in this inventory were:

- Mercury oxide (button cells and other sizes): Button cell batteries are miniature batteries in the shape of a coin or button that are used to provide power for small portable electronic devices. Mercury oxide batteries are speciality batteries often used in hospitals, military facilities and commercial applications. They contain more than 30% of mercury. They are likely to be present in the country in small amounts according to UN Comtrade information.
- Other button cells: A small amount of other mercury-containing button cell batteries are reported to be imported to Sierra Leone. Those include zinc-air, alkaline button cells, and silver-oxide button cells.
- Other batteries with mercury: This category contains typical cylinder alkaline batteries that may or may not contain mercury; their total mercury contribution is considered minimal.

2.6.6. Mercury in Skin-lightening creams and soaps

According to the data collected by the national inventory team, the use of mercury-containing skin-lightening creams and soaps, hair treatment, and other cosmetic products is a noticeable source of exposure in Sierra Leone. A recent study (Master's thesis) on thirty (30) skin lightening/whitening products (soap, creams and lotions) indicates a level of mercury of between 2.30 mg/L to 15.56 mg/L for 29 products, with one product having a relatively lower mercury concentration of 0.71 mg/L. However, no estimates are available for the amounts of such creams sold annually. This source should be investigated closer in future updates of the inventory, if possible.

2.6.7. Mercury in Polyurethane Catalyst, other Manometers and Gauges, Laboratory chemicals and other Laboratory and Medical equipment

The data for these categories are estimates calculated based on the population in Sierra Leone. There is no reported use of polyurethane with mercury catalyst in Sierra Leone. However, based on experience from other countries, their use is most likely present as part of various applications. The use and disposal for other manometers and gauges account for 4 kg Hg/year.

2.7. DATA AND INVENTORY ON WASTE AND RECYCLING

Wastes are unwanted materials or by-products which are no longer required for their initial use. There are different types of waste depending on the different processes responsible for generating the waste. Wastes can be broadly categorised in to non-hazardous and hazardous waste: however, whatever the categorisation, systems must be put in place for proper handling, otherwise they can represent severe health and environmental issues. The hierarchy for waste management includes source reduction, recycling (including composting), combustion with energy recovery, and disposal. The necessary infrastructure for such waste management is not currently available in Sierra Leone, resulting in unsafe methods of managing our wastes. Significant investments would be required to rectify this.

The instrument that regulates the management of waste at the national level is the EPA Act of 2008 as amended in 2010 and is to be monitored by the EPA-SL. Waste management is subjected to an environmental impact assessment (EIA) process; even though the agency is yet to issue any company a licence, most of the companies or institutions with the responsibility of managing waste in the major cities of the country are in the process of preparing relevant EIA reports. However, in the recent past, the agency had issued two licences for the transboundary transport of waste (used oil) from Sierra Leone to neighbouring Guinea which has reusing facilities and accepted to receive the waste in accordance to the Basel Convention.

Table 12 shows the waste categories and practices identified as present in Sierra Leone and their estimated mercury inputs.

For the purpose of this inventory, the following source categories, which are applicable to the country, will be considered and described below: incineration/burning of medical waste, open fire waste burning and informal dumping of general waste. However, it should be noted that since waste segregation is rare, the industrial and household level hazardous wastes (e.g. batteries) end up being disposed into the municipal solid waste (MSW) streams.

2.7.1. Incineration of Medical Waste

Table 12 - Waste Categories and Treatment Practices Common in Sierra Leone

Source category	Estimated Hg releases, standard estimates, Kg Hg/y						
	Estimated mercury input (kg Hg/year)	Air	Water	Land	By-products and impurities	General waste	Sector specific waste treatment / disposal
Use and disposal of products with mercury content							
Incineration / burning of medical waste	17	16.9	0.0	0.0	0.0	0.0	0.0
Open fire waste burning (on landfills and informally)	552	552.2	0.0	0.0	0.0	0.0	0.0
Waste deposition/landfilling and wastewater treatment							
Informal dumping of general waste	368	36.8	36.8	294.5	-	-	-
Wastewater system/treatment	1	0.0	0.5	0.0	0.0	0.1	0.0

18- Minamata Convention: Article 4, Annex A.
19- IEA, Electricity access Today – WEO-2011 new Electricity access Database (2009 data country-by-country), accessed June 2012.

Medical wastes are defined to include all types of wastes produced by health facilities such as general hospitals, medical centres and dispensaries. Even though such wastes represent a small amount of total wastes generated in a community, they present aggravated risks because of their tendency to transmit diseases to the staff of the healthcare facilities, patients and the community. It is important, therefore, that such wastes are treated separately and managed properly. In Sierra Leone, items with the potential to generate mercury waste are traditional thermometers (mercury in glass) and other measuring devices (e.g. blood pressure gauges and pyrometers) used in hospitals or laboratories, and mercury alloys used for tooth fillings. However, the use of mercury in glass thermometers has been drastically reduced or even eliminated in hospitals and clinics with the introduction of electronic thermometers during the Ebola epidemic in 2014. Nevertheless, mercury in glass thermometers may still provide a major source of mercury pollution in hospitals and laboratories where they have been collected and are lying in hospital stores awaiting final disposal.

Incineration of medical waste is the preferred disposal method in all the government hospitals and peripheral health units (PHUs) and would generate mercury emissions to air where mercury-containing wastes were included in incineration. This also implies that there is no sorting of medical waste.

Generally, waste management in private hospitals is not monitored effectively and their wastes are mostly disposed of in the general waste stream. Management of waste in government or government-assisted hospitals (tertiary health care hospitals, satellite and PHUs) is supervised by the Directorate of Environmental Health and Sanitation at the Ministry of Health and Sanitation (MoHS). There are about 1,171 health facilities nationwide of which 28 are hospitals (tertiary health care hospitals) with around 50% of them in Freetown and at least one in each of the twelve districts of the country (MoHS, 2017). There are about 1,143 PHUs with varying capacities, most of which only offer out-patient services. Waste management in the government-controlled facilities involves categorising wastes into non-hazardous (domestic: paper, plastics, food),hazardous (medical: gloves, dressings, sharps, specimen container) and human waste (human parts) with minimal further waste segregation. There are usually two containers/wastes bins placed per section; one for non-hazardous waste and the other for hazardous (medical or infectious) waste.

Figure 10: waste bins for medical/hazardous (yellow cover) and non-hazardous wastes



The bins (Figure 10 above) are permitted to be 75% filled and are emptied on a daily basis. The number of the bins at each facility will depend on the number of sections generating the different waste types i.e. larger facilities will generate more waste and as such will have more bins

(a) (b) (c)



Figure 11: (a) Incineration practice in government hospital (b) an electric diesel incinerator at a government hospital (operational) and (c) installed autoclave unit in government hospital

The non-hazardous wastes are sent to the general waste stream whereas the medical wastes are treated within their facilities. Operating theatres have a third level of waste bins. Human waste (placenta and amputations) are either buried or placed in pit that is constructed such that seeping into the underground is minimized. The remaining medical wastes (which may include instruments containing mercury) are incinerated mostly using locally constructed incinerators with minimal emission control technology and in some cases electrical diesel-fueled incinerators that may have some level of emission control technology (Figure 11 above).

Figure 12: Best Practice at Emergency Hospital - Freetown



Based on interviews held with staff at the MoHS, autoclaves (10), electric diesel-fueled (10) and shredders were supplied to some of these government hospitals but most of them are not currently operational (either not yet installed or installed but not in use).

An autoclave to disinfect waste is being used at the emergency hospital (in Freetown) in addition to other acceptable waste treatment methods. The residues generated are deposited into pits that are lined to prevent leaching of materials.

Health Care Waste (HCW)

The table 13 gives quantification of Health Care Waste (HCW) generated by thirteen (13) government hospitals all over the country based on estimates made by Ecosteryl (2014) for MoHS on medical waste management in Sierra Leone. Of the HCW generated, according to WHO a maximum of 25% constitute the hazardous waste portion (Heunis, 2016). The medical waste from private hospitals and majority of the PHUs are normally deposited at the dumpsite together with the general MSW.

Health and Environmental Concerns of Medical or Health Care Wastes

The potential for HCW to cause harm arises from its composition as they can contain infectious agents, hazardous chemicals or pharmaceuticals, radioactive materials and sharp objects. Individuals with the greatest exposure to the health risk associated with such wastes are workers in healthcare facilities that work in laundries and those that are involved in the handling, transport and disposal of the waste. Medical practitioners (doctors and nurses), patients and visitors at such establishments could also be exposed to certain extents to the HCW. Sharp objects can contain blood and can be a major source of transmission of HIV and hepatitis if someone sustains a cut or bruise from such items if they are infected. Even though there is no published study on infection rate of these diseases for health care workers, the prevalence of HIV and hepatitis is generally on the increase in the country[20].

During the Ebola outbreak in Sierra Leone (2014-2016), the level of awareness on the use of PPEs (Personal Protection Equipment) and sanitization of the hospital environment has been greatly enhanced; however, there are still major challenges. Based on inspections at some major health care facilities, it is observed that workers handling the waste within the waste management units in these facilities are at the greatest risk of infection. This is mainly as a result of none or minimal training of workers, unavailability of PPE and crude methods of waste disposal.

Burning of waste in mostly locally-constructed incinerators (with little or no emissions control technology) causes discharges that not only result in the degrading of the surrounding atmosphere but also affect individuals within the health facilities as well as inhabitants living close to these facilities, exposing them to diseases associated with poor air quality. Normally, the remnants from the incineration are put into pits that may not completely prevent seeping into ground water polluting wells in the surrounding area and other water bodies. For instance, the two main referral/government hospitals in the capital, Freetown, are located in densely populated areas close to the ocean; though not investigated, these may pose serious environmental and public health challenges.

Table 13 - Waste generation from Government Hospitals nationwide (AMB - Ecosteryl, 2014)

District	Referral Centre/Government Hospital	Waste generation (ton/year)
BO	Bo Government Hospital	210
BOMBALI	Makeni Government Hospital	162
BONTHE	Bonthe & Matru Government Hospital	54
KAILAHUN	Kailahun Government Hospital	150
KAMBIA	Kambia Government Hospital	110
KENEMA	Kenema Government Hospital	210
KOINADUGU	Koinadugu Government Hospital	108
KONO	Kono Government Hospital	105
MOYAMBA	Moyamba Government Hospital	55
PORT LOKO	Port Loko/Lungi Government Hospital	108
TONKOLILI	Tonkolili Government Hospital	140
WESTER AREA	Connaught Hospital Kingharman Road Hospital Lumley Government Hospital Rokupa Government Hospital PCMH & Ola During Children's Hospital Under Fives Hospital Macauley Street Hospital	420
Total		2012

20- WHO Sierra Leone Annual Report: A Year in Focus 2017

2.7.2. Treatment of Municipality Solid Waste (Open waste burning and informal dumping of general waste)

Municipal Solid Waste (MSW), commonly known as trash or garbage includes everyday thrown away items from households, commercial and institutional entities. This includes items such as packaging, paper, cardboard, food scraps, plastic bags and containers, glass bottles, grass clippings, furniture, tires, and electrical items. Since there is limited or no waste separation in most cases, the MSW contains hazardous waste such as chemicals from industries (waste or expired items) as well.

Management of municipal waste is under the purview of the local councils, which in certain cases has been contracted to private companies, such as MASADA in Freetown, and some limited artisanal recycling (particularly plastics) and reuse for livelihood purposes. However, mostly, there is no waste segregation at source. With even the few exceptions, such as institutions/companies with waste management plans that encourage waste segregation, ultimately, they are likely to be bundled into one waste stream before it reaches the final dumpsite. Waste is in some cases being collected from households or other premises and brought to transit points for a certain fee (or brought by individuals) and ultimately disposed of at a general dumpsite controlled by the local government authorities. Such dumpsites are present in all major towns or cities in the country. Since the dumpsites are not engineered landfills, there are no means to prevent pollutants leaching into ground water and land. Therefore, all wastes ending up into dumpsites (As shown in Figure 13 below) are calculated under the category of 'informal dumping of municipal waste'.

For the wastes that are not collected, they will be dumped in the gutters or illegally at open spaces within the different communities. At the dumpsites and open spaces some level of scavenging takes place and the final treatment of waste is often by open burning. Most times the wastes catch fire due to flammable gases generated at the designated dumpsites. Burning as a means of reducing waste volume is mostly done at the illegal dumpsites.



Figure 13: Kingstom Dumpsite in Freetown

According to Wiedinmyer (2012), the total MSW generated in Sierra Leone in 2012 was 920,316.16 tonnes with total MSW openly burned amounting to 552,190 tonnes giving an estimated total MSW informally dumped as 368,126.16 tonnes.

Health and Environmental Concerns of Municipal Solid Wastes

Waste generation is a largely inevitable process, with the amount of waste generated broadly proportional to the population. Poor management of waste poses serious health and environmental challenges. In Sierra Leone, like other countries, the population is concentrated at urban areas with minimal infrastructure to manage the waste and, as such, the greatest effect is concentrated in these zones. Since waste segregation is not done in general, the MSW stream consists of different materials from different sources. Generally, improper and indiscriminate dumping of waste in these urban settlements normally at areas not designated for such purposes results in a decrease in the aesthetic value of the environment, encouraging rodents and insects to inhabit these locations. During the rainy seasons, waste litters the streets and blocks drains, leading to flooding, especially in Freetown. During this period, pollution of water bodies is eminent, and the prevalence of water borne diseases such as cholera and diarrhoea is high, leading to loss of lives.

At the designated dumpsites, since the lands are not engineered, incident of pollution of both ground water (via leaching) and surface water (run-off) is common. In an article by Frazer-Williams et al. (2013) on the influence of the King Tom (commonly called Kingtom) dumpsite (the largest dumpsite in Freetown) on the nearby environment, levels of heavy metals (copper, zinc, nickel and lead) are relatively high compared to WHO standards, on both water and fish samples collected from nearby water bodies. A similar study conducted at this location (air samples collected 300 m away from the dumpsite) gives a concentration of 11 Polyaromatic hydrocarbons (PAHs) in the PM2.5 fraction ranges between 0.23 ng/m3 and 12.90 ng/m3 in the wet season and 0.72 ng/m3 and 75.95 ng/m3 in the dry season (Taylor and Nakai, 2012). Inhalation of PM2.5 is strongly associated with air borne diseases fatal to affected individuals. Result of a questionnaire survey on the impact (signs and symptoms associated with poor air quality) of the dumpsite on residence living nearby is given thus (Kamara and Conteh, 2015): the respondents experience coughing (75.5%), sneezing (67.5%), chest burn (76.0%), sore throat (64.0%), difficulty breathing (81.5%), skin irritation (78.0%) and eye burn/irritation (85.0%) either most of the time or sometimes.

2.7.3. Wastewater System/Treatment

This sub-category contributes 1 kg Hg/year. There is no central sewage treatment and wastewater treatment facilities in the country. As such, homes, hospitals, hotels or other amenities within the municipalities discharge their wastewater directly to the drainages/gutters. Some homes, hospitals and hotels have constructed septic tanks for their sewage. When these tanks are full, the sewage is collected and deposited on dumpsites without any treatment. With the exception of two beverage industries with full treatment facilities (The two beverage industries with treatment plants treat the water to a basic level to remove key physical, chemical and bacteriological contaminants), for compagnies with Environmental Impact Assessment (EIA) licences, pre-treatment facilities are constructed as a requirement per the terms and conditions of the EIA licences. Pre-treatment and laboratory analyses are therefore usually conducted before discharging.

2.8. DATA AND INVENTORY OF CREMATORIA AND CEMETERIES

The table below summarizes the estimated inputs, emissions and releases obtained for cemeteries in Sierra Leone.

Cemeteries contribute 188 kg Hg/year. The CIA World Factbook has been used as a data source for the bodies buried in a year.

Human bodies contain certain amounts of mercury, mainly as a result of dental amalgams, which are released when bodies are buried or cremated. Cremation happens in Sierra Leone, but in insignificant amounts and thus there is no data on that sub-category.

2.9. DATA AND INVENTORY OF MERCURY STOCKPILES, SUPPLY AND TRADE

2.9.1. Mercury supply in Sierra Leone

Based on UN Comtrade, there is no official import of mercury (HS code 284390) or dental fillings, which could contain mercury (HS code 300640) in the years 2013-2017. This is not that surprising as there are no industrial activities that demand mercury. Dental hospitals stopped using mercury amalgams although there are uncertainties related to some small-scale smuggling which is hard to estimate, which is based on a conversation with a dentist at the main referral hospital in Freetown. Furthermore, there are no known mercury-intensive industrial processes where mercury could be flowing into the markets. Therefore, we conclude that the only real demand for mercury occurs in the artisanal and small-scale gold mining (ASGM) where mercury amalgamation is practised. Thus, this chapter concentrates on illicit mercury trade to supply the need in ASGM.

During the inventory process, a separate research on artisanal and small-scale gold mining was carried out and the following text is based on the produced report[21].

2.9.2. Mercury Trade

As, at the time of writing, the world market price for a mercury flask of 34.47 kg was 2,000 USD (0.058 USD/g), it can be estimated that, on average, mercury worth 9,054 USD is imported annually to be used in artisanal mining[22]. However, there are differences when considering the market price of mercury in Sierra Leone. Using an average estimate of Le100,000/Oz (0.47 USD/g), there is close to 75,000 USD circulating in the mercury trade in Sierra Leone.

The mercury users interviewed usually buy 1-4oz (28-112g) of mercury at once. It was mentioned by mercury users in Kumaru that mercury comes mostly from Liberia. It was also indicated by the same informants from Kumaru that a small part of the mercury used in the area was coming from Ghana where it is cheaper than in Liberia, while there are obviously more travel costs involved in getting it from there. It was also mentioned by an unlicensed trader in Kumaru that Chinese operators brought in the mercury and use it there in their own operations; and by other unlicensed traders in Kumaru that mercury can be bought from gold buyers in Guinea. Cheaper mercury in Ghana is understandable in the larger context; neighbouring Togo is known to be the import hub of mercury to western Africa, providing mercury to Ghana's mercury-intensive artisanal mining sector, as illustrated in Figure 14[23]. Evidence collected seems to confirm that mercury is flowing from Togo via various channels, as suspected in the World Bank/COWI report of 2016.

To put the mercury trade into context, it is illustrative to think of the volume of consumed mercury[24] in artisanal mining (156 kg). As an extremely dense liquid metal, it would only take a little more than 11 litres in volume, to pack 156 kg of elemental mercury. Such quantity can be easily imported by a few people carrying backpacks, or by a single person making a few trips to neighbouring countries in a year. When it comes to alleged mercury use in small-scale mining (max 676 kg), they have very little reason to use the same trade channels as artisanal miners. The small-scale mining companies that were visited imported raw materials for their own use directly from China, giving them ample opportunities to import some liquid mercury along with steel and heavy machinery, if so needed[25].

2.10. CONTAMINATED SITES

Mercury contaminated sites represent one of the aspects of Article 12 of the Minamata Convention that stipulates that: "Each party shall endeavour to develop appropriate strategies for identifying and assessing sites contaminated by mercury or mercury compounds" and that, "Any actions to reduce the risks posed by such sites shall be performed in an environ-

Table 14 - Mercury Releases from Cemeteries

Source category	Estimated Hg releases, standard estimates, Kg Hg/y						
	Estimated mercury input (kg Hg/year)	Air	Water	Land	By-products and impurities	General waste	Sector specific waste treatment / disposal
Cemeteries							
Cemeteries	188	0.0	0.0	188	-	-	-

21- EPA-SL & UNITAR 2018. The ASGM Overview of Sierra Leone. Environment Protection Agency. Freetown, Sierra Leone
22- The calculation is based on the average estimation of mercury use in artisanal mining (156.1kg).
23- World Bank/COWI, 2016
24- Density of elemental liquid mercury 13.69 kg/litre
25- It is worth noting that China is one of the most prominent mercury producers in the world (primary mercury mining, recycling and by-production) and that mercury amalgamation is known to be practised among Miners in China. (https://wedocs.unep.org/bitstream/handle/20.500.11822/21725/global_mercury.pdf?sequence=1&isAllowed=y)

mentally sound manner incorporating, where appropriate, an assessment of the risks to human health and the environment from the mercury or mercury compounds they contain."

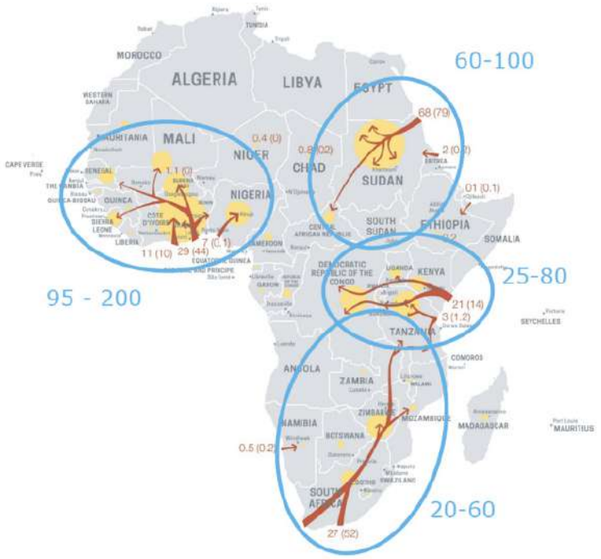


Figure 14: Overall trade flow of mercury in Sub-Saharan Africa. Red numbers indicate the average official import for the period 2010-2015 from countries outside the region with 2015 import figures in brackets. The actual import may be up to twice the indicated official import. The area of yellow circles, indicate the estimated mercury consumption for artisanal mining in the countries (mean estimate). The blue numbers indicate the likely total mercury consumption within the sub-regions indicated by the blue circles. (Illustration from (World Bank/COWI, 2016). Used with permission.)

In general, a contaminated site is a place where there is an accumulation of toxic substances or residues which may affect the soil, groundwater, sediments and even air as in the case of mercury to levels that pose a risk to the environment or human health or be above the safe limits recommended for a specific use. Mercury has been used in different areas ranging from dentistry, in gauges, consumer products and mostly in gold mining areas. Therefore, sites in Sierra Leone potentially contaminated with mercury may include dumpsites (hospital, municipal and industrial, among others), gold mining areas (current and former) and any other environment where waste-containing mercury is being managed.

2.10.1. Strategy for identifying and Assessing Mercury Contaminated Sites in Sierra Leone

To identify potentially contaminated sites in the country, areas based on land use type with the potential of mercury being used or items suspected of containing mercury or compounds of mercury are being deposited were considered. The strategy for identifying and assessing mercury contaminated sites can include a Preliminary Desk Study, a Preliminary Site Investigation and a Detailed Site Investigation. Besides the Detailed Site Investigation, both Preliminary Desk Study and Preliminary Site Investigation steps were conducted:

- Preliminary Desk Study

Areas in which there may be presence of mercury were identified. Key places of interest in Sierra Leone are gold mining areas and dumpsites. Information was obtained by interviewing staff at the National Mineral Agency (a body charged with the responsibility of managing mining activities in the country) and the Environment Protection Agency – Sierra Leone (EPA-SL). Information on previous studies on investigation of mercury in the environment or item containing mercury or compounds of mercury in products is not readily available (from all indications such studies have not been conducted in the past on mercury pollution). The data obtained for mercury in the marine environment is based on some qualitative studies which assessed the risk of bioaccumulation of mercury in fish species that present a potential to bioaccumulate the chemical.

- Preliminary Site Investigation

Visits to gold mining sites at the Southern and Northern regions of the country were conducted in February 2018. Interviews were conducted with the miners on their activities to determine the use of mercury in their processing of the gold. It was identified that mercury is currently in use at the Baomahun hills in Bo district and attempt was made to use it for a very short time downstream of the Adith hill at the Tonkolili district. No samples (soil or water) were collected from these locations, but information was obtained by interviewing stakeholders and by expert assessment of the environment.

- Detailed Site Investigation

This step hasn't been undertaken under this project but will be necessary to quantify the contamination and support both Preliminary Desk Study and Preliminary Site Investigation. This study is mainly the field sampling and would be useful to quantify all the identified aspects of the preliminary site investigation. The results could constitute the basis for a national risk assessment for human health and the environment and to propose strategies for the sound management of contaminated sites. Different types of sampling such as direct and indirect samplings, biological sampling and soil and water sampling for laboratory analysis. Data processing and interpretation will be useful to finalize the profile of each site studied in terms of contamination.

2.10.2. Potential Contaminated Sites in Sierra Leone

Three key areas have been identified as places with high probability for mercury contamination in Sierra Leone based on activities conducted there or have the potential to serve as recipient of components containing mercury or compounds of mercury. These areas are discussed below.

- Dumpsites

Dumpsites or open dumpsites serve as major recipient of wastes generated especially in the urban areas. Separation of waste at different sectors is not a common practice in Sierra Leone. Generally, waste management in the urban areas will involve collection of waste from different areas and transported to transit points and/or directly to the dumpsites. These dumpsites are considered as major contaminated sites especially resulting from dumping of mercury containing products and related wastes. Dumpsites can contain mercury contaminated soil from which surface and groundwater can be polluted by run-off or leachate percolation respectively. Burning of waste and volatilization can introduce mercury in the surrounding air at the dumpsite. The tables consist of a list of the major dumpsites in cities in Sierra Leone.

Figure 15 gives a map of Freetown indicating hazard prone areas. However, the lighter shades of pink found within the map constitute the two major dumpsites i.e. Kingtom and Granville Brook (see arrow) with the smaller pink spot showing solid waste transit points within the city. The Kingtom dumpsite was established in 1940 and that of the Granville Brook around 1976. The land used in these areas had not been put into any other use in the past and there is no plan as to what future management arrangements they will be under into in the event of closure of both sites. Both sites were initially located at the outer limits of the city, but due to expansion, they are now right in the middle of human settlements.

- Marine environment

The marine environment (from which fish is being harvested) can serve as a reservoir for huge amounts of contaminants coming from natural and anthropogenic sources. For instance, leachate and run-off water from the two main dumpsites in the capital Freetown ends up at the Atlantic Ocean, with a similar situation existing for other water bodies located in areas where mercury is being used in processing gold at the provincial areas in the country. Mercury has been identified (among other contaminants) by the Food and Agricultural Organization (FAO) as an environmental chemical contaminant that is relevant to fish. According to a report published in 2014 by the Ministry of Fisheries and Marine Resources and Ministry of Health on environmental contaminants in Sierra Leone's fish and fisheries products, of the nine families of fishes (of different species) considered in the study, six of them have high risk characterization for all the targeted species with respect to mercury accumulation. However, such characterization was based on theoretical assessments that need to be validated by laboratory analysis.

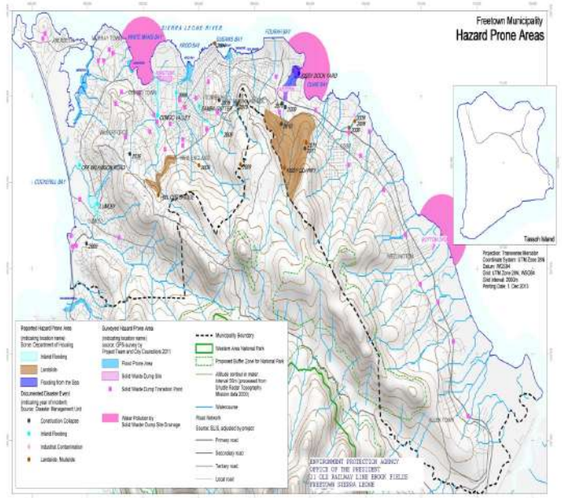


Figure 15: Map showing major dumpsites and solid waste transit points in Freetown[26]

- Artisanal and Small-scale Gold Mining (ASGM)

In Sierra Leone, artisanal and small-scale gold mining is taking place mainly in the northern region (Bombali, Koinadugu and Tonkolili) and to a lesser extent in some areas of Kono, Kenema, Bo and Kailahun districts. However, the use of mercury in gold processing has only been identified at Baomahun in the Bo district (currently in use) and for a short period at Mansumbrie (downstream of the Adith hill) in Magburuka in the Tonkolili district as shown in figure 16.

- Baomahun (Bo district)

Baomahun is located at N 08o25.709' and W 011o40.500' and at about 42 Km from the district headquarter town of Bo. Golding mining is the major activity conducted in the area, mainly by young men and women. Generally, gold mining is done within the township but without the use of mercury. However, mining (illicit)



Figure 16: Map of Sierra Leone showing districts where mercury has been used in gold mining (arrow) - (a) Magburuka in the Tonkolili district and (b) Baomahun in the Bo district

being conducted at the outer limits of the township (at the Baomahun hills), which is a concession area on which exploration is being conducted by a gold mining company, includes prevalent use of mercury by the miners in processing the gold. Based on information gathered by interviewing stakeholders during the site visit, mining is conducted all around the hill consisting of about ten mining blocks with each block containing between 6–10 pits for purifying the gold using the mercury. This process involved adding about 1 oz of mercury to the initially washed gold dust (tailings) in a metal head pan/plastic bowl, with washing continued in the pit containing water to separate the gold-mercury amalgam from the remaining materials. Some of the mercury is being separated for reuse, with the

26- Freetown Municipality, Hazards Prone Areas

mercury in the amalgam burnt off at the final stage to obtain the pure gold. An estimated total of 2 kg of mercury is being used per year for all the mining blocks. The main path through which mercury is being introduced into the environment in this area is by run-off of water from the pits (during the rainy season) onto surface water, leaching from the pit to groundwater and to the atmosphere during burning-off of mercury from the amalgam. Unfortunately, no personal protective equipment is being used by the miners during handling of the mercury and burning of the amalgam is not only limited on the site but also occurs within the township if the miner will be taking the product (amalgam) to the gold dealer.

- Mansumbrie (Tonkolili district)

Large scale gold mining has been conducted in the hills of Mansumbrie (N08o49.106' and W011o43.907') in the past but currently, only small scale, mostly illicit mining is taking place without the use of mercury. However, around the middle of 2017, report of mercury use by miners coming from Baomahun at the downstream of the Mansumbrie (Adith) hill was reported by local miners to the authorities (Figure 17). The activity was reported to have lasted for about a month before been halted by the authorities.

2.11. IMPACTS OF MERCURY ON HUMAN HEALTH AND THE ENVIRONMENT

In terms of impacts on health and the environment, a distinction must be made between the different forms of mercury and between activities. Mercury is considered by the WHO to be one of the ten chemicals or groups of chemicals of very high concern to public health[27]. Aspects to consider when defining exposure levels include: (i) the form of mercury, (ii) the dose or concentration, (iii) the age of the exposed persons or developmental stage of the foetus, (iv) the duration of the exposition, (v) the pathway of contamination (such as inhalation, ingestion or skin contact) and (v) dietary patterns (especially fish and seafood consumption)[28].

The national mercury inventory in Sierra Leone highlighted the use of mercury in several activities, products and instruments, which generate emissions and releases to the environment, harmful for human health. ASGM and informal waste dumping as well as open air waste burning are practices that contribute heavily to mercury and mercury compounds pollution.

Elemental mercury, or metallic mercury, is the most volatile form of the chemical element. As a result, during heating or burning, as in the case of ASGM (widely practised in Sierra Leone), where this chemical is added to gold to form an amalgam that is then heated to extract the gold, mercury is released into the atmosphere. Elemental mercury is also released during open air burning of waste containing mercury. With a high persistence capacity, elemental mercury can remain in the air for a period ranging from a few days to several months. In open spaces and with the force of the wind, this mercury can be transported and deposited in areas often far from emission sites. This deposit therefore contaminates the environment and has an impact on living organisms.

With regards to the consequences on human health, any individual involved in an activity where mercury is emitted in the form of vapour is directly exposed, in particular through inhalation or contact with the skin (also for example when instruments such as thermometers are broken). Elemental mercury is toxic to the central and peripheral nervous systems. Inhalation of mercury vapour can cause adverse effects on the nervous, digestive and immune systems, lungs and kidneys, and can be fatal. The figures 18 and 19 illustrate the risks of elemental mercury for human health, especially in ASGM activities[29].



Figure 17: Location (N08o49.717' and W011o44.547') downstream of Adith hill with possibility of mercury contamination

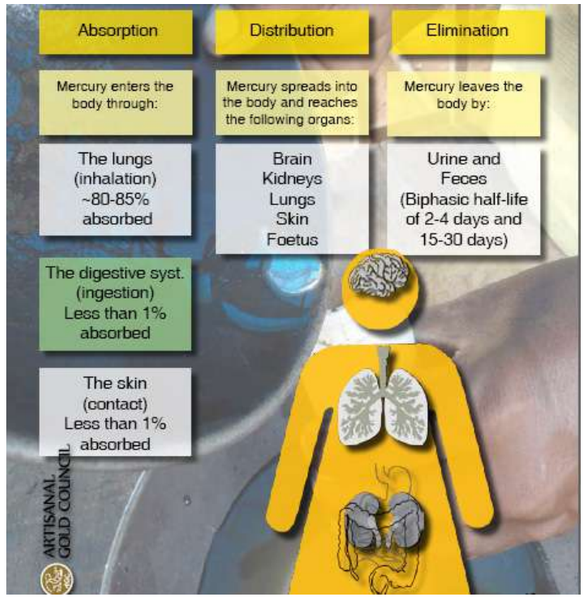


Figure 19 - Illustration of the Health Effects of elemental Mercury on Humans[30]

Two other important forms of mercury are inorganic mercury (mostly HgII compounds) and monomethylmercury (CH_3HgX)[31], commonly known as methylmercury (MeHg). Elemental mercury can be oxidized into HgII mostly found in soil. The mercuric cation, Hg^{2+}, usually forms complexes with anions, binds to organic matter or is adsorbed on inorganic mineral surfaces. The main factors influencing speciation and behaviour of mercury in soil are: pH, organic matter concentration, redox potential, cation exchange capacity, chloride concentration, aeration, soil mineralogical composition and texture. Inorganic mercury can also undergo the methylation process, resulting from natural microbial transformation of inorganic mercury[32] occurring under specific conditions (abiotic environments, soil or sediment (in aquatic environment) systems among others) to form methylmercury.

While oral ingestion of inorganic mercury compounds has potential effects on kidneys, methylmercury is known to have a serious impact on the brain. With its high toxicity, bioaccumulation and biomagnification (in the food chain) properties, methylmercury is one of the most dangerous forms of mercury. On ASGM sites for example, methylation can occur in soil or aquatic environments close to ASGM sites. Methylmercury then potentially contaminates fish that are consumed by local communities. Figure 20 below reminds the risks of methylmercury for human health[33].

DATA GAPS AND RECOMMENDATIONS

This initial mercury inventory report has drawn on opinions and data from the local and international literature on mercury-containing materials, devices and mercury emissions from various sources. The information has been accepted as provided and has not been independently checked. The main identified data gaps are:

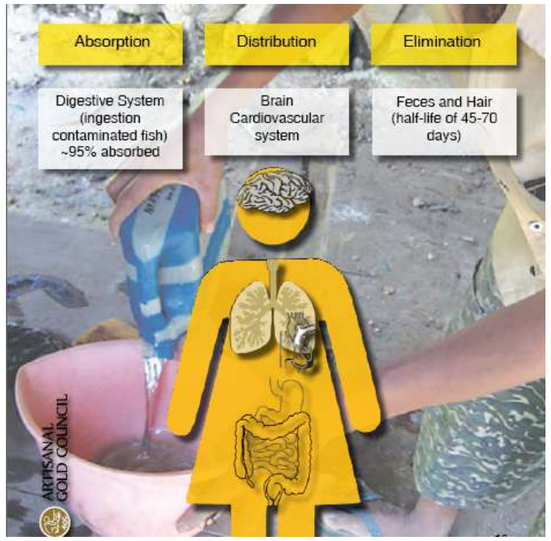
- Lack of reliable data on mercury emission sources;
- Lack of data on mercury in cosmetic products, recycled materials and wastewater treatment;
- More detailed analysis on the data gaps are presented in the relevant sections of this report.

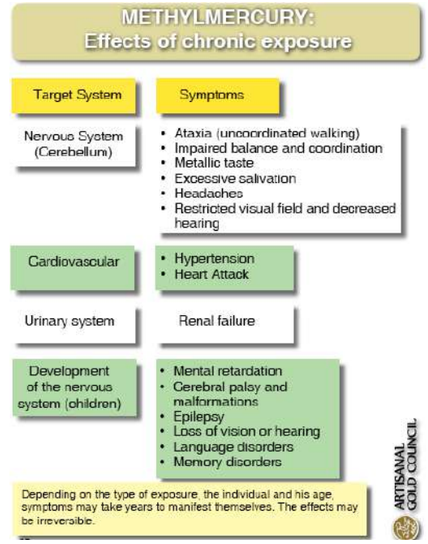
Furthermore, it must be noted that default input factors have been used for the estimation of mercury releases from general waste treatment and wastewater treatment. The default factors are based on literature data of mercury contents in waste and wastewater, and these data were only available from developed countries. The tests carried out as a part of this inventory process indicate that the intermediate default input factors for general waste and wastewater may over-estimate the mercury releases from these sources, and therefore low-end-of-range default factors were used instead. Consequently, any over-estimation does not significantly impact the core findings of this inventory.

A few recommendations for next steps are:

- Produce reliable data for these categories;
- Produce reliable data on ASGM sites and communities;
- Further investigation on each mining site across the country to produce solid data;
- Update HS codes for relevant mercury containing products;
- Produce national data on mercury containing products;

Figure 20 - Health Effects of Mercury Compounds





27- https://www.who.int/en/news-room/fact-sheets/detail/mercury-and-health
28- https://www.who.int/foodsafety/publications/chem/mercuryexposure.pdf?ua=1
29- Richard M., Moher P., and Telmer K. (2014). Health Issues in Artisanal and Small-Scale Gold Mining (2014) https://wedocs.unep.org/bitstream/handle/20.500.11822/11533/Health_Training_Oct2014_version1.0_eng_lowQ.pdf?sequence=1&isAllowed=y)
30- Richard M., Moher P., and Telmer K. (2014). Health Issues in Artisanal and Small-Scale Gold Mining (2014) https://wedocs.unep.org/bitstream/handle/20.500.11822/11533/Health_Training_Oct2014_version1.0_eng_lowQ.pdf?sequence=1&isAllowed=y
31- X representing anions such as chloride, nitrate, sulphide or sulphate
32- http://residus.gencat.cat/web/.content/home/ambits_dactuacio/sols_contaminats/Cercasols_recursos_sol/Soil-Guideline-Values-for-mercury-in-soil-UK-Environment-Agency-March-2009.pdf
33- Richard M., Moher P., and Telmer K. (2014). Health Issues in Artisanal and Small-Scale Gold Mining (2014) https://wedocs.unep.org/bitstream/handle/20.500.11822/11533/Health_Training_Oct2014_version1.0_eng_lowQ.pdf?sequence=1&isAllowed=y

- More accurate and recent data is required;
- Conduct field sampling and laboratory analyses that will provide the concentrations of mercury on the sites and help identify the best remediation method;
- Need for further studies in the Baomahun mine site: this will give a comprehensive overview as to the extent to which the use of mercury has impacted surrounding populations and environment.

IMPLICATIONS OF INVENTORY RESULTS WITH REGARDS TO ARTICLES OF THE MINAMATA CONVENTION

The National Mercury Inventory gives a comprehensive overview of inputs, uses, emissions and releases of mercury and mercury compounds in Sierra Leone. The results obtained as well as the descriptions of the current situation for each source category in the country imply that most of the Articles of the Minamata Convention are relevant to Sierra Leone. As a Party to the Convention, the country would need to comply with the requirements of the following Articles.

Article 3: Mercury supply sources and trade

This Article is about the fluxes of mercury but also any kind of "mixture" which contains important concentrations mercury (at least 95 per cent according to Paragraph 1 of the Article) and compounds of mercury. No primary mercury activities were identified in the country, but Sierra Leone should make sure such activities are not undertaken in the future.

Article 4: Mercury-added products

Numerous products containing mercury and/or mercury compounds were identified in the national inventory. Sierra Leone did not report any national manufacture; therefore, the focus will be on actions preventing the import of such products, especially those listed in Annex A (part 1). Also, dental amalgam has been identified as used in the country (estimated inputs of 29 kg/year), which implies that the requirements of the second Part of Annex A should be taken into consideration. Perhaps, Sierra Leone would need to amend its relevant legislation in order to include the dispositions of the Minamata Convention such as the phasing-out of the production, export and import of mercury-added products and the phasing-down of the use of dental amalgams. Finally, measures should be put in place for monitoring fluxes of mercury containing products and the respect of the legislation in place.

Article 5: Manufacturing Processes in which mercury or mercury compounds are Used

As mentioned previously, the national inventory has not identified any manufactures using mercury or mercury compounds in the country. However, this Article should be taken into consideration and Sierra Leone should, perhaps through legal instruments, monitoring measures and other actions/strategies identified as relevant, that bans on any manufacturing processes using mercury or and/or mercury compounds (especially those listed in Part 2 of Annex B) are put in place in the future.

·Article 7: Artisanal and Small-scale Gold Mining (ASGM)

Sierra Leone has identified more than insignificant gold mining using mercury amalgamation on its territory and has reported it to the Minamata Secretariat. Therefore, a NAP project dedicated to ASGM is being developed in parallel with the MIA. Results of the investigations carried out under the NAP, the report on the ASGM overview and the results of the national inventory clearly prove the relevance of this Article to the country. As a Party to the Convention, Sierra Leone will need to adapt legal and institutional frameworks as well as put in place relevant measures for reducing, and where feasible eliminating the use of mercury and mercury compounds in ASGM activities. Appropriate actions should also be taken for reducing emissions into the atmosphere and releases into waters and soils.

Finally, Sierra Leone should promote cooperation and information exchange with other countries within the West African region that have identified similar activities on their territories. This would help the dissemination of best practices in the region and enhance the implementation of the provisions of this Article. The NAP will give more technical details on ASGM sites identified in Sierra Leone.

Articles 8 and 9: Emissions and releases

These Articles are relevant for Sierra Leone considering activities such as open waste burning of general and medical waste identified in the country. Therefore, to comply with these two Articles that have similar dispositions, measures should be taken to prevent the construction of new structures as those listed in Annex D, limit and control emissions and releases from existing sources. Here as well, amendments of the legislation in place should be considered to include specifications of these articles into national frameworks.

Article 10: Environmentally sound interim storage of mercury, other than waste mercury

As Sierra Leone has not identified any significant stocks of mercury and mercury compounds on its territory. However, in case such stocks are discovered in the future, the Party should enhance storage methods that are environmentally friendly and sustainable. In doing so, any relevant guidance and/or specifications developed and proposed under the Minamata Convention, the Basel Convention (on The Control of Transboundary Movements of Hazardous Waste and Their Disposal) and the Global Mercury Partnership should be closely consulted.

Article 11: Mercury wastes

This Article, in parallel with some of the dispositions of the Basel Convention, mainly discusses the sound management of mercury wastes. As such, wastes consisting and/or containing mercury and/or mercury compounds as well as waste contaminated with mercury and/or mercury compounds should be recovered, recycled, re-used or, if necessary, disposed of in an environmentally sound manner. Therefore, Sierra Leone will need to take appropriate measures to solve the issues of informal dumping and open waste burning identified on its territory. Relevant articles of the Basel Convention as well as other Conventions or legal/scientific instruments should be consulted when putting in place such measures.

·Article 12: Contaminated sites

The national mercury inventory does not directly tackle the issue of contaminated sites. However, based on the identification of the different source categories, a strategy for identifying, characterizing and assessing mercury contaminated sites was proposed and followed to identify potentially contaminated areas and conduct preliminary sites investigations. Sierra Leone will need to conduct further research through detailed sites investigations in order to quantify the extent of the contamination that will guide (along with relevant risk assessments and cost evaluations) the choice of appropriate measures for reducing the impacts of such sites on health and the environment.

Article 16: Health Aspects

Health aspects can be considered as being part of the mercury-related concerns in Sierra Leone. As such, this Article is relevant for the country which will need to conduct further studies on the impacts of mercury and mercury compounds on communities' health, put in place relevant programmes for educating on mercury issues and preventing any risky exposure. Moreover, populations at most risk should be identified and targeted. Populations should be able to benefit from appropriate health system and treatments.

Articles 17, 18 and 19: Information exchange, Public information, awareness and education and Research, development and monitoring

These articles contain elements to promote: (i) collaboration between Parties in terms of information sharing on scientific, technical, economic and legal results/practices; (ii) availability of information as well as the conduct of awareness-raising campaigns on health and environmental adverse effects caused by mercury and/or mercury compounds and best practices to prevent the risks; (iii) improvements of any research, inventories, assessments and/or methodologies related to mercury issues and elaboration of relevant mapping tools whenever necessary. In complying with these Articles, Sierra Leone should encourage its institutions to collaborate with other countries' relevant institutions for sharing best approaches and measures.

3. Identification of Populations at Risks and Gender Dimensions

OVERVIEW

The use of mercury and its compounds pose severe health risks with the potential for environmental contamination. In Sierra Leone, mercury is particularly used for Artisanal and Small-scale Gold Mining (ASGM) and the close interface of miners and mercury vapor exposes them to contamination through inhalation and skin contact. Improper waste management in the country results in the dumping of waste containing mercury without segregation. This can lead to mercury contamination of dumpsites that are mostly located within inhabited communities in Freetown. The use and discharge of mercury compounds by laboratories (academic institutions and industry) could be potential sources for human exposure and environment contamination. This could be attributed to the general lack of enforcement of laboratory chemicals and waste management regulations. A recent unpublished report by Precon, (a consultant hired by the Ministry of Fisheries and Marine Resources) on the quality of fish and fisheries products in Sierra Leone found trace amounts of mercury in "herring", which is a major protein source for low income earners in the country. The proliferation of skin care products containing mercury is a concern for human exposure to mercury. From the foregoing, it is clear that some significant section of the country's population is at risk to mercury pollution and the associated health problems.

3.1. POPULATIONS AT RISK AND GENDER DIMENSIONS

Artisanal and Small-Scale Gold Mining (ASGM) Communities

The inventory on mercury use in Sierra Leone shows no evidence of mercury use in alluvial gold mining but indicates its use in hard rock sites in the ASGM sector particularly in Kumaru (Tonkolili District) and Baomahun (Bo District). Gold is removed from its ore by dissolution in mercury to form the gold-mercury amalgam, which is then burnt to recover the gold. The mercury is vaporized upon heating leaving the pure gold behind in a process called panning. Because of the little or no knowledge of miners regarding the harmful effect of mercury on their health, this process is often carried out in the open with no consideration to safety procedures or the use of PPEs. The process of purifying and amalgamating the gold, exposes women and children to the fumes. The NAP[34] further discusses the issue of youth and children in ASGM.

With regard to the gender dimension, the overview of the gold panning sector and the NAP[35] conclude that women are particularly involved in the sector. For years, the latter have focused on gold mining at the expense of diamond mining, for example. The NAP reports that most women involved in the sector are either single, widowed or separated from their husbands. They constitute about 15% of the population working in the sector and almost half (47%) of the population involved in gold mining in general. Apart from that, it seems that women face various obstacles at gold panning sites. Among the main challenges are:

- The difficulty of being integrated into groups of miners generally dominated by men;
- The difficulty in accessing hard rock mining sites;
- The difficulty of becoming a landowner;
- The difficulty of obtaining funding because of their exclusion from groups of miners, which can undermine their activities;
- Difficulty in positioning oneself in the supply chain.

Communities within Waste Dumpsites

The lack of coordination within the waste management sector continues to be a serious challenge in Sierra Leone. Whilst efforts are being made to coordinate its collection and handling (the reintroduced first-Saturday monthly national cleaning), dumpsites, especially in Freetown continue to be located within communities. The dumping of untreated sewage at dumpsites, the percolation of dumpsites leachate into the groundwater, the open burning of non-segregated wastes are all public health concerns which may lead to the release of unsuspected contaminants including mercury into the environment. Open burning and untreated dumpsite leachate percolation are potentially high risk factors for mercury release into the environment. The fact that solid waste dumping in the country is devoid of segregation and controlled treatment, mercury wastes are more likely to be dumped without recognition of the potential public health and environmental hazards. Communities at close proximities to such dumpsites are therefore constantly subjected to inhalation of dumpsite fumes and the possible consumption of contaminated rainwater, making such communities among the most exposed to health hazards associated with mercury contamination. People engaged in solid waste scavenging and recycling mostly women and children[36] are also exposed to such risk, especially noting the fact that such activities are undertaken without the use of appropriate Personal Protective Equipment (PPEs).

Medical and Laboratory Personnel

Mercury and mercury containing products including measuring instruments are used in research, industrial and medical laboratories. Breakage of mercury containing products and instruments exposes laboratory staff and medical personnel (e.g. doctors, nurses, dentists) to mercury. Additionally, handling and disposal of mercury-containing wastes do not follow strict protocols for safe chemicals management that prevent workplace exposure or environmental protection. Staff of laboratories lack the requisite training to handle mercury compounds and waste and are not subject to periodic hazardous waste management certification processes required for best practices. The lack of specialized hazardous waste handling vendors in the country increases the risk of environmental pollution and public exposure. The EPA-SL should embark on a nationwide chemical stock and capacity assessment in handling hazardous substances in and from laboratories. This intervention would ensure a proper chemicals management culture with elements of provision of appropriate PPEs for laboratory personnel, periodic inventory and chemical waste management in the sector. The EPA-SL and its partners should review available guidelines for handling and disposal of mercury containing equipment and chemicals in laboratories, and develop domestic versions, as necessary. Compulsory training and examination on chemical hazards must be conducted for staff handling poisonous chemicals before assignment of such responsibilities.

Consumers of Beauty, Care and Dental Products

There is high demand for skin lightening creams and soap, particularly among women within the youth age bracket. Mercury salts inhibit the formation of melanin, which results in lighter skin tone. A WHO report states that mercury is a common ingredient in most beauty care products (e.g. skin creams, bathing soap, make-up) used in Africa[37]. Unfortunately, most of the products are those affordable for low income earners. Although the use of mercury compounds as preservatives is permitted in the convention, the increasing use of inorganic mercury in the form of ammoniated mercury as a major ingredient in skin lightening creams and soaps, and organic mercury (ethyl mercury) in eye make-up, has become a major concern. Both forms of mercury could be easily absorbed into fatty tissues and into the blood stream, causing tremendous health problems. A range of health problems associated notably with consumers of beauty products containing mercury include kidney damage, skin rashes and discoloration and weakening of the immune system in response to both fungal and bacterial infections.

Consumers of beauty care products in Sierra Leone are predominantly youthful women, most of whom are of childbearing age. This does not only expose consumers to the health hazards of mercury but more so young children (who may ingest mercury through breastfeeding) or an unborn foetus that is much more vulnerable to mercury hazards. It would be prudent for the EPA-SL and the MoHS engages importers and consumers of beauty care products for information sharing on mercury in such products, the health hazards of mercury and the broader implementation of the Minamata Convention in Sierra Leone. The implementation of the provisions of the convention can only be fully achieved by leaving no one behind.

Producers and Consumers of Urban Vegetables

Urban agricultural practices contribute significantly to urban food security, especially with vegetable production. Unfortunately, much of the urban vegetable cultivation is either carried out in areas close to dumpsites or uses manure mined from dumpsites. The soft tissues of vegetables make them prone to bioaccumulation of mercury and thus is a possible source of human exposure to mercury (Njagi, 2014, Vongdala et al, 2019). These circumstances would expose persons engaged in urban agriculture or consumers of their produce to the possible hazards of mercury. Women with low income, mostly single parents/widows, are involved in urban gardening. The inability to afford chemical fertilizers makes dumpsites which are rich in organic manure their first land choice for gardening. Because such women would often have their children work with them on such sites, deprived women and children are more likely to be exposed to mercury and its health effects. The EPA-SL, MoHS and Ministry of Agriculture and Forestry (MAF) should undertake baseline studies on the levels of mercury pollution at dumpsites, leachates that flow from dumpsites into water bodies and vegetables harvested from such areas. Based on the outcome of such baseline studies, public awareness and education could be done with regards mercury in urban vegetables. If necessary, a proactive step be taking to relocate urban vegetable farmers away from dumpsites.

Consumers of Fish

Soft-bodied animals, mostly shellfish, easily bioaccumulate mercury in the form of organic mercury. Shellfish (sea snails, oysters and other bivalves) is a common protein source in Sierra Leone. An unpublished report indicates some low levels of mercury in herring fish, which is the main protein source for low-income earners in Sierra Leone. The vulnerability of low-income earners who cannot even afford primary healthcare should be a serious concern.

Implications of the identification of populations at risks and gender dimensions analysis for Sierra Leone as a Party to the Minamata Convention

Based on the results of the national mercury inventory and numerous surveys conducted across the country, several population groups in Sierra Leone are directly or indirectly exposed to various forms of mercury and are therefore potentially at risk. Indeed, as a Party to the Minamata Convention, Sierra Leone will have to take into account the obligations of the following Articles when addressing the issue of vulnerable populations and gender dimensions.

Article 16 on health aspects

It is evident that with regard to populations at risk in particular (and the entire Sierra Leonean population in general), health protection must be given priority. To do so, Sierra Leone will need to develop and implement appropriate strategies and systems to protect identified vulnerable groups. The measures adopted in this context may be based on existing guidelines for increased and regular exposure to mercury and mercury compounds proposed by any relevant institution such as WHO. It will also be essential to encourage changes in habits, particularly through preventive information/education programmes based on scientific findings. In relevant professional circles, such as the health sector (including dentistry), the agricultural sector, the ASGM sector as well as waste management activities, appropriate health care systems with training on appropriate safety measures should be put in place to prevent risks of exposure and therefore contamination. All this should undeniably be supported by

34- "National Action Plan for Reducing Mercury Use in the Artisanal and Small-scale Gold Mining (ASGM) Sector in Sierra Leone", EPA-SL, UN Environment and UNITAR, August 2019
35- "National Action Plan for Reducing Mercury Use in the Artisanal and Small-scale Gold Mining (ASGM) Sector in Sierra Leone", EPA-SL, UN Environment and UNITAR, August 2019
36-World Bank Report: Solid Waste Management in Freetown; 2017. www.thepatrioticvanguard.com/world-bank-report-solid-waste-management-in-freetown

37- www.who.int/ipcs/assessment/public_health/mercury_flyer.pdf

strengthening and updating national legal instruments and the technical capacities of the sectors concerned.

Article 17 on Information exchange

In West Africa, the issues related to mercury and mercury compounds facing Sierra Leone are shared by several other countries in the region. Therefore, in developing its strategies and in selecting appropriate measures to be implemented, it is recommended to promote dialogue and information exchange among the countries of the sub-region and, if necessary, with other countries that have made similar observations at their levels. Information and experience in the scientific (e.g. toxicology and ecotoxicology of mercury and its compounds), technical, economic and legal fields may be exchanged. Specific information on the health effects of mercury and mercury compounds as well as the continuous improvement of occupational safety are also crucial points. In terms of reducing or, if possible, eliminating the import and use of mercury-added products, Sierra Leone will be able to facilitate information exchange on the best alternatives to products with mercury or mercury compounds.

Article 18 on Public information, awareness and education

The adverse effects of the use of mercury and its compounds were, for the most part, unknown to the vulnerable groups identified in Sierra Leone. The information exchange/discussion workshops and awareness-raising campaigns organised within the MIA and NAP projects represent a major step forward in terms of public information, awareness and education on issues related to mercury and mercury compounds. In order to go even further and meet the obligations of the Minamata Convention, Sierra Leone will need to promote and facilitate access to information and education, as well as the regular organization of awareness-raising campaigns among target groups. By using appropriate communication tools, all themes relevant to the mercury issue can be addressed. These include the effects of mercury on health and the environment, the identification of economically viable alternatives (specific to each mercury-added products) for the country, recent scientific research findings or any other aspect deemed relevant by the institutions in charge.

4. Policy, Regulatory and Institutional Framework Assessment

4.1. POLICY AND REGULATORY ASSESSMENT

EXISTING DISPOSITIONS IN RELATION TO CHEMICALS, INCLUDING MERCURY, ENVIRONMENTAL PROTECTION AND HEALTH ASPECTS

National Environmental Policy (NEP)

There is a range of beneficial effects of chemicals to modern life. Different chemical groups and application including food preservatives, medicines, fertilizers, pesticides, detergents, refrigerants, cosmetics, have positive effects on modern society. However, there is also an unpleasant/harmful aspect to the use of chemicals. These harmful effects are frequently expressed as obnoxious health and environmental impacts, such as the increasing prevalence of rare diseases like cancers[38,39] , a range of endocrine effects, and neurodevelopmental effects including birth disorders. It is against this background that Sierra Leone recognizes the need for a strategic approach to the use and management of chemicals in order to ensure that the beneficial effects outweigh the negative.

In 1990, the Government with the support of the World Bank prepared the National Environmental Policy (NEP) and the National Environment Protection Act, 2000 (NEPA) as guiding documents for the effective protection and management of the environment and natural resources.

The National Environmental Policy (NEP)[40], which was approved by Cabinet in 1990 and revised in 1994 (GOSL, 1994), aimed to achieve sustainable development in Sierra Leone through sound environmental and natural resources management. The policy objectives are to:

- Secure for all Sierra Leoneans a quality environment adequate for their health and well-being;
- Conserve and use the environment and natural resources for the benefit of the present and future generations;
- Restore, maintain and enhance the ecosystems and ecological processes essential for the functioning of the biosphere;
- Preserve biological diversity, and uphold the principle of optimum sustainable yield in the use of living natural resources and ecosystems;
- Raise public awareness and promote understanding of the essential linkages between the environment and development and encourage individual and community participation in environmental improvement efforts.

The NEP also contains sector policies on land tenure, land use and soil conservation; forests and wildlife; biological diversity and cultural heritage; mining and mineral resources; air quality and noise; sanitation and waste management; toxic and hazardous substances; coastal and marine resources; working environment; energy production and use; settlements, recreational space and greenbelts and public participation.

One of the major strategies which the Government pursues in achieving the goals of the NEP is to make Environmental Impact Assessments (EIA) a must for all proposed activities that may significantly affect the environment and the use of resources (GoSL, 1994). In order to achieve this goal, the EPA-SL Act of 2008 First Schedule, Section 24 clearly states the projects requiring EIA licenses; the Second Schedule, Section 25 states the factors for determining whether a project requires an EIA; and the Third Schedule, Section 26 states the components and contents of EIAs[41].

The NEP also has a specific goal and policy for water resource management which ensures adequate quantity and acceptable water quality to meet domestic, industrial, transportation, agricultural and fisheries' needs by accelerating programmes for the utilisation of water for various uses and expanding water quality management, monitoring and assessment programmes. Laws prohibiting the pollution of water bodies exist but their enforcement is a significant challenge as the country lacks monitoring equipment, expertise and accredited laboratories.

The Environmental Protection Agency Sierra Leone Act, 2008 amended 2010

Even though ASGM activities are not specifically enlisted in the First Schedule (Section 24) as requiring an EIA Licence, Section 58 of the EAPS-SL Act, 2008 amended 2010 clearly specified the manufacturing, sale, transportation, handling or disposal of toxic and hazardous substances including their waste, to which mercury is not an exception, is prohibited.

The Act also made provisions for the Board of Directors to develop specific Regulations for specific issues as they emerge. Even though, there are other drafted Regulations on Chemicals and Hazardous Substances in general, the development of a specific Regulation on the Minamata Convention on Mercury is deemed necessary. Besides, it would serve as the domestication process.

National Industrial Policy, March 2011

Several serious efforts have been made since Independence in 1961 to revitalize the economy and to create an enabling environment for an industrial take-off. Industrialization was the vogue in newly independent countries which perceived it as an integral part of the development process, and one that would facilitate the transformation of a predominantly agricultural economy to a modern industrial economy.

Chapter 3 (Industrial Development) of the 2011 Policy lists Mining and Quarrying as one of the components that essentially constitutes the industrial sector of Sierra Leone. Gold is one of the major minerals that

38- Luo J., Hendryx M., Ducatman A. Association between six environmental chemicals and lung cancer incidence in the United States. J. Environ. Public Health. 2011;2011:463701. doi: 10.1155/2011/463701.
39- Darbre P.D., 2018. Overview of air pollution and endocrine disorders. Int J Gen Med, 191-207
40- Country Environment Profile (CEP) Sierra Leone, September 2006
41- Environment Protection Agency Sierra Leone Act, 2008

contributes greatly to the economy as also determined in the ASGM Overview of Sierra Leone (2018) for the development of the ASGM National Action Plan (NAP). Therefore, such a policy is very much relevant to the ASGM sector. Section K (Environmental Protection) of Chapter 3 also pays premium to promote measures to ensure:

1. The preservation, protection and improvement of the quality of the environment and
2. The protection of the life and health of humans, animals and plants.

In formulating measures relating to the environment, the Policy further states that Government shall take account of:

- Available and accessible scientific and technical data;
- The potential costs and benefits of action or inaction;
- The precautionary principle and those principles relating to preventive action, rectification of environmental damage at source and the principle that the polluter pays; and
- The need to protect Sierra Leone from the harmful effects of hazardous materials transported, generated, disposed of or shipped through or within the sub-region. Government will ensure a balance between the requirements of industrial development and the protection and preservation of the environment.

Sierra Leone Trade Policy, June 2010

The Trade Policy of Sierra Leone was established with commitment not only to re-establish the conditions that would enable the economic and social development of the country but to promote sustainable growth. To achieve this sustainable growth, effective management and protection of the environment is considered essential. That is why Section 3.7.4 (Consumption and Environment) of the Policy clearly stated in its context that "Sustainable development, a factor in determining consumer welfare in the long term, depends on environmental protection, among others. However, environmental protection involves costs and trade-off with other economic interests and may require changes in consumption patterns. There is need to promote environmental protection and foster sustainable consumption".

In this vain, fostering sustainable consumption patterns by promoting environmental protection remains key in the policy objective for sustainable development. Thus, Government commitment on public awareness raising among those engaged in the trade on the importance of environmental protection and consumption patterns that do not destroy the environment is crucial.

The Mines and Mineral Act, 2009

The Mines and Mineral Act of 2009 regulates the exploration, mine development and marketing of minerals and secondary mineral processing in Sierra Leone. The government regulating entity is the Ministry of Mines and Mineral Resources.

The Act provides the legal framework for mining operations in Sierra Leone. It establishes a modern cadastre system for issuing, registering and surveying mining operations. It vests all mineral resources in the State, regardless of the ownership of the soil in which they are found. It includes three types of mining licences: artisanal (issued by the Director of Mines), small-scale and large-scale operations (issued by the Minister of Mines and Mineral Resources). Regarding large-scale mining operations, the Minister has the legal right, on behalf of the holder of a mining permit, to acquire the land or land-lease required for mining (Part V section 36). This can be done provided reasonable efforts to produce an agreement on reasonable terms with the rightful owners or occupier of the land have failed. The previous owner or occupier must be compensated based upon loss in market-value of the land or resettled on suitable alternative land (Section 38).

Regarding artisanal and small-scale mining, the consent of the owner or the rightful occupier or the Chiefdom Mining Allocation Committee is required (Sections 85:2 (c) and 96: (b)). Under Section 31(1)(b) of the 2009 Act, mining is not allowed in land set apart for any public purpose without the consent of the relevant government authorities. This is important because forest carbon projects in Community Forests are considered usage of land for public purposes. Moreover, when considering the granting of rights to mine in a given area, the Minister of Mines and Mineral Resources is required to consider the need to conserve natural resources in the area.

Part X, Sections 84 to 94 clearly states the need to apply for an artisanal mining licence in order to carry out artisanal mining operations. Furthermore, Part XI also emphasizes this need for Small-scale mining. Moreover, Part XV, Section 131(1) and (2) strongly recommends that the Minister shall require an environmental impact assessment licence as prescribed under the Environment Protection Act as a condition for granting a small-scale mining licence or a large-scale mining licence.

The National Minerals Agency Act, 2012

Being an Act to establish the National Minerals Agency, the Agency was established for effective implementation of the Mines and Minerals Act, 2009. Key objectives were:

- To promote the development of the minerals sector by effectively and efficiently managing the administration and regulation of mineral rights and minerals trading in Sierra Leone, including geological survey and data collection activities;
- To establish a National Minerals Agency Board to provide technical and other support to the Agency and
- To provide for other related matters.

Environmental and Social Regulations for Minerals Sector, 2012

These Regulations aim at bridging the gap between the EPA-SL Act 2008 and the Mines and Minerals Act 2009. It explains in detail the EIA process for the mining sector especially in the categorization aspect. Another area it lays emphasis on is the social aspect which usually becomes a rift between mining companies and communities. It clearly explains the agreement of the community development action plan and its implementation. Public disclosure processes are also captured.

2016 Strategic Environmental Assessment of the Artisanal Mining Sector in Sierra Leone

The environmental degradation caused by artisanal mining is currently a major problem in Sierra Leone and there is currently no existing programme to rehabilitate the dug-out mined fields left exposed and unsuitable for farming or any other activity. To address this problem, the Environment Protection Agency – Sierra Leone in collaboration with the National Minerals Agency, the Ministry of Mines and Mineral Resources and other partners conducted a Strategic Environmental Assessment (SEA) of the artisanal mining sector to ascertain the extent of environmental degradation caused by artisanal mining in a bid to transform the sector into a more viable and sustainable one, that contributes to economic growth and development. The SEA of 2016 evaluated the environmental, social and health effects as well as the economic implications of artisanal mining on other viable sectors and proposed twenty-two main recommendations aimed at addressing the issues raised.

In 2017, an implementation action plan was developed to ensure that each recommendation of the SEA was fully implemented. This action plan also outlined specific timelines, the responsible persons and institution for each action and the estimated cost to help achieve the recommendation. Extensive sensitization on the findings of the SEA report were conducted countrywide through workshops that brought together artisanal miners, supporters of the artisanal mining sector, local authorities, civil society organisations, and MDAs, among others. Together these workshops were complimented by television and radio programmes so as to reach more people.

Artisanal Mining Policy for Sierra Leone, 2017

This Policy has been prepared to complement the Minerals Policy 2017, in order to harness the potential financial, livelihood and other gains of artisanal mining in Sierra Leone. It provides greater details on key artisanal mining policy issues from which a clear artisanal mining (AM) policy framework is defined, specific AM governance issues are addressed, and policy principles by which the economic and social contribution of AM in Sierra Leone may be effectively captured for the benefit of citizens.

This Artisanal Mining Policy covers the management of artisanal mining of minerals conducted on or under land or water, and related value chain aspects. This policy does not cover large-scale or small-scale mining of minerals, the oil and gas sector, quarrying (i.e. aggregate, construction materials) and ground water resources.

Policy statement and implementation strategy

The Artisanal Mining Policy sets out that Government will work with international development partners to develop one or more gold pilots through which modern artisanal gold mining methodologies can be introduced to promote good mining practices that include formalized operations, exclusion of child labour, maintenance of good health and safety standards, and minimizing or avoiding the use of toxic chemicals in gold recovery. Depending on the success and viability of the pilot, a more programmatic approach to implementing these frameworks may follow. Access to information and training for miners and dealers on gold valuation, value-added techniques, environmental good practice as well as consideration of gold buying centres and value chain development, and other assistance to gold miners and gold dealers will be developed.

Government seeks to capture Sierra Leone's opportunity to operate as a fair-trade gold mining jurisdiction and will strengthen regulation of gold exports. Sierra Leone will actively seek to participate in "Fair mined", a gold certification programme conducted by the Alliance for Responsible Mining (Bolivia, Colombia, Peru and Mongolia are presently engaged in the programme). The certification system (potentially useful for checks and balances to monitor, minimizing or avoiding the use of mercury) will be piloted to promote an Artisanal Mining Certification programme as has been established for diamonds through the Kimberley Certification Process. The process will ensure that miners certified under the "Fair mined" standard receive a fair price as well as an additional premium that is democratically invested in the community; Government will also include provisions that ensure fair pay to diggers and other mine workers who do not use mercury.

The capacity of NMA staff specific to gold valuation, environmental best practice and mining methodologies will be strengthened. As part of the Geological Survey Lab, development of assay services will be funded; chemical tests that verify gold and the gold content are essential for operators to value their gold. NMA will work with gold miners to establish information systems and training materials through which miners can easily access market prices, market interest, and modern mining methodologies. MMMR will review the outcomes of earlier gold support programmes that included participation of the Bank of Sierra Leone in the establishment of the Precious Minerals Office to (1) assay gold dust; (2) market gold; and (3) smelt gold as part of a consolidated assistance programme for gold miners. Security requirements and provisions for storing gold will also be assessed. This approach would require considering some institutional realignment of NMA operations.

National Environmental Health Policy, March 2012

This Policy is developed for the promotion of Environmental Health. The Policy sets out measures covering basic sanitation especially to the supply of safe and adequate drinking water and improved sanitation in both urban and rural communities. Control of communicable diseases and strengthening of Public Health institutions are also covered. This policy document is therefore an essential complement to the National Health Policy (promulgated in 1993).

The following policy areas are covered:

- Environmental Health Administration
- Manpower and manpower development
- Environment Sanitation and Water supply
- Waste Management
- Disposal of the Dead
- Port Health
- Food Hygiene
- Occupational Health and industrial Hygiene
- Housing and Vector control including Entomology
- Environmental Health Information and its effective use
- Control of Communicable Diseases
- Legislation and Prosecution

4.2. INSTITUTIONAL ASSESSMENT

The Environment Protection Agency Sierra Leone

In 2000, the Government of Sierra Leone established a Department of the Environment by virtue of the Environment Protection Act, 2000, in the Ministry of Lands, Country Planning and the Environment. In 2005, this Environment Protection Department and the Forestry Division of Ministry of Agriculture and Forestry were hived off from their respective Ministries to establish the then National Commission on the Environment and Forestry (NaCEF), which was under the supervision of the Office of the President. It is important to note that NaCEF was created by a cabinet decision and had no statutory mandate. In 2007, the function of the environment was transferred to the Ministry of Lands whilst the Forestry Division returned to the Ministry of Agriculture.

The EPA-SL was established in 2008 through the Environmental Protection Agency Act (2008) and became operational in 2009. The Agency is housed within the President's Office and is the main Government Agency in charge of all issues concerning the environment. The EPA-SL was established with the goal of creating and enforcing a strict regulatory framework for environmental regulation in Sierra Leone. It has the mandate to coordinate, monitor and evaluate the implementation of national environmental policies, programmes and projects, including issuing Environmental Impact Assessment (EIA) licenses.

The EPA liaises with the Forestry Division of the Ministry of Agriculture and Food Security (MAFS) and NPAA when it comes to ensuring companies that acquire concessions in forest areas also carry out the required EIAs. The broader mandates of the Agency include:

- Environmental policy making and planning: The Agency formulates national environmental policies.
- Overall coordination with relevant MDAs: The Agency is in charge of coordination of all environmental management programmes.
- Enforcement and Compliance: The Agency initiates legislative proposals, standards and guidelines on the environment in accordance with the Act.
- Environmental Impact Assessment Licensing: The Agency reviews and approves environmental impact assessments and statements submitted in accordance with the Act.
- Environmental Integration: The Agency ensures the integration of environmental concerns in overall national planning by developing modalities and maintaining linkages or partnerships with relevant Government Ministries, departments and Agencies.
- Environmental Research: The Agency promotes research, surveys and other environmental related studies for the formulation of sound government policies.
- To prescribe standards and guidelines: Relating to ambient air, water and soil quality, the pollution of air, water, land and other forms of environmental pollution including the discharge of wastes and the control of toxic substances.
- Focal Point of All Environmental Issues: The Agency serves as the Focal point for all Multi-lateral Environmental Agreements.

Among the functions of the Agency relative to ASGM as enshrined in the Act are:

- To collaborate and coordinate with such foreign and international bodies as the Agency considers necessary for the purposes of the Act;
- To promote studies, research, surveys and analyses for the improvement and protection of the environment and the maintenance of a sound ecological system;
- To promote effective planning in the management of the environment;
- To develop a comprehensive database on the environment;
- To coordinate and monitor the implementation of national environmental policies; and
- To act as the focal point on all issues concerning the environment.

It is now the leading institution in the country charged with the responsibility of protecting and effectively managing the environment for the benefit of citizens.

The EPA-SL is the focal point for Basel, Rotterdam and Stockholm Conventions, the Minamata Convention on Mercury, the Montreal Protocol and Strategic Approach to International Chemicals Management (SAICM). The assessment exercise of the ASGM sector is anchored in the Chemicals Control and Management Department of EPA-SL, working in collaboration with international experts, as well as a national coordinator and a team of local experts from relevant ministries, government agencies, academia, research institutions and NGOs.

In line with the National Environmental Policy of Sierra Leone, the EPA-SL ensures that Environmental Impact Assessment (EIA) is applied to all developments which will have potential impacts on the environment. The actual implementation of the EIA started in 1999 by the then Department of Environment, under the Ministry of Lands, Country Planning and Environment. However, the EIA guidelines developed in 1999 were not robust enough to address the many environmental issues during the development of projects. This necessitated the EPA-SL to revise the EIA procedure guidelines in 2015.

The Ministry of the Environment

The Government of Sierra Leone under the auspices of His Ecellency President Julius Maada Bio established the new Ministry of thr Environment (MoEnv) in late 2019. Initially, the Ministry of Lands , Housing and Environment (MLHE) housed an environmental department with lack of supervisory powers over EPA-SL. The EPA-SL was reporting directly to the Office of the President. Thus, there was enormouse conflict on supervisory mandate by MLHE. The new MoEnv is created to solve this issue and effective coordinate and supervise all environmental issues in one umbrella.

EPA-SL will be supervised and guided by MoEnv interms of policy and regulatory development. The aim of establishing the new MoEnv was also to bring together all closely environmental related departments in one umbrella to avoid working in silos. These includes

- Forestry Division (in charge of managing the forest to avert deforestation) in the Ministry of Agriculture and Forestry (MAF)
- National Protected Area Authority (NPAA) which are in charge of national parks and protected areas under the supervision of MAF
- National Radiation and Safety Authority (NRSA) under the supervision of Ministry of Energy (MoE)
- Meteorology Agency which is the Focal Point for Climate Change housed in EPA-Sl under the supervision of Ministry of Transport and Aviation (MTA)
- Disaster Management Department (in charge of coordinating environmental disaster issues) in the Office of National Security (ONS) which is under the Office of the President

All of the above will be coordinated and effective supervised under one command, the MoEnv there by solving the problem of overlapping mandates.

The Ministry of Mines and Mineral Resources (MMMR)

The Ministry of Mines and Minerals Resources is the supervisory, policy and regulatory development body for the mines sector. For an effective supervisory role, the Mines and Minerals Act, 2009 was legislated with the following objectives:

To promote local and foreign investment in the mining sector by introducing new and improved provisions for exploration, mine development and marketing of minerals and mineral secondary processing for the benefit of the people of Sierra Leone;

To ensure that management of the mineral sector is transparent and accountable in accordance with international best practice; to promote improved employment practices in the mining sector;

To improve the welfare of communities adversely affected by mining;

- To introduce measures to reduce the harmful effects of mining activities on the environment and
- To provide for other related matters.

This ministry controls all mining activities in the country. In recognition of the negative impact of mining on the environment and concerns expressed by the public, the Ministry has developed a new mining policy and legislation, which make provision for the rehabilitation of mined out areas and ensure "that prospecting, exploration, mining and processing of mineral resources proceed in an environmentally sound manner". The mining code stipulates that large and medium scale mines develop and submit an Environmental Impact Assessment (EIA) prior to the application for a mining license. The EIA must clearly state the appropriate steps/actions to be taken to mitigate damage caused by mining activities on the environment. The ministry contributes to the management of natural resources through provision of grants to local communities for the rehabilitation of mined out areas.

The Ministry is divided into three main sections: (i) Administration (Office of the Permanent Secretary), (ii) Mines Division and (iii) Geological Survey Division. The last two have been subsumed into the National Minerals Agency which now has the mandate to implement the Mines and Minerals Act, 2009.

The National Minerals Agency

The National Minerals Agency (NMA) was established for effective implementation of the Mines and Minerals Act. To this end, the Mines and Geological Survey Divisions are now an integral department of the NMA. Part III (Functions of the Agency), Section 11(1) clearly state the object of NMA inter alia: "the Agency is established to promote the development of the minerals sector by effectively and efficiently managing the administration and regulation of mineral rights and minerals trading in Sierra Leone, to provide technical and other support to the mineral sector including geological survey and data

collection activities". The NMA now have four main operational departments as follows:

1. Department of Mines responsible for all activities associated with administering mineral rights and monitoring mining operations;
2. Department of Geological Survey responsible for facilitating and monitoring exploration and managing national geological information;
3. Department of Precious Minerals Trading responsible for administering precious minerals trading licenses and certifying precious minerals exports;
4. Department of Finance and Administration responsible for managing the Agency's budget, human resources, and reporting.

For each of these departments, divisions can be created by the Board of Directors as prescribed in the Act

Ministry of Health and Sanitation (MoHS)

The ministry has full responsibility for developing and implementing national policy and regulation with re-

spect to public health. It trains and recruits health officers and supervises local authorities that have devolved responsibilities for the delivery of certain public health functions.

With respect to mercury, the core mandate and possible roles of the ministry would be developing policies, laws and regulations related to occupational health and safety in ASGM operations and surrounding communities, developing a national health strategy for the sector, and training local health care officers and medical service providers; coordinating local and international NGOs on health and sanitation issues

Furthermore, the ministry serves as the national and international health and sanitation focal point and principal implementer of all health and sanitation projects.

The Ministry is subdivided into different directorates and departments responsible for specific roles as defined by the policy. The Environmental and Public Health Directorate (EPHD) which will be transformed into the National Public Health Agency (NPHA), Health Education Department (HED) serving as the outreach unit, the College of Medicines and Allied Sciences and School of Nursing are the training institutions for the Ministry, District Health Management Teams (DHMTs) are in charge of district Hospitals, community health units and peripheral clinics, and the Emergency Operational Center in charge of coordinating and surveillance disease outbreaks.

Health officials often participate in meetings, projects and related activities relating to environmental management. With respect to this, an Environmental and Public Health Directorate was established within the Ministry charged with the responsibility to implement the Public Health Act and other related policies and plans.

The Ministry of Health and Sanitation also collaborates with various other ministries, departments and agencies on matters relating to environmental and public health.

Ministry of Education, Science and Technology (MEST)

The Ministry of Education is responsible for the regulation of all private and government learning institutions. It also supports by providing adequate learning facilities, equipment and materials for citizens. The Ministry also serves as the principal curriculum developer for a better nation.

Through the academic institutions, the Ministry could assist in the delivery of environmental education including the management of chemicals. Moreover, schools, colleges and university laboratories still use mercury bulb thermometers in the country which may be another supply chain source. Therefore, tailoring the current curriculum with the environmental aspect into schools and introducing specific module on Multilateral Environmental Agreement (MEAs) into the curriculum of colleges and university offering environmental sciences shall be a great help in reducing and eliminating mercury.

Njala University which offers Environmental Chemistry and Environmental Management and Quality Control together with Fourah Bay College which has a Chemistry Department and Milton Margai College of Education and Technology with an environmental programme also have the requisite capacity to conduct research in mercury. Much research on environmental issues has been undertaken by these institutions. However, paying special attention to mercury issues will yield a good dividend on the reduction and elimination of mercury. The results of such research can form the basis of an informed decision to develop policies and regulations.

Ministry of Fisheries and Marine Resources (MFMR)

This Ministry manages, develops and conserves all fisheries and marine resources. The Fisheries Management and Development Act of 1988 (GOSL, 1988) and the Fisheries Regulation of 1990 prescribe the preparation of management and development plans, specific procedures for licenses, and measures for conservation, enforcement and surveillance.

The management of marine and coastal resources is currently shared between the Ministry of Fisheries and Marine Resources and the Sierra Leone Maritime Administration (SLMA). SLMA is responsible for safety and pollution issues of marine transportation. On the other hand, the Ministry has a supervisory role over SLMA and regulates the marine resources. Action in these institutions is very low with respect to mercury pollution, due to the low knowledge of its usage and consequences.

However, under the New Direction Government of President Julius Maada Bio, restructuring the sector is ongoing to realize its potential and protect the environment. The Ministry and the Maritime Administration are now fully in charge of regulating the sector.

Ministry of Trade and Industry

The Ministry of Trade and Industry (MTI) has the sole mandate of developing policies and programmes to stimulate local and export trade as well as to enhance private sector investment, industrial and economic growth. The functions of the Ministry with respect to mercury issues amongst others are:

1. Liaise with other Ministries, Departments and Agencies of Government to provide an enabling environment for the Private Sector to thrive and
2. Coordinating and spearheading the implementation of the National Trade Policy.

The main focus areas of the Ministry are trade promotion, private sector development, investment, export promotion and industry development. In view of this, the MTI serves as Board Member to the EPA-SL. The Board of EPA-SL is fully charged with the responsibility to issue or not to issue an EIA Licence/permit to companies, as the case may be. A total of eleven (11) Agencies were established under MTI some of which are also Board Members to the EPA-SL. From these Agencies, the Sierra Leone Standards Bureau (SLSB) has a role to play in the implementation of the Minamata Convention on Mercury. The general mandate of the bureau is to ensure the safety of products consumed in Sierra Leone and development of standards with respect to International Standards Organization (ISO).

The Sierra Leone Standards Bureau is an organization recognized at national, regional and international levels that has a principal function, by virtue of its statutes; the preparation, adoption/adaption or approval of Standards that are made available to the public. It is also the National Statutory Body responsible for the management of the nation's Quality Infrastructure involving Metrology, Standardisation, Testing, Quality Management and Conformity Assessment including Certification. The SLSB is therefore the National Standards Body and by law also a Conformity Assessment Body; ensuring that specified requirements relating to a product, process, system, person or body are fulfilled. As the National Standards Body, SLSB is responsible for developing and publishing Sierra Leone Standards in line with International Standards for all products and services including petroleum, foods, drugs, cosmetics, and testing procedures, management systems and for services.

Conformity Assessment includes Inspection, Testing, and Certification activities. As a conformity assessment body, SLSB is mandated to carry out product assessment through inspection and testing and issuance of certificates of conformity/quality which will allow the use of a Certification Mark.

SLSB is responsible for the control and approval of products within Sierra Leone. The Bureau exercises the legal right to control the use or sale of products within the country and may take enforcement action(s) to ensure that products marketed within country comply with legal requirements. In collaboration with other Regulatory Bodies, they have jurisdiction solely over products sold on the domestic market and to ensure that products sold meet technical regulations as determined by national legislation. Furthermore, these regulators are responsible for the imposition of sanctions in the case of non-compliance with technical regulations (compulsory standards).

Generally, the application of Standards is compulsory but not fully followed. However, in a situation where a Standard covers an area or field which borders on the health and safety of people, it needs to be enforced.

Sierra Leone is a member of the World Trade Organisation (WTO) and needs to take further steps to meet the requirements of the Technical Barriers to Trade (TBT) and Sanitary and Phytosanitary (SPS) Agreement by making its technical regulations transparent to trading partners. The SLBS has been nominated as the enquiry point for both SPS and TBT issues. An effective notification and enquiry point require trained staff and the resources to undertake inter-agency and inter-ministerial contacts and coordination and to manage the necessary flow of information.

Ministry of Labour and Social Security (MLSS)

The Ministry of Labour and Social Security is in charge to ensure that health and safety at the workplace is guaranteed. In the execution of its mandate, the Inspectorate department of the Ministry deals with matters related to the management of the use of chemicals. Through its membership of the International Labour Organisation (ILO), this unit is a Party to a number of ILO conventions/protocols related to the management of chemicals. The Convention on Occupational Health and Safety at Work is perhaps the most relevant in the ASGM sector as child and (pregnant) women labour is still a challenge, as well as other working conditions.

This ministry could be key in the implementation of the MIA (and the NAP) since most companies and groups operating in this sector are in violation of the labour and social security laws. The Ministry regulates relations between employers and employees, and safeguards heath of the employees. Further to that it supervises the provisions relating to the formation and interpretation of contracts of service, the recruitment of native labour for foreign services, restrictions on the engagement of industrial workers, employment of women, adolescents and children apprenticeship contracts. It also regulates death, insolvency and change of residence of employer; breaches of contract and disputes between employer and employed, provisions as to agents; advances by employers.

Ministry of Tourism and Cultural Affairs (MTCA)

The MTCA supervises the National Tourist Board and the National Museum on tourist promotion and development. It also liaises with relevant ministries/departments regarding the preservation of ancient monuments and relics and environmental protection for tourism and eco-tourism through the Sierra Leone Tourist Board.

Customs and Excise Department (CED) of the National Revenue Authority (NRA)

At present, no economically useful chemical is manufactured in Sierra Leone. All chemicals therefore are imported into the country. The Customs and Excise Department (CED) of the National Revenue Authority (NRA) is the government organ responsible for overseeing and regulating the import of chemicals into Sierra Leone. This department faces a number of challenges in the achievement of its ultimate goal of controlling and protecting borders/entering points and help in mobilizing revenue for development. Some of these challenges include the employment of the right mix of personnel (including those with the requisite scientific background to support the chemical management efforts demanded by the Minamata Convention on Mercury and other related Conventions) and requisite modern equipment and technology. The existence of a small number of customs posts, each covering hundreds of kilometres of porous borders connected by poor road and communication network, is an added challenge for an effective control of the border.

Ministry of Local Government and Rural Development (MLGRD)

This ministry is charged with the responsibility to develop policies and legislations for local government institutions (Councils) and oversee/monitor developmental activities in rural communities at the national level. Thus, the ministry is key in the ASGM sector. However, the local communities could not realize the benefits of these policies and legislation because there

was no decentralization. In 2004, the Decentralization secretariat was established under the supervision of the Ministry with the core mandate to Fast-track the devolution process of certain functions from ministries to local councils. At community level, the councils and local authorities are fully in charge of implementing development projects and monitoring them as well. This is the reason why every council is assigned an Environmental and Social Officer (ESO) as a result of it being a devolved function. Community Health Units (CHUs) are also managed by councils.

Various local authorities and village level organisations throughout the country have direct impact on the use and management of natural resources. The relative importance and effectiveness of these authorities/ bodies varies greatly between one natural resource and the other. They are, however, all concerned with some aspect of natural resources management.

Authorities/organisations found in most villages and towns that are of direct relevance to the use of natural resources include:

- Traditional authorities, i.e. the chiefs and elders;
- Village development committees (which provide linkages between traditional authorities);
- Producer associations, miners' associations among others;
- Market women's associations;
- Mutual support groups for mining activities.

While some villages are headed by a "headman" with little mineral resources holding responsibilities, there are other Chiefs with vast mineral resources holding responsibilities (mining responsibilities). The importance of these authorities in natural resources issues vary widely, but generally the village or town chiefs play key roles in natural resources management. Chiefs have the responsibility to ensure that concession holders and developers in ASGM pay royalties (informally). There is, however, little evidence that these Chiefs carry out actions to ensure the proper environmental and health best practices for gold mining. They should empower and support ESOs in disseminating the message of best practice and enforcing its implementation which is completely lacking.

Village development committees operate in response to directives from the Government and Paramount Chiefs. They generally organise communal labour initiatives often with plans for the management of natural resources. Miners associations are very limited and assume responsibilities for a wide range of artisanal mining activities.

Decentralization Secretariat (DecSec)

This is principally responsible for implementing the devolution process including monitoring and providing capacity training for Local Councils. In 2004, the Devolution Act for decentralization was enacted by Parliament as a key prerequisite for development after the civil war. However, challenges still remain as some ministries are yet to devolve certain critical functions to local councils. Recently, the Decentralization Commission has enforced the devolution of over 70 percent government functions to local councils.

Ministry of Social Welfare, Gender and Children's Affairs

The Ministry of Social Welfare, Gender and Children's Affairs is charged with the responsibility of responding to the social needs related to gender inequalities, disabilities, women's rights, child rights, and religious rights, among others. The challenges facing the country are enormous in terms of breakdown of the social fabric of families and institutions. Therefore, the Government of Sierra Leone mandated the Ministry with social responsibility to promote and look into the issues of gender empowerment, groups in vulnerable situations, children, elderly and persons with disabilities.

Women and children often form the largest percent of the ASGM labour force as women serve as specialists in panning and children as messengers. Lactating mothers and pregnant women are all involved in the ASGM activities. These groups are therefore very critical in this sector for the Ministry.

Ministry of Information and Communication

The Ministry has the following mandates:

- To provide policy guidance and strategic direction on all matters concerning the media, access to public information, broadcasting, telecommunications, postal services and information communication technology.
- Facilitate universal, ubiquitous and cost-effective access to information and communications infrastructure and services throughout the country.
- Promote the utilization of ICT in all spheres of life to optimize the accelerated socio-economic growth and development through dissemination of public information and provision of innovative information and communication technologies.
- Formulate and implement policies of information and communications technology.
- To provide press and information services to Government Ministries and Departments, locally and externally

The main functions of the Ministry with respect to the implementation of the Minamata Convention include the following:

- To ensure, through the office of the Government spokesperson, that all institutions of Government work collaboratively to achieve coherent and effective communications with the public
- To prepare and produce publicity and information materials and disseminate public information locally and internationally.
- To print legal, security and accounting documents as well as educational and general publicity materials for government and semi-government institutions;
- To speak on behalf of the Government
- Develop appropriate policies and strategies that enhance provision of innovative information and communication technology.

The Ministry also performs oversight roles on agencies and departments (with respect to the Convention) that relates to the functions of the Ministry such as the Right to Access Information Commission (RAIC).

The Right to Access Information Commission (RAIC)

It is the commission set up through the Right to Access Information Act 2013 for the implementation of the provisions thereof.

The Government of Sierra Leone understands that freedom of information is an indispensable part of democratic societies. The passing of the Right to Access Information Law in 2013 offers the right to its citizens and interested persons free access to information primarily in the hands of government and non-state actors. With the passing of this law, access to information and open data offers its citizens the opportunity to critically evaluate authorities appointed and elected to account for their stewardship.

The establishment of the Right to Access Information Commission (RAIC) in 2014 generated a lot of interest from the demand side of the process, namely, citizens (disabled, women, and youth, as well as civil society organizations) and development partners who remain concerned about getting access to vital information as a way to effectively manage corruption and promote service delivery.

Ministry of Finance

The Ministry of Finance is a key arm of the Government of Sierra Leone mandated to formulate and implement sound economic policies and public financial management, ensure efficient allocation of public resources to promote stable economic growth and development in the context of a stable macroeconomic environment.

4.3. ROLES OF PRIVATE SECTOR, ACADEMIC AND OTHER NON-GOVERNMENTAL INSTITUTIONS

Private sector institutional arrangements

Private sector is core in the development of any nation because it helps to drive the economy by bringing or establishing investment, more so in the management of the country natural resources. This is largely evident in the ASGM sector, mercury-added products trade and other businesses. Even the mercury trade is carried out by the private sector (individuals or networks of miners or gold traders). Therefore, engaging this sector through strong awareness for the implementation of the Convention could be vital.

Sierra Leone'. Government at the moment cannot initiate natural resources management alone. This may be due to the poor resources available to government agencies and the degradation of the environment caused by some communities.

However, the Government, NGOs and local communities have, over the years, initiated activities that provide natural resource management services. Problems that are identified have been under scrutiny in these initiatives, including the poor level of resources available to the different sectors.

Academic institutions

Njala University, which evolved from the University of Sierra Leone in 2004, has a Faculty of Environmental Sciences with four academic departments that focus on teaching and research activities on the environment. Similarly, Fourah Bay College, a component of the University of Sierra Leone, has a Chemistry Department that conducts research on chemical issues. This research ranges from air, water and soil pollution to contamination issues. However, it is not clear how much of this research has looked at mercury issues.

A number of institutions within the University of Sierra Leone are involved in environmental and natural resource data gathering, monitoring, and evaluation. These include the Departments of Biological Sciences and of Chemistry, the Institute of Marine Biology and Oceanography (IMBO), the Institute for Population Studies (IPS) (all at Fourah Bay College) and the Division of Community Health at the College of Medicine and Allied Health Sciences.

The University of Sierra Leone and Njala University are the only academic institutions in the country with the capacity to provide training on Chemicals Management.

Non-governmental organisations (NGOs)

Non-governmental Organisations (NGOs) in Sierra Leone have supported communities to address sustainable use of natural resources. They have done this through encouraging communities to maintain forest reserve areas, promoting community biodiversity programmes, supporting livestock production and management and park management. Some of these NGOs were also represented in the two stakeholder engagement workshops conducted for the development of the NAP in Sierra Leone.

There is a strong NGO sector in Sierra Leone creating public interest on health and environmental issues. However, there is no one specifically engaging in chemicals management yet. The most active NGOs on the ground in areas related to environmental and natural resources management are:

- **The Conservation Society of Sierra Leone (CSSL)**, which promotes the conservation and sustainable use of Sierra Leone's natural resources through research, education, advocacy and support to site management groups. CSSL also undertakes campaigns for the protection of wildlife, parks and sanctuaries.
- **The Environmental Foundation for Africa (EFA)**, whose mission in Sierra Leone is to restore and protect the environment and its natural resources. It has acquired experience in terms of operation in conflict zones, humanitarian and refugee operations, post-conflict reconstruction and rehabilitation.
- **The Commonwealth Human Ecology Council (CHEC-SL)** promotes conservation of the ecology through education and disseminates environmental information through the mass media. It also supports the Government of Sierra Leone (GoSL) in promoting, through education, policy imple-

mentation and project execution.

- **The Organisation for Research and Extension of Intermediate Technology (OREINT)** promotes self-sustaining rural development through the promotion of agriculture and appropriate technology to enhance and improve the socio-economic status of the people in rural areas.
- **Green Scenery and Friends of the Earth** are other local NGOs that are actively involved in tree planting and awareness raising campaigns on the protection and management of the environment and natural resources.
- **Network Movement for Justice and Development (NMJD)** is a national human rights-oriented civil society development and advocacy organisation. NMJD engages government on policy reform matters and has a long history and experience in working with grassroots communities in Sierra Leone with the vision to see a Sierra Leone where basic rights of citizens are protected and promoted (especially the Economic, Cultural and Social Rights) and justice is delivered to the poor who are empowered to challenge and transform the systems that keep them in poverty.

Relevant Civil Society Organisations (CSOs) are also working closely with ASGM communities and have a good understanding of the sector. They include the following:

- **African Youth on Mining and Environment (AYME)** base in Koidu, Kono District engaged in youth empowerment in the mining sector and sustainable management of the environment.
- **Community Action for Sustainable Development Initiative (CASDI)** is an advocacy CSO base in Bo District on environmental protection.
- **Knowledge for Community Empowerment Organization (KOCEPO)** another CSO base in Tankoro, Koidu City advocating in better mining practices.

4.4. INTERNATIONAL ORGANISATIONS

The United Nations is an essential international body when it comes to environmental issues related to various aspects (social, economic, health and others), such as mercury pollution resulting from human use. Each United Nations Organization, Programme and Institute has its own speciality, but because of the interconnection between the fields involved in contemporary issues, they are called upon to collaborate on the same subject. This arrangement was fully recognized in the development of the framework of the MIA and NAP projects under the Minamata Convention. The relevant United Nations bodies that have played an essential role and are involved in the implementation of the Convention are:

The International Labour Organization (ILO): The ILO brings together governments, employers and employees to develop labour standards, laws and programmes to promote decent and sustainable work for all women and men. With regard to the Minamata Initial Assessments and National Action Plans, the ILO will have a crucial role to play in the implementation of action plans (including the formalization of the mining sector) to ensure a decent working environment for all workers at mining sites and all professionals involved in waste management or handling of substances or objects containing mercury and/or other hazardous chemicals.

The United Nations Development Programme: UNDP is one of the leading organizations in terms of development, equality, poverty reduction, and inclusion. It supports states in policy development, institutional and leadership capacity building and the promotion of relevant partnerships. In support of the Minamata Convention and the MIA projects in some countries, UNDP acts as an implementing agency, overseeing coordination between implementing partners, national agencies and institutions, as well as coordinating all regional seminars for the project. UNDP will continue to play a key role in the further implementation of the Minamata Convention, including for other GEF-funded projects especially regarding development and social aspects of the Convention.

The United Nations Environment Programme (UN Environment): UN Environment is the United Nations agency specialized in the field of the environment. Among others, the Programme aims to: (i) Coordinate United Nations activities related to the environment (ii) Assist countries in the implementation of environmental policies and (iii) Promote sustainable development issues. Through its mercury programme, UN Environment plays a significant role in the management of mercury. The UN Environment developed the inventory Toolkit used worldwide for developing national mercury inventories. Moreover, UN Environment, as UNDP, serves as a GEF agency for various MIA and NAP projects, including the Sierra Leone MIA and NAP projects. It will be essential to work with UN Environment in the implementation phases of the Minamata Convention, particularly for technical aspects related to the preservation and protection of the environment, sustainable development, the management of chemicals (including mercury and mercury compounds) and waste, and environmental pollution in general.

The United Nations Institute for Training and Research (UNITAR): UNITAR's Chemicals and Waste Management Programme has provided technical assistance in various areas such as: (i) training on the Toolkit for the national mercury inventories, (ii) revision of the various individual reports, in particular the evaluation of the policy, legal and institutional frameworks, the environmental impact study and the inventory report. Furthermore, UNITAR supports the writing and revision of the final MIA report. UNITAR can also play a key role in the further implementation of the Minamata Convention notably in terms of capacity building, technical assistance, chemicals pollution as well as waste management.

The World Health Organization (WHO): The WHO is the lead entity at the international level for all aspects related to health. In support of the MIA process, it has led a study on the use and management of waste products and tools from the health sector in order to estimate the effects on the health of populations in the West African region. WHO will play an important role in the implementation of all activities and compliance with the Articles of the Convention.

Other international bodies have essential roles, such as:

The African Development Bank (ADB) and the **World Bank: The African Development Bank** is a leading institution in Africa in terms of financial and socio-economic aspects. Moreover, it also has diverse funding programmes and is increasingly involved in numerous projects in the fields of poverty reduction, nutrition and food security, civil society protection, but also in Environmental, Social and Governance aspects. The World Bank is the vital funding body for various projects around the world. With the main objectives of reducing poverty and promoting prosperity by increasing income for each country and sharing innovative information, the World Bank has been working for several years on a wide range of issues. It also attaches particular importance to sustainable development and environmental issues such as the pollution of ecosystems by chemicals and access to drinking water throughout the world. For this reason, both the ADB and the World Bank could be important in the potential future implementation activities of the Minamata Convention in Sierra Leone.

ANALYSIS OF THE POLICY, REGULATORY AND INSTITUTIONAL FRAMEWORKS OF SIERRA LEONE WITH REGARDS TO THE ARTICLES OF THE MINAMATA CONVENTION

Based on the assessments of the legal and institutional frameworks above, the tables presented in this section link existing national instruments with the provisions of each Article of the Minamata Convention relevant to Sierra Leone. For each Article, the laws and their relevant content for the Article, the key institutions with their functions considered relevant to the Article and the aspects that need to be improved to fully meet the Article's requirements are presented.

Table 15 - Analysis of the legal and institutional frameworks of Sierra Leone with regards to Article 3 of the Minamata Convention

Article 3: Mercury Supply Sources and Trade		
Description of the Article and applicability in the context of Sierra Leone		
Article No	Succinct summary of provisions of the Article	Applicability
3.3	Not allow new primary mercury mining	Applicable
3.4	Phase out existing primary mercury mining within 15 years	Not applicable
3.5(a)	Obtain information on stocks of mercury or mercury compounds exceeding 50 metric tons (MT), and mercury supply generating stocks exceeding 10 MT/year	Not applicable
3.5(b)	Restrict the use of excess mercury from decommissioning Chlor-alkali plants, and require environmentally sound disposal	Applicable (for preventive measures)
3.6	Not allow the export of mercury unless the importing country provides written Consent and the mercury is for an allowed use under the convention or environmentally sound storage, and all other conditions of Article 3.6 are met	Applicable (for preventive measures)
Policy and regulatory measures in place that enable Sierra Leone to comply with the above listed provisions:		
Title, ref. no. and date of relevant Policy and Regulatory Measure	**What aspects of the above provisions are being addressed by policy/regulatory measure**	
Environment Protection Agency Sierra Leone Act, 2008 amended 2010 11 September, 2008 and 2 September 2010	Part VI - Miscellaneous • Section 53, Subsections (1) to (4) - enforcement notice, and • Section 54, Subsections (1) to (4) - powers of the Agency related to enforcement and • Section 58 - toxic and hazardous substances 1. The Board may prescribe activities or substances which shall be considered toxic or hazardous. 2. The Agency shall take all necessary and appropriate measures to monitor, control and regulate the manufacture, sale, transportation, handling or disposal of toxic and hazardous substances, including toxic and hazardous wastes. 3. The possession, introduction or importation into Sierra Leone of internationally banned chemicals or substances is prohibited. 4. Any person who contravenes subsection (3), (4) or (5) commits an offence and is liable on conviction to a fine not exceeding fifty million Leones or to a term of imprisonment not exceeding two years or to both the fine and imprisonment. 5. Without prejudice to subsection (1), a court may declare an activity or substance to be hazardous where the court is satisfied on the evidence before it that the activity or substance has the potential of causing grave damage to the environment.	

National Industrial Policy, Ministry of Trade and Industry March 2011	Chapter 4- Policy Framework, Section A. Objectives of the National Industrial Policy • Utilization of natural resources, human resources, capital, technology and management capabilities for the production of goods and services on a sustainable basis; • Enhanced industrial production on an environmentally sustainable basis. Section K. Environmental Protection • Government, in its industrialization drive, shall promote measures to ensure: i. The preservation, protection and improvement of the quality of the environment and ii. The protection of the life and health of humans, animals and plants. • In formulating measures relating to the environment, Government shall take account of: i. Available and accessible scientific and technical data; ii. The potential costs and benefits of action or inaction; iii. The precautionary principle and those principles relating to preventive action, rectification of environmental damage at source and the principle that the polluter pays and • The need to protect Sierra Leone from the harmful effects of hazardous materials transported, generated, disposed of or shipped through or within the sub-region. Government will ensure a balance between the requirements of industrial development and the protection and preservation of the environment
Sierra Leone Trade Policy Ministry of Trade and Industry June 2010	Section 3.7.4 Consumption and Environment Policy context: • Sustainable development, a factor in determining consumer welfare in the long term, depends on environmental protection, among others. However, environmental protection involves costs and trade-off with other economic interests and may require changes in consumption patterns. There is need to promote environmental protection and foster sustainable consumption. Policy Objective • To foster sustainable consumption pattern by promoting environmental protection that contributes to sustainable development • Policy Prescriptions i. Government will sensitize the public on the importance of environmental protection ii. Government will encourage consumption patterns that do not destroy the environment
The Mines and Minerals Act, 2009 7 January 2010	Section 85 – Application for an Artisanal Mining Licence • (2)(e) Give or be accompanied by a statement giving particulars of the programme of proposed mining operations, including a statement of (i) The likely effects of the proposed mining operations on the environment and on the local population and proposals for mitigation and compensation measures; (ii) Any particular risks (whether to health or otherwise) involved in mining the minerals, particularly radioactive minerals, and proposals for their control or elimination; Section 91 – Rights and duties of holders of artisanal mining licences • (3)(g) Carry out rehabilitation and reclamation of mined out areas; • PART XV–PROTECTION OF THE ENVIRONMENT • Section 131 - Protection of natural resources to be taken into account. • (1) In deciding whether or not to grant a mineral right, the Minister shall take into account the need to conserve the natural resources in or on the land over which the mineral right is sought, or in or on neighbouring land. • (2) The Minister shall require an environmental impact assessment licence as prescribed under the Environment Protection Act as a condition for granting a small-scale mining licence or a large-scale mining licence. • Section 132 - General duty to protect environment and minimize pollution. • (1) Every holder of a mineral right shall carry on its operations in a manner that is reasonably practicable in order to minimize, manage and mitigate any environmental impact including but not limited to pollution resulting from such operations • (2) Notwithstanding the generality of subsection (1), a holder of a mineral right shall be subject to all laws of the Republic concerning the protection of the environment. • Sections 133 to 137 – Detailed environmental impact assessment shall be undertaken.
Outstanding regulatory or policy aspects that would need to be addressed/developed to ensure compliance with the Convention's provisions	
The Toxic and Hazardous Substance Regulations 2016 Hazardous Chemicals and Pesticides Control and Management Act 2016	• Legislation tries to address Article 3, paragraph 8 of the Convention • However, implementing Article 3 is challenging since Sierra Leone is purely importing Mercury. • Section 58 paragraph 1 of the Environment Protection Agency Sierra Leone Act, 2008 considered Mercury toxic and hazardous. • Thus, there is the need for a Mercury Legislation to adequately address the provisions in the Minamata Convention. • Domestication of the Convention by ratifying drafted legislations is very important
Name of the Institution/stakeholder and its role with respect to the above-listed provisions	Relevant institutional capacity in place to comply with the above listed provisions
The Environment Protection Agency Sierra Leone (EPA-SL)	• The Environmental Protection Agency Sierra Leone (EPA-SL) became operational in 2009. • The EPA-SL is housed within the President's Office • The main government Agency in charge of all issues concerning the environment and climate change. • The goal is to create and enforcing a strict regulatory framework for environmental regulation in Sierra Leone. • Its mandate is to coordinate, monitor and evaluate the implementation of national environmental policies, programmes and projects, including issuing Environmental Impact Assessment (EIA) licences to projects outlined in the First Schedule of the 2008 Act amended 2010. • Also responsible to issue environmental permit/licences for importing/exporting or transporting toxic and hazardous substances/chemicals that are not listed as banned chemicals, chemical weapons or Chemical, Biological, Radiological, and Nuclear and (CBRN).. • Charged with the responsibility to effectively manage and protect the environment for the benefit of its citizenry. It is the Focal Point for all environmental issues/conventions nationally and internationally.

Ministry of Trade and Industry (MTI)	The Ministry has the sole mandate of developing policies and programmes to stimulate local and export trade as well as to enhance private sector investment, industrial and economic growth. It envisages a private sector-led economy, which will ensure that the socio-economic needs of the citizens are met through private sector development, job and wealth creation. The core functions of MTI are to: • Coordinating and spearheading the implementation of the National Trade • Policy. • Provide policy guidance and supervision to its agencies/departments for efficient and effective service delivery to the citizens of the Sierra Leone. • Coordinate the development of Trade Support Programme that reflects the policy objectives of the Government. • Coordinate the formulation of Annual Implementation Plans for the Trade Support Programme, reflecting appropriate sequencing of implementation of Programmes and ensuring that Trade Policy remains an integral component of national development plans. • Liaise with other Ministries, Departments and Agencies of Government to provide an enabling environment for the Private Sector to thrive. Key service areas include trade and cooperatives promotion, private sector development, investment and export promotion and industrial development.
The Cooperate Affairs Commission (CAC)	The Corporate Affairs Commission was established by the Companies Act of 2009 amended in 2014 to supervise and regulate all companies in Sierra Leone, and that it had been granted mandate to draft regulations that would facilitate its operations. It regulates the establishment of new companies, enforces compliance with procedural requirements, and handles the incorporation and registration of companies in Sierra Leone.
The Sierra Leone Standards Bureau (SLSB) (Act No. 2, 1996 (National Provisional Ruling Council Decree, Repeal and Amendment Act No. 3 of 1996)), 18 December 1996	• Responsible for the erstwhile Weights and Measures administration of the Ministry of Trade and Industry. The Weights and Measures Act No. 22 of 1961 was created to replace the Weights and Measures Ordinance that existed before Sierra Leone gained independence from the United Kingdom. • Designated as: (i) National Standards Body; (ii) National Certification Body and (iii) National Accreditation Body. • Mandated to assess, confirm that a product conforms to applicable standards and to ensure that companies demonstrate their technical competence in line with national and international best practices. Also, the Certification of products and Accreditation of conformity assessment bodies. • National Statutory body responsible for standardization and Quality Assurance and services for both the Local Market and for export (collection and dissemination of information on standardization and related matters, verification of weights and measures used in trade and commerce and calibration of industrial and laboratory equipment). • Hold the Codex Contact point for Sierra Leone; prepare, modify or amend specifications/Technical Regulations[42] Correspondent member of ISO since 1 January 2009[43] SLSB offers the following services • Standardization • Development and sale of national standards metrology • Legal metrology and industrial metrology conformity assessment • Product certification scheme, testing and inspection consultancy • Training of stakeholders on standards and quality management principles In view of the above, the EPA-SL collaborated with the SLSB in 2014 to developed two standards 1. Effluent Standards – Discharge of Effluent into Water bodies (with Hg limit of 0.1mg/L); 2. Air Quality Standards Very recently, sophisticated test equipment has been secured to enhance their capacity.
Customs and Exercise Department (CED)	Key tasks include • Supports government reforms in improving the conduct of health and environmental friendly business activities in Sierra Leone • Facilitates the free movement of persons and goods across the country's frontiers (with emphasis on the turnaround time and client experiences and border controls) • Revenue Administration: of various tax handles by way of fair assessment, collection, and accounting. • Trade Facilitation: the introduction of risk management approach in processes, and a fast track regime for compliant businesses. • Border Control: enforcement of restricted and or prohibited imports and exports in collaboration with other MDAs. • Data Collection: Capture trade statistics and maintain a database of import, and exports transactions. • Regulate Customs Brokers: Training, eligibility and Licenses of Customs Brokers. • Specialised Units within this department are • Valuation – Ensure assessments of imports based on Transaction Value. • Risk management – Profile businesses, Brokers and Processes to achieve targeted controls. • Post Clearance Audit – Verify declarations from records on business premises. • Harmonized System (HS) Classification and Rules of Origin – ensure commodities descriptions and applicable rates are adhered to. The department is the government organ responsible for overseeing and regulating the importation of chemicals into Sierra Leone.
Remaining Capacity Gaps at National Level that need to be addressed before provisions can be met • Enhance training for both new and current staff of the EPA-SL, SLSB, CED-NRA and MTI on Mercury and Mercury-added products monitoring to mitigate water and air pollution	

42- African National Codex Contact Points (NCCPs ... - AU-IBAR
www.au-ibar.org › pan-spso › 740-african-national-codex-contact-points-nc... Jul 3, 2015 - African National Codex Contact Points reached common positions on ... Niger, Nigeria, RCA, Senegal, Sierra Leone, Somalia, South Sudan
43- https://www.ncbi.nlm.nih.g

Table 16 - Analysis of the legal and institutional frameworks of Sierra Leone with regards to Article 4 of the Minamata Convention

Article 4: Mercury-Added Products		
Description of the Article and applicability in the context of Sierra Leone		
Article No	Succinct summary of provisions of the Article	Applicability
4.1	· Not allow the manufacture, import, and export of products listed in Part I of Annex A not otherwise excluded following the phase out date listed in the Annex	Applicable
4.3	· Phase down the use of dental amalgam through two or more measures listed in Part II of Annex A	Applicable
4.5	· Take measures to prevent the incorporation of products listed in Part I of Annex A (i.e., switches and relays, batteries) into larger, assembled products	Applicable
4.6	· Discourage the manufacture and distribution of new mercury product types	Applicable
Policy and regulatory measures in place that enable Sierra Leone to comply with the above listed provisions		
Title, ref. no. and date of relevant Policy and Regulatory Measure	What aspects of the above provisions are being addressed by policy/regulatory measure	
Environment Protection Agency Sierra Leone (EPA-SL) Act, 2008 amended 2010 11 September 2008 and 2 September 2010	Part VI - Miscellaneous Section 58 - toxic and hazardous substances (2) The Agency shall take all necessary and appropriate measures to monitor, control and regulate the manufacture, sale, transportation, handling or disposal of toxic and hazardous substances, including toxic and hazardous wastes. (4) The possession, introduction or importation into Sierra Leone of internationally banned chemicals or substances is prohibited.	
National Industrial Policy, Ministry of Trade and Industry March 2011	Chapter 4- Policy Framework; Section K. Environmental Protection · The need to protect Sierra Leone from the harmful effects of hazardous materials transported, generated, disposed of or shipped through or within the sub-region. Government will ensure a balance between the requirements of industrial development and the protection and preservation of the environment	
Sierra Leone Trade Policy Ministry of Trade and Industry June 2010	Section 3.7.4 Consumption and Environment Policy context · Sustainable development, a factor in determining consumer welfare in the long term, depends on environmental protection, among others. However, environmental protection involves costs and trade-off with other economic interests and may require changes in consumption patterns. There is need to promote environmental protection and foster sustainable consumption. Policy Objective · To foster sustainable consumption pattern by promoting environmental protection that contributes to sustainable development Policy Prescriptions i. Government will sensitize the public on the importance of environmental protection Government will encourage consumption patterns that do not destroy the environment	
The Customs Act, 2011	Section 2. (1) There is hereby continued in existence the Department of Customs to assist the National Revenue Authority to direct, manage and enforce the provisions of this Act. Section 7. Customs control and customs control zones (1) Customs shall carry out all the controls it deems necessary to ensure the correct application of this Act or any other Act governing the entry, customs exit, transit, transfer and use of goods moved between the territory and other countries or territories outside the customs territory. (2) The Minister may appoint areas of land or territorial waters in Sierra Leone as Customs Control Zones for the purposes of administering or enforcing this Act. Section 8 - Reporting of imported and exported goods (1) The importer, exporter, his appointed agent or the person in charge of the conveyance shall be responsible for reporting all goods that are imported or exported, to the Customs office designated for that purpose nearest to the place where the goods are introduced into, or exported from Sierra Leone, regardless of whether the goods are liable to duty and taxes, and all such goods shall be placed under and be subject to Customs control.	
Outstanding regulatory or policy aspects that would need to be addressed/developed to ensure compliance with the Convention's provisions • Prohibition of Mercury-added Products, their Use and Disposal Regulations: The development of this regulations shall be a very strong instrument to effectively monitor the compliance of Article 4. This is just one angle of the domestication process of the Convention. In Sierra Leone, skin lightening creams has dominated the cosmetics market as large proportion of women and some men use such products. This has resulted to skin diseases being observed on women. Moreover, dental amalgam is still practice in the health sector. • National Environmental Health Policy on Dental Amalgam: This will help to address the dentistry sector. Thus, there is the need to develop a policy on this or incorporated in the current policy.		
Name of the Institution/stakeholder and its role with respect to the above-listed provisions	Relevant institutional capacity in place to comply with the above listed provisions	
The EPA-SL	· Manage and Protect the environment for the benefit of citizenry (in collaboration with other relevant MDAs) · Enhance collaboration with other MDAs · Issue clearance certificates for the exportation and importation of non-banned chemicals (in collaboration with other MDAs)	
NRA (Customs and Excise Department)	· Generate revenue through tax collection · Protect the country's environment · Control the entry/exit points	
MoHS	· Responsible for the Public Health and Environmental Unit in the fore front with directives from the Chief Medical Officer (CMO) · Relevant body to address health issues related to the use and disposal of mercury-added products	
MTI	· Responsible for the development of policies and legislations for trade and industry · Issues trade permits and monitor trade and industrial activities in terms of imports, exports, production and sales	
Sierra Leone Standards Bureau (SLSB)	1. · Develop standards 2. · Effectively monitor consumer products That is products fit for safety consumption	
Remaining Capacity Gaps at National Level that need to be addressed before provisions can be met · Equipment and training for EPA-SL, MTI, CED/NRA and SLSB staff to enable effective identification of Mercury-added products for effective monitoring to mitigate health hazards especially that of the skin		

Table 17 - Analysis of the legal and institutional frameworks of Sierra Leone with regards to Article 5 of the Minamata Convention

Article 5: Manufacturing processes in which mercury or mercury compounds are used		
Description of the Article and applicability in the context of Sierra Leone		
Article No	Succinct summary of provisions of the Article	Applicability
5.2	· Not allow the use of mercury or mercury compounds in the manufacturing processes listed in Part I of Annex B	Applicable, (for preventive measures in feature)
5.3	· Restrict (as specified in the Annex) the use of mercury in the processes listed in Part II of Annex B	
5.6	· Not allow new facilities from using mercury in the processes listed in Annex B, except facilities using mercury catalysts to produce polyurethane	
5.5	· For facilities with processes listed in Annex B, identify and obtain information on mercury or mercury compound use; and control mercury emissions to air, and releases to land and water	
5.7	· Discourage new uses of mercury in industrial processes	
Policy and regulatory measures in place that enable Sierra Leone to comply with the above listed provisions:		
Title, ref. no. and date of relevant Policy and Regulatory Measure	What aspects of the above provisions are being addressed by policy/regulatory measure	
Environment Protection Agency Sierra Leone Act, 2008 amended 2010 11 September 2008 and 2 September 2010	Part VI - Miscellaneous · Section 53, Subsections (1) to (4) - enforcement notice, and · Section 54, Subsections (1) to (4) - powers of the Agency related to enforcement and · Section 58 - toxic and hazardous substances (3) The Board may prescribe activities or substances which shall be considered toxic or hazardous. (4) The Agency shall take all necessary and appropriate measures to monitor, control and regulate the manufacture, sale, transportation, handling or disposal of toxic and hazardous substances, including toxic and hazardous wastes. (5) The possession, introduction or importation into Sierra Leone of internationally banned chemicals or substances is prohibited. (7) Any person who contravenes subsection (3), (4) or (5) commits an offence and is liable on conviction to a fine not exceeding fifty million Leones or to a term of imprisonment not exceeding two years or to both the fine and imprisonment. (9) Without prejudice to subsection (1), a court may declare an activity or substance to be hazardous where the court is satisfied on the evidence before it that the activity or substance has the potential of causing grave damage to the environment.	
National Industrial Policy, Ministry of Trade and Industry March 2011	· Chapter 4- Policy Framework, · Section A. Objectives of the National Industrial Policy · · Utilization of natural resources, human resources, capital, technology and management capabilities for the production of goods and services on a sustainable basis; · · Enhanced industrial production on an environmentally sustainable basis. · · Section K. Environmental Protection · · Government, in its industrialization drive, shall promote measures to ensure: · i. The preservation, protection and improvement of the quality of the environment and · ii. The protection of the life and health of humans, animals and plants. · · In formulating measures relating to the environment, Government shall take account of: · i. Available and accessible scientific and technical data; · ii. The potential costs and benefits of action or inaction; · iii. The precautionary principle and those principles relating to preventive action, rectification of environmental damage at source and the principle that the polluter pays and · · The need to protect Sierra Leone from the harmful effects of hazardous materials transported, generated, disposed of or shipped through or within the sub-region. Government will ensure a balance between the requirements of industrial development and the protection and preservation of the environment	

Sierra Leone Trade Policy Ministry of Trade and Industry June 2010	Section 3.7.4 Consumption and Environment Policy context • Sustainable development, a factor in determining consumer welfare in the long term, depends on environmental protection, among others. However, environmental protection involves costs and trade-off with other economic interests and may require changes in consumption patterns. There is need to promote environmental protection and foster sustainable consumption. • Policy Objective • To foster sustainable consumption pattern by promoting environmental protection that contributes to sustainable development • Policy Prescriptions i. Government will sensitize the public on the importance of environmental protection ii. Government will encourage consumption patterns that do not destroy the environment
Outstanding regulatory or policy aspects that would need to be addressed/developed to ensure compliance with the Convention's provisions Mercury Trade Policy: This will enhance the regulation of all mercury trade in Sierra Leone for effective implementation of the Convention's provisions and monitoring	
Name of the Institution/stakeholder	Relevant institutional capacity in place to comply with the above listed provisions
MTI	• Responsible for the development of policies and legislations for trade and industry • Issues trade permits and monitor trade and industrial activities in terms of imports, exports, production and sales
The EPA-SL	• Manage and Protect the environment for the benefit of citizenry (in collaboration with other relevant MDAs) • Enhance collaboration with other MDAs • Issue clearance certificates for the exportation and importation of non-banned chemicals (in collaboration with other MDAs)
NRA (Customs and Excise Department)	• Generate revenue through tax collection • Protect the country's environment • Control the entry/exit points
Sierra Leone Standards Bureau (SLSB)	• Develop standards • Effectively monitor consumer products That is products fit for safety consumption.
Remaining Capacity Gaps at National Level that need to be addressed before provisions can be met • Equipment and training for EPA-SL, MTI, CED/NRA and SLSB staff to enable effective identification of Mercury-added products for effective monitoring to mitigate health hazards.	

Table 18 - Analysis of the legal and institutional frameworks of Sierra Leone with regards to Article 6 of the Minamata Convention

Article 6: Exemptions available to a Party upon request		
Description of the Article and applicability in the context of Sierra Leone		
Article No	Succinct summary of provisions of the Article	Applicability
6.1	• Any State or regional economic integration may register for one or more exemptions from the phase-out dates listed in Annex A and Annex B	Applicable (in case needed)
Policy and regulatory measures in place that enable Sierra Leone to comply with the above listed provisions		
Title, ref. no. and date of relevant Policy and Regulatory Measure	• What aspects of the above provisions are being addressed by policy/regulatory measure	
Environment Protection Agency Sierra Leone Act, 2008 amended 2010 11 September 2008 and 2 September 2010	Part VI - Miscellaneous • Section 53, Subsections (1) to (4) - enforcement notice, and • Section 54, Subsections (1) to (4) - powers of the Agency related to enforcement and • Section 58 - toxic and hazardous substances 1. The Board may prescribe activities or substances which shall be considered toxic or hazardous. 2. The Agency shall take all necessary and appropriate measures to monitor, control and regulate the manufacture, sale, transportation, handling or disposal of toxic and hazardous substances, including toxic and hazardous wastes. 3. The possession, introduction or importation into Sierra Leone of internationally banned chemicals or substances is prohibited. 4. Any person who contravenes subsection (3), (4) or (5) commits an offence and is liable on conviction to a fine not exceeding fifty million Leones or to a term of imprisonment not exceeding two years or to both the fine and imprisonment. Without prejudice to subsection (1), a court may declare an activity or substance to be hazardous where the court is satisfied on the evidence before it that the activity or substance has the potential of causing grave damage to the environment.	
National Industrial Policy, Ministry of Trade and Industry March 2011	Chapter 4- Policy Framework, Section A. Objectives of the National Industrial Policy • utilization of natural resources, human resources, capital, technology and management capabilities for the production of goods and services on a sustainable basis; • enhanced industrial production on an environmentally sustainable basis. Section K. Environmental Protection • Government, in its industrialization drive, shall promote measures to ensure: v. The preservation, protection and improvement of the quality of the environment and vi. The protection of the life and health of humans, animals and plants. • In formulating measures relating to the environment, Government shall take account of: vii. Available and accessible scientific and technical data; viii. The potential costs and benefits of action or inaction; ix. The precautionary principle and those principles relating to preventive action, rectification of environmental damage at source and the principle that the polluter pays and The need to protect Sierra Leone from the harmful effects of hazardous materials transported, generated, disposed of or shipped through or within the sub-region. Government will ensure a balance between the requirements of industrial development and the protection and preservation of the environment	
Sierra Leone Trade Policy Ministry of Trade and Industry June 2010	Section 3.7.4 Consumption and Environment Policy context • Sustainable development, a factor in determining consumer welfare in the long term, depends on environmental protection, among others. However, environmental protection involves costs and trade-off with other economic interests and may require changes in consumption patterns. There is need to promote environmental protection and foster sustainable consumption. Policy Objective • To foster sustainable consumption pattern by promoting environmental protection that contributes to sustainable development • Policy Prescriptions i. Government will sensitize the public on the importance of environmental protection Government will encourage consumption patterns that do not destroy the environment	
Outstanding regulatory or policy aspects that would need to be addressed/developed to ensure compliance with the Convention's provisions • Mercury Trade Policy/Regulations with an exemption annex/schedule: This will enhance the regulation of all mercury trade in Sierra Leone for effective implementation of the Convention's provisions and monitoring		
Name of the Institution/stakeholder and its role with respect to the above-listed provisions	Relevant institutional capacity in place to comply with the above listed provisions	
MTI	• Responsible for the development of policies and legislations for trade and industry • Issues trade permits and monitor trade and industrial activities in terms of imports, exports, production and sales	
The EPA-SL	• Manage and Protect the environment for the benefit of citizenry (in collaboration with other relevant MDAs) • Enhance collaboration with other MDAs • Issue clearance certificates for the exportation and importation of non-banned chemicals (in collaboration with other MDAs)	
Remaining Capacity Gaps at National Level that need to be addressed before provisions can be met • Equipment and training for EPA-SL and MTI staff to enable effective identification of Mercury-added products for effective monitoring to mitigate health hazards		

Table 19 - Analysis of the legal and institutional frameworks of Sierra Leone with regards to Article 7 of the Minamata Convention

Article 7: Artisanal and Small-scale Gold Mining (ASGM)		
Description of the Article and applicability in the context of Sierra Leone		
Article No	Succinct summary of provisions of the Article	Applicability
7.1 to 7.4and Annex C	• Take measures to reduce, and where feasible, eliminate mercury and mercury compound use, emissions (to air), and releases (to land and water) associated with ASGM	Applicable
	• Establish coordinating mechanism and delineate agency roles for development/implementation of an ASGM National Action Plan (NAP) • Define and formalize or regulate ASGM consistent with the Convention • Eliminate whole ore amalgamation, open burning of amalgam or processed amalgam, burning of amalgam in residential areas, and cyanide leaching of mercury-laden sediment, ore or tailings (the "worst practices")	Applicable
	• Set mercury use reduction goals or targets consistent with the timely elimination of the worst practices and other use reduction efforts	Applicable
	• Develop steps to facilitate the formalization or regulation of the artisanal and small-scale gold mining sector	Applicable
	• Develop 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;	Applicable
	• Reduce mercury emissions, releases, and exposures associated with ASGM, and prevent mercury exposures of vulnerable populations (particularly women of child-bearing age and children)	Applicable
	• Strategies for managing trade and preventing the diversion of mercury and mercury compounds from other sectors to ASGM, and manage mercury trade consistent with the NAP	Applicable
	• Implement a public health strategy to address mercury exposures to ASGM miners and communities	Applicable
Policy and regulatory measures in place that enable Sierra Leone to comply with the above listed provisions		
Title, ref. no. and date of relevant Policy and Regulatory Measure	What aspects of the above provisions are being addressed by policy/regulatory measure	
Environment Protection Agency Sierra Leone Act, 2008 amended 2010 11 September 2008 and 2 September 2010	PART IV–ENVIRONMENTAL IMPACT ASSESSMENTS • Section 23 - Prohibition of certain activities. (2) Except as otherwise provided in this Act and notwithstanding the provisions of any enactment, no person shall undertake or cause to be undertaken any of the projects set out in the First Schedule unless he holds a valid licence in respect of such project. (3) Any person who contravenes subsection (1) commits an offence and is liable on conviction to a fine not exceeding twenty-five million leones in the case of a citizen of Sierra Leone and ten thousand United States dollars in the case of a non-citizen or to a term of imprisonment not exceeding two years or to both the fine and imprisonment. • Section 24 - application for and issue of licences (2) Any person who wishes to undertake or cause to be undertaken any of the projects set out in the First Schedule shall apply to the Agency for a licence. (2) An application shall be accompanied by a description of the project proposed to be undertaken. • Section 25 - Agency to decides on need for environmental impact assessment (1) The Agency shall, within fourteen days of receiving an application decide whether an environmental impact assessment is required of the project. (2) The matters set out in the Second Schedule shall be taken into consideration when a decision is being taken as to whether an environmental impact assessment is required in respect of any project. (3) Where a decision has been taken that an environmental impact assessment is not required in respect of any project the Executive Director shall, in writing inform the applicant accordingly. Part VI - Miscellaneous • Section 58 - toxic and hazardous substances (4) The discharge of any toxic and hazardous substance into the air or in, on or under the land and waters of Sierra Leone is prohibited.	
Sierra Leone Trade Policy Ministry of Trade and Industry June 2010	Section 3.5.7 Sectoral Development – Mining • Policy context Export promotion and support services are both critical to the success of a strategy of export-led industrialization. In particular, while Sierra Leone has set up export promotion agencies such as the SLIEPA, the expected results can be diminished by lack of support services in such areas as production, marketing, sales, negotiations, international trade finance, export procedures, banking, transport and standards. Support services are needed to facilitate export growth both in existing and new markets. While the service industry has been growing, in Sierra Leone, as in many other African countries, the sector is dominated by foreign firms. However, not all the providers are equipped to ensure quality trade-related services. Moreover, while regulations could be used to enhance competition, local capacity also needs to be developed to provide alternatives. • Policy Objectives 1. To develop and diversify exports of traditional and non-traditional produce to existing and new markets 2. To ensure availability of a variety of trade-related services. • Policy Prescriptions 1. Government will formulate and implement a National Export Strategy and strengthen the existing export promotion agencies to ensure a full range of export promotion services, including collection and dissemination of information on products and market opportunities, support participation in trade fairs and exhibitions in other countries, provision of market entry support services, and export management training. 2. Government will encourage private sector to invest in providing export support services to ensure high export performance 3. Government will encourage competition in the provision of trade support services	
The Mines and Minerals Act, 2009 7 January 2010	Section 85 – Application for an Artisanal Mining Licence • (2)(e) give or be accompanied by a statement giving particulars of the programme of proposed mining operations, including a statement of (i) the likely effects of the proposed mining operations on the environment and on the local population and proposals for mitigation and compensation measures; (ii) any particular risks (whether to health or otherwise) involved in mining the minerals, particularly radioactive minerals, and proposals for their control or elimination; Section 91 – Rights and duties of holders of artisanal mining licences • (3)(g) Carry out rehabilitation and reclamation of mined out areas; Section 93 - Notice to remedy dangerous or defective mining operations • (1) Where an authorised officer considers any mining operation under an artisanal mining licence or anything, matter or practice in or connected with any such mining operation to be so dangerous or defective as in his opinion to be likely to cause bodily injury to any person, he may give notice in writing of it to the holder of the licence. • (2) A notice issued pursuant to subsection (1) may require the danger or defect to be remedied or removed, either immediately or within such time as may be specified, and if the authorised officer considers it necessary, order the mining operations to be suspended until the danger is removed or the defect remedied to his satisfaction. • (3) The holder of an artisanal mining licence to whom notice has been given under subsection (1), shall comply with the notice. Section 96 – Application for Small-scale Mining Licence • (2)(f) give or be accompanied by a statement giving particulars of the proposed programme of mining operations, including a statement of i. the likely effects of the proposed mining operations on the environment and on the local population and proposals for mitigation and compensation measures; ii. any particular risks (whether to health or otherwise) involved in mining the minerals, particularly radioactive minerals, and proposals for their control or elimination; • 2(g) be accompanied by an environmental impact assessment licence as may be required by the Minister under subsection (2) of section 131; PART XV–PROTECTION OF THE ENVIRONMENT Section 131 - Protection of natural resources to be taken into account. 1. In deciding whether or not to grant a mineral right, the Minister shall take into account the need to conserve the natural resources in or on the land over which the mineral right is sought, or in or on neighbouring land. 2. the Minister shall require an environmental impact assessment licence as prescribed under the Environment Protection Act as a condition for granting a small-scale mining licence or a large-scale mining licence. Section 132 - General duty to protect environment and minimize pollution. 1. Every holder of a mineral right shall carry on its operations in a manner that is reasonably practicable in order to minimize, manage and mitigate any environmental impact including but not limited to pollution resulting from such operations 2. Notwithstanding the generality of subsection (1), a holder of a mineral right shall be subject to all laws of the Republic concerning the protection of the environment. 3. Sections 133 to 137 – Detailed environmental impact assessment shall be undertaken.	

Environmental and Social Regulations for the Minerals Sector, 2012	PART III - ENVIRONMENTAL AND SOCIAL MANAGEMENT PRINCIPLES AND ACCOUNTABILITY • Regulation 8 - Sustainability principle All mining activities shall be carried out in a sustainable manner by minimizing or eliminating negative environmental and social adverse impacts in accordance with the provisions relating to environmental impacts contained in Section 132 (1) of the Mines and Minerals Act 2009 and those relating to social impacts contained in Section 133 (1) (b) (xii) and (xiii) of the same. • Regulation 9. Polluter pays principle 1. In accordance with the principles of international environmental law and the provisions of Section 132 of the Mines and Minerals Act 2009, the cost of pollution avoidance, prevention, control, remediation and compensation shall be borne by the polluter. 2. For the avoidance of doubt, this principle shall be applicable to any kind of environmental or social impact derived from the development, construction, operation and management of mining activities. PART VII - ENVIRONMENTAL STANDARDS • Regulation 55 - Environmental quality standards 1. Environmental quality standards establish the degree, level or concentration of elements and substances, as well as physical, chemical and biological parameters, present in ambient air, water or soil that does not pose a significant risk on the public health and the environment. 2. Alterations of environmental quality exceeding the above-mentioned standards are not legally imputable to the holder of a mineral right except if a direct cause-effect relationship between its operations and the violation of the environmental quality standards is proved.
Artisanal Mining Policy for Sierra Leone June 2017	Section 4. 14 Artisanal Gold Mining Current status Artisanal Mining (AM) is considered by Government to be an essential contributor to poverty reduction, notably in rural communities. Artisanal gold mining in Sierra Leone is increasing. Specific policy attention shall be given now to ensure that artisanal gold mining financial and development benefits are adequately captured and that mine safety, worker health and environmental protection requirements are in place. Miners and NMA staff lack gold valuation expertise and information to gain insight into market developments. For Sierra Leone, the potentially comparative role of diamond mining's contribution to financing spurring on localized economic battles should be recognized as artisanal gold mining increases. Policy objectives The primary AM Policy objectives are to: i. Provide legitimate employment for the rural poor and contribute to poverty reduction; ii. Improve AM financial benefits for miners and AM communities; iii. Formalize Artisanal Mining operations to be legally compliant; iv. Reduce incentives for illegal AM operations; v. Introduce and promote the use of modern mine safety and worker health practices for lifecycle of AM operations including the introduction of modern methodologies and technologies to further improve and develop the AM sector; vi. Recognize AM environmental impacts and adopt practical environmental protection measures to mitigate impacts; vii. Promote fair trade practices that benefit all actors; viii. Reconcile legal gaps through strengthened institutional and staff capacity for improved monitoring and clarified legal guidance; ix. Ensure that geo-data and related mapping become integral aspects of AM operations; x. Improve access to finance for AM operations; and xi. Ensure timely, regularized communications and outreach amongst miners, mine workers, and mine communities.

Child Rights Act 3 September 2007 Ministry of Social Welfare, Gender and Children Affairs	PART I – PRELIMINARY Section 32 – Protection from exploitative labour. 1. No person shall subject a child to exploitative labour as defined in subsection (2). 2. Labour is exploitative of a child, if it deprives the child of its health, education or development. 3. Section 37 - Support from village heads, Parental and others. 4. A head of village shall have a duty to receive and have discussed in Bare or similar gatherings matters that may be affecting or may affect the common welfare of children in the community. 5. Any person, including a child, concerned about the welfare of children or any child in the community may communicate his concern to a village child welfare committee. 6. Any head of a community shall refer to a village child welfare committee any matter concerning child welfare that is complex or which the community fails to resolve. Section 40 - Support from central Government 1. The Ministry shall implement policies and programmes for childcare services to help working parents carry out employment and other work-related obligations and necessary activities without unnecessarily harming the best interests of the child. Section 43 - Guidance and provision from those entitled by customary law. A person entitled by custom or tradition to render appropriate direction and guidance and make provision for the needs of the child shall not be prevented from offering such services to the child if the services are in the short and long term best interests of the child. PART VIII – EMPLOYMENT OF CHILDREN Section 125 - Matching age for full-time employment. The age of fifteen shall be the age at which the compulsory primary education of a child shall end, and also the minimum age for the engagement of a child in full-time employment. Section 126 - Prohibition of child labour at night. 1. No person shall employ a child in night work. 2. Night work constitutes work between the hours of eight o'clock in the evening and six o'clock in the morning. Section 127 - Minimum age for light work. 1. The minimum age for the engagement of a child in light work shall be thirteen years. 2. Light work constitutes work which is not likely to be harmful to the health or development of the child and does not affect the child's attendance at school or the capacity of the child to benefit from school work. Section 128 - Minimum age for hazardous employment. 1. The minimum age for the engagement of a person in hazardous work is eighteen years. 2. Work is hazardous when it poses a danger to the health, safety or morals of a person. 3. Hazardous work includes– (a) going to sea; (b) mining and quarrying; (c) Porterage of heavy loads; (d) Manufacturing industries where chemicals are produced or used; (e) Work in places where machines are used; and (f) Work in places such as bars, hotels and places of entertainment where a person may be exposed to immoral behaviour. Section 129 - Application For the avoidance of doubt, this Part shall apply to employment in the formal and informal sectors. Section 130 – Registration of children and young persons in Industrial undertakings. (1) An employer in any industrial undertaking shall keep a register of the children and young persons employed by him and of the dates of their births if known or of their apparent ages if their dates of birth are not known. (2) An industrial undertaking is an undertaking other than one in commerce or agriculture and includes– (a) Mines, quarries and other works for the extraction of minerals from the earth; (b) Undertakings in which articles are manufactured, altered, cleansed, repaired, ornamented, finished, adapted for sale, broken up or demolished, or in which materials are transformed, including undertakings engaged in ship building or in the generation, transformation or transmission of electricity or motive power of any kind; (c) Undertakings engaged in the transport of passengers or goods by road or rail, including the handling of goods at docks, quays, wharves, warehouses and airports. Section 131 - Offences under this Part. 1. Any person who contravenes the provisions of this Part commits an offence and is liable on summary conviction to a fine not exceeding Le10 million or to imprisonment for a term not exceeding two years or to both such fine and imprisonment. 2. Notwithstanding subsection (1), any person who contravenes subsection (1) of section 130 commits an offence and is liable on conviction to a fine not exceeding Le500,000.
National Environmental Health Policy Government of Sierra Leone 18 March 2015	Section 1.1 GENERAL ADMINISTRATIVE POLICY POLICY STATEMENTS: (ii) A reasonable standard of Environmental Health is the minimum level expected. (v) If, and when, it becomes necessary, the Environmental Health Division should, in collaboration with the Ministry of Marine Resources and the Ports Authority, establish a sub-unit to monitor the littoral and marine environmental against oil spills and other marine pollutants. Manpower and other resources should be marshalled and managed to effect (iii) above.

Health and Labour Policies	Development of health and labour policies for the ASGM sector is very vital. The health risk in this sector is extremely high especially for children, pregnant women and lactating mothers in such mining communities. The involvement of under age in the sector is also alarming and requires immediate attention to labour authorities. With these policies, a positive turn around will surely be experienced.
Implementation of the recommendation(s) of the Strategic Environmental Assessment (SEA) for the Artisanal Mining Sector in Sierra Leone EPA and NMA, December 2010	Recommendation 1 of the SEA clearly states the following which are key for the ASGM sector. a) The definitions of Artisanal and Small-scale mining for gold and diamonds should be adapted with immediate effect and included in policy guidance to be issued by MMMR/NMA and EPA-SL. b) When the relevant legislation is revised (Mines and Minerals Act 2009; Environment Protection Act 2008 and 2010; and Environmental Regulations, 2013) the formal definitions of Artisanal and Small-Scale Mining should reflect the policy decisions taken in (a) above.
Formalization	Currently, the ASGM sector is informal at virtually all nodes of the supply chain, the majority of gold is smuggled out of the country, and Sierra Leone currently does not have a national strategy for formalizing the ASGM sector.
Mercury trade	As discussed under Article 3, Sierra Leone does not yet have effective legislation in place to restrict the important of mercury, which poses challenges for the NAP's requirement to develop strategies for preventing the diversification of mercury or mercury compounds from other industries to the ASGM sector.
Outstanding regulatory or policy aspects that would need to be addressed/developed to ensure compliance with the Convention's provisions · The NMA and the EPA-SL need to spearhead together to mainstream best practices in ASGM communities. Environmental issues are crosscutting issues that should be embedded in relevant MDAs' annual activity plans. Nevertheless, EPA-SL has established environmental focal points in almost all of the MDAs, CSOs and quarterly meetings held in which updates on environmental issues are discussed. Therefore, teaming up together with NMA in the implementation of this Article will yield the required results.	
Name of the Institution/stakeholder and its role with respect to the above-listed provisions	Relevant institutional capacity in place to comply with the above listed provisions
EPA-SL (Trained and qualified technical staff)	The First Schedule of the EPA-SL Act 2008 amended 2010 enlisted mining as one of the projects required to acquire an EIA Licence but it is not specific whether exploration, artisanal, small-scale or large-scale. For a company to acquire the EIA licence, it has to conduct an impact assessment study which is submitted to the Agency for review and onward approval by the Board of Directors. If in any case the study contravenes national legislations and international treaties/conventions, such project will be rejected accordingly. Monitoring is also core in the Terms and Conditions issue with the licence. However, extensive public awareness programmes have been conducted by the Agency on the effects of Mercury use in the ASGM sector nationwide.
NMA (Unqualified and untrained Mines Monitoring Officers (MMOs))	The National Minerals Agency (NMA) is established to fully implement the Mines and Mineral Act 2009 under the supervision of the Ministry of Mines and Mineral Resources (MMMR). As prescribe by the Act, they issue licences for exploration, artisanal, small-scale, and large-scale mining. In addition to this, they are also responsible to monitor the activities of the mining companies and issued dealer and export licences. Thus, the use of Mercury is not an exception in the ASGM sector.
Ministry of Mines and Minerals Resources (MMMR) (Unqualified and untrained Mines Monitoring Officers (MMOs). These were recruited by the ministry with no technical criteria)	The Ministry is divided into three main sections: · The Administration (Office of the Permanent Secretary) · Mines Division: valuation of gold and diamonds for export; and collection of export charges, taxes and royalties on behalf of the government Geological Survey Division: geological mapping of Sierra Leone, prospecting and exploration operations, the collection, compilation, publication and dissemination of data and information concerning the geology and mineral resources of the country; advises Government on all matters of geological nature. The Mines Division administers the provisions of the Mines and Minerals Act, the Explosive Act and the regulations made under these Acts. These include the issue of all mineral rights and the administration and supervision of all activities under these rights. This Division also issues Mining Licences to Artisanal and small-Scale miners and administers the regulations on the mining and marketing of precious minerals through the Government Gold and Diamond Office (GGDO) produced under these licences.
Remaining Capacity Gaps at National Level that need to be addressed before provisions can be met · National Environmental Health Policy on Dental Amalgam: This will help to address the dentistry sector. Thus, there is the need to develop a policy on this or incorporated in the current policy	

Table 20 - Analysis of the legal and institutional frameworks of Sierra Leone with regards to Article 8 of the Minamata Convention

Article 8: Emissions		
Description of the Article and applicability in the context of Sierra Leone		
Article No	Succinct summary of provisions of the Article	Applicability
8.4	· Require best available techniques/best environmental practices (BAT/BEP) or associated emission limit values (ELVs) for new (as defined in Article 8.2(c)) sources listed in Annex D (coal-fired power plants, coal-fired industrial boilers, non-ferrous metal smelting and roasting processes, waste incineration, and cement production)	Applicable in terms of waste incineration
8.5	· Require one or more measures identified in Article 8.5 to control/reduce mercury emissions from existing sources listed in Annex D, which shall be operational at the source within 10 years	Applicable in terms of waste incineration
8.7	· Require monitoring/reporting and other wise establish a mercury emissions inventory for sources listed in Annex D	Applicable in terms of waste incineration
Policy and regulatory measures in place that enable Sierra Leone to comply with the above listed provisions		
Title, ref. no. and date of relevant Policy and Regulatory Measure	What aspects of the above provisions are being addressed by policy/regulatory measure	
· Environment Protection Agency Sierra Leone Act, 2008 amended 2010 · 11 September 2008 and · 2 September 2010	· PART III–Functions and Management of Agency · Section 12. Subject to this Act, the Agency shall perform the following functions: · (f) Issue environmental permits and pollution abatement notices for controlling the volume, types, constituents and effects of waste discharges, emissions, deposits or other source of pollutants and of substances which are hazardous or potentially dangerous to the quality of the environment or any segment of the environment; · (h) Prescribe standards and guidelines relating to ambient air, water and soil quality, the pollution of air, water, land and other forms of environmental pollution including the discharge of wastes and the control of toxic substances; · (t) Promote the establishment of national environmental standards;	
Outstanding regulatory or policy aspects that would need to be addressed/developed to ensure compliance with the Convention's provisions · Review and update the National Environmental Standards on Air Quality: Even though there is an existing Air Quality Standards developed by the Sierra Leone Standards Bureau (SLSB) for the consumption of EPA-SL, there is need for the establishment of a national environmental standards that captures Mercury emissions · Air quality guidelines and regulations: Development of air quality guidelines and regulations inclusive of Mercury parameters shall be the implementing tool to reduce or eliminate Mercury emissions		
Name of the Institution/stakeholder and its role with respect to the above-listed provisions	Relevant institutional capacity in place to comply with the above listed provisions	
Environnent Protection Agency Sierra Leone	Trained and qualified technical staff Part III Section 12(f), (h) & (t) of the EPA-SL Act 2008 amended 2010 clearly prescribes the implementation of the above paragraphs of Article 8. Note that incineration is not used in any of the dumpsites, but it is believed to be used in hospitals, clinics and EIA Licenced companies with EPA-SL. In practical, it is just burning in furnace rather than proper incineration being done.	
Remaining Capacity Gaps at National Level that need to be addressed before provisions can be met · Conduct stakeholders' engagements · Equipment and training to test for Mercury in air, land and water		

Table 21 - Analysis of the legal and institutional frameworks of Sierra Leone with regards to Article 9 of the Minamata Convention

Article 9: Releases to Land and Water		
Description of the Article and applicability in the context of Sierra Leone		
Article No	Succinct summary of provisions of the Article	Applicability
9.3, 9.6	· Require reporting or otherwise obtain information as needed to identify significant sources of mercury/mercury compound releases to land or water, and to maintain an inventory of releases from the sources identified	Applicable
9.5	· Take one or more measures specified in Article 9.5 to control/reduce mercury and mercury compound releases to land and water from significant sources it identifies	Applicable
Policy and regulatory measures in place that enable Sierra Leone to comply with the above listed provisions		
Title, ref. no. and date of relevant Policy and Regulatory Measure	**What aspects of the above provisions are being addressed by policy/regulatory measure**	
Environment Protection Agency Sierra Leone Act, 2008 amended 2010 11 September 2008 and 2 September 2010	PART III – FUNCTIONS AND MANAGEMENT OF AGENCY Section 12. Subject to this Act, the Agency shall perform the following functions: (f) issue environmental permits and pollution abatement notices for controlling the volume, types, constituents and effects of waste discharges, emissions, deposits or other source of pollutants and of substances which are hazardous or potentially dangerous to the quality of the environment or any segment of the environment; (h) prescribe standards and guidelines relating to ambient air, water and soil quality, the pollution of air, water, land and other forms of environmental pollution including the discharge of wastes and the control of toxic substances; (t) promote the establishment of national environmental standards; Part VI - Miscellaneous Section 58 - Toxic and Hazardous Substances The discharge of any toxic and hazardous substance into the air or in, on or under the land and waters of Sierra Leone is prohibited.	
· Sierra Leone Water Company Act. 2017	· Part VIII – Offences · Section 47 Injury, diversion or pollution · (1.c) pollute or cause risk of pollution to any water in any waterworks or catchment area. · (2) Any person who contravenes subsection (1) commits an offence and is liable on conviction to a fine not exceeding 10,000,000.00 Leones or to a term of imprisonment not exceeding 3 years or to both the fine and imprisonment.	
National Water Resources Management Agency Act 2017	PART IX–OFFENCES AND PENALTIES Section 35 · (2) Any person who– (a) interferes with or alters the flow of; or (b) pollutes or contaminates, any water resource beyond such level as the Agency may prescribe, commits an offence and is liable on conviction to a fine not less than Le 10,000,000.00 or to a term of imprisonment not exceeding 3 years or to both such fine and imprisonment. (3) Any person who. (a) diverts, dams, stores, dredges, abstracts or uses water resources; or (b) constructs or maintains any works for the use of water resources, in contravention of this Act commits an offence and shall be liable on conviction to a fine not less than of Le 20,000,000.00 or to a term of imprisonment not exceeding 1 year or to both such fine and imprisonment	
Outstanding regulatory or policy aspects that would need to be addressed/developed to ensure compliance with the Convention's provisions · Establishment of national environmental standards on water and soil quality; · Development of water and soil quality guidelines and regulations		
Name of the Institution/stakeholder and its role with respect to the above-listed provisions	**Relevant institutional capacity in place to comply with the above listed provisions**	
EPA-SL	· Trained and qualified technical staff · Issues environmental permits and pollution abatement notices for controlling the volume, types, constituents and effects of waste discharges, emissions, deposits or other source of pollutants and of substances which are hazardous or potentially dangerous for the environment · Prohibits the discharge of toxic and hazardous substances into air, water and land	
Sierra Leone Water Company (SALWACO)	· Limited number of trained and qualified laboratory technicians · In charge of water supply for the provinces only. · Regional offices has been established and equipped with mini laboratories for basic water quality parameters testing.	
National Water Resources Management Agency (NWRMA)	**The National Water Resources Management Agency 2017 has been enacted by the Parliament, but the company is yet to be established**	
Remaining Capacity Gaps at National Level that need to be addressed before provisions can be met · Conduct stakeholders engagements · Equipment and training to test for Mercury in air, land and water		

Table 22 - Analysis of the legal and institutional frameworks of Sierra Leone with regards to Article 10 of the Minamata Convention

Article 10: Environmentally sound interim storage of mercury, other than waste mercury		
Description of the Article and applicability in the context of Sierra Leone		
Article No	Succinct summary of provisions of the Article	Applicability
10.2	Take measures to ensure interim mercury storage is conducted in an environmentally sound manner, taking into account guidelines to be developed by the Conference of the Parties (COP)	Applicable
Policy and regulatory measures in place that enable Sierra Leone to comply with the above listed provisions		
Title, ref. no. and date of relevant Policy and Regulatory Measure	What aspects of the above provisions are being addressed by policy/regulatory measure	
Environment Protection Agency Sierra Leone Act, 2008 amended 2010 11 September 2008 and 2 September 2010	PART III – FUNCTIONS AND MANAGEMENT OF AGENCY · Section 12. Subject to this Act, the Agency shall perform the following functions: (h) Issue environmental permits and pollution abatement notices for controlling the volume, types, constituents and effects of waste discharges, emissions, deposits or other source of pollutants and of substances which are hazardous or potentially dangerous to the quality of the environment or any segment of the environment; (j) Prescribe standards and guidelines relating to ambient air, water and soil quality, the pollution of air, water, land and other forms of environmental pollution including the discharge of wastes and the control of toxic substances; (t) Promote the establishment of national environmental standards; Part VI - Miscellaneous · Section 58 - Toxic and Hazardous Substances The discharge of any toxic and hazardous substance into the air or in, on or under the land and waters of Sierra Leone is prohibited.	
Customs Act, 2011	· Section 9 - Temporary storage of goods. (1) Subject to section 41, the Commissioner-General may approve for such periods and subject to certain conditions and restrictions, transit warehouses or container depots for the temporary storage of imported or exported goods not yet reported, as provided in section 8, pending their report and subsequent declaration under a customs procedure in accordance with this Act. Once duly reported and placed under customs control, no goods shall be removed from a customs office, transit warehouse or container depot by any person other than an officer in the performance of his duties under this Act, or any other Act, unless the goods have been released by an officer.	
Outstanding regulatory or policy aspects that would need to be addressed/developed to ensure compliance with the Convention's provisions · A specific Regulations on Mercury Management in accordance with the Minamata Convention on Mercury		
Name of the Institution/stakeholder and its role with respect to the above-listed provisions	**Relevant institutional capacity in place to comply with the above listed provisions**	
EPA-SL	· Trained and qualified technical staff · Issues environmental permits and pollution abatement notices for controlling the volume, types, constituents and effects of waste discharges, emissions, deposits or other source of pollutants and of substances which are hazardous or potentially dangerous for the environment	
NRA (Customs and Excise Department)	· Trained and qualified staff · Generate revenue through tax collection · Protect the country's environment · Controls the entry/exit points of the state: effect policing of these entry/exit points and borders remains crucial in the implementation of this Article	
Remaining Capacity Gaps at National Level that need to be addressed before provisions can be met · Conduct workshops and seminars to equipped staff of EPA-SL and NRA		

Table 23 - Analysis of the legal and institutional frameworks of Sierra Leone with regards to the Article 11 of the Minamata Convention

Article 11: Mercury Wastes		
Description of the Article and applicability in the context of Sierra Leone		
Article No	Succinct summary of provisions of the Article	Applicability
11.3 (a)	Take measures to manage mercury wastes in an environmentally sound manner, taking into account guidelines developed under the Basel Convention and in accordance with COP requirements to be developed.	Applicable
11.3 (b)	Take measures to restrict mercury derived from the treatment or re-use of mercury waste to allowed uses under the Convention or environmentally sound disposal	Applicable
11.3 (c)	Require transport across international boundaries in accordance with the Basel Convention, or if the Basel Convention does not apply, consistent with international rules, standards, and guidelines	Applicable
Policy and regulatory measures in place that enable Sierra Leone to comply with the above listed provisions		

Title, ref. no. and date of relevant Policy and Regulatory Measure	What aspects of the above provisions are being addressed by policy/regulatory measure
Environment Protection Agency Sierra Leone Act, 2008 amended 2010 11 September 2008 and 2 September 2010	PART III–FUNCTIONS AND MANAGEMENT OF AGENCY • Section 12. Subject to this Act, the Agency shall perform the following functions: • (f) Issue environmental permits and pollution abatement notices for controlling the volume, types, constituents and effects of waste discharges, emissions, deposits or other source of pollutants and of substances which are hazardous or potentially dangerous to the quality of the environment or any segment of the environment; • (h) Prescribe standards and guidelines relating to ambient air, water and soil quality, the pollution of air, water, land and other forms of environmental pollution including the discharge of wastes and the control of toxic substances; Part VI - Miscellaneous • Section 58 - Toxic and Hazardous Substances • (2) The Agency shall take all necessary and appropriate measures to monitor, control and regulate the manufacture, sale, transportation, handling or disposal of toxic and hazardous substances, including toxic and hazardous wastes. The introduction or importation of toxic or hazardous wastes into Sierra Leone for storage or disposal by any means whatsoever is prohibited
Outstanding regulatory or policy aspects that would need to be addressed/developed to ensure compliance with the Convention's provisions • Domestication of the Basel and Minamata Conventions • Development of guidelines and regulations on waste (taken specific consideration on mercury waste) • Validation of drafted Standard Operating Procedures for disposal of Hazardous Waste Substance • Validation of drafted Standard Operating Procedures for disposal of Expired or Unfit Chemicals	
Name of the Institution/stakeholder and its role with respect to the above-listed provisions	**Relevant institutional capacity in place to comply with the above listed provisions**
EPA-SL	• Established Chemicals Control and Management department with trained and qualified technical staff. • Sierra Leone as a Party to the Basel Convention, the Agency is charged with the responsibility to fully implement the obligations of this convention
Remaining Capacity Gaps at National Level that need to be addressed before provisions can be met • Conduct stakeholders engagements	

Table 24 - Analysis of the legal and institutional frameworks of Sierra Leone with regards to the Article 12 of the Minamata Convention

Article 12: Contaminated Sites		
Description of the Article and applicability in the context of Sierra Leone		
Article No	Succinct summary of provisions of the Article	Applicability
12.1	Develop strategies for identifying and assessing mercury/mercury compound contaminated sites	Applicable
12.2	If risk reduction activities are taken at contaminated sites, they are taken in an environmentally sound manner, incorporating risk assessment where appropriate	Applicable
Policy and regulatory measures in place that enable Sierra Leone to comply with the above listed provisions		
Title, ref. no. and date of relevant Policy and Regulatory Measure	**What aspects of the above provisions are being addressed by policy/regulatory measure**	
Environment Protection Agency Sierra Leone Act, 2008 amended 2010 11 September 2008 and 2 September 2010	PART III–FUNCTIONS AND MANAGEMENT OF AGENCY • Section 12. Subject to this Act, the Agency shall perform the following functions: (k) Conduct investigations into environmental issues and advise the President thereon; (l) Promote studies, research, surveys and analyses for the improvement and protection of the environment and the maintenance of a sound ecological system;	
Outstanding regulatory or policy aspects that would need to be addressed/developed to ensure compliance with the Convention's provisions • Development of remediation guidelines or procedures for contaminated sites with special consideration on mercury • Government to design a better policy on land reclamation.		
Name of the Institution/stakeholder and its role with respect to the above-listed provisions	**Relevant institutional capacity in place to comply with the above listed provisions**	
EPA-SL	• Qualified Technical staff • Conducts investigations into environmental issues (contamination/pollution cases) and advise to promote studies, research, surveys and analyses for the improvement and protection of the environment and the maintenance of a sound ecological system	
Remaining Capacity Gaps at National Level that need to be addressed before provisions can be met • Required more training on Mercury contamination investigation and remediation		

Table 25 - Analysis of the legal and institutional frameworks of Sierra Leone with regards to Article 13 of the Minamata Convention

Article 13: Financial Resources and Mechanism		
Description of the Article and applicability in the context of Sierra Leone		
Article No	Succinct summary of provisions of the Article	Applicability
13.1	Access domestic resources as may be needed to implement Convention obligations	Applicable
13.2	Access financial resources available under the Convention financial mechanism and other resources available from multilateral, regional, and bilateral funding sources	Applicable
Policy and regulatory measures in place that enable Sierra Leone to comply with the above listed provisions		
Title, ref. no. and date of relevant Policy and Regulatory Measure	**What aspects of the above provisions are being addressed by policy/regulatory measure**	
Environment Protection Agency Sierra Leone Act, 2008 amended 2010 11 September 2008 and 2 September 2010	PART III–FUNCTIONS AND MANAGEMENT OF AGENCY • Section 12. Subject to this Act, the Agency shall perform the following functions: (e) Collaborate and coordinate with such foreign and international bodies as the Agency consider necessary for the purposes of this Act; (u) Act as the focal point on all issues concerning the environment;	
Public Financial Management Act 2016	BUDGET EXECUTION PROCESS Section 60 - Multiannual commitments (1) Assumption of a commitment, settlement of which requires expenditures from the Estimates for multiple financial years or in a future financial year (hereinafter called "multiannual commitment"), by a budgetary agency shall be subject to the prior approval of the Minister. (2) The Minister may approve a multiannual commitment under subsection (1), if – (a) the amount to be paid under the commitment within the present financial year is equal to or less than the available appropriation and the available allotment, if any; (b) the legality of expenditures to be made from the Estimates under the commitment has been verified in accordance with any enactment; (c) the amount to be paid under the commitment does not cause any ceiling on total and other expenditures under the Fiscal Strategy Statement to be exceeded. Section 61 - Commitment control system (1) There shall be a commitment control system which maintains records of annual and multiannual commitments assumed or approved under section 59 and 60. (2) The Minister shall by statutory instrument to prescribe the functions and operations of a commitment control system referred to in subsection (1). Section 62 - Inclusion of outstanding commitments in provisions under the Estimates. (1) The main Estimates for a financial year to be laid before Parliament shall include the amount of a provision for an item of expenditures sufficient to cover the aggregate of portions of the outstanding approved multiannual commitments for the expenditures to be paid within the financial year, in order to prevent occurrence of expenditure arrears. A Supplementary Estimate to be laid before Parliament during a financial year may reduce the amount of a provision for an item of expenditures from the existing provision under the Estimates, only to the extent that the amount of the available provision after the reduction is still sufficient to cover the aggregate of the outstanding approved commitments for the expenditures to be paid within the financial year, in order to prevent occurrence of expenditure arrears.	
Fiscal Management and Control Act 2017	Section 3 - Transfer of revenues. 1. All monies held in the accounts of agencies of Government shall, on the coming into operation of this Act, be transferred into the Consolidated Fund. 2. Where in any enactment it is provided that revenues or other monies received by an agency of Government are to be retained by that agency for any purpose including defraying the expenses of that agency, such revenues or other monies shall be paid into the Consolidated Fund notwithstanding any provision to the contrary contained in the enactment. 3. Notwithstanding the generality of subsection (2), an agency of Government, specified in the Schedule, shall, on the coming into operation of this Act, pay into the Consolidated Fund, revenues or other monies received by that agency for and on behalf of the Government Section 5 – Regulations 1. The Minister may by statutory instrument make Regulations for the purpose of giving effect to the provisions of this Act. 2. Notwithstanding the generality of subsection (1), Regulations made under this Act may provide that a proportion or ratio of the monies paid into the Consolidated Fund by an agency of Government be allocated to that agency by the Minister for the purpose of defraying the expenses of that agency. SCHEDULE – LIST OF AGENCIES 1. The Petroleum Regulatory Agency 2. The Petroleum Directorate 3. The Road Maintenance Fund Administration 4. The Environment Protection Agency 5. The National Telecommunications Commission 6. The Sierra Leone Maritime Administration	
Outstanding regulatory or policy aspects that would need to be addressed/developed to ensure compliance with the Convention's provisions • Development of a national financial mechanism for the effective implementation of the convention		
Name of the Institution/stakeholder and its role with respect to the above-listed provisions	**Relevant institutional capacity in place to comply with the above listed provisions**	
EPA-SL	• Established finance department • As a focal point to the convention, it pays all due contributions on behalf of the Government of Sierra Leone. All projects of the convention are also managed by the Agency with respect to the finance guidelines or principles of the Ministry of Finance.	
Remaining Capacity Gaps at National Level that need to be addressed before provisions can be met • Training in project proposal and management		

Table 26 - Analysis of the legal and institutional frameworks of Sierra Leone with regards to Article 14 of the Minamata Convention

Article 14: Capacity-building, technical assistance and technology transfer		
Description of the Article and applicability in the context of Sierra Leone		
Article No	Succinct summary of provisions of the Article	Applicability
14.2	Capacity-building and technical assistance pursuant to article 14.1 and Article 13 may be delivered through regional, sub-regional and national arrangements, including existing regional and sub-regional centres, through other multilateral and bilateral means, and through partnerships, including partnerships involving the private sector.	Applicable
Policy and regulatory measures in place that enable Sierra Leone to comply with the above listed provisions		
Title, ref. no. and date of relevant Policy and Regulatory Measure	What aspects of the above provisions are being addressed by policy/regulatory measure	
National Environmental Health Policy Government of Sierra Leone 18th March, 2015	Section 1.2 MANPOWER POLICY STATEMENTS (ii) For efficient service delivery, the basic manpower of the division is the trained and qualified Environmental Health Officer (EHO) according to syllabuses of the National School of Hygiene and the West African Health Examination Board (WAHEB).	
Outstanding regulatory or policy aspects that would need to be addressed/developed to ensure compliance with the Convention's provisions · Government or Ministry of Health and Sanitation to review or develop a Health Education policy that incorporate mercury issues. taking cognisance of capacity – building, technical assistance and technology transfer.		
Name of the Institution/stakeholder and its role with respect to the above-listed provisions	Relevant institutional capacity in place to comply with the above listed provisions	
EPA-SL	· Established department in charge of chemicals management · The Agency is the focal point and implementer of the convention. It therefore conducts or organize trainings, workshops and stakeholders' meetings, awareness raising and sensitisation programmes. It also represents the country in all meetings pertaining to the convention.	
MoHS	· Existing structures in all chiefdoms · The health and sanitation issues associated with the ASGM sector and Mercury in general are enormous and faces serious challenges. Therefore, the role of the ministry still remains crucial for the populace in those areas. As a ministry, it is responsible for the provision of health facilities, supply of medicines and recruitment of health personnel.	
NMA	· District offices established with limited number of technical staff in all regions usually one in most cases. Logistics and/or equipment are also a challenge. · Regulator body for all mining activities undertaken in the country. They issue licences to small-scale, large-scale and artisanal mining licences either for exploration or full scale mining.	
Remaining Capacity Gaps at National Level that need to be addressed before provisions can be met · Capacitate miners on land reclamation techniques or procedures · NMA to design a "smart mining system" for reclaiming land · EPA and NMA needs more training for field staff · Vehicles and equipment for analysis needed · Train health personnel for specific mercury related problems		

Table 27 - Analysis of the legal and institutional frameworks of Sierra Leone with regards to Article 16 of the Minamata Convention

Article 16: Health Aspects		
Description of the Article and applicability in the context of Sierra Leone		
Article No	Succinct summary of provisions of the Article	Applicability
16.1(a)	Promote the development and implementation of strategies to identify and protect populations at risk, such as developing fish consumption guidelines	Applicable
16.1(b)	Promote occupational exposure educational and prevention programs	Applicable
16.1(c)	Promote prevention, treatment, and care services for affected populations	Applicable
Policy and regulatory measures in place that enable Sierra Leone to comply with the above listed provisions		
Title, ref. no. and date of relevant Policy and Regulatory Measure	What aspects of the above provisions are being addressed by policy/regulatory measure	
Environment Protection Agency Sierra Leone Act, 2008 amended 2010 11 September 2008 and 2 September 2010	PART III–FUNCTIONS AND MANAGEMENT OF AGENCY · Section 12. Subject to this Act, the Agency shall perform the following functions: (j) act in liaison and co-operation with government agencies, local councils and other bodies and institutions to control pollution and generally protect the environment; (r) coordinate with Government Ministries, local councils and other agencies on matters relating to environmental protection and management;	

National Environmental Health Policy Government of Sierra Leone 18 March 2015	Section 1.1 GENERAL ADMINISTRATIVE POLICY POLICY STATEMENTS: (i) A reasonable standard of Environmental Health is the minimum level expected. (ii) If, and when, it becomes necessary, the Environmental Health Division should, in collaboration with the Ministry of Marine Resources and the Ports Authority, establish a sub-unit to monitor the littoral and marine environmental against oil spills and other marine pollutants. Manpower and other resources should be marshalled and managed to effect (iii) above.
Outstanding regulatory or policy aspects that would need to be addressed/developed to ensure compliance with the Convention's provisions · Development of environmental health policy for the ASGM sector to be champion by both EPA-SL and MoHS	
Name of the Institution/stakeholder and its role with respect to the above-listed provisions	Relevant institutional capacity in place to comply with the above listed provisions
EPA-SL	· Established regional offices · The Agency always act in liaison and co-operation with government agencies, local councils and other bodies and institutions to control pollution and generally protect the environment. Moreover, it will coordinate with Ministries of Fishery and Marine Resources, Health and Sanitation, Local Government and Rural Development, local councils and Sierra Leone Standards Bureau on health matters.
Ministry of Health and Sanitation	· Limited number of Community Health Officers (CHOs) and nurses. Nonetheless, there is at least one trained and qualified CHO is available in all of the clinics located in all the ASGM communities visited. Even though health clinics are established in all chiefdoms, they are sometimes overcrowded by patient and there is not enough space and equipment to help everyone. Execute all health and sanitation matters. However, this responsibility is successfully executed with the collaboration with Local Councils as a result of devolution of certain responsibilities to them.
Remaining Capacity Gaps at National Level that need to be addressed before provisions can be met · Stakeholder workshops at mine sites level · Stakeholders engagement to recruit more trained and qualified health personnel especially in ASGM issues · More and better-quality equipment needed in clinics (they do have sterilizers) · More standard delivery and examination beds and kits needed · More staff and more training needed for community health workers. They do receive training about once in one or two months from NGOs or the Ministry of Health	

Table 28 - Analysis of the legal and institutional frameworks of Sierra Leone with regards to Article 17 of the Minamata Convention

Article 17: Information Exchange		
Description of the Article and applicability in the context of Sierra Leone		
Article No	Succinct summary of provisions of the Article	Applicability
17.1, 17.3 and 17.5	Each party shall facilitate the exchange of information referred to in paragraph 17.1. Each Party shall designate a national focal point for the exchange of information under this Convention. Share information on the health and safety of humans and the environment as non-confidential, in accordance with Article 17.5	Applicable
Policy and regulatory measures in place that enable Sierra Leone to comply with the above listed provisions		
Title, ref. no. and date of relevant Policy and Regulatory Measure	What aspects of the above provisions are being addressed by policy/regulatory measure	
Environment Protection Agency Sierra Leone Act, 2008 amended 2010 11 September 2008 and 2 September 2010	PART III–FUNCTIONS AND MANAGEMENT OF AGENCY Section 12. Subject to this Act, the Agency shall perform the following functions: (b) Coordinate the activities of bodies concerned with the technical or practical aspects of the environment and serve as a channel of communication between such bodies and the President (d) Secure, in collaboration with such persons as it may determine the control and prevention of discharge of waste into the environment and the protection and improvement of the quality of the environment; (e) Collaborate and coordinate with such foreign and international bodies as the Agency considers necessary for the purposes of this Act; (j) Act in liaison and co-operation with government agencies, local councils and other bodies and institutions to control pollution and generally protect the environment; (r) Coordinate with Government Ministries, local councils and other agencies on matters relating to environmental protection and management;	

Right to Access Information Act 2013	PART II–THE RIGHT TO INFORMATION Section 2 - Access to information (1) Every person has the right to access information held by or is under the control of a public authority. (2) Every person has the right to access information held by or is under the control of a private body where that information is necessary for the enforcement or protection of any right. (3) Nothing in this Act limits or otherwise restricts the disclosure of or the right to access, information pursuant to any other enactment, policy or practice. (4) Any person making a request for information to a public authority shall be entitled– (a) To have the public authority confirm or deny whether it holds information of the description specified in the request; and (b) Where the public authority holds information of the description specified in the request, to have the information communicated to that person (5) A public authority shall be deemed to have complied with subsection (4) if it has communicated the information to the applicant. (6) In this Act, the duty of a public authority to comply with paragraph (a) of subsection (4) shall be referred to as "the duty to confirm or deny". Section 3 - Submission and form of request. (1) A request for information under section 2 shall: (a) Be made in writing; (b) Describe the information requested; and (c) Provide an address, which may be an email, for purposes of correspondence. (2) For the purposes of paragraph (a) of subsection (1), a request shall be deemed to be made in writing where the text of the request– (a) Is transmitted by electronic means; (b) Is received in legible form; and (c) Is capable of being used for subsequent reference. (3) An application to access information shall be made in English or Krio by email, fax, post, telephone or by any other medium provided that the applicant provides– (a) Contact details; and (b) Sufficient particulars for the public information officer or any other official to understand what information is being requested. (4) A public information officer who receives an oral request shall reduce the request to writing, including the public information officer's name and designation and shall give a copy thereof to the applicant. (5) Notwithstanding subsection (3), an application may, if the applicant is unable to communicate in English, be made in any other local language in use in Sierra Leone: and in that event the public information officer to whom the application is made shall arrange for a translation of the application into English. (6) Where a request for information does not comply with subsection (3), the public information officer who receives the request shall render such reasonable assistance, free of charge, as may be necessary to enable the request to comply with that subsection. (7) A request referred to in subsection (6) shall not be deemed to have been rejected while assistance is being rendered. (8) A public authority may determine the form for requests for information, but the form shall not be such as to unreasonably delay requests or place an undue burden upon applicants; and no application may be rejected on the ground only that the applicant has not used the prescribed form. (9) A public authority which receives a request for information shall provide the applicant with a receipt documenting the request. (10) A public authority shall record and maintain records of all requests for information and all public transactions in a manner that facilitates the right to information. Section 4 - Time limit for compliance. (1) Subject to subsection (2), section 2 shall be complied with as soon as possible, and in any event within fifteen working days of receipt of the application. (2) Where the information sought concerns the life or liberty of a person, section 2 shall be complied with within forty-eight hours of receipt of the application. (3) Where an application is especially complex or relates to a large volume of information, the public authority may request the Commission for an extension of not more than fifteen working days. (4) Any failure to conform to the timelines set out in this section shall be deemed a refusal of the request, for purposes of complaints and appeals. Section 5 - Transfer of application. (1) Where a public authority does not hold information which is responsive to a request or part of a request, that request or any relevant part of it may, not later than three days from the date of its receipt, be transferred to another public authority if the information requested is held by that other public authority. (2) Where an application is transferred under subsection (1), the applicant shall be informed of the transfer immediately, and in any event not later than three working days from the date of the transfer. A public authority to which an application is transferred under subsection (1) shall decide the request in accordance with the timelines set out in section 4, to run from the day upon which the public authority receives the transferred request.
Outstanding regulatory or policy aspects that would need to be addressed/developed to ensure compliance with the Convention's provisions · Development of a Communication and awareness raising strategy on the ASGM sector and Mercury effects	
Name of the Institution/stakeholder and its role with respect to the above-listed provisions	Relevant institutional capacity in place to comply with the above listed provisions
EPA-SL	· Qualified technical staff · Information exchange is key for any institution and developmental programmes. Through EPA-SL, this knowledge can be gained and capacity also built. Which is why the establishment of the Information, Education and Communication depart was prioritise in the Act. In view of this, a seventy-two hours period was allocated as maximum response period for all formal request sent to the Agency. This made the Agency to be in pole position to comply with the Access to Information Bill
Remaining Capacity Gaps at National Level that need to be addressed before provisions can be met · Official appointment of Focal Point to the Minamata Convention on Mercury	

Table 29 - Analysis of the legal and institutional frameworks of Sierra Leone with regards to Article 18 of the Minamata Convention

Article 18: Public information, awareness and education		
Description of the Article and applicability in the context of Sierra Leone		
Article No	Succinct summary of provisions of the Article	Applicability
18.1	Each Party shall promote and facilitate provision to the public of available information referred to in paragraph 18.1 and education, training and public awareness related to the effects of exposure to mercury and mercury compounds on human health and the environment	Applicable
18.2	Each Party shall use existing mechanisms or give consideration to the development of mechanisms, such as pollutant release and transfer registers where applicable, for the collection and dissemination of information on estimates of its annual quantities of mercury and mercury compounds that are emitted, released or disposed of through human activities.	Application
Policy and regulatory measures in place that enable Sierra Leone to comply with the above listed provisions		
Title, ref. no. and date of relevant Policy and Regulatory Measure	What aspects of the above provisions are being addressed by policy/regulatory measure	
Environment Protection Agency Sierra Leone Act, 2008 amended 2010 11 September 2008 and 2 September 2010	PART III–FUNCTIONS AND MANAGEMENT OF AGENCY Section 12. Subject to this Act, the Agency shall perform the following functions: (m) initiate and pursue formal and non-formal educational programmes for the creation of public awareness of the environment and its importance to the economic and social life of Sierra Leone (s) Collect and make available to the public or interested persons or bodies, through publications and other appropriate means and in cooperation with public or private organizations, environmental data and information;	

Right to Access Information Act 2013	PART II–THE RIGHT TO INFORMATION Section 2 - Access to information (1) Every person has the right to access information held by or is under the control of a public authority. (2) Every person has the right to access information held by or is under the control of a private body where that information is necessary for the enforcement or protection of any right. (3) Nothing in this Act limits or otherwise restricts the disclosure of or the right to access, information pursuant to any other enactment, policy or practice. (4) Any person making a request for information to a public authority shall be entitled– (a) To have the public authority confirm or deny whether it holds information of the description specified in the request; and (b) Where the public authority holds information of the description specified in the request, to have the information communicated to that person (5) A public authority shall be deemed to have complied with subsection (4) if it has communicated the information to the applicant. (6) In this Act, the duty of a public authority to comply with paragraph (a) of subsection (4) shall be referred to as "the duty to confirm or deny". Section 3 - Submission and form of request. (1) A request for information under section 2 shall– (a) be made in writing; (b) describe the information requested; and (c) provide an address, which may be an email, for purposes of correspondence. (2) For the purposes of paragraph (a) of subsection (1), a request shall be deemed to be made in writing where the text of the request– (a) Is transmitted by electronic means; (b) Is received in legible form; and (c) Is capable of being used for subsequent reference. (3) An application to access information shall be made in English or Krio by email, fax, post, telephone or by any other medium provided that the applicant provides– (a) Contact details; and (b) Sufficient particulars for the public information officer or any other official to understand what information is being requested. (4) A public information officer who receives an oral request shall reduce the request to writing, including the public information officer's name and designation and shall give a copy thereof to the applicant. (5) Notwithstanding subsection (3), an application may, if the applicant is unable to communicate in English, be made in any other local language in use in Sierra Leone: and in that event the public information officer to whom the application is made shall arrange for a translation of the application into English. (6) Where a request for information does not comply with subsection (3), the public information officer who receives the request shall render such reasonable assistance, free of charge, as may be necessary to enable the request to comply with that subsection. (7) A request referred to in subsection (6) shall not be deemed to have been rejected while assistance is being rendered. (8) A public authority may determine the form for requests for information, but the form shall not be such as to unreasonably delay requests or place an undue burden upon applicants; and no application may be rejected on the ground only that the applicant has not used the prescribed form. (9) A public authority which receives a request for information shall provide the applicant with a receipt documenting the request. (10) A public authority shall record and maintain records of all requests for information and all public transactions in a manner that facilitates the right to information. Section 4 - Time limit for compliance. (1) Subject to subsection (2), section 2 shall be complied with as soon as possible, and in any event within fifteen working days of receipt of the application. (2) Where the information sought concerns the life or liberty of a person, section 2 shall be complied with within forty-eight hours of receipt of the application. (3) Where an application is especially complex or relates to a large volume of information, the public authority may request the Commission for an extension of not more than fifteen working days. (4) Any failure to conform to the timelines set out in this section shall be deemed a refusal of the request, for purposes of complaints and appeals. Section 5 - Transfer of application. (1) Where a public authority does not hold information which is responsive to a request or part of a request, that request or any relevant part of it may, not later than three days from the date of its receipt, be transferred to another public authority if the information requested is held by that other public authority. (2) Where an application is transferred under subsection (1), the applicant shall be informed of the transfer immediately, and in any event not later than three working days from the date of the transfer. A public authority to which an application is transferred under subsection (1) shall decide the request in accordance with the timelines set out in section 4, to run from the day upon which the public authority receives the transferred request.
Outstanding regulatory or policy aspects that would need to be addressed/developed to ensure compliance with the Convention's provisions Development of a Communication and awareness raising strategy on the use of mercury and its effects. This can be included in the national education curriculum and the Ministry of Information and Communication.	
Name of the Institution/stakeholder and its role with respect to the above-listed provisions	Relevant institutional capacity in place to comply with the above listed provisions
EPA-SL	A well-established Information, Education and Communication Department. However, staffing still remains a challenge in executing the functions of this department Section 12(m) and (s) of the Agency's Act 2008 amended 2010 state that the Agency shall (m) Initiate and pursue formal and non-formal educational programmes for the creation of public awareness of the environment and its importance to the economic and social life of Sierra Leone (s) Collect and make available to the public or interested persons or bodies, through publications and other appropriate means and in cooperation with public or private organizations, environmental data and information;
National Minerals Agency	Established Pubic Relation unit As an Agency controlling one of the key revenue sources of the country, it has the full responsibility to keep informing the citizenry on their activities through its Public Relation unit. Furthermore, mining and export data they collected are very crucial for any developmental strategies
Ministry of Basic and Secondary School Education and the Ministry of Tertiary and Higher Education	Capacity building of curricula development departments Integrating environmental issues at primary and secondary levels is very important. This is more crucial because Mercury bulb thermometers are still use in schools, colleges and universities laboratories.
Non-Governmental Organizations (NGOs)	Limited capacity in the ASGM sector especially for local NGOs NGOs usually form a link between the Government and the general public in terms of development. These NGOs are in most often the implementers of development project. At the same time, they serve as pressure groups to the Government for proper execution of development projects. However, much attention is not given to the ASGM sector.
The Forth Estate	Existing structures available The principal function of the fourth estate is to inform the public on the progress of development undertaken by all sectors in the country through radio, print and electronic media. Therefore, the involvement of the fourth estate is very crucial
Remaining Capacity Gaps at National Level that need to be addressed before provisions can be met • Constant stakeholders' engagement on the ASGM	

Table 30 - Analysis of the legal and institutional frameworks of Sierra Leone with regards to Article 19 of the Minamata Convention

Article 19: Research, Development and Monitoring		
Description of the Article and applicability in the context of Sierra Leone		
Article No	Succinct summary of provisions of the Article	Applicability
19.1	shall endeavour to cooperate to develop and improve, (a) Inventories of use, consumption, and anthropogenic emissions to air and releases to water and land of mercury and mercury compounds; (b) Modelling and geographically representative monitoring of levels of mercury and mercury compounds in vulnerable populations and ecosystems, (c) Assessments of the impact of mercury and mercury compounds on human health and the environment;(d) Harmonized methodologies for the activities undertaken under subparagraphs (a), (b) and (c);(e) Information on the environmental cycle, transport, transformation and fate of mercury and mercury compounds in a range of ecosystems	Applicable
19.2	Build on existing monitoring networks and research programmes in undertaking the activities identified in paragraph 19.1.	Applicable
Policy and regulatory measures in place that enable Sierra Leone to comply with the above listed provisions		
Title, ref. no. and date of relevant Policy and Regulatory Measure	What aspects of the above provisions are being addressed by policy/regulatory measure	
Environment Protection Agency Sierra Leone Act, 2008 amended 2010 11 September 2008 and 2 September 2010	PART III–FUNCTIONS AND MANAGEMENT OF AGENCY Section 12. Subject to this Act, the Agency shall perform the following functions: (e) Collaborate and coordinate with such foreign and international bodies as the Agency considers necessary for the purposes of this Act; (k) Conduct investigations into environmental issues and advise the President thereon; (l) Promote studies, research, surveys and analyses for the improvement and protection of the environment and the maintenance of a sound ecological system; (q) Coordinate and monitor the implementation of national environmental policies (u) act as the focal point on all issues concerning the environment;	
Outstanding regulatory or policy aspects that would need to be addressed/developed to ensure compliance with the Convention's provisions • More research to be conducted serving as a baseline for the development of new or revise policy(ies) and regulations on the entire sector		
Name of the Institution/stakeholder and its role with respect to the above-listed provisions	Relevant institutional capacity in place to comply with the above listed provisions	
Environment Protection Agency Sierra Leone It is clearly stated in Section 12(k), (l) and (q) of the EPA-SL Act 2008 amended 2010 that the Agency has the function to (k) conduct investigations into environmental issues and advise the President thereon; (l) promote studies, research, surveys and analyses for the improvement and protection of the environment and the maintenance of a sound ecological system; (q) coordinate and monitor the implementation of national environmental policies	Three regional offices established in Bo (l technical staff), Makeni (2 technical staff) and Kono (1 technical staff). All of these staff have no knowledge in chemicals management. Only one vehicle available in each of the regional offices with no bikes available. No laboratory neither field test kit available for test of Mercury	

National Minerals Agency	This Agency is charged with the responsibility to fully implement the Mines and Minerals Act 2009. Among these responsibilities are a) Issuing permits/licence to both miners and dealers b) Monitoring of mining areas for illegal activities c) Export data collection d) Regional offices established in Kono, Makeni, Magburaka and Bo Limited technical staff available Lack of sufficient monitoring equipment and vehicles Unqualified and untrained Mines Monitoring Officers (MMOs) available. These are recruited by the Ministry which pose problems in the command chain, job execution and salary scale
Remaining Capacity Gaps at National Level that need to be addressed before provisions can be met · Training of technical staff especially those at the regional offices · Recruitment of more trained and qualified technical staff · Equipping regional offices for effective monitoring · Integrate MMOs into NMA for proper training, and effective job execution with better salary	

Table 31 - Analysis of the legal and institutional frameworks of Sierra Leone with regards to Article 21 of the Minamata Convention

Article 21: Reporting		
Description of the Article and applicability in the context of Sierra Leone		
Article No	Succinct summary of provisions of the Article	Applicability
21.1	Shall report to the Conference of the Parties, through the Secretariat, on the measures it has taken to implement the provisions of this Convention and on the effectiveness of such measures and the possible challenges in meeting the objectives of the Convention	Applicable
21.2	Shall include in its reporting the information as called for in Articles 3, 5, 7, 8 and 9 of this Convention	Applicable
Policy and regulatory measures in place that enable Sierra Leone to comply with the above listed provisions		
Title, ref. no. and date of relevant Policy and Regulatory Measure	What aspects of the above provisions are being addressed by policy/regulatory measure	
Environment Protection Agency Sierra Leone Act, 2008 amended 2010 11 September 2008 and 2 September 2010	PART III–FUNCTIONS AND MANAGEMENT OF AGENCY Section 12. Subject to this Act, the Agency shall perform the following functions: (u) act as the focal point on all issues concerning the environment;	
Outstanding regulatory or policy aspects that would need to be addressed/developed to ensure compliance with the Convention's provisions · Annual report on the implementation of the Convention's obligations as per requirement		
Name of the Institution/stakeholder and its role with respect to the above-listed provisions	Relevant institutional capacity in place to comply with the above listed provisions	
Environment Protection Agency Sierra Leone Being the focal point and the implementer of the convention, the Agency solely execute this mandate to satisfy the obligations of the convention	Staff of the Chemicals Control and Management are equipped with expertise	
Remaining Capacity Gaps at National Level that need to be addressed before provisions can be met · Required refresher trainings		

5. Awareness-raising and Understanding of Workers and the Public

5.1. AWARENESS RAISING

In spite of the fact that Sierra Leone was among the early signatories to the Minamata Convention, the overall public knowledge about the potential risk related to the use of and exposure to mercury and its compounds is generally low. Therefore, a successful approach to the implementation of the Minamata convention in the country should start with a massive public awareness-raising on the use and public health dangers of mercury. This should be followed by focused discussions and specific stakeholder engagements with content specific education targeting various groups at risk of exposure to mercury. In achieving this, the EPA-SL, in collaboration with the Ministry of Health and Sanitation (MoHS) and the National Minerals Agency (NMA), must adopt effective communication strategies that target raising awareness across all sectors on the use and dangers of mercury to human health and the environment.

The first public engagement on the Minamata Convention was the inception workshop organized in February 2016 by the EPA-SL with support from UNITAR. This event brought together public policy and decision makers across all sectors, researchers, representatives of other MDAs and a cross-section of the general public with the key aim of raising public awareness on mercury, its environmental and health impacts and the need for national action. The event saw the launch of the Minamata Initial Assessment (MIA) project, which rolled out the National Inventory Exercise on the use and anthropogenic emissions and releases of mercury. The inventory identified the use of and human exposure to mercury and developed national baseline data. This was achieved through extensive field visits to all communities engaged in ASGM with experts identifying vulnerable groups and raising awareness on their exposure to the dangers of mercury. The event formed part of the broader national information exchange, capacity building and knowledge generation strategy that aims to develop a national communication strategy on the Minamata Convention.

Subsequent public awareness raising campaigns continued with the hosting of two other workshops by the EPA-SL/UNITAR for groups in vulnerable situations that are subject to high risk exposure to mercury, government and community stakeholders who are responsible for or influence key decision making with regards to the use of mercury/mercury-containing products. The two workshops held in March 2019, discussed the key elements of the Minamata Convention and highlighted Sierra Leone's obligations as a Party to the convention. The introductory sessions of both events targeted awareness raising on the Convention and its key objective of protecting public health and the environment from the anthropogenic emission and release of mercury.

The first Workshop was held in Makeni, the Northern Region capital, which brought together key stakeholders in the ASGM including public officials, miners, gold traders, civil societies, traditional/community leaders, the academia, and NGOs. Participants were further educated about the dangers of mercury use, the need to eliminate worst practices and promote mercury-free methods or technologies, plans for the formalization of the ASGM sector, the management and prevention of illegal mercury trade, public health strategy on the exposure of miners and their communities to mercury and gender dimensions among others. Participants present expressed delight over the shared information on mercury use in the ASGM sector and craved the indulgence of the NMA and EPA-SL to accelerate the formalization of the sector and adopt a stringent enforcement stance for the elimination of mercury in ASGM in Sierra Leone.

The second workshop, held in Freetown, brought together strategic policy advisers and decision makers including representatives from the Ministry of Foreign Affairs, Ministry of Finance, Ministry of Health and Sanitation, Ministry of Mines and Mineral resources and other relevant institutions previously identified. Policy issues related to public health and environmental pollution, new technologies, implications of revenue generation policies on the ASGM sector and the need for policy reforms were comprehensively discussed.

5.2 OUTCOMES OF STAKEHOLDER ENGAGEMENTS

5.2.1 ASGM Sector Players

A cross-section of miners, goldsmiths and traders were informed about the health hazards associated with the use of mercury for gold processing. ASGM communities at high risk of mercury health hazards expressed concerns over their vulnerability and requested the EPA-SL to adopt and enforce stringent regulations related to mercury use in the ASGM sector. A gold mining expert introduced a new mining practice/technology for gold processing that is devoid of the use of mercury. Miners were particularly excited about the new technology and look forward to its introduction in the ASGM sector in Sierra Leone. The expert confirmed that the new technology is used in other countries and that it is not only free from mercury use but even more efficient in gold recovery than the mercury method. The importance of using personal protective equipment during mining was fully discussed. Miners made commitments to share information obtained from the workshop with other miners who were not present.

5.2.2 Public Health Practitioners

Public health practitioners were educated on the health problems associated with mercury in high risk communities and the required healthcare services.

Further information on the handling of medical equipment containing mercury, the use of mercury in dental amalgam and the need for their phase out were discussed. Health care providers would require training on proper diagnostic procedures in identifying mercury-related illness and offering the appropriate care.

5.2.3 Media Practitioners, NGOs and CSOs

The involvement of mainstream media outlets is critical in information dissemination on mercury and associated health and environmental problems. Non-Governmental Organizations (NGOs) as development partners and Civil Society Organizations (CSOs) as advocacy groups are equally important in information dissemination and public education. Civil societies are particular useful as drivers of information dissemination through the non-formal and tradition approaches appropriate for rural communities. Media practitioners recorded the proceedings of the work and developed news items for newspaper publication or radio and TV broadcast. Presenters endeavoured to shed more light on the scientific and policy issues various thematic areas. Civil society organizations raised concerns over enforcement of child rights and environmental protection laws. Officials of the EPA-SL vowed to step up enforcement regimes of the ASGM sector. It was suggested that actors in the ASGM sector be monitored for strict compliance with the provisions in their EIA licenses. Further training and education are required through workshops and seminars as part of capacity building efforts for media practitioners to improve skills on information dissemination on mercury.

5.2.4 Policy Makers, Local Government and Academia

Policy makers across all sectors (finance, the revenue authority, foreign affairs, immigration department, law enforcement, among others), representatives of local government authorities and academia discussed policy issues related to the Minamata convention and its integration at the national level. Detailed discussions around the policy implications of implementing the convention were held with the view of consolidating institutional networking in support of the implementation of the Minamata Convention. Such engagements have the potential to foster cooperation among sector players with the aim of reducing the reliance on mercury and products and promoting newer technologies and products that are mercury-free. For example, tariffs and custom policies could be used to limit the import and smuggling of mercury and products through good coordination between the EPA-SL and the National Revenue Authority. Discussion on child protection, labour laws and gender issues formed part of the exchanges that were led by academic and policy experts.

5.2.5 Private Sector

Representatives of various businesses participated in the Makeni workshop. The majority of the business houses are engaged in small-scale mining of gold while the others were small scale gold retailers. A direct link between gold and mercury trade was established as per discussions and exchanges among the participants. Gold retailers and the channels for mercury entry into the market is mostly achieved through smuggling. Information on the new mercury-free technology was greeted with excitement, hoping that its introduction into the ASGM sector will mark a new dawn in the industry. In order to achieve broader public engagements especially targeting small scale mercury traders (mostly involved in the smuggling of mercury), traders and users of cosmetics containing mercury, dentists and all suspected of exposure to mercury, the National Action Plan should contain public awareness raising activities (radio/television discussions, roadshows, workshops/seminars) that should be robust and aggressive with the aim of achieving behavioural/perception change.

5.3 PUBLIC EDUCATION AND INFORMATION DISSEMINATION STRATEGIES

One of the key recommendations from participants in the workshops was an extensive public education through radio and television discussions on the use and public health dangers of mercury in Sierra Leone. Participants suggested that the EPA-SL develops a national communication strategy that will be effective for public education on the hazards of mercury through the following modes:

- Establishing a mechanism for accessing information on mercury and its hazards and forging a strategic information dissemination for public consumption that aims at behavioural and attitudinal changes towards the use of mercury and mercury products.
- Radio and television talk shows on the Minamata Convention, the use of mercury and products in the country and the impact on public health and the environment.
- Involving the print media for the publication of newsletters, posters and newspaper articles on mercury issues.
- Developing a dynamic and regularly updated online database on the status of mercury use in Sierra Leone and successes achieved in the implementation of the Minamata Convention. Such information can be developed into visual documentaries for public broadcast on television.
- Developing concise messages on the thematic areas of the Convention and of the Global Mercury Partnership for public billboards, hand bills and brochures.
- Translation of such messages into key local languages and developed into audio and visual jingles for radio, television and online broadcast.
- The use of social media for information sharing.
- The use of community communication engagements (village and town hall meetings) to target communities in particularly vulnerable situations.
- Incorporating the public hazards of mercury in school environmental study/science curriculum.
- Developing a documentary on the status of mercury use and progress achieved.

5.4 DOMESTICATION OF THE MINAMATA CONVENTION

Sierra Leone's adoption and ratification of the Minamata Convention is considered a huge success in curbing the menace of mercury on public health and the environment. However, domestication of the Convention is considered critical for the full implementation of the Convention. This can be achieved through the establishment of a coordination secretariat on the Minamata Convention within the EPA-SL tasked with the functions including: to develop a framework for institutional information gathering and sharing on the implementation process and coordinating public education, communication and awareness raising through periodic roundtables and town hall meetings that aim to effect behavioural change and improve public perception towards the risks posed by the use of mercury products. The coordination secretariat should also develop an abridged version of the Convention with the aim of ensuring easy comprehension.

6. Priorities for Action and Implementation Plans

The various assessments carried out under this project have enabled identification of the national priorities for Sierra Leone, as follows:

1. Legal and institutional capacity building and/or strengthening for the integration of the requirements of the Minamata Convention into the national frameworks;
2. The phasing-out of the Import of Mercury-added Products;
3. The phasing-down of the use of dental amalgams;
4. The Elaboration of an environmentally sound management of waste system, particularly mercury-containing waste;
5. Reduction and, where feasible, elimination of the use, emissions and releases of mercury and mercury compounds in and from Artisanal and Small-scale Gold Mining.

The Sustainable Development Goals (SDGs)[44] associated with these intervention plans are as follows:

- Goal 3: Ensure healthy lives and promote well-being for all at all ages
- Goal 8: Promote sustained, inclusive and sustainable economic growth, full and productive employment and decent work for all
- Goal 9: Build resilient infrastructure, promote inclusive and sustainable industrialization and foster innovation
- Goal 12: Ensure sustainable consumption and production patterns
- Goal 14: Conserve and sustainably use the oceans, seas and marine resources for sustainable development
- Goal 15: Protect, restore and promote sustainable use of terrestrial ecosystems, sustainably manage forests, combat desertification, and halt and reverse land degradation and halt biodiversity loss
- Goal 16: Promote peaceful and inclusive societies for sustainable development, provide access to justice for all and build effective, accountable and inclusive institutions at all levels

The National Medium-Term Development Plan 2023 is mostly shaped to achieve the sustainable development goals with specific priorities aimed at promoting inclusive economic growth that assures a healthy population. Therefore, the priorities for action should include considerations of how to make economic activities (such as ASGM, any waste-related activities, and mercury in products and cosmetics) more sustainable for the populations. This should includes ensuring that populations are properly informed and guided about the risks associated with the use or presence of mercury and the means of preventing exposure to humans and the environment.

6.1. PRIORITY AREAS AND INTERVENTION PLAN 1: LEGAL AND INSTITUTIONAL CAPACITY BUILDING AND/OR STRENGTHENING FOR THE INTEGRATION OF THE REQUIREMENTS OF THE CONVENTION INTO NATIONAL FRAMEWORKS

Analysis of the National Situation

The assessment of legal and institutional frameworks in Sierra Leone indicates well-established structures and existing binding legal instruments that broadly seek to address some of the provisions of the Minamata Convention:

- Environmental Protection with the National Environmental Policy (NEP) and the National Environmental Protection Act (NEPA);
- The Ministry of Trade and Industry with the Artisanal Mining Policy and the National Industrial Policy for the industrial sector, including large-scale gold mining;
- The mining sector with the Mines and Minerals Act and policies related to Artisanal Mining.

Sierra Leone also has a framework that addresses environmental health issues, the National Environmental Health Policy. The Environmental Protection Act also contains provisions on waste management including toxic and dangerous substances.

Although the aforementioned instruments contain provisions that seek to address chemicals and waste management, none of them fully addresses the issues of mercury pollution and the related public health problems. In addressing these shortcomings, it is therefore imperative to update such instruments and/or create new ones that adopt the provisions of the Minamata Convention with a clear mandate to focus on the country's obligations as contained therein. As the inventory has identified source categories such as the use and disposal of mercury-containing products, primary metal production, waste disposal and incineration and energy consumption as the most important, it is necessary to put in place appropriate frameworks for each of these categories for future implementation of the Minamata Convention.

Objective and outputs

The objective of this action plan is therefore to put in place an appropriate legislative and institutional framework for the implementation of the Minamata Convention.

This objective can be divided into sub-objectives with the aim of:

(i) The establishment of a committee of experts with the requisite skills and knowledge to drive the implementation process;

(ii) The establishment of coordination mechanisms that facilitate consultations with relevant stakeholders (probably those involved in this MIA and the NAP projects and any other relevant ones identified following these projects);

(iii) The review and update of the relevant legal instruments related to the Convention as identified during the legal assessment;

(iv) The creation of binding instruments for those aspects of the Convention not covered by existing instruments;

(v) The adaptation of the responsibilities of national institutions;

(vi) The establishment of a monitoring/control system for assessing the implementation and respect of established instruments.

6.2. PRIORITY AREA AND INTERVENTION PLAN 2: PHASE-OUT OF THE IMPORT, EXPORT AND/OR PRODUCTION OF MERCURY-ADDED PRODUCTS

Analysis of the National Situation

Products containing mercury or mercury compounds are the most important source, emission and release categories of mercury in Sierra Leone. In total, the estimated mercury inputs from this category amounts to 1552 kg of mercury per year. Because of the adverse impacts these products could have on human health or the environment when in frequent contact with them or their improper disposal, Article 4 and Annex A (Part I) of the Convention call for the complete elimination of the production, import, export and use of these products (particularly those explicitly listed in Annex A) by 2020. In the case of Sierra Leone, the focus will be on eliminating import and use since no manufacture has been identified at the national level.

Currently, although there are general measures to regulate consumption taking into account environmental protection (Sierra Leone Trade Policy), customs and control areas as well as the inventory or reporting of imported and exported goods (The Customs Act), Sierra Leone does not have any institutional capacity for the systematic identification and quantification of mercury-containing products circulating on its territory. This makes it difficult to control inflows.

In order to meet the requirements of the Minamata Convention, it is necessary to adopt policies and legal instruments that specifically target the control of mercury-containing products. This can range from the integration of the ban on mercury-containing products into the national regulatory framework (refer to Action Plan 1), to the introduction of economically-viable alternatives on the national market, levying high tariffs on mercury containing products and the forceful retrieval of products already present on the territory after the phase-out.

Objective and outputs

The objective of this national plan is directly aligned with the Convention's obligations to eliminate the import and use of mercury-containing products in the country by 2020. To do so, it is necessary to achieve, the following:

(i) Relying on the national tools that integrate this provision into the national legal framework (which will have to be done in the implementation plan 1) for identifying relevant activities to be implemented;

(ii) Identification, in concrete terms, of all mercury-containing products still present on the national territory;

(iii) Embarking on nationwide information and awareness-raising workshops/activities for the population on the hazards of these products for health and the environment in order to encourage habit change and prepare for the introduction of alternatives on the market;

(iv) Forceful retrieval of all mercury-containing products still present in the territory after the ban normally effective in 2020;

(v) Identification of alternatives to each type of mercury-containing product and economic analysis on the feasibility of introducing these substitutes on national territory;

(vi) Establishment of a monitoring and control mechanism to prevent parallel (illegal) trade in mercury-containing products after the ban and to assess changes resulting from the control activities.

Table 32 – Preliminary budget estimates for the proposed Intervention Plans

Intervention Plan	Expenses (US dollars)	Source of funding
Legal and institutional capacity building and/or strengthening for the integration of the requirements of the Minamata Convention into the national frameworks;	1,830,000	GEF, Minamata Secretariat (Specific International Programme), Special Programme, other relevant funding agencies/institutions/programmes
Phasing-out of the Import of Mercury-added Products	1,855,000	GEF, Minamata Secretariat (Specific International Programme), other relevant funding agencies/institutions/programmes, private companies
Phasing-down of the use of dental amalgams	690,000	WHO, other relevant funding agencies/institutions/programmes, private companies
Environmentally sound management of waste, particularly mercury-containing waste	1,540,000	GEF, Minamata Secretariat (Specific International Programme), World Bank, UN Habitat, UNOPs other relevant funding agencies/institutions/programmes, private companies
Reduction and, where feasible, elimination of the use, emissions and releases of mercury and mercury compounds in and from Artisanal and Small-scale Gold Mining	820,000	GEF, Minamata Secretariat (Specific International Programme), other relevant funding agencies/institutions/programmes, private companies
TOTAL	**6,735,000**	

44- https://sustainabledevelopment.un.org/post2015/transformingourworld

Table 33 – Intervention Plan 1: Legal and Institutional capacity building

Intervention Plan 1: Legal and institutional capacity building and/or strengthening for the integration of the requirements of the Minamata Convention into the national frameworks				
Relevant SDGs: # 3, # 8, # 9, # 12, # 14, # 15 et # 16				
Relevant Articles of the Minamata Convention: Articles that have provisions identified as relevant during the national inventory and legal and institutional evaluations are relevant for this implementation plan (Namely Articles 3, 4 (Mercury-added products), 5, 7 (Artisanal and Small-scale Gold Mining), 8 (Emissions), 9 (Releases), 10 (Environmentally sound interim storage of mercury, other than waste mercury), 11 (Mercury Waste), 12 (Contaminated sites), 16 (Health aspects), 17 (Information exchange), 18 (Public information, awareness and education), 19 (Research, development and monitoring))				
Key institutions: EPA, Ministry of Justice (Ministry of Local Government and Rural Development (MLGRD))				
Other relevant stakeholders and partners: The Ministries of Mines and Mineral Resources, Lands, Housing and the Environment, Health and Sanitation				
Period: 2020 - 2024			Level of priority: Medium to High	
Total Budget: 1,830,000 USD				
Potential risks: · Delays in honouring National Obligations · Lack of interest and participation of actors and stakeholders · National Emergencies (e.g. security or economic)				
Proposed activities (or group of activities)	Description	Relevant stakeholders	Timeline	Budget estimates (USD)
Preliminary/general activities and actions to put in place				
Establish a team of experts on legal and institutional issues with the skills required and mechanisms of coordination to update the legal and institutional frameworks	The team of experts should be composed of experts from different legal field and should have the required experience in drafting national legal instruments that include requirements of Conventions. The team formed should: (i) have sufficient experience in drafting legal instruments, (ii) have knowledge of the various international conventions that Sierra Leone has signed and/or ratified.	EPA-SL, Ministry of Justice, Ministry of Local Government and Rural Development (MLGRD), Ministry of Finance in collaboration with any other Ministry, national public or private institution	2020 - 2021	150,000
Organize meetings and/or discussion workshops to address the needs to meet the requirements of the Convention, identify the tools to be updated or created, allocate tasks and responsibilities and establish an appropriate work plan	These meetings would help setting the framework of the work needed. Also, based on the gaps and recommendations of the MIA report, teams can be formed according to the different themes to be covered.	EPA-SL, MLGRD, Ministry of Justice, Ministry of Finance in collaboration with any other Ministry, national public or private institution	2020 - 2021	60,000
Conduct capacity building and information trainings of each team according to the distribution of responsibilities. Details regarding each aspect of the Convention with regards to the national current frameworks should be given in order to emphasize the needed inputs.	These activities would allow the different teams to superimpose the provisions of the Articles of the Convention on existing national tools in order to deduce needed inputs. The preliminary study that was carried out as part of this MIA can serve as a basis.	EPA-SL, MLGRD, Ministry of Information and Communication in collaboration with any other Ministry, national public or private institution	2021 - 2022	80,000
Identify precisely the provisions of the national framework that can be amended but also the missing aspects that must be fully developed and integrated to meet the requirements of the Convention	The team should clearly identify the policies that need to be updated and the ones that should be elaborated to comply with the requirements of the Minamata Convention. For this activity, a needs classification can also be proposed based on the results of the national mercury inventory. The source categories present in the country can guide the identification of legislative needs	EPA-SL, Ministry of Justice, MLGRD in collaboration with other Ministries if needed	2021	30,000
Strengthening of the Legal framework: The gaps already identified in the present MIA are reported in this plan. However, activities can be added if any needs were to be notified in the future				
Mercury containing products (including medical devices): develop a national policy that Prohibits the production, export and import of mercury-containing products to comply with Article 4 of the Minamata Convention	The elaboration of such instrument will enhance and structure the control of mercury-containing products fluxes in the country. For Sierra Leone, skin lightning products as well as batteries and electrical switches and relays are of major concern.	EPA-SL, Ministry of Justice, Ministry of Local Government and Rural Development (MLGRD), Ministry of Finance in collaboration with any other Ministry, national public or private institution	2021 - 2022	50,000
Dental Amalgams: Develop a national environmental health policy on dental amalgams that enhances the phasing-down of dental amalgams with mercury	Provisions on dental amalgams are listed in Part II of Annex A. The policy developed should include aspects regarding health promotion and caries prevention, promotion of mercury-free alternatives for dental restoration and the establishment of health systems in favour of mercury-free alternatives	EPA-SL, Ministry of Justice, Ministry of Local Government and Rural Development (MLGRD), Ministry of Health, Ministry of Finance and WHO, in collaboration with any other Ministry, national public or private institution	2021 - 2022	50,000
Following the prohibition of import of mercury containing products, elaborate legally-binding tools to discourage the use of the remaining products on the national territory	The mercury containing products remaining on the national territory should be identified, quantified and collected. This policy could enhance the gathering of such products.	EPA-SL, MLGRD, Ministry of Finance in collaboration with any other Ministry, national public or private institution	2021 - 2022	50,000
Similar to discouraging the use of remaining mercury containing products, develop a policy to promote the use of mercury-free alternatives identified and made available on the market	This policy could promote the exchange of remaining mercury products in favour of mercury-free alternatives as a first step.	EPA-SL, MLGRD, Ministry of Health in collaboration with other relevant entities	2021 - 2022	50,000
ASGM: update the existing policies on Artisanal Mining to include the provisions of Article 7 of the Minamata Convention	Article 7 of the Convention should be integrated in the national framework by putting in place legally-binding instruments addressing aspects such as the reduction of the use of mercury and mercury compounds, education and capacity-building. Any Policy/activity related to ASGM should be undertaken in close consultation of the NAP developed in Sierra Leone.	EPA-SL, Ministry of Justice, MLGRD, Ministry of Mines in close consultation with other relevant bodies	2021 - 2022	40,000
Sound Management of Waste: develop a legal framework that integrates the Basel Convention (along with the Ban Amendment) and the Minamata Convention (Article 11) in terms of sound management of waste	This framework would support the Environment Protection Agency Sierra Leone Act (2008, amended 2010) in promoting appropriate measures for managing all types of waste (specified in the policies to be developed) following existing guidelines.	EPA-SL, MLGRD, Customs	2021 - 2022	150,000
Emissions and releases: put in place national policies for enhancing the development of standards on air, water and soil quality as well as the development of adequate guidelines to reduce emissions and releases to the environment	The Environment Protection Agency Sierra Leone Act (2008), the Sierra Leone Water Company Act (2017) and the National Water Resources Management Agency Act (2017) could be updated to include standards/limit values and alternative measures to reduce emissions and releases from relevant sources (based on Articles 8 and 9 of the Convention).	EPA-SL, MLGRD	2021 - 2022	200,000
In developing the necessary regulations that include the requirements of the Minamata Convention, ensure that enhancing regular data gathering and updating as well as access to information (on the effects of hazardous chemicals for example) are included.	The Minamata Convention and its obligations set out in its articles are closely consulted and relevant dispositions for Sierra Leone are included in national legal and institutional frameworks. Whenever needed, additional data/information gathering is promoted to effectively guide the updating of the legal framework.	EPA-SL, MLGRD	2021 - 2022	120,000
Strengthening of the Institutional framework: Based on the legal framework and the recommendations of the MIA report, targeted entities should be strengthened for effective application of the legal framework established				
Organize trainings for both new and current staff of the EPA-SL, SLSB, CED-NRA and MTI	These trainings will strengthen the institutions' capacities regarding Mercury and Mercury-added products, monitoring methods as well as mitigation strategies to reduce air, water and soil pollution.	EPA-SL	2021 - 2023	50,000
Provide adequate equipment and trainings for EPA-SL, MTI, CED/NRA and SLSB staff	This activity will help enabling effective identification of Mercury-added products for effective monitoring to mitigate health hazards especially that of the skin.	EPA-SL, Ministry of Health	2021 - 2024	150,000
Conduct workshops and seminars to equip staff of EPA-SL and NRA	These workshops will aim at informing and sharing the recent amendments/ additions to the legal frameworks and their linkages with the Articles of the Minamata Convention.	EPA-SL	2021 - 2023	100,000
Overall Monitoring and control system				
Establish sustainable control/monitoring systems (with competent personnel accordingly trained) to ensure the respect and application of the updated legal instruments on mercury and mercury compounds fluxes, use, emission, release, and disposal to ensure compliance with the Convention	Sustainable and comprehensive systems for monitoring the application of national regulations are in place and regular reports to national stakeholders, government, and Conference of the Parties are delivered.	EPA-SL, MLGRD,	2022 - 2024	500,000
Total Budget				**1,830,000**

6.2. PRIORITY AREA AND INTERVENTION PLAN 2: PHASE-OUT OF THE IMPORT, EXPORT AND/OR PRODUCTION OF MERCURY-ADDED PRODUCTS

Analysis of the National Situation

Products containing mercury or mercury compounds are the most important source, emission and release categories of mercury in Sierra Leone. In total, the estimated mercury inputs from this category amounts to 1552 kg of mercury per year. Because of the adverse impacts these products could have on human health or the environment when in frequent contact with them or their improper disposal, Article 4 and Annex A (Part I) of the Convention call for the complete elimination of the production, import, export and use of these products (particularly those explicitly listed in Annex A) by 2020. In the case of Sierra Leone, the focus will be on eliminating import and use since no manufacture has been identified at the national level.

Currently, although there are general measures to regulate consumption taking into account environmental protection (Sierra Leone Trade Policy), customs and control areas as well as the inventory or reporting of imported and exported goods (The Customs Act), Sierra Leone does not have any institutional capacity for the systematic identification and quantification of mercury-containing products circulating on its territory. This makes it difficult to control inflows.

In order to meet the requirements of the Minamata Convention, it is necessary to adopt policies and legal instruments that specifically target the control of mercury-containing products. This can range from the integration of the ban on mercury-containing products into the national regulatory framework (refer to Action Plan 1), to the introduction of economically-viable alternatives on the national market, levying high tariffs on mercury containing products and the forceful retrieval of products already present on the territory after the phase-out.

Objective and outputs

The objective of this national plan is directly aligned with the Convention's obligations to eliminate the import and use of mercury-containing products in the country by 2020. To do so, it is necessary to achieve, the following:

(i) Relying on the national tools that integrate this provision into the national legal framework (which will have to be done in the implementation plan 1) for identifying relevant activities to be implemented;

(ii) Identification, in concrete terms, of all mercury-containing products still present on the national territory;

(iii) Embarking on nationwide information and awareness-raising workshops/activities for the population on the hazards of these products for health and the environment in order to encourage habit change and prepare for the introduction of alternatives on the market;

(iv) Forceful retrieval of all mercury-containing products still present in the territory after the ban normally effective in 2020;

(v) Identification of alternatives to each type of mercury-containing product and economic analysis on the feasibility of introducing these substitutes on national territory;

(vi) Establishment of a monitoring and control mechanism to prevent parallel (illegal) trade in mercury-containing products after the ban and to assess changes resulting from the control activities.

Table 34 – Phase-out of the Production, Export and/or Import of Mercury-added products

Intervention Plan 2: Phase-out of the Import, Export and/or the Production of Mercury-added Products	
Relevant SDGs: # 3, # 9, # 12, # 14, # 15 et # 16	
Relevant Articles of the Minamata Convention: Article 4 (Along with Annex A, Part I) but also Articles 8, 9, 12, 16, 17 and 18	
Article 4: Mercury-added products (and Annexe A, Part I): Prohibit the manufacture, import and export of mercury-added products. Part I: Phased-out mercury-added products by the end of 2020 (Batteries, Switches and relays, Compact fluorescent lamps (CFLs), High pressure mercury vapour lamps (HPMV)), Mercury in cold cathode fluorescent lamps and external electrode fluorescent lamps (CCFL and EEFL), Cosmetics including skin lightening soaps and creams; Pesticides, biocides and topical antiseptics; non-electronic measuring devices such as barometers; hygrometers; manometers; thermometers; sphygmomanometers.	
Key institutions: EPA-SL, Customs Office	
Other relevant stakeholders and partners: Ministries of Information and Communications, Finance, Health and Sanitation, Internal Affairs, Trade and Industry	
Period: 2020 - 2024	Level of Priority: High
Total Budget: 1,855,000 USD	
Potential risks: Delays in honouring National Obligations · Lack of interest and participation of actors and stakeholders · National emergencies (e.g. security or economic)	

Proposed activities (or group of activities)	Description	Relevant stakeholders	Timeline	Budget estimates (USD)
Preliminary/general activities and actions to put in place				
Set mechanisms of coordination and identify relevant actors (ministries, stakeholders) to be part of a "Products Advisory Committee" (PAC)	The members of the PAC should be chosen on the basis of their expertise and the added value they can bring to the process of reducing the use of mercury-containing products.	EPA-SL, Ministry of Health and Sanitation, Ministry of Trade and Industry in collaboration with other relevant institutions	2020 - 2021	80,000
Organize PAC inception meeting(s) for: (i) identifying and discussing best strategies to address existing issues, (ii) identifying the needs, (iii) classifying the priorities, (iv) defining the objectives, and (v) setting timing and project milestones. Financial and technical aspects should also be considered	The meetings will enable the members of the PAC to have an overview of the current national situation regarding mercury-containing products with regards to the dispositions of the Minamata Convention. This will help setting the priorities and proposing needed inputs and actions to comply with the Convention. During these meetings, the findings of the national mercury inventory will be used as a basis and additional information missing will be identified.	EPA-SL, Ministry of Health and Sanitation, Ministry of Trade and Industry in collaboration with other relevant institutions	2020 - 2021	50,000
Improve the national database on the fluxes of mercury-containing products in the country but also on mercury-containing products already present in the country. A detailed inventory as well as comprehensive classification of the products should be elaborated	If possible, update the mercury inventory by quantifying the real imports of mercury containing products but also the quantities of mercury present in the country (retailers' stocks and others) would be useful to have a clear overview of the products to replace when looking for alternatives.	EPA-SL, Ministry of Health and Sanitation, Ministry of Trade and Industry, Customs and Excise Department and National Revenue Authority in collaboration with other relevant institutions	2020 - 2021	150,000
Based on the law banning the import of mercury-containing products and/or mercury compounds that will have been put in place during response plan 1, develop and implement a strategy to prohibit the entry of mercury-containing products into the country	This activity aims at elaborating a clear strategy with different steps guiding the process of phasing-out mercury-containing products listed in Annex A (Part I) that are present in Sierra Leone. Awareness-raising and information dissemination on Article 4 of the Convention as well as the new law that will be adopted and the risks of mercury for health should be included.	EPA-SL, Ministry of Health and Sanitation, Ministry of Trade and Industry in collaboration with other relevant institutions	2020 - 2021	75,000
To complement the law banning the import, undertake a process to adopt the Globally Harmonized System for the Classification and Labelling of Chemicals (GHS)	Amending the Import Law will include the provision of Annex A of the Minamata Convention on the Prohibition of the Import of Listed Mercury-Containing Products. At the same time, the GHS system could ensure importers classify and label the chemicals and mixtures they are bringing into the country. The GHS can therefore assist on communication of hazards and related safety measures, and in identifying the contents of products.	EPA-SL, Ministry of Health and Sanitation, Ministry of Trade and Industry, Sierra Leone Standards Bureau, National Revenue Authorities (Customs and Excice department), Sierra Leone Law enforcement	2020 - 2021	100,000
Specific activities to raise-awareness and collect remaining mercury-containing products				
Medical instruments: Inform and raise awareness among the healthcare sector professionals regarding the impacts of mercury-containing materials and on the advantages of mercury-free alternatives	Thermometers, manometers, medical blood pressure instruments, laboratory chemicals and other medical equipment with mercury were reported as present in the country. Approaching the healthcare sector regarding the impacts of the use but also the non-appropriate disposal of these product on health and the environment will be necessary to enhance the change of habits and adoption of alternatives	EPA-SL, Ministry of Health and Sanitation in collaboration with other relevant institutions	2019 - 2020	100,000
Set up awareness-raising and information exchange campaigns to exchange information with the population on the health risks of mercury-containing products (batteries, light sources, creams and soaps containing mercury and other products identified in the mercury inventory) and on the guidelines of the Minamata Convention	Similarly to awareness-raising activities conducted on the medical instruments containing mercury, this activity aims at enhancing habits changes towards mercury-free alternatives but also encourage the gathering of the remaining mercury-containing products.	EPA-SL, Ministry of Health and Sanitation, Ministry of Trade and Industry, Ministry of Education, Science and Technology, Ministry of Information and Communication in collaboration with other relevant institutions	2020 - 2021	75,000
Encourage the collection of mercury-containing products still present on the territory with a view to their environmentally-friendly recovery or disposal	After the phasing-out, it will be necessary to collect remaining products on the national territory for potential valorisation and/or disposal.	EPA-SL, Ministry of Health and Sanitation, Ministry of Trade and Industry, Ministry of Education, Science and Technology, Ministry of Information and Communication in collaboration with other relevant institutions	2020 - 2021	150,000

Identifying economically viable alternatives to each mercury containing products				
Based on the results of the MIA report as well as the detailed inventory and classification conducted, identify alternatives to each mercury containing product	In Sierra Leone, alternatives will be needed for medical instruments, light sources, batteries and cosmetics containing mercury.	EPA-SL, Ministry of Health and Sanitation, Ministry of Trade and Industry, Ministry of Education, Science and Technology in collaboration with other relevant institutions	2020 - 2022	250,000
Undertake an economic feasibility study to select the best option(s) for the country among the alternatives identified	This economic analysis could help identifying the best options that will be financially sustainable for the country.	EPA-SL, Ministry of Health and Sanitation, Ministry of Trade and Industry, Ministry of Education, Science and Technology in collaboration with other relevant institutions	2020 - 2022	75,000
Implement a strategy to raise awareness and inform the population about the benefits of these products in order to encourage a change in habits	The strategy will make it possible to prioritize the different stages of awareness campaigns, the groups and regions to prioritize and the communication tools adapted for each group and region.	EPA-SL, Ministry of Health and Sanitation, Ministry of Trade and Industry, Ministry of Education, Science and Technology, Ministry of Information and Communication in collaboration with other relevant institutions	2020 - 2023	50,000
Organize Information dissemination campaigns to promote the identified mercury-free alternatives, explaining their advantages for human health and the environment	This activity is necessary to prepare the replacement of mercury-containing products. This can also help to avoid a decline in trade when alternatives are put on the market because civil society will be informed of the changes and their benefits.	EPA-SL, Ministry of Health and Sanitation, Ministry of Trade and Industry, Ministry of Education, Science and Technology, Ministry of Information and Communication in collaboration with other relevant institutions	2020 - 2021	50,000
Introduce the alternatives on the market	Gradually replace mercury-containing products on the market with cheap alternatives	EPA-SL, Ministry of Trade and Industry, Ministry of Information and Communication in collaboration with other relevant institutions	2020 - 2023	300,000
Monitoring				
Develop a monitoring system to prevent "informal" entries of mercury containing products in the country, control the use of alternatives instead of mercury-containing products and measure progress over time	Once alternatives are available, awareness and information campaigns are conducted, and the process of reducing the import and use of mercury-containing products has begun, it is essential to set up a monitoring system to monitor the proper functioning of the practices and rules put in place.	EPA-SL, Ministry of Information and Communication in collaboration with other relevant institutions	2020 - 2024	350,000
TOTAL Budget				**1,855,000**

6.3. PRIORITY AREA AND INTERVENTION PLAN 3: PHASE-DOWN OF THE USE OF DENTAL AMALGAM

Analysis of the national situation

Dental amalgams have been classified under the use and disposal of mercury-containing products category. Even though they are products with added mercury, amalgams are subject to specific provisions set out in Part II of Annex A. Indeed, for these products, it is a question of taking appropriate measures to gradually reduce the use of dental amalgams while taking into account the national situation and existing international guidelines, notably those elaborated by WHO, on dental restorative materials.

The national inventory provides an estimate of mercury inputs of 29 kg of mercury per year from dental amalgam. This is not the most significant category but a more thorough investigation to complete the inventory of this MIA report is needed. At present, there is no official framework for the control of dental amalgam but one of the recommendations of the legal evaluation is to adopt a national health policy on dental hygiene.

Objective and outputs

The objective of this implementation plan is to take appropriate measures to gradually accompany the phase-down of the use of dental amalgam in the country. The measures adopted may, among others, lead to the following progress:

(i) Reducing the demand for dental restoration;

(ii) Promoting mercury-free dental equipment;

(iii) Establishing a dental health and insurance system favourable to mercury-free products;

(iv) Promoting the use of Best Available Techniques (BAT) and Best Environmental Practices (BEP);

(v) Reducing, leading to the gradual elimination of, the use of mercury-containing amalgams.

Table 35 – Phase-down of the use of dental amalgams

Intervention Plan 3: Phase-down of the use of dental amalgams				
Relevant SDGs: # 3, # 9, # 12, # 14, # 15 et # 16				
Relevant Articles of the Minamata Convention: Article 4 (along with Annex A, Part II) as well as Articles 16 and 18				
Article 4 and Annexe A, Part II: Phase Down the use of Dental Amalgam by implementing 2 or more of the 9 proposed measures. Article 16: Health Aspects Parties encouraged to Promote the development and implementation of strategies and programmes to identify and protect populations at risks; Develop and implement science-based educational and preventive programmes on occupational exposure; Promote appropriate health-care services for prevention, treatment and care; Strengthen institutional and health professional capacities for prevention, diagnosis, treatment and monitoring. Article 18: Public information, awareness and education Each Party to promote and facilitate: (i) Provision to the public of available information relating to the use, substitution, release sources, health and environmental effects of mercury and mercury compounds, alternatives to them; (ii) Education, training and public awareness related to the effects of exposure to mercury and mercury compounds; (iii) To consider use of existing mechanisms or developing mechanisms, such as pollutant release and transfer registers (PRTR) for the collection and dissemination of information on estimates of emissions, releases and disposals.				
Key institutions: Ministry of Health and Sanitation, EPA-SL				
Other relevant stakeholders and partners: Dental training institutions and colleges				
Period: 2020 - 2024			Level of Priority: Low to Medium	
Total Budget: 690,000 USD				
Potential risks: Delays in Honouring National Obligations Lack of interest and participation of actors and stakeholders National emergencies (e.g. security or economic)				
Proposed activities (or group of activities)	**Description**	**Relevant stakeholders**	**Timeline**	**Budget estimates (USD)**
Preliminary/general activities and actions to put in place				
Set mechanisms of coordination and identify relevant actors (ministries, stakeholders) to be part of a "Dental Amalgam Committee"	The members of the Committee should be chosen on the basis of their expertise in dentistry and the added value they can bring to the process of phasing-down the use of dental amalgams containing mercury.	Ministry of Health and sanitation, EPA-SL, any Dentists' associations and other relevant bodies	2020 - 2021	85,000
Organize inception meeting(s) for: (i) identifying the needs for complying with the Convention, (ii) classifying the priorities, (iii) identifying and discussing best strategies to phase-down mercury dental amalgams (iv) defining the objectives, and (v) setting timing and project milestones. Financial and technical aspects should also be considered	With the support of the information on dental amalgams provided in the MIA, these meetings will help to define in more detail the needs to meet the Objectives of the Convention and organize the work to be done according to the budget that will be available. Objectives of this plan should include prevention of dental caries and health promotion.	Ministry of Health and sanitation, EPA-SL, any Dentists' associations and other relevant bodies	2020 - 2022	60,000
Identify and collect the necessary information to complete the inventory carried out in the MIA	Information such as the number of national dentists (private and public) still using dental amalgams containing mercury, the quantities of dental amalgams installed per year or other relevant information would be required to assess the extent of the actions to be implemented.	Ministry of Health and sanitation, EPA-SL, any Dentists' associations and other relevant bodies	2020 - 2022	45,000
Elaborate an effective strategy to guide the process of phasing-down the use of dental amalgams with mercury and include this strategy in existing related national plans	The strategy should include the necessary steps, from the choice of alternatives to their introduction into society and raising awareness among practitioners and civil society.	Ministry of Health and sanitation, EPA-SL, any Dentists' associations and other relevant bodies	2020 - 2022	45,000
Activities needed to comply with the Minamata Convention				
Organize information dissemination workshops/campaigns regarding appropriate measures to prevent caries and activities aiming at promoting health	By promoting the practical measures to be adopted on a daily basis, the objective is to prevent cavities and thus naturally reduce the need for dental restoration.	Ministry of Health and Sanitation, EPA-SL, any Dentists' associations and other relevant bodies	2020 - 2022	40,000
Identify different alternatives and undertake an economic analysis to choose economically viable options for the country	Alternatives already exist to replace the mercury-silver alloy used in current amalgams. By identifying the most practical and economically viable ones, this will support the arguments to convince professionals and civil society.	Ministry of Health and Sanitation, EPA-SL, any Dentists' associations, Ministry of Education, Science and Technology and other relevant bodies	2020 - 2022	45,000
Organize training workshops for dental professionals to introduce mercury-free alternatives and best management practices	These trainings will enable the dissemination of the alternatives identified for the country, homogenize practices between professionals and introduce the best manipulation/management techniques.	Ministry of Health and Sanitation, EPA-SL, any Dentists' associations, Ministry of Education, Science and Technology and other relevant bodies	2020 - 2021	50,000

Introduce economically viable options to the market, promoting at the same time the use of these mercury-free options for dental restoration instead of dental amalgam when feasible	Provide mercury-free alternatives to professionals or amalgam use based on encapsulated mercury that does not require mixing on site would reduce mercury releases during preparation of the amalgam. Enhancing the co-existence between alternatives and amalgams could then represent a better option for minimizing the releases. .	Ministry of Health and Sanitation, EPA-SL, any Dentists' associations, Ministry of Information and Communication and other relevant bodies	2020 - 2022	45,000
Organize campaigns to inform the population about the risks of dental amalgam containing mercury and encourage the use of alternatives or better techniques when feasible	This activity would increase knowledge among the population and enhance the change of habits, the adoption of measures to prevent dental restoration and a better consideration of the available techniques for dental restauration when necessary.	Ministry of Health and Sanitation, EPA-SL, any Dentists' associations, Ministry of Information and Communication and other relevant bodies	2020 - 2022	60,000
Establish health systems for the prevention of caries and, where necessary, for mercury-free alternatives in dental restoration	If health systems offered to the population offer benefits when choosing mercury-free solutions, this will encourage gradual change in practice and thus reduce the use of mercury-containing options.	Ministry of Health and Sanitation	2020 - 2023	75,000
Promote the use of Best Environmental Practices in dental facilities to reduces releases of mercury and mercury compounds to water and land and organize a disposal mechanism for the mercury collected in clinics	When amalgam is manufactured, there is a risk of mercury and mercury compounds being released into water that will then potentially be discharged into surrounding sewers or waterways and soils. The adoption of appropriate techniques and disposal systems can limit these releases and therefore the contamination of the environment.	EPA-SL, any Dentists' associations, Ministry of Information and Communication and other relevant bodies	2020 - 2024	80,000
Monitoring				
Develop a monitoring system to control the functioning of all measures and systems put in place	After the introduction of measures, health systems for alternatives and the legal framework (intervention plan 1), the control system will make it possible to closely monitor the progress made	Ministry of Health and sanitation, EPA-SL, any Dentists' associations and other relevant bodies	2020 - 2023 (continuously over the years)	60,000
TOTAL Budget				**690,000**

6.4. PRIORITY AREA AND INTERVENTION PLAN 4: ENVIRONMENTALLY SOUND MANAGEMENT OF WASTE, PARTICULARLY MERCURY-CONTAINING WASTE

Analysis of the national situation

Similar to its neighbours, Sierra Leone identified and listed various waste management activities during the inventory. Indeed, there are many informal waste disposal sites on the national territory as well as incineration and open burning practices for general waste but also for medical waste. The emissions and discharges resulting from these practices are among the highest in the country.

As a result, Sierra Leone is called upon to meet the requirements of Article 11 of the Minamata Convention. This Article, specifically dedicated to mercury waste, stipulates that any waste consisting of mercury and/or mercury compounds, containing mercury and/or mercury compounds or contaminated with mercury and/or mercury compounds must be treated according to specific guidelines developed on the basis of the provisions of the Basel Convention and other relevant guides. In addition, the measures adopted must take into account the following aspects: (i) the reduction of releases from the identified sources, (ii) the elaboration of a multi-pollutant control strategy for monitoring mercury releases, (iii) the use of Best Available Techniques and Best Environmental Practices (BAT/BEP) for addressing mercury releases issue and (iv) the implementation of alternative measures to reduce releases from identified sources.

The management of mercury-containing waste is a broader issue of environmentally sound waste management from which it is difficult to separate. Therefore, the proposed action plan below presents preliminary measures to be adopted for the environmentally sound management of waste in general before focusing on mercury-containing waste. The legislative aspects mentioned are reminders of what will have been done under the first proposed action plan on legal and institutional capacity building.

Objective and outputs

The objective of this action plan is to present the necessary steps for the establishment of a structure adapted to the environmentally sound management of waste, particularly that containing mercury and mercury compounds. This includes the following achievements:

(i) The establishment of a committee of experts with the necessary skills for waste management;

(ii) The updating of the inventory of disposal sites and existing structures;

(iii) The detailed analysis of the types of waste present;

(iv) The development and implementation of detailed strategies and steps for effective management;

(v) The identification of appropriate techniques at each stage of the management process;

(vi) The identification of final disposal methods appropriate to the country.

Table 36 – Intervention Plan 4: Environmentally sound management of waste, particularly mercury containing waste

Intervention Plan 4: Environmentally sound management of waste, particularly mercury-containing waste				
Relevant SDGs: # 3, # 9, # 12, # 14, # 15 et # 16				
Relevant Articles of the Minamata Convention: mainly Article 11, but also Articles 12, 16, 17 and 18				
Article 11: Mercury waste Each Party shall take appropriate measures so that mercury waste is: (i) Managed in an environmentally sound manner, taking into account the guidelines developed under the Basel Convention and in accordance with requirements of the Conference of the Parties to the Minamata Convention; (ii) Only recovered, recycled, reclaimed or directly re-used for a use allowed to a Party under this Convention or for environmentally sound disposal pursuant to paragraph 3 (a); For Parties to the Basel Convention, not transported across international boundaries except for the purpose of environmentally sound disposal in conformity with this Article and with the Basel Convention. Article 12: Contaminated sites Each party shall endeavour to develop appropriate strategies for identifying and assessing sites contaminated by mercury or mercury compounds. Article 16: Health Aspects Parties encouraged to Promote the development and implementation of strategies and programmes to identify and protect populations at risks; Develop and implement science-based educational and preventive programmes on occupational exposure; Promote appropriate health-care services for prevention, treatment and care; Strengthen institutional and health professional capacities for prevention, diagnosis, treatment and monitoring. Article 17: Information Exchange Each Party shall facilitate the exchange of: (a) Scientific, technical, economic and legal information concerning mercury compounds, including toxicological, Eco-toxicological and safety information; (b) Information on the reduction or elimination of the production, use, trade, emissions and releases of mercury and mercury compounds; (c) Information on technically and economically viable alternatives to: (i) mercury-added products; (ii) manufacturing processes in which mercury or mercury compounds are used and (iii) activities and processes that emit or release mercury or mercury compounds; (d) Epidemiological information concerning health impacts associated with exposure to mercury and mercury compounds, in close cooperation with WHO and other relevant organizations, as appropriated. Article 18: Public information, awareness and education Each Party to promote and facilitate: (i) Provision to the public of available information relating to the use, substitution, release sources, health and environmental effects of mercury and mercury compounds, alternatives to them; (ii) Education, training and public awareness related to the effects of exposure to mercury and mercury compounds; (iii) To consider use of existing mechanisms or developing mechanisms, such as pollutant release and transfer registers (PRTR) for the collection and dissemination of information on estimates of emissions, releases and disposals.			
Key institutions: EPA-SL, Ministry of Health and Sanitation, Ministry of Labour and Social Security, Ministry of Education, science and technology, local governments and municipal institutions				
Other relevant stakeholders and partners:				
Period: 2020 - 2023			Level of Priority: Medium to High	
Total Budget: 1,540,000 USD				
Potential risks: · Delays in honouring National Obligations · Lack of interest and participation of actors and stakeholders · National emergencies (e.g. security or economic)				
Proposed activities (or group of activities)	Description	Relevant stakeholders	Timeline	Budget estimates (USD)
Preliminary/general activities and actions to put in place				
Bring together the relevant experts to form a steering committee for the intervention plan	Committee members should have the required skills and experience in areas such as waste management, chemical management and pollution and/or similar areas.	EPA-SL, Ministry of Health and Sanitation, Ministry of Labour and Social Security, Ministry of Education, science and technology in consultation with local governments, municipal institutions and other relevant bodies	2020 - 2021	80,000
Raise awareness among the stakeholders involved and the members of the committee on the issue of sound waste management in Sierra Leone	Raise awareness among the stakeholders involved and the members of the committee on the issue of sound waste management in Sierra Leone	EPA-SL, Ministry of Health and Sanitation, Ministry of Labour and Social Security, Ministry of Education, science and technology in consultation with local governments, municipal institutions and other relevant bodies	2020 - 2021	55,000
Organize inception workshops to define the framework and discuss the different aspects of the implementation of the plan	These workshops will provide an opportunity to discuss aspects such as: (i) the existing legislative framework and amendments made (based on response plan 1), (ii) the needs to be met to meet the requirements of the Convention (based on the results of the MIA), (iii) the objectives of the plan, (iv) the financial aspects and (v) the distribution of responsibilities	EPA-SL, Ministry of Health and Sanitation, Ministry of Labour and Social Security, Ministry of Education, science and technology in consultation with local governments, municipal institutions and other relevant bodies	2021 - 2022	80,000
Specific activities (as part of a strategy to put in place an appropriate system for managing waste in an environmentally friendly manner)				
Identify and develop an inventory of all waste sites on the national territory	Information on waste sites and informal dumping sites where open burning is practised should be gathered in cooperation with the relevant entities to complete the findings of the MIA report.	EPA-SL, Ministry of Education, Science and Technology in consultation with local governments, municipal institutions and other relevant bodies	2021 - 2022	120,000

Identify and develop an inventory of all of the sites where medical devices and other products, including those that contain mercury are stored and/or eliminated	It is necessary to identify and conduct an inventory of all medical institutions, meteorology institution, civil aviation, and other relevant structures that store and incinerate devices, including products that contain mercury. The following can be considered: all types of thermometers containing mercury, and laboratory and medical equipment, including containing mercury.	EPA-SL, Ministry of Education, Science and Technology in consultation with local governments, municipal institutions and other relevant bodies	2021 - 2022	180,000
Establish a classification of the different groups of waste encountered, including all waste containing mercury	In establishing this classification, it would be necessary to isolate mercury-containing products, including medical devices, and to propose a specific classification for these mercury-containing products	EPA-SL, Ministry of Education, Science and Technology in consultation with other relevant bodies	2021 - 2022	60,000
Define national guidelines on the sound management of waste, including mercury-containing wastes	These national guidelines should be developed for supporting a practical management of wastes and should be developed in accordance with the legal and institutional frameworks elaborated in intervention plan 1 as well as international provisions and guidance available.	EPA-SL, Ministry of Education, Science and Technology in consultation with local governments, municipal institutions and other relevant bodies	2021 - 2023	65,000
Develop an appropriate collection and storage system for waste, including mercury-containing waste	When developing the system, it is important to consider: separation of mercury-containing products from other general waste; and in medical, civil aviation, and other concerned institutions, devices and other products containing mercury should be separated from other waste. Also, the system should identify the different steps of waste management, going from collection to disposal, including valorisation, recycling, treatment and other need steps. Aspects regarding transport should also be considered.	EPA-SL, Ministry of Education, Science and Technology in consultation with local governments, municipal institutions and other relevant bodies	2021 - 2023	85,000
Undertake training sessions of professionals and awareness raising campaigns targeting the civil society	Trainings to professionals in the waste management sector, notably on the safety measures to be adopted in the workplace, the different categories of waste implemented, the amended legal and institutional framework and the various stages of the rational management system implemented (or to be implemented) in the country	EPA-SL, Ministry of Education, Science and Technology, Ministry of Health and Sanitation, Ministry of Information and Communication in consultation with local governments, municipal institutions and other relevant bodies	2020 - 2022	85,000
Separate the different types of waste				
Separate mercury-containing products from municipal waste streams when feasible	Separate mercury-containing products from municipal waste streams, which otherwise harm human health and the environment as well as produces mercury emissions and releases once disposed or incinerated.	EPA-SL in collaboration with waste management companies, local governments and municipal institutions	2020 - 2022	100,000
Separate discarded medical devices containing mercury from clinical wastes	Separate discarded medical devices containing mercury from clinical wastes, which otherwise harm human health and the environment as well as produces mercury emissions and releases once disposed or incinerated.	EPA-SL in collaboration with waste management companies,	2020 - 2022	90,000
Apply BAT/BEP to e-waste management practices that minimize or prevent emissions and releases	Encourage application of BAT/BEP to e-waste management that minimize or prevent emissions and releases.	EPA-SL in collaboration with waste management companies	2020 - 2022	120,000
Develop environmentally sound interim storage for waste prior to disposal under the terms of the Basel Convention, including specific storage for mercury products when feasible	The depot sites made available serve as a first step and will help to facilitate a first sorting step. Mercury-containing waste may be isolated during sorting.	EPA-SL in collaboration with local governments, municipal institutions, waste management companies and other relevant bodies	2020 - 2022	150,000
Undertake awareness raising campaigns targeting the civil society, stakeholders and all professionals and encourage the use of any temporary deposit sites that may have been set up	These campaigns will serve to inform and raise public awareness of the issues related to inappropriate waste management, including the disadvantages of not separating waste types (particularly mercury-containing waste) and the risks to health and the environment. This may encourage the change of habit and the sorting and use of the storage sites made available.	EPA-SL, Ministry of Education, Science and Technology, Ministry of Health and Sanitation, Ministry of Information and Communication in consultation with local governments, municipal institutions and other relevant bodies	2020 - 2022	50,000
Allocate appropriate sites for the different stages of the waste management system and identify the best techniques for each stage	Steps and techniques for recovery, treatment (chemical or other with reduced risks to health and the environment), recycling and appropriate methods of final disposal must be put in place at suitable sites and with the necessary equipment. Safety equipment for professionals should also be made available	EPA-SL in collaboration with local governments, municipal institutions and waste management companies	2020 - 2022	120,000
Monitoring				
Set up a monitoring system	Once the sound waste management system, with all appropriate steps, is put in place, it will be necessary to monitor and evaluate the proper functioning of the structures as well as compliance with existing legally binding frameworks. This monitoring can also be useful in rectifying a situation or measure that is considered ineffective.	EPA-SL, Ministry of Education, Science and Technology	2020 - 2023	100,000
TOTAL Budget				**1,540,000**

6.5. PRIORITY AREA AND INTERVENTION PLAN 5: REDUCTION AND, WHERE FEASIBLE, ELIMINATION OF THE USE, EMISSIONS AND RELEASES OF MERCURY AND MERCURY COMPOUNDS IN AND FROM ARTISANAL AND SMALL-SCALE GOLD MINING

Analysis of the National Situation

Artisanal and small-scale gold mining produces approximately 2.95 tons of gold annually in Sierra Leone, accounting for all gold produced in the country. Such mining activities are mostly undertaken by individual miners or small enterprises with limited capital investment and the use of rudimentary technology. The implementation of existing legal and regulatory frameworks (Mines and Minerals Act, 2009; NMA Act, 2012 & the EPA Act 2008) governing ASGM remains a huge challenge particularly for remote mining communities. Mining and trade of gold in Sierra Leone is made of a complex web of actors with varying interest, which has resulted in the smuggling of most of the gold produced into neighbouring countries. This is also the major driving factor for mercury smuggling into the country. It is observed that mercury is not used in alluvial gold mines but mostly used in hard rock gold mining areas like Baomahun and Kumaru accounting for an estimated use of 352 kg per annum. Often, mercury-gold amalgams are burnt openly without the use of the required personal protective gears, retorts or other mercury capturing devices. Unfortunately, mercury users in ASGM have very little awareness of the negative environmental and health implications. The non-formal nature of the ASGM sector is the key underlying factor for the current state of affairs. The National Action Plan (NAP) document developed in parallel to the MIA report will provide more details on the ASGM overview and the strategy for formalizing the sector and will be closely consulted when implementing this proposed action plan.

Objective and Outputs

The objective of this action plan is to adopt appropriate mechanisms for the reduction or elimination of the use of mercury in the ASGM sector. This proposed intervention plan should be implemented in parallel with the “strategy for introducing better mining practices and managing mercury use” of the Sierra Leone NAP report. The following aspects should be considered:

1. The formalization of the ASGM sector

- Review of the artisanal and small-scale mining policies
- Institutional Strengthening and Capacity Building of the NMA and the EPA for Mercury reduction and elimination
- Formation of mercury vendors Association

1. Research into better mining practices and sustainable non-mercury alternatives [in accordance with Article 7.4 (c)];
2. Promote the use of best available techniques and best environmental protection [in accordance with Article 7.4(f) of the Minamata Convention];
3. Provision of technical and financial support to ASGM actors especially women and youths [in accordance of Article 7.4 (d) with the Minamata Convention];
4. Development of strategies to prevent the diversion of mercury or mercury compounds for use in ASGM and processing [in accordance of Article 7.4 (a) with the Minamata Convention];

Improve border security and control; increase excise duty on mercury;

5. Putting a ban on the use of mercury in ASGM;
6. Robust and sustained Public Education and Awareness of the health and environmental implications of mercury [in accordance with Article 7.4 (b) of the Minamata Convention].

Table 37 – Intervention Plan 5: Reduction and, where feasible, elimination of the use, emissions and releases of mercury and mercury compounds in and from ASGM

Intervention Plan 5: Reduction and, where feasible, elimination of the use, emissions and releases of mercury and mercury compounds in and from Artisanal and Small-scale Gold Mining				
Relevant SDGs: # 3, # 9, # 12, # 14, # 15 et # 16				
Relevant Articles of the Minamata Convention: Articles 7, 8 and 9				
Article 7 on ASGM: (i) Reduce, where possible, the use of mercury or mercury compounds in Artisanal and Small-scale Gold Mining and processing activities by mercury amalgamation; (ii) Report significant gold panning activities and undertake activities required by the Convention. Article 8 on emissions: A Party with relevant sources shall take measures to control releases and may prepare a national plan setting out such measures and their expected targets, goals and outcomes. Implement 1 or more of the 5 measures as soon as practicable but no more than 10 years after entry into force. Require the use of BAT/BEP for any new sources, no later than 5 years after entry into force. Develop and maintain an inventory of emissions from relevant sources. Article 9 on releases: Controlling and, where feasible, reducing releases of mercury and mercury compounds to land and water from the relevant point sources not addressed in other provisions of the Convention. Parties to identify the relevant point source categories and may prepare a national plan setting out measures, as listed in paragraph 5, to be taken to control releases and its expected targets, goals and outcomes. Plan to be submitted to the COP within 4 years of entry into force.				
Key Institutions: EPA-SL; Ministry of Mines and Mineral Resources; NMA				
Other relevant stakeholders and partners: Ministry of Trade and Industry; Ministry of Local Government and Rural Development, Ministry of Information and Communications; Local Government Councils				
Period: 2020 – 2024			Level of Priority: Medium to High	
Total Budget: 820,000 USD				
Potential risks: · Delay in honouring National Obligations resources · Lack of interest and participation of actors and stakeholders · National Emergencies (e.g. security or economic)				
Proposed activities (or group of activities)	Expected outputs and outcomes	Relevant stakeholders and international partners	Timeline	Budget estimates (USD)
Preliminary/general activities and actions to put in place				
Establish a team of experts to coordinate the formalization of the ASGM sector	Team of Experts to review existing artisanal and small-scale mining policies with the aim of formalizing the ASGM sector. Propose a new definition for artisanal and small-scale mining, review licenses fees and permit duration.	Ministry of Mines and Mineral Resources, NMA, EPA-SL, Ministry of Justice, and other line ministries	2020 - 2021	85,000
Identify a team of experts on chemical use issues, in particular the use of mercury	This team will be in charge of elaborating and putting in place relevant strategies and method for reducing the use of mercury in ASGM	Ministry of Mines and Mineral Resources, NMA, EPA-SL, Ministry of Justice, and other line ministries	2020 - 2021	60,000
Organize workshops between the different experts	Consultations on proposed policy and legal frameworks (intervention plan 1) and validation workshops of the different measures put in place.	Ministry of Mines and Mineral Resources, NMA, EPA-SL, Ministry of Justice, and other line ministries	2020 - 2021	100,000
Isolate the sites where mercury is used for amalgamation and accurately quantify the mercury used at these sites	This activity will help updating the current mercury inventory and give a more detailed overview of the use of mercury on ASGM sites.	Ministry of Mines and Mineral Resources, NMA, EPA-SL, Ministry of Justice, and other line ministries	2020 - 2021	70,000
Elaborate a strategy for enhancing the reduction of mercury in ASGM	This strategy will gather the different steps (including the use of recycled mercury) for achieving the elimination of the use of mercury for gold amalgamation.	Ministry of Mines and Mineral Resources, NMA, EPA-SL, Ministry of Justice, and other line ministries	2020 - 2021	75,000
Specific Activities				
Enhance Capacity Building and propose a Business organization of ASGM actors	Holding of stakeholders' workshop on the environmental and health risks of mercury use in the ASGM sector. Training on the development of purposeful business models. Formation of Miners Cooperatives. Capacity building of district council staff and paramount chiefs on the legal and regulatory framework with regards ASGM.	NMA, MMMR, Ministry of Trade and Industry, Ministry of Local Government, EPA-SL and other line ministries.	2020 - 2021	150,000
Strengthen the Research and Development with regards to mercury-free alternatives and better practices in the mining sector as suggested in the NAP	Institutional strengthening of the NMA, EPA Universities and the Ministry of Trade on the development of Alternative Techniques and better mining practices for Gold mining. The use of crushing, the improving of grinding as well as the perfection of the sodium borate gold washing technique and its introduction to ASGM and other better practices mentioned in the NAP should be explored.	NMA, EPA-SL, Universities, MTI	2020 - 2021	120,000
Organize Public Education and Awareness-raising campaigns	Radio Jingles and discussion, engagement of mining communities through workshops, community meetings, Billboards with pictures depicting the effects of mercury on human health, fish and the environment	EPA-SL, NMA, Ministry of Health, mobile phone companies, District Councils, Paramount and Section Chiefs, Community radios, town/village criers	2020 - 2021	60,000
Organize specific campaigns for promoting the recycling of mercury	The recycling of mercury will reduce the introduction of new mercury on ASGM sites. This could represent one of the first steps in the reduction of the use of mercury, before the introduction of mercury-free alternatives.	EPA-SL, NMA, mobile phone companies, District Councils, Paramount and Section Chiefs, Community radios, town/village criers	2020 - 2021	100,000
Monitoring	The use and practise of alternative mining techniques. Monitoring the importation and use of mercury	EPA-SL, NMA and Chiefs	2020 - 2022	100,000
TOTAL BUDGET				**820,000**

7. Mercury Mainstreaming in National Priorities in Sierra Leone

Sierra Leone has an Environmental Protection Act enacted in 2008 (amended in 2010) together with other policies on chemicals management, climate change, conservation and biodiversity. However, the country has no specific laws or policies on control and management of the use of mercury. Recent inventory on the uses of mercury and mercury products shows a wide range of mercury use and generation of mercury related wastes in the country. Unfortunately, public awareness on the dangers of mercury is low and the use of appropriate protective gears and methods of handling mercury and mercury products are not treated with the seriousness they deserve. A large portion of the country's population is either directly or indirectly exposed to harmful effects of mercury through work related activities, use of mercury containing products and the consumption of contaminated foodstuffs. The use of mercury containing beauty care products especially among the female youths within childbearing age should be a public health concern. Additionally, a number of possible contaminated sites were identified in the inventory including waste dumpsites (often used for urban gardening) and gold mining sites. Poor implementation of chemical waste management policies largely due to low manpower and institutional capacity also bears the risks of exposing laboratory staff and waste management handlers. The outcome of the MIA has shed light on the potential vulnerabilities of populations exposed to mercury and mercury containing products in the country.

There is therefore needs to develop a national policy and management strategy for the handling of mercury and mercury products in line with the provisions of the Minamata Convention. To achieve this, a broad spectrum of engagement and collaboration among International partners, government institutions, civil society groups, research institutions and the general public required throughout the process. The UN institutions involved in environmental protection and particularly the Minamata Convention will be required to give necessary financial and technical support/guidance to the process as stated in the articles of the Convention. The EPA-SL in collaboration with other line ministries including the Ministry of Health and Sanitation, the Ministry of Mines and Mineral Resources, the Ministry of Trade and the Ministry of Justice should initiate the necessary policy reforms and amend existing legal instruments on chemicals management with specific reference to mercury. Provisions for mainstreaming the Minamata Convention is detailed in the Medium -Term National Development Plan 2019 – 2023 Volume I, Cluster I Part II Sub-cluster 1.4 (Environmental Sanitation and hygiene), Cluster II Part II Sub-cluster 2.6 (Improving the Management of Mineral Resources) and Cluster III Part II Sub-cluster 3.4 (Waste Management).

The development and adoption of a National Adaptation Plan (NAP) as the key national strategy that would lay the foundation for a comprehensive roadmap in the management of mercury and related products is necessary. This plan should be broad based to cover the management of mercury use in all sectors including medicine, beauty care products, ASGM, and waste management. It should speak to the development of new regulations and standard operating procedures for the handling of instruments/equipment containing mercury in industries and laboratories. The policy on Chemicals Waste Management Plan by companies/industries must require special reporting on use, management and disposal of mercury and wastes as part of the broader environmental Impact Assessment.

The impact of mercury on fetuses and newborn babies has the potential of not only increasing mercury related health problems in the country but also has the potential to increase financial burden of the health sector on the economy. Therefore, government must adopt policies that are gear towards reducing the availability of mercury containing body care products on the market. To achieve this, government can place direct bans on products with high mercury contents or levy high tariffs on such products. This can be mainstreamed through Cluster III of Part II, Sub-cluster 3.4 (Waste Management) of the Sierra Leone's Medium -Term National Development Plan 2019 – 2023, Volume I.

In the Waste Management sector, the EPA-SL and other line ministries should develop a comprehensive waste management policy that categorizes mercury-containing waste as hazardous and requiring special handling procedures. Efforts must be made to develop remotely place landfill sites and simultaneously close the two notorious dumpsites that are currently at the centre of the city. A policy to encourage private sector investment in waste management can help sanitize the currently beleaguered waste management sector in the country. This can be mainstreamed through Cluster III Part II Sub-cluster 3.4 (Waste Management) of the Sierra Leone's Medium -Term National Development Plan 2019 – 2023 Volume I.

With new Standard Operating Procedures (SOPs) in the sector, open burning at waste sites with the potential of exposing the public to mercury fumes will be largely controlled. Although, urban gardening depends on waste dumpsites for local manure the risk of mercury bioaccumulation in vegetables in urban gardens must be thoroughly monitored and if necessary, urban garden at waste dumpsites must be curtailed.

ASGM is the biggest user of mercury in the country and urgent action must be taken to introduce new technologies devoid of the use of mercury in gold mining. The perfection of the "sodium borate gold washing technique" alongside an appropriate gold ore handling has been proposed as an alternative in Sierra Leone. With this progress achieved, the EPA-SL in collaboration with the NMA should spearhead the introduction of this alternative mining technique that does not require the use of mercury.

The achievement of a considerable outcome in the mainstreaming of the mercury priorities would require massive public education and awareness raising. Public education on the harmful effects of mercury on human health must be done in schools, mosques, churches, adult literacy programs, radio and television discussions. Media houses, municipal and district councils must be involved in the spread of the harmful effects of mercury through billboard messages, handbills, radio and television jingles. These messages must convey information about mercury in beauty care products.

Moreover, The Environment Protection Agency Strategic Plan (2017 – 2021) has been identified as relevant for integrating some activities of the intervention plans proposed in the previous chapter as presented in the table below.

Table 38 - Mainstreaming of mercury priorities in the existing National Action Plans

Objectives/targets of the National Action Plan	Description	Intervention Plan/Activity Mainstreamed
Environment Protection Agency Strategic Plan 2017 - 2021		
EPA-SL capacity to provide effective and efficient environmental protection and management services enhanced	1.1 EPA-SL governance and management structures and guidelines strengthened by the year 2021 1.2 EPA-SL staff increase (number of staff) and capacity (staff and institutional knowledge, skills and practices) 1.3 EPA-SL adequately equipped to monitor environmental parameters (air, water, noise and soil) for purposes of compliance promotion and enforcement by 2021 1.4 EPA-SL organizational, infrastructural, and logistical capacity enhanced by 2021 1.5 Enhance the Understanding of ODS Identification and management by 2021	Intervention plan 1: Legal and institutional capacity building and/or strengthening for the integration of the requirements of the Minamata • Organize trainings for both new and current staff of the EPA-SL, SLSB, CED-NRA and MTI • Provide adequate equipment and trainings for EPA-SL, MTI, CED/NRA and SLSB staff • Conduct workshops and seminars to equipped staff of EPA-SL and NRA • Establish sustainable control/monitoring systems (with competent personnel accordingly trained) to ensure the respect and application of the updated legal instruments on mercury and mercury compounds fluxes, use, emission, release, and disposal to ensure compliance with the Convention Intervention Plan 2: Phase-out of the Import, Export and/or the Production of Mercury-added Products Organize Information dissemination campaigns to promote the identified mercury-free alternatives, explaining their advantages for human health and the environment Intervention Plan 3: Phase-down of the use of dental amalgams • Organize campaigns to inform the population about the risks of dental amalgam containing mercury in order to discourage individuals from adopting health systems in favour of this practice • Intervention Plan 4: Environmentally sound management of waste, particularly mercury-containing waste • Define national guidelines on the sound management of waste, specifically mercury-containing wastes • Develop an appropriate collection and storage system for waste, including mercury-containing waste • Undertake training sessions of professionals and awareness raising campaigns targeting the civil society • Develop environmentally sound interim storage for mercury waste prior to disposal under the terms of the Basel Convention

National Environmental Protection and Management Coordination and Mainstreaming Strengthened	2.1 Environmental sustainability guidelines for the MDA's, NGOs, and CSOs for the period 2017 -2021 developed and implemented. 2.2 Sierra Leone Environmental Information Network (SLEIN) policy formulated and implemented by 2018 2.3 Natural Resources Governance Network (NRGN) established by 2017. 2.4 EPA-SL Performance and Coordination with the Governance Justice and Security Sector maintained and improved. 2.5 National Climate Change Strategy and action Plan implemented by 2021 2.6 Environmental Planning and Research in relevant thematic areas enhanced. 2.7 Enhance Pollution control and chemical management by 2021	Intervention plan 1: Legal and institutional capacity building and/or strengthening for the integration of the requirements of the Minamata · Mercury containing products (including medical devices): develop a national policy that Prohibits the production, export and import of mercury-containing products to comply with Article 4 of the Minamata Convention · Dental Amalgams: Develop a national environmental health policy on dental amalgams that enhances the phasing-down of dental amalgams with mercury · Following the prohibition of import of mercury containing products, elaborate legally-binding tools to discourage the use of the remaining products on the national territory · ASGM: update the existing policies on Artisanal Mining to include the provisions of Article 7 of the Minamata Convention · Sound Management of Waste: develop a legal framework that integrates the domestication of the Basel and the Minamata Convention (Article 11) in terms of sound management of waste · Emissions and releases: put in place national policies for enhancing the development of standards on air, water and soil quality as well as the development of adequate guidelines to reduce emissions and releases to the environment
Compliance and enforcement of environmental policy and legislative framework enhanced	2.8 Environmental Protection and Management policy and legislative frameworks (policies, plans, laws, regulations and guidelines) by 2021 2.9 EPA-SL compliance monitoring system (equipment installed, operated and data utilized in compliance and enforcement) processes by 2018 2.10 EIA tools and processes refined and mainstreamed within the development sector by 2017 2.11 Operational, legal, compliance and enforcement department strengthened. 2.12 Implementation of multilateral environmental agreements strengthened	
Education and public awareness on environmental protection and management enhanced	4.1 Education for Sustainable Development (ESD) Implementation Strategy for the period 2017 -2021 developed and implemented 4.2 Establish Regional Centers in priority areas where training regulations established in the existing public institution are fully recognized and accredited can be facilitated. 4.3 Environmental clubs supported and strengthened by the year 2021 4.4 Environmental committees of local councils strengthened by 2021 for effective local environmental protection and management functions 4.5 Partnership with local communities to facilitate effective dissemination on environmental awareness promoted 4.6 Public private partnership on environmental issues promoted	Intervention plan 1: Legal and institutional capacity building and/or strengthening for the integration of the requirements of the Minamata · Conduct capacity building and information trainings of each team according to the distribution of responsibilities. Details regarding each aspects of the Convention with regards to the national current frameworks should be given in order to emphasize the needed inputs. Intervention Plan 2: Phase-out of the Import, Export and/or the Production of Mercury-added Products · Set up awareness-raising and information exchange campaigns to exchange information with the population on the health risks of mercury-containing products (batteries, light sources, creams and soaps containing mercury and other products identified in the mercury inventory) and on the guidelines of the Minamata Convention · Organize Information dissemination campaigns to promote the identified mercury-free alternatives, explaining their advantages for human health and the environment · Medical instruments: Inform and raise awareness among the healthcare sector professionals regarding the impacts of mercury-containing materials and on the advantages of mercury-free alternatives · Encourage the collection of mercury-containing products still present on the territory with a view to their environmentally friendly recovery or disposal Intervention Plan 3: Phase-down of the use of dental amalgams · Organize campaigns to inform the population about the risks of dental amalgam containing mercury in order to discourage individuals from adopting health systems in favour of this practice · Organize information dissemination workshops/campaigns regarding appropriate measures to prevent caries and activities aiming at promoting health · Organize training workshops for dental professionals to introduce mercury-free alternatives and best management practices Intervention Plan 4: Environmentally sound management of waste, particularly mercury-containing waste · Raise awareness among the stakeholders involved and the members of the committee on the issue of rational waste management in Sierra Leone · Undertake awareness raising campaigns targeting the civil society, stakeholders and all professionals and encourage the use of any temporary deposit sites that may have been set up Intervention Plan 5: Reduction and, where feasible, elimination of the use, emissions and releases of mercury and mercury compounds in and from Artisanal and Small-scale Gold Mining · Organize Public Education and Awareness-raising campaigns · Organize specific campaigns for promoting the recycling of mercury
Cross-cutting issues mainstreamed in environmental protection and management	7.1 Youth-led initiatives on environmental protection and management facilitated by 2021 7.2 Women-led initiatives on environmental protection and management facilitated by 2021 7.3 Physically Challenged-led initiatives on environmental protection and management facilitated by 2021 7.4 Collaboration in various thematic areas with stakeholders for the effective protection and management of the environment promoted by 2021	All the intervention Plans should be considered

References

MERCURY INVENTORY

1. UNEP/MAP and MED POL. Guidelines on Best Environmental Practices for the environmental sound management of mercury contaminated sites.
2. UNEP. 2013. Minamata Convention on Mercury – Text and Annexes.
3. Environment Protection Agency – Sierra Leone (EPA-SL). 2016. National Baseline Information Report on Contaminated Sites, Sierra Leone.
4. Report by Ministry of Fisheries and Marine Resources (MFMR) and Ministry of Health and Sanitation (MoHS) - (Precon Food Management B.V.). 2014. National Monitoring Plan for Environmental Contaminants in Sierra Leone Fish and Fisheries Products.
5. Louis Barend Heunis. 2016. The Quantification of Medical Waste from the Point of Generation to the Point Of Disposal: Case Studies at Three Private Hospitals in Pretoria. Thesis submitted in accordance with the requirements for the degree of Master in Science, University of South Africa.
6. AMB - Ecosteryl. 2014. Infectious Medical Waste Treatment Solutions for Sierra Leone. Medical Waste Management.
7. Ministry of Health and Sanitation (MoHS). 2017. Annual Health Sector Performance Report 2016.
8. Ronnie A.D. Frazer-Williams, Badru-Deen Barryand Richard S.A. Latiff. 2013. Waste management at the Kingtom dumpsite and its influence on nearby aquatic environment. Department of Chemistry, Fourah Bay College, University of Sierra Leone.
9. Eldred Tunde Taylor and Satoshi Nakai. Monitoring the levels of toxic air pollutants in the ambient air of Freetown, Sierra Leone. African Journal of Environmental Science and Technology Vol. 6(7), pp. 283-292.
10. 10. Adams A Kamara and Chernor Conteh. 2015. Determination of the Physico-Chemical Characteristics of Rain Water as a Measure of Air Quality Assessment: A Case Study of the Kingtom Community, Freetown. A Dissertation Submitted to the Department of Chemistry, Fourah Bay College (USL), In Partial Fulfillment of the Requirement for the Degree of Bachelor of Science (With Honours). Bourgeosis,M,Dooms-GoosensA,KnockaertD,SprengerD,VanBovenM,Vantittelboom T.(1986).Mercury intoxication after topical application of a metallic mercury ointment.Dermatologica. 172:48-51.dio:10.1159/000249292.
11. Government of Nigeria (2017). Minamata Convention on Mercury. Initial Assessment Report for Nigeria
12. IMERC Fact Sheet (2015). Mercury Use in Lighting
13. Mercury Time to Act. Copyright © United Nations Environment Programme, 2013. ISBN: 978-92-807-3310-5
14. Wren CD, Fischer KL, Stokes PM. 1988. Levels of lead, cadmium and other elements in mink and otter from Ontario, Canada. Environ Pollut 52:193–202.
15. 1World Health Organization. 2017. Mercury and health fact sheet. World Health Organization, Geneva, Switzerland. Accessed at www.who.int/media centre

LEGAL AND INSTITUTIONAL ASSESSMENT

16. Environment Protection Agency Sierra Leone Act, 2008 amended 2010
17. National Industrial Policy, March, 2011
18. Sierra Leone Trade Policy, June, 2010
19. The Mines and Minerals Act, 2009
20. The Customs Act, 2011
21. The Mines and Minerals Act, 2009
22. Environmental and Social Regulations for the Minerals Sector, 2012
23. Artisanal Mining Policy for Sierra Leone, June 2017
24. National Environmental Health Policy, Government of Sierra Leone, 18th march, 2015
25. Child Rights Act 2007
26. Sierra Leone Water Company Act, 2017
27. National Water Resources Management Agency Act 2017
28. Public Financial Management Act 2016
29. Fiscal Management and Control Act, 2017
30. Right to Access Information Act 2013

ANNEX 1 - RELEVANT STAKEHOLDERS

First and last Names	Function	Institution/Agency/Company
Alie Dukuray Jalloh	National Project Supervisor	Environment Protection Agency
Mohamed Abdulai Kamara	National Project Coordinator & Consultant	Environment Protection Agency
Dr. Edward Hinga Sandy	Lead Consultant 2	Fourah Bay College, University of Sierra Leone
Dr. Victor Tamba Simbay Kabba	Consultant	Njala University
Dr. Eldred Tunde Taylor	Lead Consultant 1	Njala University
Anthony A. Karim	Consultant	Fourah Bay College, University of Sierra Leone
Adams Alpha Kamara	Consultant	Fourah Bay College, University of Sierra Leone
Bashiru Kargbo	Consultant	Environment Protection Agency
Dr. Nana Pratt	Committee Chair	Fourah Bay College, University of Sierra Leone
Iyesha Josiah Kamara	Committee Member	Women's Network on Environmental Sustainability
Musa M. Korje	Committee Member	Pharmacy Board Sierra Leone
Dorcas Hassa-King	Committee Member	Ministry of Agriculture and Forestry
Mohamed Jabbie	Committee Member	Leone Ccement (LEOCEM) Factory
Haroun Keh Turay	Committee Member	Ministry of Loacl Government and Rural Development
Abu B. Tarawalie	Committee Member	National Revenue Authority
Idriss S. Tejan	Committee Member	Ministry of Foreign Affairs and International Cooperation
Tamba Kamanda	Committee Member	Sierra Leone Standards Bureau
Ivorymae Coker	Committee Member	Ministry of Fisheries and Marine Resources
Abdul Rahman Parker	Environmental and Safety Officer	Freetown City Council
Alhassan S. S. Fullah	Committee Member	Ministry of Mines and Mineral Resources
Bockarie P. Sesay	Committee Member	Ministry of Health and Sanitation
Fatmata B. Jalloh	Committee Member	Climate Change, Environment Forest Conservation Consortium Sierra Leone
Mickail Turay	Director of Trade	Ministry of Trade and Industry
Stephen S. J. Jusu	Committee Member	National Minerals Agency
Jorden De Haan	Consultant/Researcher	
Oliver Wootton		UNITAR
Imelda Dossou Etui	Consultant	UNITAR
Juha Ronkainen	Consultant/Researcher	