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MINISTERE DE L'ENVIRONNEMENT, DE LA PROTECTION DE LA NATURE ET DU DEVELOPPEMENT DURABLE

REPUBLIC OF CAMEROON

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MINISTRY OF ENVIRONMENT, PROTECTION OF NATURE AND SUSTAINABLE DEVELOPMENT

Minamata Initial Assessment Report

Cameroon, 2018

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LIST OF ACRONYMS

Acronym	Definition
ASGM	Artisanal Small-Scale Gold Mining
BAT/BET	Best Available Techniques
CAPAM	Small-scale Mining and Promotion Framework Unit
CDE	Camerounaise des Eaux
CFC	Chlorofluorocarbon
CIMAF	Ciments frique
CITES	Convention on International Trade in Endangered Species of Wild Fauna and Flora
CMS	Convention on Migratory species
CREPD	Centre de Recherche et d'Éducation pour le Développement
EIA	Environmental Impact Assessment
EU	European Union
FAO	Food and Agriculture Organization
GDP	Gross Domestic Product
GEF	Global Environmental Facility
MIA	Minamata Initial Assessment
MINADER	Ministry of Agriculture and Rural Development
MINEE	Ministry of Energy and Water Resources
MINEPDED	Ministry of Environment, Protection of Nature and Sustainable Dvelopment
MINEPIA	Ministry of , Fisheries and Animal Industry
MINFOF	Ministry of Forestry and Wildlife
MINRESI	Ministry of Scientifi Research and Innovation
MINHDU	Ministry of Town Planning and Urban Development
MINMIDT	Ministry of Industry and Technological Development
NIP	National Implementation Plan
ONG	Organisation Non Gouvernementale
POPs	Persistent Organic Pollutant
PRTR	Pollutant Release and Transfer Register
PVC	Polyvinyl Chloride
QA/QC	Quality Assurance/Quality Control
REACH	Registration Evaluation and Authorization
RFI	Radio France International
SAICM	Strategic Approach to International Management of Chemicals
ASGM	Artisanal Small Scale Gold Mining
UNDP	United Nations Development Program
UNEP	United Nations Environment Program
UNIDO	United Nations Industrial Development Organization
UNITAR	United Nations Institute for Training and Research
WHO	World Health Organization

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PREFACE

I have the pleasure in presenting the Cameroonian Minamata Initial Assessment Report. This document is based on the findings of the Cameroonian National inventory of Mercury releases (Level 2) report carried out in 2017. The report aims to strengthen national decision-making toward ratification of the Minamata Convention on Mercury and build national capacity towards implementation of future provisions, equally paves the way for Cameroon to take further actions towards reducing releases and emissions of mercury and safeguarding population.

Mercury (Hg) does not only pose significant local contamination problems, but can travel long distances through the atmosphere and /or deposited in ecosystems. In aquatic systems, mercury from local and distant sources can be converted into methylmercury, a serious neurotoxin. High-dose exposure to methylmercury can lead to significant neurological damage, heart disease and fatalities. Low-dose exposure has been linked to developmental delays and neurological damage affecting brain and muscle capacity, especially in small children. Thus, mercury remains a major global, regional and national challenge in terms of threat to human health and the environment.

The Minamata Convention on Mercury is a global treaty designed to protect human health and the environment from the adverse effects of mercury. It is in this light that the Global Environment Facility (GEF) made funding available for countries that needed assistance with early ratification and implementation efforts related to the Minamata Convention. These projects funded by GEF are called Minamata Initial Assessments (MIAs). “MIA projects” aim to strengthen national decision-making towards ratification of the Convention and build national capacity for its successful implementation.

As part of Cameroon’s efforts to the Convention, the Ministry of Environment, Protection of Nature and Sustainable Development of Cameroon, with the United Nations Environment Program (UNEP) and the support of the United Nations Institute for Training and Research (UNITAR), was responsible for the implementation of MIA project to further assist Cameroon in completing pre-ratification activities under the Minamata Convention, facilitate policy and strategic decision-making and prioritize areas for future interventions on mercury related issues.

It is in this regard that an inventory of the annual mercury releases to various relevant environmental media in Cameroon, from anthropogenic sources was prepared based on UNEP Toolkit Level 2 to build national capacity around issues related to mercury releases, and chemicals management in general.

Besides the inventory activities, assessment of legal/regulatory and policy frameworks and institutional capacity for implementation of the Convention was also conducted. The assessment will help meeting the preconditions of the Convention in these regards. Based on the major gaps identified during the institutional and legislative analysis and national mercury inventory, the Ministry of Environment, Protection of Nature and Sustainable Development of Cameroon will continue working on successful implementation of the Minamata Convention at the national level. These efforts will include improvement of legal framework on management of chemicals and waste, strengthening institutional and administrative capacities for sound management of chemicals, adoption of Best Available Technology/Best Environmental Practice (BAT/BEP) standards and leading intensive awareness raising and education activities all of which will give Cameroon an opportunity to accomplish the primary objective of the Convention – protecting the environment and human health from adverse effects.

H. E. Hele Pierre
Minister of Environment, Protection of Nature and Sustainable Development

Executive Summary

The report summarizes the results of main outputs of the project "Development of Minamata Initial Assessment in Cameroon" (further referred as MIA Project). It provides the review of inventory results and policy/regulatory and institutional frameworks assessment, as well as the review of potential future interventions that target major sectors responsible for mercury and hazardous waste management in Cameroon.

I. Results from the National Mercury Inventory

The inventory was prepared in accordance with the guidance provided in the UNEP *Toolkit for identification and quantification of mercury releases* (the Toolkit) Level 2 published in 2017, which aims at assisting countries to build a knowledge base that identifies the sources of mercury releases in their country and estimates or quantifies the releases.

The total input of mercury estimated per source category, after taking the computation measures to avoid double counting of mercury inputs from waste and products, and in products produced domestically and sold on domestic market, is 21370 kg/year (this total does not represent the arithmetic sum of inputs from individual category) with the total kilograms of mercury input coming from each category of source as follows: 15564 kg for "Consumer products with intentional use of mercury", 12482 kg for "Waste incineration", 2600 kg for "Primary (virgin) metal production", 2508 kg for "Waste deposal/landfilling and waste water treatment", 702 kg for "Production of other minerals and materials", 333 kg for "Extraction and use of fuels/energy sources", 241 kg for "Crematoria and cemeteries", 118 kg for "Other intentional product/process uses, and 6 kg for "Production of recycled metals".

Results from the Level 2 inventory provided information on four different output pathways for mercury: 1) emissions to air, 2) direct releases to water, 3) direct releases to land, and 4) others. The 'other' category includes output pathways for by-products, general waste and sector-specific waste treatment. Below is a summary of mercury emissions and releases to each of these output pathways, identifying the major sectors responsible for these emissions and releases.

Emissions to air: Total mercury emissions to the atmosphere from various anthropogenic sources in Cameroon is estimated in this report to about 18314 kg per year (the reference year for the activity data used in this study is not fix but stretches between 2014-2016). From this total emission, 12 636.7 kg come from the source category "Waste incineration and burning", 2645.1 kg from the source category "Consumer products with intentional use of mercury (whole life cycle)", 2042 kg from the source category "Primary (virgin) metal production" exclusively artisanal gold production, 423.7 kg from the source category "Production of other minerals and materials with mercury impurities", 301.2 kg from the source category "Extraction and use of fuels/energy sources", 254.3 kg from the source category "Waste deposition/landfilling and waste water treatment", 9.2 kg from the source category "Other intentional product/process use" mostly dental amalgams and manometers and gauges with mercury, and 1.8 kg from the source category "Production of recycled metals".

Releases to Water: Total mercury releases from anthropogenic sources in Cameroon to water is 5355 kg per year. Consumer products with intentional use of mercury (whole life cycle) contributed the most to mercury release in water with 4729.9 kg followed far behind by Primary (virgin) metal production with 332 kg and Waste deposition/landfilling and waste water treatment with 296.3 kg. The two remaining minor sources categories are "Other intentional product/process use" and "Extraction and use of fuels/energy" sources with

46.5 kg and 9.7 kg respectively; while releases on land come mostly from three principal sources categories, namely "Consumer products with intentional use of mercury (whole life cycle)", "waste deposition/landfilling and waste water treatment", with 3236.5 kg, 1898 kg and 1186 kg respectively. The remaining minor releases sources on land being the "Ccrematoria and cemeteries", "Other intentional product/process use", and "Production of recycled metals" with 240.6 kg, 14 kg and 1.9 kg respectively.

Releases to Land: releases on land come mostly from three principal sources categories, namely "Consumer products with intentional use of mercury (whole life cycle)", "waste deposition/landfilling and waste water treatment", and "Primary (virgin) metal production" with 3236.5 kg, 1898 kg and 1186 kg respectively. The remaining minor releases sources on land being the "Ccrematoria and cemeteries", "Other intentional product/process use", and "Production of recycled metals" with 240.6 kg, 14 kg and 1.9 kg respectively.

Releases to general waste: The main annual output of mercury to the general waste stream in Cameroon occurs from the source category "Consumer products with intentional use of mercury (whole life cycle)" with 5106.9 kg. The three remaining minor source categories being "Other intentional product/process use", "Waste deposition/landfilling and waste water treatment", and "Production of recycled metals" with 27.4 kg, 35.4 kg and 1.8 kg respectively.

Releases to by-products and impurities in products: Estimate total annual mercury carried on as by-products and impurities in products in Cameroon is 205 kg from four sources categories, namely "Production of other minerals and materials with mercury impurities" with 142.9 kg/year, "Primary (virgin) metal production" with 40 kg/year, "Extraction and use of fuels/energy sources" with 17.6 kg/year, and "Other intentional product/process use" with 4.8 kg/year.
Estimate annual mercury output to sector specific treatment/disposal is 252 kg from six source categories as follow: "Production of other minerals and materials with mercury impurities" with 135.4 kg, "Waste incineration and burning" with 44.2 kg; "Consumer products with intentional use of mercury (whole life cycle)" with 28.1 kg, "Waste deposition/landfilling and waste water treatment" with 23.6 kg, "Other intentional product/process use" with 15.9 kg, and "Extraction and use of fuels/energy sources" with 4.6 kg.

II. Policy, regulatory and institutional assessment

While Cameroon has signed the Minamata Convention, it was yet to ratify it. The policy, regulatory and institutional assessment identified systemic gaps that may impede the successful implementation of the Convention at a national scale. Regulations increased institutional capacity, and improved coordination among and between stakeholders will be critical for the successful implementation of the Convention. Some of the primary gaps identified through this component of the MIA include:

- the need to revise the Mining Code that would appropriately prohibit any future primary mercury mining and adequately addresses potential releases of mercury associated with tailings from processed ore.
- Absence of regulation and relevant institutional mechanisms for regulation of interim storage of mercury and mercury compounds, other than mercury wastes
- The Environmental Impact Assessment and regulation on Air Protection should be strengthened to incorporate provisions associated with Best Available Technology/Best Environmental Practice (BAT/BEP) standards that will help the country comply with Article 8 of the Convention.

- ❖ Cameroon's regulation on Transboundary Movement of Hazardous Wastes and the Waste Management Code together provide a structure for effective compliance with Articles 10 and 11 of the Convention. However, a lack of and human to monitor the transboundary movement of hazardous wastes and facility for the environmentally sound interim storage of mercury- wastes presents a challenge for the implementation of these Articles.
- ❖ Given the diversity of products to which mercury is added (including assembled products), it is recommended to adopt a law on chemicals and waste from which specific regulations covering the life cycle of mercury added products shall be derived.
- ❖ Within a Joint Order No. 005/MINEPDED/MINCOMMERCE of 24 October 2012 on electrical electronic equipment, legal limits on the mercury content in relevant components of electrical and electronic equipment should be set to facilitate controls during import or inform their sound disposal at end of useful life., assuming that these are controlled by customs department when imported.
- ❖ It was generally accepted by the team of consultants and members of the Steering Committee that there is an overall lack of public awareness about the risks associated with mercury exposure in Cameroon. An awareness raising campaign will be a key component of any future ratification and implementation activities.

III. Priority areas adopted for implementation of the Convention in Cameroon

The priority areas identified for the implementation of the Minamata Convention on Mercury in Cameroon are derived from the major gaps in information identified during the institutional and legislative gap analysis, national mercury inventory potential synergies between the Minamata Convention and other chemicals conventions (e.g., Basel and Stockholm). The MIA project implementation helped to considerably advance the ratification process of the Minamata Convention which is imminent; therefore, the priority actions will target areas where rapid progress can be made in a cost-effective way.

Areas of Intervention

In order to better assist Cameroon with meeting the overall goal of the Minamata Convention, at least six key areas of intervention have been identified and adopted by the key stakeholders. These include:

- Environmentally sound management of mercury containing waste including the development of interim storage;
- Developing and implementing an ASGM national action plan
- Take measures to phase down the use of dental amalgam and other mercury products
- Strengthening the legal and institutional framework;
- National Capacity building, education and awareness on mercury pollution and the Minamata Convention;
- Improve Monitoring and Reporting Capacity on Mercury levels in food, soil, water and air.

INTRODUCTION

Mercury is a naturally occurring substance with a density of 13.546 g-cm-3 (200c)atomic number 80. It has long been used in thermometers and batteries before being banned in 1999 in many countries. It is recognized as a chemical of worldwide concern because of its long-range transport in the atmosphere, its persistence in the environment, its ability to bioaccumulate in ecosystems and more significantly over the years.
Mercury is a highly toxic heavy metal that poses a threat to human health and the global environment. With its various compounds, it presents a series of serious effects on health and is particularly harmful for the nervous system, thyroid, kidneys, lungs, immune system, eyes, gums and skin. It can cause memory loss or language problems, and the damage it causes to the brain is irreversible. There are no levels of exposure to elemental mercury that are safe for the human body, with effects that can be seen even at very low levels. Fetuses, newborns and children are among the most vulnerable and most sensitive to the harmful effects of mercury.

The Minamata Convention on Mercury was adopted by the Conference of Plenipotentiaries on 10 October 2013 in Japan by 128 countries including Cameroon who actively participated in all the five intergovernmental negotiating committees under the auspice of UNEP. Cameroon signed the treaty in September 2014 and is in the process of it ratification. The Minamata Convention on Mercury entered into force on 16 August 2017 and held its first conference of the Parties meeting from 24-29 September 2017. There are currently 92 Parties to the Minamata Convention. The Convention is so named after tribute to many lives lost in the Minamata Bay in Japan, where between 1932 and 1968, thousands of people were poisoned by industrial effluents contaminated with mercury, victims were found demonstrating paralyzing symptoms of a new disease that would later be called the Minamata disease.

Mercury circulates throughout the world through the environment, even in particularly remote places like the aArtic. No country can control the transboundary effects of mercury alone: international cooperation is the only way to combat this scourge. With the adoption of the Minamata Convention, the international community has taken a decisive step in the fight against emissions and releases of mercury, the threat it poses to the environment and the health of millions of people worldwide.

What are the objectives and main obligations of the Minamata convention?

The objective of the Minamata Convention is to protect human health and the environment from anthropogenic emissions and releases of mercury and mercury compounds. To this end, its provisions cover the entire life cycle of mercury, including the control and reduction of a wide range of products, processes and industries that use, release or emit mercury. The convention also deals with the primary mining of mercury, its export and import, its safe storage and its disposal as waste. Identifying at-risk populations, improving medical care and training health professionals in the identification and treatment of the effects of mercury will also contribute to the implementation of the Convention.
The convention has 35 articles and 5 annexes, which can be divided into four main categories namely:

- Operational provisions, which describe the parties' obligations to reduce anthropogenic emissions and releases of mercury and mercury compounds to the environment, covering the entire life cycle of mercury:
- Supports to parties,
- Information and awareness,
- Administrative aspects

I. Operational provisions,:

A. Mercury trade and supply

Article 3 regulates the conditions of supply and trade in mercury.
Authorization of a new primary mining is prohibited from the entry into force of the Treaty and existing mines must be closed at the latest 15 years after the ratification of the convention. During this period, mercury from to these mining cannot supply the artisanal and small-scale gold mining sector.

The Parties are encouraged to identify existing mercury stocks beyond fifty tons as well as the sources generating more than ten tonnes of mercury per year. Binding provisions are also planned for the management of mercury from the dismantling of the production facilities of chlorine-alkali using a process to mercury. The trade of mercury will be the subject of a "written consent" procedure and will be limited to use in line with the provisions of the convention. The import coming from non-Party States will be subjected to the production by these Parties of a certification proving the origin of mercury.

B. Use of mercury in industry

Articles 4, 5 and 6 establish the conditions for the use of mercury in products and in industrial processes. They establish a list of products and industrial processes prohibited from a deadline date as well as lists of products and processes for which the use of mercury must be restricted in the absence of economically and technically viable alternatives.
These provisions may be the object of exemptions, for a period of five years, renewable once on request to the Conference of the Parties.
Article 7 obliges the Parties where ASGM is more than significant and is based on amalgamation of mercury to extract gold from ore to take measures to reduce and if possible eliminate the use of mercury under this activity.

C. Discharges and storage

Articles 8 and 9 detail the obligations of the Parties concerning the control and, to the extent possible, the reduction of mercury emissions to air and releases of mercury to land and water. To this end, the Conference of the Parties will establish guidelines on inventories and best available techniques. Regarding air emissions, Parties will take measures to reduce them and will be able to voluntarily establish national action plans for this purpose. For the five sources of mercury listed in Annex D, the construction of new facilities must necessarily be accompanied by the application of best available techniques. For releases to soil and water, article 9 requires the Parties to make an inventory of the sources of significant mercury and take certain actions. An update inventory of the sources of mercury will also be maintained by the Parties.
Articles 10 and 11 give details on the obligations of the Parties concerning the environmentally sound mercury and mercury waste storage management. In the absence of specific elements in the text, the Conference of the Parties should adopt binding provisions for the management of mercury waste and waste containing mercury and may also extend this to the storage of mercury for use allowed by the convention. The guidelines developed by the Basel convention on the transboundary movement of hazardous waste will be the basis to define the conditions of imports and exports of such waste.
Article 12 encourages Parties to develop appropriate strategies to identify and evaluate sites contaminated by mercury. The Conference of the Parties will adopt guidance on the management of contaminated sites.

II. Support to parties,

D. Financing and implementing committee

Article 13 details the financial mechanism for the Minamata Convention on mercury which will be intrusted by the Global Environment Facility (GEFthat provides "new, predictable and adequate financial resources to cover the costs of assistance to the implementation" of the Minamata convention. A specific international program, provided on a voluntary basis and that the host institution will be referred to the first Conference of the Parties will also be established in order to support the strengthening of capacity and technical assistance.

Article 14 calls on the Parties to cooperate "in order to provide, within their respective capabilities, a capacity-building and technical assistance" to developing countries, in particular by means of bilateral cooperation and partnerships, including with the private Japan sector or in connection with other multilateral environmental agreements on chemicals and waste. The Parties shall also promote alternative environmental technologies, in particular in least developed countries and small island States, in order to strengthen their capacities to implement the convention. The Conference of the Parties will have to make recommendations on the implementation of this article and its improvement.
Article 15 establishes, upon entry into force of the convention , an implementation and Compliance Committee, composed of 15 members elected by the Conference of the Parties. It may wish to discuss on the basis of written communications transmitted by any party with respect to its compliance, national reports submitted pursuant to article 21, and the requests made by the Conference of the Parties.

E. Health aspects

Article 16 is dedicated to the Heath aspect of the convention . It encourages the Parties to identify and protect populations at risk, promote and implement programs of education and prevention on occupational exposure to mercury, promote appropriate health care services to prevent and treat the affected populations and implement, or strengthen institutional capacities and means of health professionals on issues related to mercury. The Conference of the Parties will work on these issues in partnership with the World Health Organization, the International Labour Organization and other intergovernmental organizations competent.

III. Information and awareness,

F. Information exchanges and cooperation

Article 17 specifies the modalities of the convention concerning the information exchange. Parties are encouraged to facilitate the information exchanges on mercury and its compounds. In this sense, the Secretariat facilitates the information exchanges between the Parties and with the Secretariats of other relevant organizations. Each Party shall designate a national correspondent for the exchange of information under the terms of the Convention.
Article 18 encourages Parties to facilitate the dissemination of information, awareness and education of the public to the issues related to mercury and its compounds, through existing mechanisms such as the registers of releases and transfers of pollutants, or that need to be created.
Article 19 calls on the Parties to cooperate to develop and improve the research and monitoring on uses, consumption, emissions to air and discharges to water and soil of mercury

G. Implementation and assessment

Article 20 indicates that, on a voluntary basis, Parties may submit to the Secretariat their national implementation plans to fulfil their obligations under the convention. These plans will be forwarded to the Conference of the Parties for recommendations and be the subject of consultations between the Parties.
Article 21 obliges the Parties to submit a report to the Conference of the Parties on the measures they have taken to implement the provisions of the convention. The first Conference of the Parties has already decided on the periodicity and the presentation of these reports.
Article 22 stipulates that the Conference of the Parties will evaluate the effectiveness of the convention of Minamata, no later than six years after its date of entry into force (about 2022), on the basis of the information available.

IV. Administrative aspects

H. The conference of the parties, secretariat and internal procedures

Article 23 establishes the Conference of the Parties which the first meeting has been convened by the Executive Director of UNEP in 2017 after the entry into force of the convention. Cameroon attended the COP1 as observer country.
Article 24 establishes a Secretariat whose role will be particular to organize the meetings of the Conference of the Parties , to facilitate the provision on request of assistance to the Parties, to support the Parties in exchanging information about the implementation of the convention. The Secretariat will act under the auspices of UNEP. Coordination and cooperation between the Secretariat and the secretariats of other conventions on chemicals and waste may be considered. The Executive Secretary of Minamata Convention was appointed in April 2018.
Article 25 details the procedure to adopt in the case of dispute settlement : arbitration, in accordance with the procedure set out in Annex E, or a referral to the International Court of Justice may be required.
Article 26 provides that an amendment to the convention will be adopted at a meeting of the Parties , by consensus or, by a three-quarters majority vote of the Parties present and voting if there is lack of consensus. The amendment will enter into force on the ninetieth day after the ratification by three-quarters or more of the Parties that were Parties at the time when the amendment was adopted.
Article 27 States that the annexes of the convention are an integral part of the Treaty and that the additional annexes adopted after the entry into force of the convention will only deal with procedure or scientific, technical or Administrative matters. The procedure described in article 26 applies for the adoption of an amendment to an annex. The amendment then take effect one year after its adoption, except for the parts that are being notified by the Secretariat within this period.
Article 28, on the voting procedures, States that each State party has one vote. The regional economic integration organizations, like the European Union, benefit, in their area of competence, to a number of votes equal to the number of their Member States that are Parties to the convention.

I. Membership

Article 29 opened the Minamata Convention to the signature by all States and regional economic communities until October 2014. Articles 30, 31, 32 and 33 specify modalities for ratification, entry into force, reservations and withdrawal of the convention. The Minamata Convention entered into force the 90th day after the deposit of the fiftieth instrument of ratification. No reservation may be made to the convention. A withdrawal can be obtained, one year after the receipt of the notification of withdrawal by the depositary of the convention.
Article 34 designates the Secretary-General of the United Nations as depositary of the Minamata convention on mercury. Article 35 make authoritative the convention texts in English, Arabic, Chinese, English, french and Russian.

Mercury Initial Assessment

In the course of 2016-2017 and in a bit to support Cameroon's effort to ratify the Convention, UNEP with a financial support of GEF implemented a project called: "Development of Minamata Initial Assessment in Cameroon" (referred to as MIA project).
The intervention envisaged achievement of four major outcomes of the Convention

- Cameroon makes full use of enhanced existing structures and information available dealing with mercury management to guide ratification and early implementation of the Minamata Convention.
- Full understanding of comprehensive information on current infrastructure and regulation for mercury management enables Cameroon to develop a sound roadmap for the ratification and early implementation of the Minamata Convention.
- Enhanced understanding of mercury sources and releases facilitating the development of national priority actions

- Improved understanding of national needs and gaps in mercury management and monitoring enables a better identification of future activities
- Cameroon's key stakeholders made full use of the MIA and related assessments leading to the ratification and early implementation of the Minamata Convention on Mercury

This Minamata Initial Assessment (MIA) report for Cameroon is a final deliverable of the project that contains general country background, findings of legal-regulatory and institutional gap analysis for mercury management and mercury inventory, initial recommendations for the legal-regulatory and capacity development measures to be implemented for ratification and implementation of Minamata Convention in the country and, mercury-related health and public information aspects and the action plan

The report has been developed with contribution of following experts:
1. Mr. ENOH Peter, Project Coordinator;
2. Mr LEMNYUY Albun William BANYE, National expert for MIA report;
3. Dr. KUEPOUO Gilbert, National expert, mercury inventory team leader;

At the initial stage of the project, a Project Steering Committee was established (see annex III) composed of representatives of the Ministry of Environment, Natural Protection and Sustainable Development (MINEPDED) Ministry of Mines, Industry and Technological Development (MINMIDT), Ministry of Economy, Planning and Regional Development (MINEPAT), Ministry of Agriculture and Rural Development (MINADER), Ministry of Livestock, Fisheries and Animal Industries (MINEPIA), Ministry of Labour and Social Security (MINTRAVAIL), Ministry of Water and Energy (MINEE), Ministry of Public Health (MINSANTE), Ministry of Housing and Urban Development (MINDHU), and Ministry of Scientific Research and Innovation (MINRESI), Ministry of Finances (MINFI), Cameroon Mining Sector Technical Assistance Project (PRECASEM), Support Framework for Small Scale Mining (CAPAM) and Representatives of other sectors, such as industry and industrial associations (GICAM), Cameroun Chamber of Commerce, Industry, Mines and Crafts, National NGOs such as CREPD working on the environmental field, particularly on chemicals and waste, and Private companies.
This large group of mid to technical level decision makers and, academic and civil society sector representatives participated in discussions of results/findings under each major milestone of the project, including legal-regulatory and institutional gap analysis, initial mercury inventory, development of legal and institutional recommendations for enabling the country to implement the Convention and, provided their feedback on the produced technical reports (Please see Annex I for the list of stakeholders/the members of Steering Committee). It is supposed that this consultative body will be maintained after the Ratification of the Convention and its implementation for better interagency coordination, stakeholder participation and provision of technical advice to key decision-makers.
In order to develop the various substantive parts of MIA, the experts' team took into consideration previous efforts made to collect information on national mercury sources and releases to improve the sound management of mercury and mercury waste including expertise gathered by some countries that had developed their MIA reports and carried out:

1. desk review and gap analysis of all national laws, sub-laws, technical guidance/methodologies and policy documents regulating hazardous chemicals and waste management and mercury lifecycle management;
2. comparative analysis of provisions of Minamata Convention and national legislation and policies;
3. survey of key stakeholders, their current capacities and capacity needs based on questionnaires and vis-à-vis semi-structured interviews;
4. survey of key data sources and data needs;
5. mercury inventory, applying UN Environment's Toolkit's Level 2 inventory approach and using
6. input data acquired from the National Institute of Statistics, various Ministries and specialized agencies, industries, dental clinics, etc.;
7. desk review of existing literature on health impacts of mercury exposure

CHAPTER I: NATIONAL BACKGROUND INFORMATION

Cameroon is located between Latitude 2° N to 13° N; Longitude 8° 25° E and 16° 20° W Nd found in Central Africa. It opens to the Atlantic Ocean in the West with a total coastline of 402 km. It is bounded to the west by Nigeria, north-east by Chad, south by Gabon, Congo and Equatorial Guinea and to the east by Central African Republic. From the Gulf of Guinea to Lake Chad, the country forms a triangle with a surface area of 475 650 km^2. (NIS 2012)

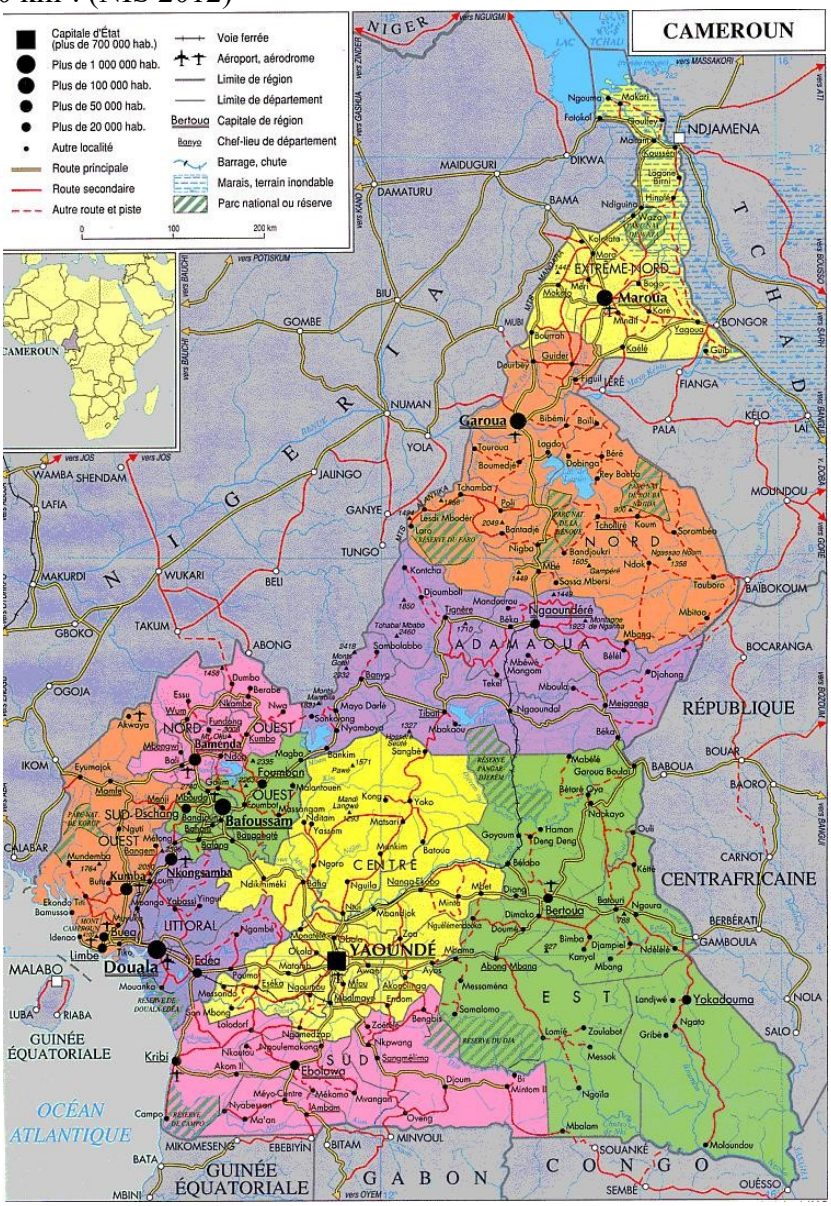


Figure 1: Administrative map of Cameroon (Sources: NIP Cameroon (2012))

1.1. Description of the national situation

Cameroon is a country of sub-Saharan Africa with a surface area of 475 650 km^2 and a population of 23 million inhabitants of which nearly 54% reside in urban area according to the Central Census Office. Cameroon's income is mainly from agriculture, the exploitation of the riches of the sub-soil and forest

resources. The industrial and services sectors are rapidly expanding or in full growth and the long-term of development orientations of the country are reflected or enshrined in a reference document called "Growth and Employment Strategy Paper" (GESP). The informal sector is dynamic in Cameroon and still uses polluting technologies and practices in the various branches of industry. Great climatic diversity induces a diversity of vegetation spanning from steppe in north to wet dense forest in the South, while transiting through the savanna. This climatic diversity encourages a range of modes and types of crops which makes Cameroon the bread basket of Central Africa. Despite the existence of the densest hydrographic network in Africa and its potential of development of hydro-electric dams, Cameroon still resorts to the construction of power stations operating with fossil energy to meet the energy demand of its populations.

1.1.1. Political and administrative organization

Cameroon is a bilingual[3] country. It got its independence on 1st January 1960 for East Cameroon placed under French administration, and 1st October 1961 for West Cameroon
under British administration. On 20 May 1972, following a referendum, the Federal Republic of Cameroon made way to a unitary State. Then in 1983, the United Republic of Cameroon became the Republic of Cameroon. After a long period of single party regime shortly after independence, multipartism was reintroduced by law 90/053 of 19 December 1990 to organize political parties.
Executive power is exercised by a President of the Republic elected by the direct suffrage or vote for a seven-year renewable term of office. The legislative power is exercised by Parliament which is made up of two houses: The National Assembly made up of 180 members of parliament elected by direct vote for a 5 years renewable mandate and the Senate which has 100 members, that is 10 members per region of which 3 are appointed by the President of the Republic and 7 others are elected officials by indirect suffrage by a regional electoral college.
The Cameroon Peoples' Democratic Movement (CPDM), the party in power, has a large
majority in the National Assembly since 2007 approximately equivalent to 5/6 of seats. The remaining seats are distributed among the four opposition parties: The Social Democratic Front (SDF), the Cameroon Democratic Union (CDU), the National Union for Democracy and Progress (NUDP), the Union of the Populations of Cameroon (UPC). Judicial power is vested on a set of jurisdictions at the helm of which is the Supreme Court.

There is also the Economic and Social Council and an Accounts Bench. The Constitution of January 1996 in addition provides for a Constitutional Council which has just been set up in February 2018. Since Decree 2008/376 of 12 November 2008 to create Regions, the national territory, is subdivided into 10 Regions, 58 divisions, 361 sub-divisions placed respectively under the authority of governors, senior divisional officers and sub-divisional officers. The decentralized technical services of the State are represented at these various levels of administration. Laws Nos. 2004/016, 2004/017 and 2004/022, to lay down orientations of decentralization, attributes to local authorities, autonomy in the management of the territory and natural resources. Decrees of implementation were signed to transfer to these Decentralized Local Authorities the means necessary to carry out their actions. The main stakeholder in matters relating to environmental Protection is the Ministry of Environment Protection of Nature and Sustainable Development (MINEPDED).

1.1.2. Demographic context

Estimated at 17 123 688 inhabitants during the third general census of the population and Housing in November 2005 with a demographic growth rate of 2.8% per annum, the population of Cameroon was estimated at 23 million inhabitants in 2015. It is estimated to reach 26.5 million in 2020 according to projections of the GESP. This population is primarily young, those who are less than fifteen years account for 45% of the population against 3% for old people of more than sixty-five years. The women constitute approximately 50.5 % of the population (table No. 2).

Table 1 :Evolution of the population (in million) of Cameroon per sex

Year Population	2005	2010	2015	2020
Women	8.6	10.1	11.6	13.4
Men	8.5	9.9	11.4	13.1
Total	17.1	20	23.0	26.5

Source: BUCREP and GESP projection (2009)

1.1.3. Economic situation

The country has several natural resources such as: petroleum and natural gas, bauxite, iron, timber, hydro-electric power, cobalt, nickel, manganese, diamond, and many other resources.

The rural sector remains the engine of the national economy both for its contribution to the GDP (45% in 2009) and the ripple or spillover effects of on the other sectors. It occupies more half of the working population. Breeding is significant in the Adamawa massive and the savannas of North. The industrial sector occupies approximately 8.9% of the working population and contributes to 27.6% of the GDP.

Since 2008, Cameroon has witnessed high economic growth. The Cameroon economy has made sustained great strides since 2010, thanks to the export driven sectors. The growth rate of the GDP was estimated at 4.2% in 2011 (against 2.9% in 2010), in spite of a drop-in oil production. This evolution reflects the dynamism of activities in food products, building, public works, as well as in the tertiary sector.

Inflation was contained below 3% in 2011, although it is on the rise compared to 2010 (1.3%). This increase is explained by a rise in the prices of foodstuffs of about 4.7% in 2011. Inflationary pressures were however limited by the price freeze of petroleum products and electricity and the actions of the Mission for the Regulation of Procurement of Consumer Products (MIRAP). The deficit of the external current account remained stable around 3%.

The GESP, aims to: take growth to approximately 5.5% on annual average for the period 2010-2020; bring down under-employment from 75.8% to less than 50% in 2020 with the creation of tens of thousands of formal jobs per annum for the next ten years; bring down the monetary poverty rate from 39.9% in 2007 to 28.7% in 2020; attain all the millennium development goals (MDGs) by 2020.

In the area of infrastructure, the country has approximately 10% of asphalt paved roads, on a total of 50 000 km of linear. The railway network adds up 1016 km of railways. Cameroon has several ports of which the most significant are those of Douala and Limbe. There is also a seasonal river port in Garoua (on the Benoué river). The project for the construction of a deep seaport in Kribi is under execution. There are also 3 international airports (Douala, Yaoundé Nsimalen and Garoua).

1.1.4. Synthesis of the socio - economic data of Cameroon

Table 2 :below gives the synthesis of the socio-economic data of Cameroon

Surface area	475650 Km2
Population	23 000 000 inhabitants in 2015
Urban population	12 420 000 inhabitants in 2015, that is 54% of the total population
Administrative capital	Yaoundé
Official Languages	French and English
Bordering countries	Chad in the North East, Central Africa Republic in the East, Nigeria in the West, Congo, Gabon and Equatorial Guinea in the South
Relief	High lands (Cameroonian dorsal) Plains (coastal littoral, part of North and Far North Regions

Hydrography	Dense (2nd in Africa). Sanaga is the longest river (920 km)
Vegetation	Varied (forest, savanna and steppe) 2nd forest massive in Africa.
Climate	Equatorial in the south and tropical in the north Alternating dry season and rainy or wet season
Political organization	Unitary decentralized state
Administrative organization	10 Regions, 58 Divisions, 360 Sub-divisions and 374 Councils and urban or city councils
Currency	CFAF (1Euro = 655,957 CFAF)
GDP	51.61 billion USD (2012)
GDP/inhabitant	2 400 USD (2012)
Real average growth rate of GDP	4.1% between 2008 and 2014
Inflation rate	2.7% on average between 2008 and 2014
Literacy rate (2011)	75%
Population growth rate	2.2% per annum after 2012
Poverty rate	37.5% in 2014
Primary school attendance rate	87% in 2014
Life expectancy at birth	54.8 years in 2005
Quotient of infant-juvenile mortality (for 1000 life births)	122 in 2011
Report of maternal mortality (for 100 000 life births)	782 in 2011

Source: MINHDU, 2016. Report of Cameroon for Habitat III

Relief and the resources of the subsoil

The relief is generally mixed: there are highland areas unevenly distributed throughout the country surrounded by narrow plains. This topography is sometimes the cause of poor external drainage of certain soils (lowlands, valleys, closed depressions). Poor drainage can also be internal to the soil due to the presence of impervious levels at depth of the profile like ferralitic crusts and cuirasses. Mount Cameroon, which rises to 4095 meters above sea level, is the highest peak in the country. In addition, the Cameroonian subsoil has riches whose exploitation is on the rise. This subsoil contains mineral resources such as oil, natural gas, iron, tin, bauxite, nepheline syenite, rutile, limestone, gold, diamond, cobalt and nickel which are undeveloped. There are, for example, three coastal sedimentary basins: the Rio Del Rey, Douala and Kribi-Campo where hydrocarbons (liquid and gaseous) have been discovered.

Since the year 2000, the gold mining sector in Cameroon has experienced tremendous growth. This is thanks to the increased efforts by the government to encourage large firms to invest in the gold sector and equally because of the gold price that tripled or even quadrupled since 2000. In 2011, the ministry of mines in conjunction with several mining companies and the small-scale miners common initiative groups started the 'Operation Gold' initiative to transform the existing informal mining into formal mines

This initiative resulted in the discovery of six new gold deposits in the North West and South West regions. This was done by the government under the Small-scale Mining and Promotion Framework Unit (CAPAM) which has been working to promote industrial gold production.

These new gold fields include Misaje, Bipindi-Lolodorf, Batouri, Sangmelima, Mamfe, Ebolowa, and Okala. The US Geological Survey puts the annual gold production in Cameroon at 10,000kgs with hopes that the increased interest from commercial gold mining firms will further improve their output.
The major energy sources in Cameroon are petroleum, coal and hydropower, biofuels and waste and their percentage distribution are shown in Fig 2. In terms of electricity, 75% of the Cameroon's electric power is obtained from hydropower schemes while the remaining from other renewable energy sources. The hydro schemes estimated at721 MW hydro scheme, were obtained from an installed capacity of approximately 1000 MW.

The real number of productive oil fields in Cameroon is unknown, but most of production is accounted for by offshore fields located in the Rio del Rey basin, South West of Cameroon. The combined production is a mixture of crude oil (52%) and natural gas liquids, condensates and naphtha (48%), with a total production in 2014 of 3,850,000 tons.

Country Environmental Overview
Importance of the environment in development policies and strategies
In the preamble of the Constitution of Cameroon, it is stipulated that in Republic of Cameroon, the environment constitutes a common heritage of the nation. It is an integral part of the universal heritage. Protection of the environment and the rational management of resources which it offers to human life is of general interest. This aims the geosphere, hydrosphere, atmosphere, their material and immaterial contents, as well as the social and cultural aspects thereof.
The President of the Republic defines the national environment policy. Its implementation is the responsibility of Government which applies it, in conjunction with Regional and Local Authorities, grassroots communities and environmental protection associations. To this end, the Government develops national strategies, plans or programs intended to ensure the conservation and sustainable use of resources of the environment.
It is in this vein that three priority programs were developed by the Ministry of Environment, Protection of Nature and Sustainable Development to meet the current environmental imperatives. These programs are related to desertification and climate change, the sustainable management of biodiversity, pollution control, nuisances and harmful and/or dangerous chemicals.
One of the objectives of the Growth and Employment Strategy Paper (GESP) of Cameroon is to attain, by 2020, the MDGs No.7 " ensure a sustainable environment by reducing by half the proportion of the population without sustainable access to safe drinking water and basic sanitation, achieve significantly the improvement in habitat by integrating the principles of sustainable development in national policies and reverse the current trend of the loss of environmental resources".
Cameroon adhered to several international initiatives, in fact to about thirty multilateral, regional and sub-regional Conventions about sustainable development and environmental protection, in particular on biodiversity, climate change, desertification, protection of the ozone layer, nuclear power, persistent organic pollutants, etc.
Pegging the battery of legal instruments of Cameroon to international mechanism relating to environment related topics is effective. This adherence provides Cameroon with a variety of opportunities related to the

management and valorization of cultural heritage and related natural resources, but also offers a framework for the development of sustainable agriculture and setting up of mechanisms to check desertification.
The need for an efficient management of natural resources in particular, energy and mineral resources, led to the development of many laws in the area. However, the first texts with actual environmental connotation date back to the end of the 80s and relate to the management of toxic waste. The legal arsenal as regards environment was enriched in 1996 by the framework law relating to environmental management, and other sector laws.
The implementation of the environmental legal framework was faced with major challenges related to the insufficiency of implementation texts which had to specify the details of execution of the legislative provisions. The implementation texts signed by the executive (Decrees, Orders, Decisions, Circulars) are intended to provide suitable indications for the application of the sectoral laws or framework law.

The country is a party to the following Multilateral Environmental Agreements (MEAs) listed in Table 3 below and is also an active participant in the voluntary global initiatives and policy frameworks listed in

Table 3: Cameroon and Multilateral Environmental Agreements

s/n	MEA	Date entry into force	Cameroon Ratification	Cameroon Accession
1	Convention on Biological Diversity, Rio de Janeiro,	05/06/1992	29/08/1994	
2	UNFramework Convention on Climate Change, and its Kyoto Protocol, Rio de Janeiro,	04/06/1992	19/10/1994	
3	United Nations Convention to Combat Desertification	17/06/1994	29/08/1994	
4	Convention on International Trade in Endangered Species of wild plants and animals (CITES),	03/03/1973	05/06/1981	
5	Convention on Wetlands of International Importance especially as Waterfowl Habitat (Ramsar),	02/02/1971	11/01/2006	
6	Bonn Convention on Migratory Species of Wild animals (CMS),	23/06/1979	01/11/1983	
7	Convention on the Protection of World Heritage, Culture & Nature	16/12/1972	07/12/1982	
8	United Nations Convention on the Law Of the Sea (UNCLOS),	10/12/1982	19/11/1985	
9	International Convention on Oil Pollution Preparedness, Response and Co-operation (OPRC),	21/11/ 1973	24/12/1998	
10	International Convention Relating to Intervention on the High Seas in Cases of Oil Pollution Casualties Intervention Convention,	29/11/1969		09/03/1984
11	International Convention on the Establishment of an International Fund for Compensation for Oil Pollution Damage,	18/12/1971	12/08/1984	
12	Convention on the protection the Ozone layer.	22/03/1985		30/08/1989
13	Convention on Assistance in Case of Nuclear Accident or Radiological Emergency	26 /09/1986	07/02/2005	
14	Convention on the Control of Transboundary Movements and Disposal of Hazardous Wastes.	23/03/1989	11/02/2001	
15	Convention on the Procedure for Prior Informed Consent relating to Chemical products and Dangerous commercial pesticides (PIC),	11/09/1998	20/05/2002	
16	Convention on Persistent Organic Pollutants (POPs), Stockholm	22/05/2001	20/05/2002	
18	International Treaty for Plant Genetic Resources for Food and Agriculture (ITPGRFA)	03/11/2001	19/12/2005	
19	Montreal Protocol on the Control of ChloroFluoroCarbons (CFC)	11/12/1997	17/05/2004	
20	Montreal Protocol on substances that deplete the Ozone Layer	1987	30/08/1989	
21	Cartagena Protocol on Biosafety	23/01/2000	20/02/2002	

Table 4: Regional Agreements

N°	MEA	Date entry into force	Ratification	Accession
1.	The BSB Yamoussa Convention (Cam-Chad-RCA	2013		
2.	The TRIDOM Accord	2005		
3.	The TNS Accord	2000		

4.	Treaty of the Commission of Ministers of Forest of Central Africa for the Conservation and Sustainable Management of Forest Ecosystems (COMIFAC)	2000		
5.	The Yaounde Declaration	1999		
6.	Convention on African Migratory Locusts, KANO/Nigeria,	1994		
7.	Nairobi Convention on Climate Change, Nairobi,	1992		
8.	The BSB Yamoussa Convention (Cam-Chad-RCA	2013		
9.	Bamako Convention on the ban on the Import into Africa and the Control of Transboundary Movement and Management of Hazardous Wastes within Africa, Bamako,	1991	01/03/1991	
10.	The Libreville/Gabon Agreement on co-operation and dialogue between the States of Central Africa on the conservation of wild fauna.	1983		
11.	Abidjan Convention relating to cooperation in the domain of protection and valorization of marine and coastal zones of West and Central Africa,	1981		01/03/1983
12.	Abidjan Convention on Cooperation in the fight against marine pollution in emergency situations	1981	01/03/1993	
13.	Convention for the Creation of the Niger Basin Authority, Faranah/Niger,	1980		
14.	Niger Protocol on Fund for Development of the Niger Basin, Faranah,	1980		
15.	The ENUGU/Nigeria Agreements relating to fauna and flora in the conventional basin of the lake Chad,	1977		
16.	The Yaounde Agreement for the creation of the development funds of the commission of the Lake Chad basin,	1973		
17.	African Convention on the Conservation of nature and Natural Resources, Algeria,	1968	29/9/78	
18.	Convention on the Lake Chad Basin Commission, Fort Lamy, Chad,	1964		
19.	Niamey/Niger Agreement on the creation of the commission of the NIGER river	1964		
20.	The Niamey Act on navigation and economic co-operation between the States of the Basin of Niger	1963		
2	International Tropical Timber Organization	2006		

CHAPTER II: INSTITUTIONAL, POLICY AND REGULATORY FRAMEWORK ASSESSMENT

2.1 Institutional assessment

In order to ensure effective implementation of the Minamata Convention through coordinated actions from institutions and stakeholders in the country, it is important to identify the relevant Government ministries, agencies and institutions as well as non-government institutions, private sector stakeholders and others as well as their respective roles and responsibilities.
We shall now assess the existing institutional the light of the provisions of each article of the convention.

Necessary Institutional capacities for the implementation of the Article 3 of the Convention are related to the regulation of mercury supply sources and trade. In Cameroon, given there is no primary mercury mining, the relevant institutions for phasing out existing mercury mining as required by Article 3 of the Convention is not directly relevant at present. However, since mercury mining for application in artisanal and small-scale gold mining (ASGM), or the import of mercury for ASGM is relevant for Cameroon, particularly in the East, Centre and south Regions. There is no is no chlor-alkali production in the country, necessary to ban the use of excess mercury from its decommissioning as required by the Article 3 of the Convention. Therefore, the need of a regulatory frameworks and institutional setting is also irrelevant.

As for obtaining information on mercury stocks in excess of 50 MT or supply stream stock exceeding 10 MT per year, so far mercury inventories are not part of national in the country. Thus, there is no institutional capacity in the country to information on mercury stocks. Besides, mercury stocks in excess of 50 MTs or in excess of10 tons annually might not be present in the country since there is no officially known/registered/licensed chlor-alkali production in the country, production in the country as indicated earlier, which are either major mercury sources or user industries. There are some small-scale gold mining activities in the East and Centre Regions areas, which have been reported to use mercury and cyanide in their extractive processes. But this use of mercury and cyanide is illegal by virtue of the 2016 regulation enacted by the Minister of Mines that bans the use of these substances in ASGM.

In Cameroon, export-import and use of mercury and its compounds in the excess of 2 kg and not laboratory and research purposes, other than mercury wastes and inorganic, used as pesticides, are not regulated
As for regulation of the export-import of mercury compounds used as pesticides, such are not yet all banned in the country. Import, production and use of such chemicals is controlled by the and Inspectors under the Ministry and Agriculture. Institutional capacity gaps in this regards as was discussed in previous chapter are as follows:

- ✓ absent knowledge and capacities of the Customs Department for effective customs' control of illegal import of mercury-based pesticides;
- ✓ Very limited laboratory opportunities and capacities for state analysis/expertise of unidentified chemicals or chemicals concerned, including mercury-based pesticides. There is no authorized entity to examine chemicals concerned, based on a request of the Customs Office;
- ✓ weak capacities of Inspectors under the Ministry Environment and Agriculture together with relevant accredited for detecting illegal trade on local market with unallowed pesticides.

Necessary institutional capacities for implementation of the Article 4 of the Minamata Convention related to the regulation of mercury-added products listed in its Annex A. In Cameroon, import and manufacture of mercury-added products specified by the Convention, is not regulated. Thus, there are no

system and institutional capacities set for banning and controlling illegal import-export and trade with mercury, other than mercury-based pesticides. Enhancing the capacity of Customs officials mercury-added products should be an important component of future implementation activities.
For mercury-based pesticides, as it was discussed in previous paragraph, capacities for smuggling with chemicals and falsifications in trade are unavailable.
As for phasing-out dental amalgams, interviews with dental professionals and the Ministry of Health concluded that Hg-containing dental amalgams are in use in the country. Difficulties still however exist in the area of affordable alternatives.

Necessary institutional capacities for implementation of the Article 7 of the Convention to the ASGM. The use of mercury amalgamation in the artisanal and small-scale gold mining (ASGM) in Cameroon was banned in 2014 following the adoption of the Minamata Convention on Mercury in 2013 with the active participation of the Cameroon delegation to all the five sessions of intergovernmental negotiation committees (mercury INCs). However, illegal gold mining with mercury amalgam is still in Cameroon due to government limited resources to enforce the new regulation. The national mining code does not provide an official definition of ASGM and there are no officially sanctioned ASGM activities in the country. Illegal small-scale activities are rampant and often take place close to the large semi mecanised gold mining sites . Reason why the "The Mining Sector Project" (PRECASEM) recently launched a study that would lead to a detailed assessment of the use of mercury in this sector and the development of an action plan in compliance to annex C of the Convention.
Necessary institutional capacities for implementation of the Article 8 of the Convention are related to the regulation (control or where feasible reduction) of air emissions of mercury and its compounds (referred as total mercury) from existing and new sources. In Cameroon, emission limit values (ELVs) are to be set for all new industries subject to Decree N ° 2011/2582 / PM of 23 August 2011 setting the terms of protection of the atmosphere, including those industrial facilities listed in Annex D of the Minamata Convention namely:

- ✓ Smelting and roasting processes used in the production of non-ferrous metals;
- ✓ Waste incineration facilities;
- ✓ Cement clinker production facilities.

However, these ELV have not been set yet for any installation by the Ministry of Environment due to lack of capacity. Concerning developing and implementing emission reduction programs/strategies for existing industries, there are no such policy mechanisms put in place. No mercury emissions data are submitted to MINEPDED by power plants, glass manufacturing and cement clinker plants. Capacities of Environmental inspectors for spot and pre-planned inspections of existing facilities are very weak particularly with regards to stack measurements.

Necessary capacities for implementation of Article 9 of the Convention concern regulation of water and land releases of mercury and setting up mercury release inventories. In Cameroon, in accordance with the Laws on Environmental Impact Assessment, discharge Permit (WDP) are to be set for all new industries including those industrial facilities listed in Annex D of the Minamata Convention. Similarly, air emission limit values, effluent discharge values are based on BAT/BET, end-off-pipe approach and water dilution effects. Nevertheless, Water Resources Management and Waste Management Services of the MINEE and MINEPDED do not have capacities for setting BATs/BEPs for industries as per Convention requirement. For wastewater discharges from water users not subject to EIA and WDP, effluent discharge limits are not generally set for mercury.

Necessary institutional capacities related to the implementation of the Article 10 of are related to the interim storage of mercury or its compounds, other than in an environmentally sound manner and in accordance with guidelines developed Basel Convention or other relevant guidelines. In Cameroon, interim storage of mercury compounds, other than wastes is not regulated. Hence, relevant system and institutional-level capacities for such actions are absent. It will therefore be necessary for the Ministry of Environment to regulate such storage.

Necessary institutional capacities related to the implementation of the Article 11 of the Convention are related to the management of mercury wastes. In Cameroon, the generation, and disposal of hazardous wastes, including mercury-containing wastes legal and policy basis is covered by the Waste Management regulatory framework, Treatment and Disposal of Hazardous Wastes as well as the waste Management Strategy. However, these documents do not specifically address mercury issues. Moreover, technical guidelines on the environmentally sound management of wastes consisting of, containing or contaminated with mercury or mercury compounds developed under the Basel Convention are not applied and there is no knowledge and capacity within the Chemicals and Waste Management Service in using this document. Strategies and action plans for hazardous waste management are also absent and identified as one priority actions under the National Waste Management strategy.
The largest problem is poor operational capacities, including infrastructure for collection, treatment, storage and disposal/elimination of hazardous wastes, particularly for mercury waste. There are very few companies that deal with environmentally safe elimination of mercury wastes.

Necessary capacities for implementation of the Article 12 of the Minamata Convention are related to the management of contaminated sites, including developing and adopting inventory/identification, risk assessment and mitigation/remediation measures for contaminated sites. At present, relevant technical regulations are not developed for safe management of contaminated sites in general, and for sites contaminated with mercury. The inventory system contaminated sites does not exist within the Chemicals and Waste Management Service of MINEPDED.
Relevant capacities for developing and implementing site inventory and cleanup/remediation strategies are absent/weak.

Necessary capacities for implementation of the Article 13 of the Minamata Convention are related to effective mobilization of domestic as well as international financial resources for the implementation of the Convention. Since Cameroon has not ratified the Convention, there is no earmarked funding yet for implementation of various provisions of the Convention. However, in case of ratification of the document, the country has internal financial resources in the form of state budget alocatted to various agencies for implementation of their duties and state programmes, funds of private businesses working in the field of hazardous chemicals and waste management, including waste collection, transportation, storage and safe disposal/treatment. Moreover, MINEPDED and other relevant ministries have long-term successful experience in working with bi-lateral and multi-lateral donors, including UNDP, UNEP, FAO, UNIDO, as well as Multi-Lateral Fund Montreal protocol and Global Environment Facility. Cameroon NGOs are also very experienced in mobilizing financial resources for implementation of environmental projects in general, and waste management projects in particular.

Necessary capacities for implementation of the Article 16 of the Minamata Convention are related to health aspects of mercury. In the country, some state institutions exist in this area, including ministries of labour, Health and Social Affairs, Environment, Protection of Nature and Sustainable Development, Agriculture, Economy and the State Security service. However, specific capacities for assessing and communicating health and environmental risks of exposure to mercury and its compounds, preventing, mitigating and providing early warnings for industrial/chemical emergencies and conducting effective response (rescue and recovery) measures during such accidents are weak. No health based ambient environmental quality standards for mercury exist for all environmental media as well as for many food products, including fish and its derivatives, monitoring, including laboratory analysis and law enforcement capacities of MINEPDED, Ministry of Labor, Health and Social Affair, Ministry of Agriculture and are weak. Awareness and educational programs and materials on mercury related health and environmental risk and sound management on mercury are absent, due to the non-existent in-country capacities within state

agencies and civic society organizations to develop and implement measures due to the absence of the knowledge and/or interest within these institutions.

Necessary capacities for implementation of the Article 18 of the Minamata Convention are related to the public information, awareness and education. In-country institutional capacities to develop and implement awareness and educational programmers on mercury and its risks are absent. As for mercury inventory and its availability to the public, such capacities within relevant authorities including MINEPDED, MINADER, and MINSANTE are weak. Only data present on mercury are on industrial emissions. Other information, including that on mercury stock, storages, wastes, mercury-added products and ambient environment quality are absent. This is due to the absence of legal obligations to set-up publicly open mercury inventory system. Such publicly open information system as Pollutants Release and Transfer Register (PRTR) is non-existent in the country.
Below are given summary tables for institutional gap analysis.

Table 5: Existing National Institutional Capacity and Remaining Gaps

Article 3 - Mercury supply sources and trade	
Description of Article:	
Succinct summary of provisions relevant to the country in question (source NRDC checklist[1])	▪ Not allow new primary mercury mining ▪ Phase out existing primary mercury mining within 15 years4 ▪ Prevent the import and use of mercury from primary mercury mining for artisanal and small-scale gold mining (ASGM) ▪ In accordance with Article 3.5(b), restrict the import and use of excess mercury from decommissioning chlor-alkali plants, and require environmentally sound disposal ▪ Obtain information on stocks of mercury or mercury compounds exceeding 50 metric tons (MT), and mercury supply generating stocks exceeding 10 MT/yr[5] ▪ Not allow the export of mercury unless the importing country provides written consent,6 the mercury is for an allowed use or environmentally sound storage, and all other conditions of Article 3.6 are met[7] ▪ Not allow the import of mercury without government consent, ensuring both the mercury source and proposed use are allowed under the Convention (and applicable domestic law)
Institutional capacity in place to comply with the above listed provisions:	
Name of institution/entity or organization/business entity:	**Capacity in place:**
MINFI through the Customs Department	Control imports and exports of chemicals in the country. The Ministry will provide information on the import of mercury added products in the country. It will also provide information on the challenges and opportunities of ratifying and early implementing the Minamata Convention related to the requirements of Annex A part 1 of the Minamata Convention.
Ministry of Environment, Protection of Nature and Sustainable Development (MINEPDED)	MINEPDED is in charge of surveillance and control actions of import of chemicals into Cameroon by providing written consent for imports. The Ministry is present in the 10 regions of Cameroon. However, there is absence of any regulatory and institutional mechanisms to regulate trade with mercury, other than mercury wastes.
MINADER and accredited laboratories	Existing capacities are weak due to the limited laboratory analysis capacities of existing accredited laboratories and weak consumer/business operator awareness to make complaints on violations.
Remaining Capacity Gaps at National Level that need to be addressed before provisions can be met:	
▪ Existence of several agencies in charge without coordination High priority. ▪ Insufficient human, technical and financial resources, poor capacities (knowledge, qualified staff, training programmers and laboratory analysis) ofCustoms Department to effectively detect illegal import-export of mercury compounds banned in the country – High priority; ▪ Absence of Capacity for customs control of illegal import-export of inorganic, lkyloxyalkyl and aryl mercury compounds used as pesticides requiring PIC and prohibited in the country. Though, existing capacities are weak to effectively detect	

[1] http://docs.nrdc.org/international/files/int_15101301a.pdf

offences due to the absence of relevant knowledge, lack of qualified customs officers, absence of guidelines/SOPs for effective border control, relevant training programmes for customs officers and inadequate state examination/ expertise of chemicals. Furthermore, coordination of Customs Office with relevant agencies is weak. For primary mercury trade control, there is no relevant regulation and respectively, institutional mechanism.

- Absence of laws/regulations and relevant implementation mechanisms for banning new mercury mines – Low priority (needs verification by stakeholders and mercury inventory);
- Absence of any regulatory and institutional mechanisms for trade with mercury other than mercury-based pesticides regulated under Rotterdam Convention – medium priority (needs verification by stakeholders and mercury inventory);
- · Poor capacities of MINADER and relevant accredited laboratories to detect falsifications/illegalmarket sale of banned mercury compounds – High priority;

Table 6: Analysis of article 4

Article 4 - Mercury-added products	
Description of Article:	
Succinct summary of provisions relevant to the country in question (source NRDC checklist[2])	▪ Prohibit the manufacture, import and export of mercury-added products. ▪ Part I: To be phased out by 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. ▪ Part II: Phase Down the use of Dental Amalgam by implementing 2 or more of 9 proposed ▪ measures
Institutional capacity in place to comply with the above listed provisions:	
Name of institution/entity or organization/business entity:	**Capacity in place:**
Ministry of Trade (MINCOMMERCE)	**MINCOMMERCE's** responsibilities include the monitoring and the control of exports, imports and the application of standards on all imported products.
Ministry of Public Health (MINSANTE)	MINSANTE is in charge of the development and respect of standards for the quality of care, medicines and medical devices, health and water infrastructure and equipment , water and food. MINSANTE legalized the order of dental surgeon who in collaboration with MINSANTE can implement measures to phase down the use of dental amalgam
MINFI through the Customs Department	Controls imports and exports of chemicals in the country. The Ministry will provide information on the import of mercury added products in the country. It will also provide information on the challenges and opportunities of ratifying and early implementing the Minamata Convention related to the requirements of Annex A part 1 of the Minamata Convention.
Ministry of Environment, Protection of Nature and Sustainable Development (MINEPDED)	MINEPDED is in charge of surveillance and control actions of import of chemicals into Cameroon, licensing or authorizing the import of electrical electronic equipment's and therefore has the legal mandate to check the import of electrical electronic equipment by providing written consent for imports. The Ministry is present in the 10 regions of Cameroon. However, there is absence of any regulatory and institutional mechanisms to regulate trade with mercury, other than mercury wastes.
Remaining Capacity Gaps at National Level that need to be addressed before provisions can be met:	
▪ sensitization of stakeholders high priority ▪ Capacity building of dental professionals high ▪ Availability of alternative	

[2] http://docs.nrdc.org/international/files/int_15101301a.pdf

Table 7: Analysis of article 7

Article 7 - Artisanal and small-scale gold mining	
Description of Article:	
Succinct summary of provisions relevant to the country in question (source NRDC checklist)	▪ Parties with ASGM to take steps to reduce and where feasible eliminate the use of mercury in such mining and its release to the environment from mining and processing. ▪ To notify the secretariat where ASGM is more than insignificant in Cameroon ▪ To develop and implement a national action plan (in accordance with Annex C). ▪ Relevant to Cameroon as a country with a sizeable ASGM community ▪ Address public health strategy in the ASGM sector
Institutional capacity in place to comply with the above listed provisions:	
Name of institution/entity or organization/business entity:	**Capacity in place:**
Ministry of Mines, Industry and Technological Development (MINMIDT)	MINMIDT through the Presidential Decree No. 2012/432 of 1 October 2012, is in charge of the elaboration and implementation of the Government's mining and industrial policy and technological development strategies within the various sectors of the national economy. As such, it is in charge of: • the elaboration of the mining map; • geological prospection and mining activities; • the valuation of mining, oil and gas resources; • the management of mining and gaseous natural resources;
Ministry of Environment, Protection of Nature and Sustainable Development (MINEPDED)	MINEPDED is in charge of surveillance and environmental control actions of chemicals in use in Cameroon
Remaining Capacity Gaps at National Level that need to be addressed before provisions can be met:	
▪ Laboratory material for analyses of mercury in water and air ▪ Capacity building of inspectors ▪ Elaborate regulatory instrument banning the use of mercury in mining	

Table 8: Analysis of article 8

Article 8 - Emissions	
Description of Article:	
Succinct summary of provisions relevant to the country in question (source NRDC checklist)	▪ 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 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. ▪ Point sources are defined in Annex D of the Convention as: Waste incineration facilities; Cement clinker production facilities. ▪ Relevant to Cameroon as host to two source categories listed in Annex D
Institutional capacity in place to comply with the above listed provisions:	
Name of institution/entity or organization/business entity:	**Capacity in place:**
Ministry of Environment, Protection of Nature and Sustainable Development (MINEPDED)	MINEPDED is in charge of surveillance and environmental control actions of chemicals in use in Cameroon
Ministry of Mines, Industry and Technological Development (MINMIDT)	MINMIDT through the Presidential Decree No. 2012/432 of 1 October 2012, is in charge of the elaboration and implementation of the Government's mining and industrial policy and technological development strategies within the various sectors of the national economy.

Remaining Capacity Gaps at National Level that need to be addressed before provisions can be met:
▪ Absence of BAT/BEP guidelines – High priority; ▪ Absence of capacities for setting BAP/BEP or relevant emission values – High priority; ▪ Absence of national strategies/programmes for controlling emissions from existing sources – Medium priority; ▪ Absence of emission inventories of waste incineration facilities – High priority; ▪ Poor quality control system of the information submitted, which is only double-checked though recalculations by the staff of the Air Protection Service. Capacities of environmental inspectors for spot and pre-planned inspections of existing facilities are very weak, particularly for stack measurements – High priority. ▪ Elaborate regulatory instrument and adoption of standard for stake emission of waste incinerators and cement facilities

Table 9: Analysis of article 9

Article 9: - Releases	
Description of Article:	
Succinct summary of provisions relevant to the country in question (source NRDC checklist)	▪ 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. ▪ Relevant to Cameroon as host to potential sources of releases
Institutional capacity in place to comply with the above listed provisions:	
Name of institution/entity or organization/business entity:	**Capacity in place:**
Ministry of Environment, Protection of Nature and Sustainable Development (MINEPDED)	MINEPDED is in charge of surveillance and environmental control actions of chemicals in use in Cameroon
Ministry of Mines, Industry and Technological Development (MINMIDT)	MINMIDT through the Presidential Decree No. 2012/432 of 1 October 2012, is in charge of the elaboration and implementation of the Government's mining and industrial policy and technological development strategies within the various sectors of the national economy.
Ministry of Water and Energy (MINEE)	MINEE According to Decree 2005/087 of March 29, 2005, is in charge of authorization for releases into water. Effluent discharge values are not based on BAT/BET, but on end-off-pipe approach and water dilution effects. Water Resources Management in MINEE and Chemicals and Waste Management Services of the MINEPDED do not have capacities for setting BATs/BEPs for industries; wastewater discharges from water users, effluent discharge limit values are not set for mercury;
Remaining Capacity Gaps at National Level that need to be addressed before provisions can be met:	
▪ Absence of BAT/BEP guidelines – High priority; ▪ Identification of national sources of mercury releases to water and land ▪ · Absence of a pollutants release control programmes for existing sources – Medi ▪ Absence of capacities (Laboratory, portable device, protocol, dedicated agency etc…) for analyses of mercury in water and air ▪ Capacity building of inspectors ▪ Enforce the existing regulation on and develop more comprehensive regulatory instrument banning the use of mercury in ASGM	

Table 10: Analysis of article 10

Article 10: Environmentally sound of than

Description of Article:	
Succinct summary of provisions relevant to the country in question (source NRDC checklist)	▪ Each Party shall take measures to ensure that the interim storage of mercury and mercury compounds intended for a use allowed to a Party under this Convention is undertaken in an environmentally sound manner, taking into account any guidelines, and in accordance with , adopted pursuant to paragraph 3. ▪ Relevance to Cameroon to be clarified during identification of industries potentially using mercury
Institutional capacity in place to comply with the above listed provisions:	
Name of institution/entity or organization/business entity:	**Capacity in place:**
Ministry of Environment, Protection of Nature and Sustainable Development (MINEPDED)	MINEPDED is in charge of surveillance and environmental control actions of chemicals in use in Cameroon, however interim storage of mercury and mercury compounds, other than wastes is not regulated. Hence, relevant system and institutional-level capacities for such actions are absent
Ministry of Mines, Industry and Technological Development (MINMIDT)	MINMIDT through the Presidential Decree No. 2012/432 of 1 October 2012, is in charge of the elaboration and implementation of the Government's mining and industrial policy and technological development strategies within the various sectors of the national economy.
Remaining Capacity Gaps at National Level that need to be addressed before provisions can be met:	
▪ Identification of industries potentially using mercury for allowed purposes within the convention ▪ Inventory of the stock of mercury for use for allowed purposes from all sectors and keep records ▪ When applicable, build appropriate interim storage facilities ▪ Capacity building of inspectors ▪ Absence of any regulation and relevant institutional mechanisms for regulation of interim storage of mercury and mercury compounds, other than mercury wastes – high priority (needs verification by mercury inventory and stakeholders).	

Table 11: Analysis of article 11

Article 11: Mercury wastes	
Description of Article:	
Succinct summary of provisions relevant to the country in question (source NRDC checklist)	Each Party shall take appropriate measures so that mercury waste is: ▪ Managed in an environmentally sound manner, taking into account the guidelines developed under the Basel Convention and in accordance with requirements of the COP ▪ 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 that Convention ▪ Relevant to Cameroon in respect of mercury-added products at end of life and of potentially contaminated wastes imported for treatment and disposal
Institutional capacity in place to comply with the above listed provisions:	
Name of institution/entity or organization/business entity:	**Capacity in place:**
Ministry of Environment, Protection of Nature and Sustainable Development (MINEPDED)	MINEPDED is in charge of surveillance and environmental control actions of chemicals in use in Cameroon - Technical guidelines on the environmentally sound management of wastes consisting of, containing or contaminated with mercury or mercury under the Basel Convention are not applied and there isno knowledge and capacity within the Chemicals and Waste in using this document. Strategies and action plans for hazardouswaste management are also absent identified as one of the priority the National Waste Management strategy and Action Plan. - problem is poor operational capacities, including collection, treatment, storage and disposal/elimination of , particularly for mercury wastes. There are very few companies with environmentally safe elimination of mercury waste. Internationally there are only few companies who really deal with disposal of mercury waste.

	- A more detailed analysis will reveal what is the best option for final disposal of mercury suitable for Cameroon.
Ministry of Mines, Industry and Technological Development (MINMIDT)	MINMIDT through the Presidential Decree No. 2012/432 of 1 October 2012, is in charge of the elaboration and implementation of the Government's mining and industrial policy and technological development strategies within the various sectors of the national economy.
Remaining Capacity Gaps at National Level that need to be addressed before provisions can be met:	
▪ Identification of all the types of mercury wastes (consisted of mercury, containing mercury, and contaminated with mercury) generated in the country, as well as their sources or generators ▪ Regulate the way those mercury wastes will be disposed of ▪ Possibly upgrade the existing hazardous waste elimination nfacilities to allow treatment of mercury wastes ▪ Absence of knowledge and capacity within MINEPDED to apply technical guidelines on the environmentally sound management of wastes consisting of, containing or contaminated with mercury or mercury compounds developed under the Basel Convention – High priority; ▪ Capacity building of inspectors	

Table 12: Analysis of article 12

Article 12: Contaminated sites	
Description of Article:	
Succinct summary of provisions relevant to the country in question (source NRDC checklist)	Each party shall endeavor to develop appropriate strategies for identifying and assessing sites contaminated by mercury or mercury compounds. Relevant to Cameroon with regard to potentially contaminated sites related to current or previous industrial and mining activity and of waste disposal
Institutional capacity in place to comply with the above listed provisions:	
Name of institution/entity or organization/business entity:	**Capacity in place:**
Ministry , Protection of Nature and Sustainable Development (MINEPDED)	MINEPDED is in charge of surveillance and environmental control actions of chemicals in use in Cameroon. A strategy for identifying contaminated sites has been developed
Remaining Capacity Gaps at National Level that need to be addressed before provisions can be met:	
▪ Guidance for identification, characterization and remediation of mercury contaminated sites ▪ Technological capacity to characterize mercury contaminated sites including Laboratory capacities ▪ Absence of Strategies and action plans for hazardous waste soils management and implementation capacities – High priority; ▪ Poor operational capacities, including infrastructure for collection, treatment, storage and disposal/elimination of hazardous wastes soils, particularly for mercury contaminated soils – High priority.	

Table 13: Analysis of article 16

Article 16: Health aspects	
Description of Article:	
Succinct summary of provisions relevant to the country in question (source NRDC checklist)	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 relevant to Cameroon given known health impacts within ASGM communities and potential impacts in other industries including waste management and disposal.
Institutional capacity in place to comply with the above listed provisions:	
Name of institution/entity or organization/business entity:	**Capacity in place:**
Ministry of Public Health	MINSANTE is in charge of the development and respect of standards for the quality of care,

(MINSANTE)	medicines and medical devices, health and water infrastructure and equipment , water and food. However, specific capacities for assessing and communicating health and environmental risks of exposure to mercury and its compounds, preventing, mitigating and providing early warnings for industrial/chemical emergencies and conducting effective response (rescue and recovery) measures during such accidents are weak
Remaining Capacity Gaps at National Level that need to be addressed before provisions can be met:	
▪ Development of a national public health strategy under the Minamata Convention, including the phase out of all mercury containing devices in the health sector, health strategy in the NAP, etc… ▪ Capacity building of health care personnel to diagnose diseases related to mercury poisoning ▪ Weak/absent specific capacities for assessing and communicating health and environmental risks of exposure to mercury and its compounds, preventing, mitigating and providing early warnings for industrial/chemical emergencies and effective response (rescue and recovery) measures – High priority ▪ Weak law enforcement, including laboratory testing capacities for food safety, due to poor QA/QC and inter-calibration of laboratories - High priority;	

Table 14: Analysis of article 18

Article 18: Public information, awareness and education	
Description of Article:	
Succinct summary of provisions relevant to the country in question (source NRDC checklist)	Each Party to promote and facilitate: • 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; • education, training and public awareness related to the effects of exposure to mercury and mercury compounds; • 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. Relevant to Cameroon as part of actions to reduce and, where possible, eliminate mercury use and toimprove behaviour in managing materials and wastes containing or contaminated by mercury.
Institutional capacity in place to comply with the above listed provisions:	
Name of institution/entity or organization/business entity:	**Capacity in place:**
Ministry of Environment, Protection of Nature and Sustainable Development (MINEPDED)	MINEPDED is in charge of surveillance and environmental control actions of chemicals in use in Cameroon. A strategy for identifying contaminated sites has been developed. - First, there is no comprehensive system for chemicals registration, evaluation, testing and authorization/ admission to the market like EU REACH system as well unified chemicals information management system. - Second, national inventory systems for hazardous chemicals, hazardous wastes, contaminated sites and effluent discharges into surface waters are absent. - There is no air emission inventory system is at place within MINEPDED - There is also a lack of institutional capacities to collect, process, store and make publicly available data on mercury primary sources, including its stocks, mercury-added products, industrial uses of mercury, mercury wastes and contaminated sites as well as on environmental releases (air emissions and land and water discharges).
Ministry of Public Health (MINSANTE)	MINSANTE is in charge of the development and respect of standards for the quality of care, medicines and medical devices, health and water infrastructure and equipment , water and food. Agencies working with MINSANTE have no evidence-based advocacy, awareness and education programmers and materials on health and environmental risks related to mercury and wastes, occupational safety and health risks related to industrial/chemical accidents;
Remaining Capacity Gaps at National Level that need to be addressed before provisions can be met:	
▪ Developing an Information Education and Communication plan for mercury ▪ Engage with relevant non state stakeholders in mercury outreach activities to vulnerable communities ▪ Capacity building of MINEPDED staff for the collection and dissemination of information ▪ Capacity building of health care personnel to diagnose diseases related to Minamata diseases	

2.2 Policy and regulatory assessment

2.2.1 Convention obligations and existing Cameroonian legislation

It is clear that Cameroon in becoming a Party to the Minamata Convention, will need to consider actions to meet its obligations under a number of the articles of that Cameroon, there is little legislation that concerns the management and control of mercury and mercury compounds. On the other side, several activities that are targeted in the Minamata Convention do not – yet - exist in Cameroon and therefore may not need to be addressed by legislation at all. Mercury related activities that do not take place in Cameroon are:

- Mercury mining28 (Article 3 (3) and (4) MC);
- The use of mercury and mercury compounds in manufacturing processes (Article 5).

The corresponding provisions of the Convention are therefore irrelevant for any conversion intonational law. We shall therefore examine the various articles of the convention and assess the implication for Cameroon's legal and legislative framework.

Article 2: Definitions

Notably, definitions in the Convention are not only listed in Article 2 but also found in other as Articles 3, 8, 9 and 11 of the Convention. The reason for such – rather unusual –"spreading" of definitions is that many terms defined concern only specific activities as defined respective provision of the Convention.

The transposition of the definitions into Cameroonian legislation is not mandatory but strongly advisable, as it clarity of legislation and hence its applicability. Today only very few relevant definitions have been incorporated legislation whilst others have been integrated into pending legal drafts.

Article 3: Mercury supply sources and trade

With regard to Article 3, Mercury supply sources and trade, Cameroon may need to amend mining regulations to prohibit and prevent any possible future mercury mining. It will also be necessary to ensure that any imports and exports of mercury are conducted in compliance with the prior informed consent arrangements set out in the Convention, while order N°004/MINEPDED/CAB of the 21 September 2017 modifying and completing the list of chemical substances of decree N°2011/2581/PM of the 23 August 2011 regulating hazardous and dangerous substances are considered adequate, it is considered necessary to amend these texts giving authority to MINEPDED for its implementation. Article 3 establishes a prior-informed consent requirement before any trade of mercury can occur between Parties to the Convention. The relationship and obligations between Parties related to mercury trade are elaborated as are rules governing Party to non-Party trade.

Table 15: Brief analysis of Cameroon's legislation in relation with Article 3 of the Minamata Convention

Article 3 - Supply and Trade	Cameroon Domestic Law	Comments/ Recommendations
Not allow new primary mercury mining	No law covers this issue	Need to develop text for Mining Code to prohibit future mining of known deposits.
Phase out existing primary mercury mining within 15 years	No law covers this issue	There is no current mercury mining in the country.
Prevent the import and use of mercury from primary mercury mining for artisanal and small-scale gold mining (ASGM)	Decree No. 2011/2585 / PM of 23 August 2011 setting out the list of harmful or dangerous substances and the regime of their release in inland waters.	Cameroon is party to the Basel Convention. A significant scale ofartsanal gold mining (illegal) occurs in the east Region of Cameroon Miners use gravity concentration method for extracting the gold. But the practice, using mercury has been reported to be rampant amongst the Chinese operators. Therefore, the import and use of mercury for this very purpose could exist. However, it is important to create legislation that restricts / prohibits/limits the use of Hg for these miners.

In accordance with Article 3.5(b), restrict the mport and use of excess mercury from decommissioning chlor-alkali plants, and require environmentally sound disposal	Law and decree on Import, Export and Transit of Wastes on the Territory of Cameroon	Cameroon is also a party to the Basel Convention.
Obtain information on stocks of mercury or mercury compounds exceeding 50 metric tons (MT), and mercury supply generating stocks exceeding 10 MT/y	Regulation on waste management	Initial inventory did not find presence of significant mercury stocks in Cameroon.
Not allow the export of mercury unless the importing country provides written consent, the mercury is for an allowed use or environmentally sound storage, and all other conditions of Article 3.6 are met.	Law on Import, Export and Transit of Wastes on the Territory of Cameroon No export of mercury/mercury compounds other than mercury wastes is regulated in Cameroon	Cameroon is also party to the Basel Convention. The clause should be introduced on the ban of mercury export-import in national legislation. Generally speaking, having a special by-law on mercury in place would have the advantage that key elements of the MC related to imports, products and assembled products could be regulated in one coherent piece of legislation (which could be amended easily if it is a by-law and not a Law, possibly under a new legal regime on Chemicals). However, it would have to be decided by the policy makers first, which types of mercury and mercury added products are banned, and to which extent, i.e. import, export and placing on the market.

The combination of Cameroon's Waste Management legal framework and the Law on Import, Export and Transit of Wastes on the Territory of Cameroon identify mercury and mercury containing wastes as hazardous materials that are banned without prior informed consent.

Article 4: Mercury-added products

The Convention seeks to reduce demand for mercury through a combination of measures that phase down and ultimately phase out the use of mercury during the manufacturing of certain products. A mercury-added product (MAP) is defined by the Convention as a "product or productcomponent that contains mercury or a mercury compound that was intentionally added" (Article 2, paragraph f). The list of MAPs whose manufacturing and trade are restricted under the Convention are outlined specifically in Annex A and does not include products where mercury was not intentionally added during manufacturing, e.g., where trace contamination is derived from natural origin. The Secretariat of the Convention will continue to review other products for possible restrictions.

Table 16: Brief analysis of Cameroon's legislation in relation with Article 4 of the Minamata Convention

Article 4 - Mercury Added Products	Cameroon Domestic Laws	Comments / Recommendations
Not allow the manufacture, import,	Law on Pesticides. As regards the prohibition of	Cameroon is a party to the Rotterdam Convention. Given the diversity of products to which mercury is added

and export of products listed in Part I of Annex A not otherwise excluded following the phase out date listed in the Annex	manufacture/import/export of mercury-added products, other than mercury added pesticides after specified phase-out date, there is no legislation in place yet in Cameroon. Joint Order No. 005/MINEPDED/MINCOMMERCE of 24 October 2012 laying down specific conditions for the management of electrical and electronic equipment and the disposal of waste from this equipment spells out detailed obligations on extended producer responsibility (EPR) for specific wastewhich includes batteries, electrical devices, etc. (see Article 3 k)).	(including assembled products) it is recommended to adopt a by-law in which restrictions and/or bans on the production, import, export and placing on the market of mercury in new products are regulated. In such by-law on "chemical products restrictions" all concerned products could be addressed one by one. Within a Joint Order No. 005/MINEPDED/MINCOMMERCE of 24 October 2012 on batteries, electrical switches or relays, legal requirements on the mercury content should be set, assuming that these are controlled by customs department when imported.
Phase down the use of dental amalgam through two or more measures listed in Part II of Annex A	No law covers this issue,.	The requirements related to measures to be taken to phase down the use of dental amalgam are diverse (see Part II of Annex A, MC). Legally, the use of dental amalgam shall be restricted to its encapsulated form (all other measures in the Annex are "soft" measures). Mercury inventory indicated that dental amalgams are on more in use in Cameroon and ban on the use of "silver" fillings might not be relevant. A legal framework regulating the use of mercury in amalgam is necessary to check its use
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	No law covers this issue.	See discussion below.
Discourage the manufacture and distribution of new mercury product types	No law covers this issue.	See discussion below.

The Law on Pesticides, as well as Waste Management in conjunction with Cameroon's participation in the Rotterdam Convention, establishes a mechanism to effectively monitor and prohibit the use of mercury and mercury-containing compounds in pesticides. As of this review, legislation restricting the amount of mercury in other products such as compact fluorescent lamps, batteries, and medical devices is not present and new legislation will need to be proposed and developed. This process will need to include participation from ministries and government agencies in charge of environment, trade, customs and energy.

Article 5: Manufacturing processes in which mercury or mercury compounds are used

Article 5 and its associated Annex B of the Convention identify manufacturing processes where mercury use will not be allowed and must be phased out (paragraph 2) and where the use of mercury compounds will be restricted (paragraph 3).Mercury use during the production of chlorine gas and caustic soda (sodium hydroxide, NaOH)at mercury-cell chlor-alkali facilities does not exist in Cameroon. Similarly, mercury used as a catalyst in the production of acetaldehyde, a precursor in the production of acetic acid, will also be phased out by 2018. Other manufacturing processes that are addressed under Article 5 include mercury used during the production of vinylchloride monomer (VCM), a precursor to PVC, and the production of polyurethane using catalysts.

Table 17: Brief analysis of Cameroon's legislation in relation with Article 5 of the Minamata Convention

Article 5 - Manufacturing Processes	Cameroon Domestic Law
Not allow the use of mercury or mercury compounds in the manufacturing processes listed in Part I of Annex B	No law covers this issue.
Restrict (as specified in) the use of mercury processes listed in Part II of Annex B	No law covers this issue. None of the processes listed in Part II of Annex B are present in the country.
Not allow new facilities from using mercury in the processes listed in Annex B, except facilities using mercury catalysts to produce polyurethane	No law covers this issue. None of the processes listed in Part II of Annex B are present in the country.
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	No law covers this issue. None of the processes listed in Part II of Annex B are present in the country.
Discourage new uses of mercury in industrial processes	No law covers this issue.

Article 7: Artisanal and small-scale gold mining

The Convention defines artisanal and small-scale gold mining (ASGM) as "gold mining conducted miners or small enterprises with limited capital investment and production" (Article 2). Globally, ASGM is responsible for emitting approximately 727 tons of mercury into the atmosphere annually and an estimated 800 tons of mercury released directly to land and water, making it the single largest source of anthropogenic mercury. While ASGM is a major source of mercury to the environment, it also plays an important role in rural development. An estimated 10-15 million people worldwide participate in the sector producing 12-15% of the world's gold. As such, ASGM represents a complex development issue in many regions that seek to protect their environment but also provide opportunities for economic development in rural communities.

Artisanal and small-scale gold mining is actively practiced in the Eastern and Centre Regions of Cameroon. During interviews with government officials, the national inventory team was informed that these miners make use of Hg secretly to amalgamate gold. This was confirmed through some analytical analysis of water sampled from the area. Therefore, ASGM and the elevated risk of Hg use in this sector appears to be of immediate concern for the country and steps should be taken to restrict any future use of Hg in this sector.

Table 18: Brief analysis of Cameroon's legislation in relation with Article 7 of the Minamata Convention

Article 7 – ASGM	**Cameroon Domestic Law**	**Comments/ Recommendations**

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	Cameroon's Mining Code Order N°000554/MINMIDT/SG/DAJ/CR of 16 June 2016 laying down conditions for the banning and use of mercury, cyanide and toxic products in mining activities Order N°000592/MINMIDT/SG/DAJ/CR of 01 july 2016 laying down conditions for the banning of mining activities besides river beds ;	According to the government officials, the national inventory team was informed that these miners make use of Hg secretly to amalgamate gold.
For governments where ASGM and mercury use is "more than insignificant"	to be determined	See comment above.
Establish coordinating mechanism and delineate agency roles for development/ implementation of an ASGM National Action Plan (NAP)	to be determined	See comment above.
Define and formalize or regulate ASGM consistent with the Convention	Cameroon Mining Code	Cameroon Mining Code should adopt the definition of ASGM as definedby the Convention (Article 2(a)).
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")	Cameroon Mining Code	Mining Code could be revised to addresse these 'worst practices'.
Set mercury use reduction goals or targets consistent with the timely elimination of the worst practices and other use reduction efforts	to be determined	Not pertinent given the current understanding of ASGM in the country.

Reduce mercury emissions, releases, and exposures associated with ASGM, and prevent mercury exposures of vulnerable populations (particularly women of child-bearing age and children)	to be determined	Not pertinent given the current understanding of ASGM in the country.
Prevent the diversion of mercury and mercury compounds from other sectors to ASGM, and manage mercury trade consistent with the NAP	Cameroon Mining Code• Decree No. 2011/2585 / PM of 23 August 2011 setting out the list of harmful or dangerous substances and the regime of their release in inland waters.	It is important to limit/prevent any future use of Hg within the ASGM sector in Cameroon.
Implement a public health strategy to address mercury exposures to ASGM miners and communities	National Center for Disease Control and Public Health	Any future public health outreach and awareness raising could include information on exposure pathways related to the use of Hg in ASGM.

Article 8: emissions

Article 8 of the Convention seeks to control and reduce mercury emissions to the atmosphere from major existing and new point sources. Annex D identifies these major point sourcesto include: coal-fired power plants, coal-fired industrial boilers, smelting and roasting of non-ferrous metals, waste incineration, and cement clinker production facilities. The Conference of Parties to the Convention adopted guidance on best available techniques and best environmental practices (BAT/BEP) at its first meeting in 2017 . Parties can be eligible for assistance to support the implementation of reduction measures that are outlined in paragraph 5 of Article 8.

Table 19: Brief analysis of Cameroon's legislation in relation with Article 8 of the Minamata Convention

Article 8 - Air Emissions	Cameroon Domestic Law	Comments / Recommendations

Require best available techniques/best environmental practices (BAT/BEP) or associatedemission limit values(ELVs) for newsources as definedinArticle 8.2(c) and listed in Annex D	Environmental Impact Permit. Decree N ° 2011/2582 / PM of 23 August 2011 setting the terms of protection of the atmosphere;	on Industrial Emissions (such as BAT, setting ofELV,establishment of a procedure for an integrated permit, control measures) will need to improve. It is strongly proposed to develop appropriate regulation on an integrated permit and related matters in the near future;
Require one or more measures identified inArticle 8.5 tocontrol/reduce mercury emissions from existing sources listed in Annex D, which shall be operational at the source within 10 years	Environmental Impact Permit Decree N ° 2011/2582 / PM of 23 August 2011 setting the terms of protection of the atmosphere;	With respect to the regulation of mercury and mercury emissions into air from existing sources, legislation should provide a legal basis for developing a national plan on controlling emissions and establishing an emissions inventory (preferably not just on mercury). The preparation and adoption of a National Plan on Mercury should be possible in Cameroon without any special legal basis related to the MC. However, if a legal basis for the adoption of such Plan is necessary, it should be incorporated into Decree N ° 2011/2582 / PM of 23 August 2011 setting the terms of protection of the atmosphere.
Require monitoring/reporting and otherwise establish a mercury emissions inventory for sources listed in Annex D	Environmental Impact Permit	Cameroon need to establish a regulation relating to mercury inventory monitoring

Emission limit values are not currently established for hazardous substances for industries subject to EIA, including source categories listed in annex D of the convention. For industries, not subject to EIA technical regulation is appliedwhich sets fixed/default value for concentration of mercury in stack emissions and gives an equation for calculation of total allowable emissions.

In Cameroon, emission inventories and reporting is required based on Air emission inventory guidelines, using emission factors and mass-balance methods. Mercury emissions are also subject to emission inventories and national reporting. The National Mercury Inventory conducted as part of the MIA project in Cameroon assisted the government in establishing a baseline upon which future reduction efforts in the country can be evaluated.Existing regulations are not based on BAT/BEP .

Article 9: Releases

Article 9 addresses direct releases of mercury and mercury-containing compounds to land and water. Quantifying the amount of mercury entering the environment via direct releases is challenging because sources include both point and diffuse sources, some of which are related to legacy deposits from contaminated sites. Under Article 9, Parties to the Convention are required to identify source categories responsible for releases that are not addressed directly in other articles of the Convention.

Table 20: Brief analysis of Cameroon's legislation in relation with Article 9 of the Minamata Convention

Article 9 – Releases	Cameroon Domestic Law	Comments / Recommendations
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 sourcesidentified	Decree N ° 2011/2584 / PM of 23 August 2011 laying down the methods of soil and subsoil protection; • Decree No. 2011/2585 / PM of 23 August 2011 setting out the list of harmful or dangerous substances and the regime of their release in inland waters. Régulation on Environmental Impact Assessment	According to 1998 Law No. 98/005 Water Law, regulates all aspects related to water management and its relation to public releases to water of pollutants is subject to special authorizations. This could therefore be helpful as necessary measures to be taken to control releases of mercury and other pollutants into waters
Take one or more measuresspecified in Article 9.5 to control/reduce mercury and mercury compound releases to land and waterfrom significant sourcesidentifie	Law on Water; Law on Environmental Impact Assessment and Environmental Permit;	The 1998 Law No. 98/005 Water Law, regulates all aspects related to water management and its relation to public health mentions discharge limit values (in relation to "special water use permits") but does not set these limit values per relevant source yet. So far MINEPDED has developed standards on releases of water quality concentration limits in surface water in Cameroon, whichisnot sufficient tocomply with the MC. It is recommended that the future water legislation of Cameroon source-specific rules based on BAT and with detailed ELV set in an Annex or Annexes / by-laws per relevant source.

Carrying out release inventories	Law on Water; Decree N ° 2011/2584 / PM of 23 August 2011 laying down the methods of soil and subsoil protection Soil Protection; Law on Environmental Impact Permit	It would be necessary to revise the current law on environment in order to provide sound legal basis for the establishment of a release inventory of mercury from relevant sources.

Effluent discharge limit values are not currently established by MINEE. It would be necessary that discharge limits for mercury be introduced into these installations. Under current guidelines, industries not subject to EIA/EE/EIP technical regulation are subject to a fixed/default value for effluent concentrations.

Because of Cameroon's industrial history and currently active non-ferrous mineral processing sector, special attention should also be given to identifying diffuse releases associated deposits of mercury associated with abandoned industrial centers. This is also pertinent to Article 12 (see below). There will be a need to further elaborate on the approach and methodology for assessing releases, including the adoption of future guidance that will be provided once the Convention enters into force.

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

Article 10 addresses the interim storage of mercury and mercury compounds that is intended for usesallowedunder the Convention. The term "interim" is used to reflect , short-term nature of storage that should be considered during the transit of mercury. Mercury releases can occur throughout the supply chain (i.e., collection, handling, transport, and storage) and the Convention recognizes the importance of adopting recommendations for minimizing such loses. Article 10 does not address the management of mercury-containing waste as that is covered under Article 11 of the Convention. Future guidelines will be adopted by the Conference of Parties and will take into account existing guidelines outlined in the Basel Convention.

Table 21: Brief analysis of Cameroon's legislation in relation with Article 10 of the Minamata Convention

Article 10 – Interim Storage	Cameroon Domestic Law	Comments / Recommendations
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)	Law No. 89/027 of 29 December 1989 on toxic and hazardous waste. Law No. 96/12 of 5 August 1996; • Decree No. 2012/2809/PM of 26 September 2012 laying down the conditions for sorting,collection, storage, transport, recovery, recycling, treatment and final disposal of waste;	Need to further develop regulations on interim storage of waste that follows established guidelines.

Article 11: Mercury wastes

Article 11 of the Convention considers the guidelines developed under the Basel Convention for the environmentally sound management and disposal of mercury-containing waste. Mercury wastes can come in a variety of forms, depending upon the source. Industrial processes using mercury will create wastes from both the manufacturing process and pollution control operations. Mercury-added products become wastes

when discarded, either because it is broken or when consumers decide to buy a new model, e.g. the case of electronic gadgets such as mobile phones and computers, where functioning devices are discarded and replaced with the latest models before the end of their useful life. The clean-up of contaminated sites may generate mercury wastes, such as treatment residuals and contaminated soil.

Table 22: Brief analysis of Cameroon's legislation in relation with Article 11 of the Minamata Convention

Article 11 – Mercury Waste Management	Cameroon Domestic Law	Comments/ Recommendations
Use a definition of mercury waste consistent with Article 11.2	No definition in current national legislation	Mercury waste is considered as hazardous according to Decree No. 2012/2809/PM of 26 September 2012 laying down the conditions for sorting, collection, storage, transport, recovery Wastes. Waste codes have been developed from the various options of waste production such as from the purification and transportation of natural gas; from cement factories etc
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.	Waste Management Code; By-law #145/2016 on Special Conditions for Collection and Treatment of Hazardous Waste	
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	Waste Management Code; Decree No. 2012/2809/PM of 26 September 2012 laying down the conditions for sorting, collection, storage, transport, recovery Wastes	
Require transport across international boundaries in accordance with the Basel Convention, or if the Basel Convention does not apply, consistent with international rules such as the Bamako convention, standards, and guidelines.	Law on Transboundary Movement of Hazardous Wastes; Draft Basel Law	

There is currently no definition of mercury waste in the national legislation that complies with Article 11, paragraph 2 of the Convention. Such a definition could be outlined under the Waste Management regulation. As a Party to the Basel Convention, steps have already been taken to harmonize the country's Waste Management Code and Law on Transboundary Movement of Hazardous Wastes with this Convention. Hence, the import of mercury waste is prohibited as well as the export of hazardous and other wastes to countries, which are not a Party to the Basel Convention. All other exports are done in accordance with the Notification procedure established by that law which is in full compliance also with Minamata Convention requirements mandated through the Customs Department and the Ministry of Environment. Current plans for establishing a hazardous waste management system, including waste collection, temporary storage and treatment provide an opportunity to confirm compliance with this article.

Article 12: Contaminated sites

Future party to that convention like Cameroon needs to develop or update its domestic policy, governance and infrastructural framework that will facilitate the implementation of the Minamata Convention in the country. One of the requirements is to address the mercury and mercury compound contaminated sites under Article 12. The treaty calls on parties to 'endeavor' to take action to address contaminated sitesontaminated sites come in many forms. They can be active, where existing processes or practices continue to contribute to the contamination, or historical, where such processes or practices have stopped but the pollution remains. The sources of the contamination may be waste management activities and/or spills and emergency incidents. The risk of exposure to local communities and the potential for prolonged releases into the environment if not remediated make contaminated sites of concern. Further, there is a need to address the following factors involving contaminated sites: determining the nature and extent of contamination, the risks to exposed populations, remediation options, and the identity of entities or persons who should assume liability for some or all or the remediation costs.

Cameroon has developed a national strategy to identify contaminated sites. This strategy is based on

- Site identification and characterization;
- Engaging the public;
- Human health and environmental risk assessments;
- Options for managing the risks posed by contaminated sites;
- Evaluation of benefits and costs; and
- Validation of outcomes.

Table 23: Brief analysis of Cameroon's legislation in relation with Article 12 of the Minamata Convention

Article 12 – Contaminated Sites	Cameroon Domestic Law	Comments/ Recommendations
Develop strategies for identifying and assessing mercury/mercury compound contaminated sites	No legislation	A National Strategyto Identify Mercury Contaminated Sites in Cameroon was developed during the process of MIA (see annex)
If risk reduction activities are taken at contaminated sites, they are taken in an environmentally sound manner, incorporating risk assessment where appropriate	Decree No. 98/031 of 9 March 1998 organizing contingency plans and disaster and major risk relief	

Article 13: Financial resources and mechanisms

Under Article 13, each Party will undertake to provide, within its capabilities, resources in respect to those national activities that are intended to implement this Convention, in accordance with its national policies, priorities, plans and programmes. These resources may include domestic funding through relevant policies, development strategies and national budgets, and bilateral and multilateral funding, as well as private sector involvement.

Table 24: Brief analysis of Cameroon's legislation in relation with Article 13 of the Minamata Convention

Article 13 – Financial Resources and Mechanisms	Cameroon Domestic Law	Comments / Recommendations
Access domestic resources as may be needed to implement Convention obligations	No specific text covers this point	See discussion below.
Access financial resources available under the Convention financial mechanism and other resources available from multilateral, regional, and bilateral funding sources	No specific text covers this point	See discussion below.

Since Cameroon has not ratified the Convention, there is no ear marked state funding for implementation of various provisions of the Convention. However, in case of ratification of the document, the country has internal financial resources in the form of state budget allocated to various agencies for implementation of their duties and state programmes, funds of private businesses work in the field of hazardous chemicals and waste management, including waste collection, transportation, storage and safe disposal/treatment. Moreover, the MINEPDED and other relevant ministries have long-term successful experience in working with bi-lateral and multi-lateral donors, including UNDP, UNEP, FAO, UNIDO, USAID as well as Multi-Lateral Fund for the Montreal protocol and Global Environment Facility. Cameroon NGOs are also very experience in mobilizing financial resources for implementation of environmental projects in general, and waste management projects in particular. Thus, it is critical to assess and mobilize domestic and international financial resources for implementation of Minamata Convention.

Article 16: Health aspects

The Minamata Convention on Mercury was developed with the primary goal of protecting human health (and the environment) from risks of mercury exposure. As such, Parties to the Convention are encouraged to develop strategies and programmes for identifying populations at risk and for providing preventative care to these populations. Article 16 focuses directly on Ministries of Health and Labor and need to establish and strengthen prevention programs and improve the capacity of health care professionals for the prevention, diagnosis, treatment and monitoring of health care risks associated with mercury exposure.

Table 25: Brief analysis of Cameroon's legislation in relation with Article 16 of the Minamata Convention

Article 16 – Health Aspects	Cameroon Domestic Law	Comments / Recommendations

Promote the development and implementation of strategies to identify and protect populations at risk	Law N° 77-11 du 13 Juillet 1977 Bearing compensation and prevention of accidents at work and occupational diseases Articles 13-15 Law N° 68-LF-18 du 18 Novembre 1968 Portant organisation de laprévention des accidents detravail et des maladiesprofessionnelles	About the development and implementation of strategies and programmes to protect population at risk it may rather be in the competence of the Ministry of Health to prepare such strategies/programmes. To which extent additional or improved standards are required with respect to health aspects should also be decided by the Cameroon Ministry of Health.
Promote occupational exposure educational and prevention programs	Order No. 55 / MINTSS / SG / DSST of 06 November 2009 Fixing the list of tables of professional illnesses compensable, deadlines during which the insurer or the employer remains responsible as well as the works likely to provoke them	The Cameroonian Law N° 77-11 du 13 Juillet 1977 Bearing compensation and prevention of accidents at work and occupational diseases is implemented by the ministry of labour on issues related to safety and occupational to chemicals
Promote prevention, treatment, and care services for affected populations	National Center for Disease Control and Public Health	Ministry of Health and labor have the mandate but has not a programme.

Article 17: Information exchange & Article 18: Public information, awareness and education

Articles 17 and 18 relate to information shared between Parties (Article 17) and the general public (Article 18). Parties are encouraged to exchange information on technological and economic information on effective alternatives to aid in the reduction and elimination of mercury in the various sectors identified throughout the Convention. This should also include scientific, epidemiological, and legal information concerning mercury and mercury compounds. Parties should also make available to the general public information on human health and environmental effects of mercury exposure, effective alternatives to mercury-added products and progress the country is making towards meeting the obligations of the Convention.

Table 26: Brief analysis of Cameroon's legislation in relation with Articles 17 & 18 of the Minamata Convention

Article17– Information Exchange & Article 18 – Public information, awareness and education	**Cameroon Domestic Law**	**Comments/ Recommendations**

Collect and disseminate information on annual quantities of mercury and mercury compounds emitted, released, or disposed; and other information specified in Article 18	Law No. 96/12 of August 5, 1996, on the Framework Law on the Environmental Management Order N ° 0021/MINEPIA of April 11 2002 laying down detailed rules for the inspection of industrial fishing vessels, scientific observation and monitoring of fishing activities. According to Article19, anyone found Contravening the provisions of this by-law shall be exposed to the penalties laid down in the regulations in force	See discussion below.
Share information on the health and safety of humans and the environment as non-confidential, in accordance with Article 17.5	No specific text covers this point	See discussion below.
Report to the COP on progress in implementing Convention obligations under Article 21	No specific text covers this point	See discussion below.
Promote and facilitate education, training, and public awareness related to mercury	No specific text covers this point	See discussion below.

Information exchange between Parties to the Convention can be facilitated by the MINEPDED and should be communicated at the national level with other relevant stakeholders. There will be several opportunities for exchange between Parties, with the Conference of Parties serving as the primary, formal mechanism.

At the national level, Law No. 96/12 of August 5, 1996, on the Framework Law on the Environmental Management stipulates that “all public and private institutions are required, within the scope of their competence, to sensitize all populations on issues regarding the environment. They must therefore incorporate in their activities programs to ensure better knowledge of the environment. Article 7 (1) equally states that everyone has the right to be informed about adverse effects on human health and the environment of harmful activities, as well as measures taken to prevent or offset these effects.

(2) A decree defines the consistency and conditions of exercise of this right is yet to be developed. However the Ministry of Environment is responsible for public awareness on and human and environmental health risks. Such efforts should be done in close collaboration with other national stakeholders including the Ministry of Health and labor.

In addition to above, Cameroon developed dissemination and awareness strategy on the Minamata initial mercury project.

The main objectives assigned to the National Dissemination and Awareness Strategy for the Mercury Initial Assessment Project in Cameroon are:

1. Make available to the public relevant information and data on mercury and preventive and curative measures to mitigate the risk of exposure to these hazardous substances.
2. Promote the adoption of an information exchange network between the different national institutions involved in mercury management. This mechanism may be connected to other networks established or to be established under the Strategic Approach to International Chemicals Management (SAICM) or any other international agreement on chemicals. Providing national and international institutions with information on actions taken to manage mercury.
3. Facilitate the dissemination of information on Cameroon's obligations vis-à-vis the Minamata Convention once it becomes a Party.

4. Disseminate to all national stakeholders the measures taken by Cameroon to protect its citizens against mercury pollution, including:
    - Regulatory texts relating to chemicals in general and mercury in particular;
    - Control measures of import flows of chemicals at risk;
    - Mercury inventories in Cameroon;
    - Sites potentially contaminated by mercury;
    - Benefits to Ratify and Implement the Minamata Convention on Mercury
5. Strengthen public participation in the implementation of the National Mercury Action Plan.

CHAPTER III: MERCURY PROFILE

3.1 Inventory Planning, Preparation and Methodology

The inventory of Mercury releases in Cameroon was developed by a team of national consultants, using the "Toolkit for identification and quantification of mercury releases (version 2017)" made available by the Chemicals Branch of the United Nations Environment Programme (UNEP Chemicals) in 2016. More specifically, the team applied Toolkit's Inventory Level 2. The method is mass balances for each mercury release source types. Pre-determined factors (so-called default input factors and default output distribution factors) were used in the calculation of mercury inputs to society and releases. These factors were derived from data on mercury inputs and releases from the relevant mercury source types from available literature and other relevant data sources. The year of 2014 was chosen as the baseline year for data collection. Thus, where available, 2014 input data was used; however, when such data was not available the most recent data was used instead.

A number of Sectoral Working Groups were established by MINEPDEDand trained based on the level 2 Toolkit for the inventory of mercury emission and releases in Cameroon on how to collect data. The working groups and their membership, including relevant stakeholders who were members or not of the MIA coordination committee were then assigned to collect dat form the sources category identified in the Toolkit:

The Toolkit considers potential mercury inputs and outputs for the following source categories:

1. Extraction and use of fuels/energy sources
2. Primary (virgin) metal production
3. Production of other minerals and materials with mercury impurities
4. Intentional use of mercury in industrial processes
5. Consumer products with intentional use of mercury
6. Other intentional product/process uses
7. Production of recycled metals (secondary metal production)
8. Waste incineration
9. Waste deposition/landfilling and wastewater treatment
10. Crematoria and cemeteries
11. Identification of potential hot-spots

Four data collection tools were applied for the inventory. First, readily available online resources on source categories/economic activities and their characteristic were searched through the internet. Second, request letters were sent to the relevant institutions aiming at identification of emission and release sources of mercury. Third, interviews were conducted with main stakeholders, including representatives of relevant agencies, potential recipients and users of mercury containing items such are medical tools/instruments and lab devises (Thermometers, manometers etc.). Four, site visits were conducted for some priority sectors such asArtisanal and small-scale gold mining (ASGM) and a concertation meeting organized with industries representatives to finalize data collection where this was not possible through letters.

Collected information and data were analyzed, main mercury emission and release sources in Cameroon were identified and mercury input-output quantified. Quantitative data were analyzed through Toolkit (LEVEL 2) spread sheet.

Summary of mercury sources

3.1

Initial task of the inventory team was to identify major mercury release sources present in Cameroon. Mercury general input by source category and subcategory are summarized in the table i below.

Table 27: Mercury input in Cameroon

Source category	Exists? (y/n/?)	Calculated Hg input to society
Source category: Extraction and use of fuels/energy sources		
Coal combustion in power plants	0	0
Coal combustion in coal fired industrial boilers	0	0
Other coal use	0	0
Mineral oils - extraction, refining and use	0	16
Natural gas - extraction, refining and use	0	35
Other fossil fuels - extraction and use	0	0
Biomass fired power and heat production	0	282
Geothermal power production	0	0
Subtotal input from extraction and use of fuels/energy sources		***333***
Source category: Primary (virgin) metal production		
Mercury (primary) extraction and initial processing (a	n	0
Gold (and silver) extraction with mercury amalgamation processes	0	2600
Zinc extraction and initial processing	n	0
Copper extraction and initial processing	n	0
Lead extraction and initial processing	0	0
Gold extraction and initial processing by methods other than mercury amalgamation	0	1000
Aluminium extraction and initial processing	0	0
Other non-ferrous metals - extraction and processing	0	0
Primary ferrous metal production	0	0
Subtotal input from Primary (virgin) metal production		***3600***
Source category: Production of other minerals and materials with mercury impurities		
Cement production	0	677
Pulp and paper production	n	0
Production of lime and light weight aggregates	0	25
Subtotal input from production of other minerals and materials with mercury impurities		***702***
Source category: Intentional use of mercury in industrial processes		
Chlor-alkali production with mercury-technology	0	0
VCM production with mercury catalyst	n	0
Acetaldehyde production with mercury catalyst	0	0
Other production of chemicals and polymers with mercury	0	0
Subtotal input from intentional use of mercury in industrial processes		***0***
Source category: Consumer products with intentional use of mercury		
Thermometers with mercury	0	899
Electrical switches and relays with mercury	0	1045
Light sources with mercury	0	24
Batteries with mercury	0	8466
Polyurethane with mercury catalysts	0	0
Biocides and pesticides with mercury	0	0
Paints with mercury	0	0
Pharmaceuticals for human and veterinary uses	n	0
Cosmetics and related products with mercury	0	5310
Subtotal input from consumer products with intentional use of mercury		***15564***

Source category: Other intentional product/process use		
Dental mercury-amalgam fillings (b	0	80
Manometers and gauges with mercury	0	38
Laboratory chemicals and equipment with mercury	0	0
Mercury metal use in religious rituals and folklore medicine	0	0
Miscellaneous product uses, mercury metal uses, and other sources	0	0
Subtotal input from other intentional product/process use		***118***
Source category: Production of recycled metals ("secondary" metal production)		
Production of recycled mercury ("secondary production")	n	0
Production of recycled ferrous metals (iron and steel)	0	6
Production of other recycled metals	0	0
Subtotal input from production of recycled metals ("secondary" metal production)		***6***
Source category: Waste incineration*3		0
Incineration of municipal/general waste	0	0
Incineration of hazardous waste	0	442
Incineration of medical waste	0	377
Sewage sludge incineration	0	0
Informal waste burning	0	11863
Subtotal input from waste incineration		***12482***
Source category: Waste deposition/landfilling and waste water treatment		
Controlled landfills/deposits*3	0	17
Diffuse disposal under some control	-	0
Informal local disposal of industrial production waste	0	0
Informal dumping of general waste*1*3	0	2373
Waste water system/treatment*2	0	118
Subtotal input from waste deposition/landfilling and waste water treatment		***2508***
Source category: Crematoria and cemetaries		0
Crematoria/cremation	0	0
Cemeteries	0	241
***Subtotal input from* crematoria and cemetaries**		***241***

The total input of mercury estimated per source category, after taking the computation measures to avoid double counting of mercury inputs from waste and products, and in products produced domestically and sold on domestic market, is **22370 kg/year** (this total does not represent the arithmetic sum of inputs from individual category) with the total kilograms of mercury input coming from each category of source as follows:

- 15564 kg for “Consumer products with intentional use of mercury”,
- 12482 kg for “Waste incineration”,
- 3600 kg for “Primary (virgin) metal production”,
- 2508 kg for “Waste deposal/landfilling and waste water treatment”,
- 702 kg for “Production of other minerals and materials”,
- 333 kg for “Extraction and use of fuels/energy sources”,
- 241 kg for “Crematoria and cemeteries”,
- 118 kg for “Other intentional product/process uses, and
- 6 kg for “Production of recycled metals”.

Mercury output distribution by source category

The distributions of mercury outputs to various environmental medias (air, water, land) and to waste and products from different source categories, as well as the percentages are summarized in the figure below

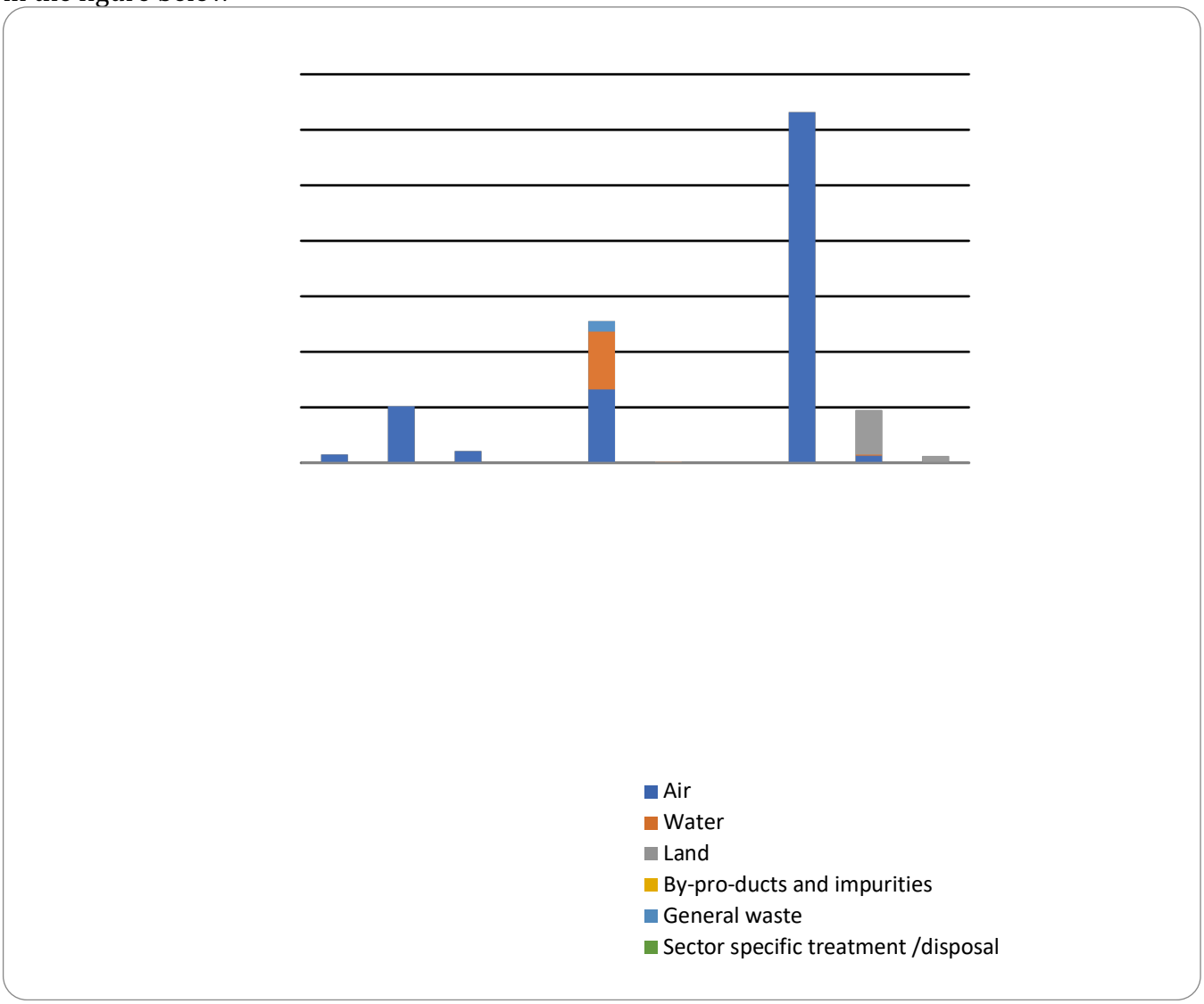


Figure 2: distributions of mercury outputs to various environmental medias

Total mercury emissions to the atmosphere from various anthropogenic sources in Cameroon is estimated in this report to about 18314 kg per year (the reference year for the activity data used in this study is not fix, but stretches between 2014-2016). From this total emission,

- 12 636.7 kg come from the source category "Waste incineration and burning",
- 2645.1 kg from the source category "Consumer products with intentional use of mercury (whole life cycle)",
- 2042 kg from the source category "Primary (virgin) metal production" exclusively artisanal gold production,
- 423.7 kg from the source category "Production of other minerals and materials with mercury impurities",
- 301.2 kg from the source category "Extraction and use of fuels/energy sources",
- 254.3 kg from the source category "Waste deposition/landfilling and waste water treatment",

- ❖ 9.2 kg from the source category "Other intentional product/process use" mostly dental amalgams and manometers and gauges with mercury,
- ❖ and 1.8 kg from the source category "Production of recycled metals".

Total mercury releases from anthropogenic sources in Cameroon to water and land is 10034 kg per year with 5355 kg going to water and 4679 kg going on land (soils) per year. Consumer products with intentional use of mercury (whole life cycle) contributed the most to mercury release in water with 4729.9 kg followed far behind by Primary (virgin) metal production with 332 kg and Waste deposition/landfilling and waste water treatment with 296.3 kg. The two remaining minor sources categories are "Other intentional product/process use" and "Extraction and use of fuels/energy" sources with 46.5 kg and 9.7 kg respectively; while releases on land come mostly from three principal sources categories, namely "Consumer products with intentional use of mercury (whole life cycle)", "waste deposition/landfilling and waste water treatment", and "Primary (virgin) metal production" with 3236.5 kg, 1898 kg and 1186 kg respectively. The remaining minor releases sources on land being the "Crematoria and cemeteries", "Other intentional product/process use", and "Production of recycled metals" with 240.6 kg, 14 kg and 1.9 kg respectively.

Figure 3: Mercury releases to the water

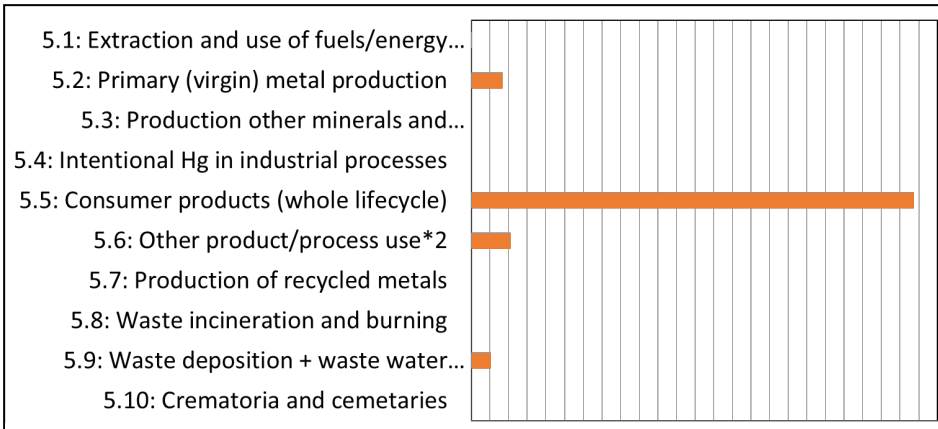
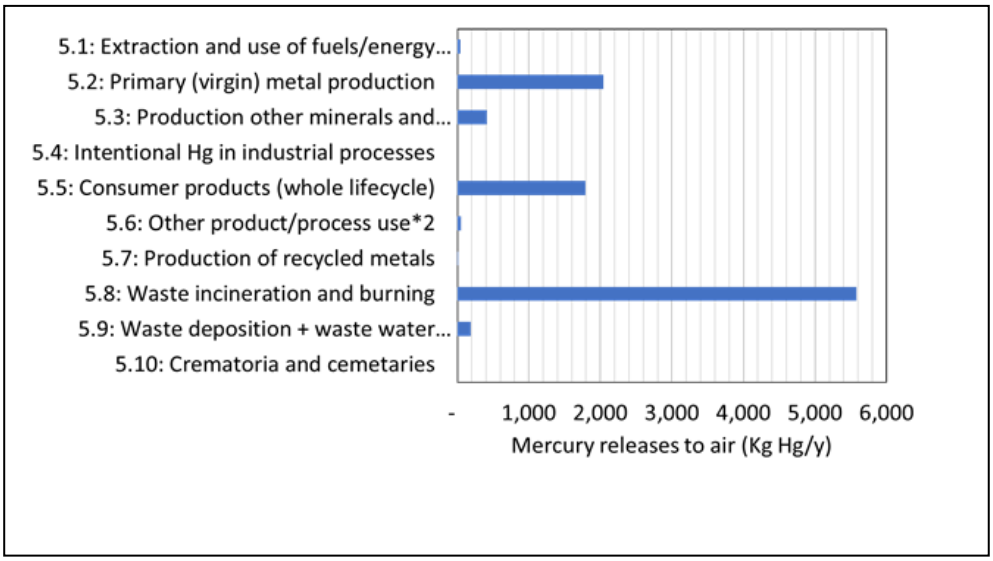
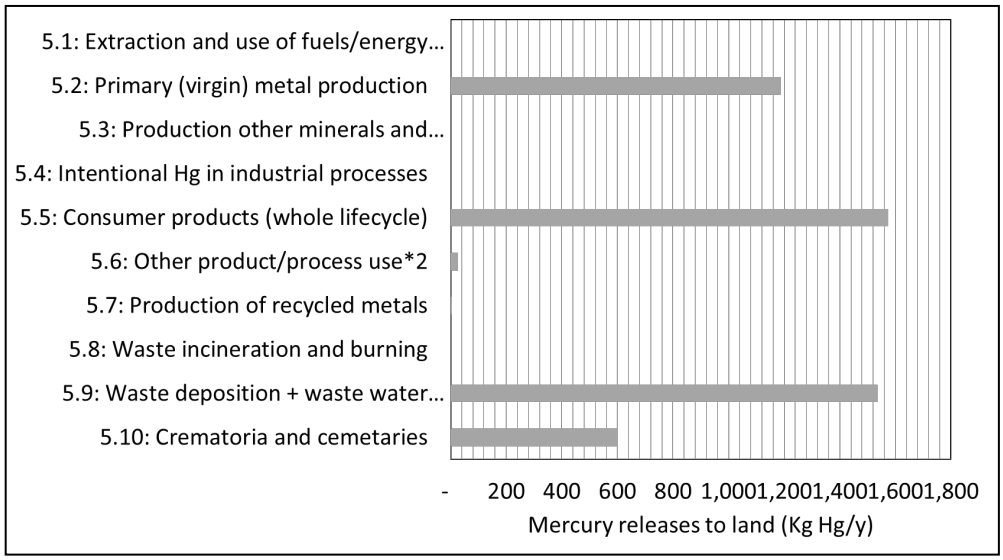


Figure 4: Mercury releases to air



The main annual output of mercury to the general waste stream in Cameroon occurs from the source category "Consumer products with intentional use of mercury (whole life cycle)" with 5106.9 kg. The three remaining minor source categories being "Other intentional product/process use", "Waste deposition/landfilling and waste water treatment", and "Production of recycled metals" with 27.4 kg, 35.4 kg and 1.8 kg respectively.

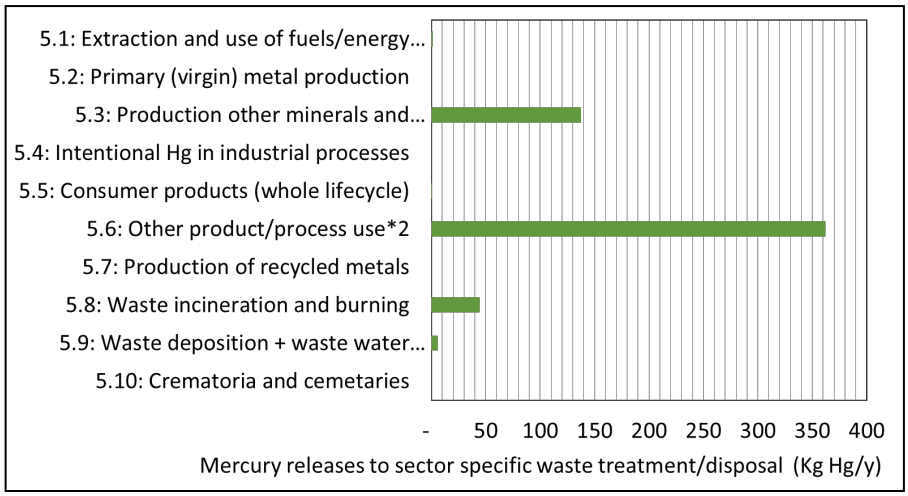
Figure 5: Mercury releases to the land



Estimate total annual mercury carried on as by-products and impurities in products in Cameroon is 205 kg from four sources categories, namely "Production of other minerals and materials with mercury impurities" with 142.9 kg/year, "Primary (virgin) metal production" with 40 kg/year, "Extraction and use of fuels/energy sources" with 17.6 kg/year, and "Other intentional product/process use" with 4.8 kg/year.

Estimate annual mercury output to sector specific treatment/disposal is 252 kg from six source categories as follow: "Production of other minerals and materials with mercury impurities" with 135.4 kg, "Waste incineration and burning" with 44.2 kg; "Consumer products with intentional use of mercury (whole life cycle)" with 28.1 kg, "Waste deposition/landfilling and waste water treatment" with 23.6 kg, "Other intentional product/process use" with 15.9 kg, and "Extraction and use of fuels/energy sources" with 4.6 kg.

Figure 6: mercury releases to waste



3.2 Data and inventory on energy consumption and fuel production

This category covers all forms of energy use including fossil fuels, biomass, biogas and geothermal energy (UNEP, 2013). It includes the fuel and energy used for electricity generation and in cogeneration plants, direct fuel use in industrial facilities, and the fuel used for commercial and residential cooking and heating. It also covers fuel used for transportation, and the energy used in the initial production (refining) of that fuel. The main pathways of mercury releases are to air, water and waste/residues. Land may also be a release pathway in domestic heating and cooking, either using woody biomass or fossil fuels, and from the extraction of mineral oil. In addition, land is often the ultimate receptor for wastes and residues.

3.2.1 Coal combustion in large power plants

There is no such installation within Cameroon. The only use of coal noted in Cameroon is coke in co combustion for cement production in CIMENCAM Figuil. Releases from cement production is covered elsewhere by the toolkit.

3.2.2 Mineral oils - extraction, refining and use

This Toolkit sub-category covers the extraction, refining, and uses of mineral oil (ie. petroleum products). This includes the combustion of oil to provide power, heat, and transportation, and other related uses, such as in bitumen. However, despite the relative potential complexity of these different areas, the input and output estimates can be broken down into a set of relatively straightforward calculations for the following three basic stages: oil extraction, oil refining and oil/petroleum combustion/use.

3.2.2.1 Oil extraction

The real number of productive oil fields in Cameroon is unknown, but the majority of production is accounted for by offshore fields located in the Rio del Rey basin, South West of Cameroon. The combined production is a mixture of crude oil (52%) and natural gas liquids, condensates and naphtha (48%), with a total production in 2014 of 3,850,000 tonnes. No data has been obtained on the mercury content of this production, but the Toolkit recommends a default factor of 3.4 mg/tonne. Using this factor gives a total annual mercury input for Cameroon oil extraction of 13 kg/year.

Figure 7: SONARA Oil refinery

The Toolkit indicates that there may be some minor releases of mercury (and other oil components) via the wastewater produced during oil extraction. This wastewater is usually processed through oil/water separators so only minor amounts of contaminants are released via the waste discharge. The Toolkit classifies the discharge as being to water which is true for Cameroon since production fields are mainly off-shore. The default distribution factor is 0.2 (ie 20%), which corresponds to a potential release to water of 2.60 kg/year.

Virtually all of Cameroon's indigenous oil production was exported until the National Oil Refinery Company (SONARA) was upgraded in 2014. As will be shown below, SONARA oil refinery plant refined 2,100,000 tonnes of oil in the same year 2014, indicating that the balance of 1,750,000 tonnes where exported the same year. Hence, the remainder of the 13 kg/yr of mercury inputs noted above (ie. 11.4 kg/yr minius the 6 kg went out through exportation, i.e. 5.4 kg/year) is included in this inventory.

3.2.2.2 Oil refining

The total intake of crude oil and refinery feedstock for the SONARA oil refinery in 2014 was 2,100,000 tonnes (INS, 2014). No recent data has been obtained on the mercury content of any of the refinery inputs. The Toolkit default factor of 3.4 mg/tonne for crude oil has been used for the input calculations, to give a mercury input to the refinery of 7 kg/year.

The Toolkit indicates that just over 40% of the mercury inputs to a refinery are lost through discharges to air, and releases in refinery wastes and by-products, such as sulphur and bitumen. No data is available on the actual distribution through the SONARA refinery, so the Toolkit default factors have been used: 0.25 (25%) to air, 0.01 (1%) to water and 0.15 (15%) to wastes. The remaining 59% of mercury inputs (4.13 kg/year) are assumed to carry over into the refinery products, such as petrol, diesel, and heavy fuel oil, and are accounted for under the use category discussed below.

3.2.2.3 Use of refined petroleum products

The Toolkit makes very little distinction between the different ways in which light oil products may be used, because it assumes that most of them will ultimately be burned, and all of the mercury will be discharged to air. The only sub-classes considered for light oils – as available data on mercury contents do not allow a closer distinction - are transport, residential heating and cooking, and industrial combustion facilities with a high degree of emission control. Residential heating and cooking only accounts for 1.3% of total petroleum product consumption in a country like Australia (MBIE, 2013), Cameroon a tropical developing country is not expected to report use of light oil use in the residential heating. However, heavy oil is used in some few combustion facilities but there are no such heavy oil-fired industrial facilities in Cameroon with an advanced level of emission control. Hence the total consumption of refined light oil products has been accounted for under the 'Transportation and other uses than residential heating and other oil combustion facilities' Toolkit category, which includes all uses in transportation, and in industrial and commercial applications.

For heavy oil, it is estimated from interview with the industrial sector that about 376797 tonnes of that type of fuel were used in 2016 in combustion facilities. This indicates a total mercury input from heavy oil combustion in facilities of 8 kg/year using the Toolkit default factor of 20 mg of Hg/tonne. The overall input quantity is further discharged to air.

As indicated above, the mercury inputs via products distributed from the SONARA Refinery are 4.13 kg/year. However, about 40% of Cameroon's domestic petroleum consumption is attributed to imported refined product. There is no data available on the mercury content of these imports, but it should be reasonable to assume they would be similar to those produced in-country. This indicates a total mercury input from petroleum products of about 3 kg/year, and the same output quantity, in the form of discharges to air.

3.2.3 Natural gas - extraction, refining and use

As with mineral oils, the mercury releases from natural gas are considered through all three stages of gas extraction, processing and use.

3.2.3.1 Gas extraction and processing

Natural gas is produced from the same fields as noted previously for oil. The national total gas production in 2014 from all fields was 80048 tonnes that is 351 513 600 cubic metres (Nm^3). Lack of transparency exists on data related to the losses from injection, flaring and other production processes offshore. However, it is worth noting that this is a drastic change in gas extraction in the region as Golar LNG the first liquefaction plant in the region recently launched an extraction process which should produce 1.2 million tons of Liquefied natural gas for exports. It will also produce 5,000 tons of condensate daily and 30,000 tons of domestic gas per year, to satisfy the local demand probably.

There is currently no available data on the mercury content of Cameroon natural gas. The Toolkit recommends that mercury inputs at the extraction stage be calculated using the concentration range of 2 to 200 $\mu g/m^3$, or a default mid-range factor of 100 $\mu g/m^3$. Using the mid-range value for the Cameroon gas volumes gives a total mercury input of 35 kg/year. The output factors given in the Toolkit show that about 50% of the mercury in the gas is carried over into product (ie 17.5 kg/year for Cameroon), and the remainder discharged to air (20%), water (20%) or in wastes (condensates, 10%).. As we indicated, there is a lack of available information on the mercury content of pipeline gas.

3.2.3.2 Gas consumption

The total volume of pipeline gas distributed in Cameroon in 2014 was inferred to be 14 900Nm^3. The Toolkit default factor for pipeline quality gas is 0.22 $\mu g/m^3$ and it is assumed that all of the mercury is released during combustion. Natural gas is only mainly used in the big cities, waste incinerator plants (BOCOM Recycling) and for power generation. The annual release to air through the consumption of pipeline natural gas is nearly nil (0.001 kg/year) due to the combination of very low default factor and low annual consumption.

3.2.3 Biomass-fired power and heat production

The UNEP report on the global assessment of mercury (2013) indicates that Cameroon is located within the area of the global atmospheric mercury deposition around the equator. Therefore, it is inferred that wood and other biomass should contain mercury that originates from that taken up naturally from the soil, and mercury deposition directly from the atmosphere as a result of natural and anthropogenic emissions to air. Most of the mercury is discharged back into the air when the biomass is burned. This Toolkit sub-category is concerned with the burning of wood and other biomass as an industrial fuel, and in residential heating and cooking.

In Cameroon about 9 406 875tonnes of biomass are consumed in homes, on the streets for roasted meat and used in co-incineration for energy production in the cement clinks, waste incinerators, and sugar plant etc. (FAO, 2015) among which 215 560 tonnes of charcoal were used in homes, on the street for fish roasting and others.

There is no published data available on the mercury content of Cameroon wood. The Toolkit recommends a default input factor of 0.03 mg/kg, or a range of 0.007 – 0.07 mg/kg, and the fist (0.03 mg/kg) will be used in the release input calculations for biomass; and a default factor of 0.12 mg/kg for charcoal combustion. The Toolkit also recommends that all of the mercury be considered as being released to air in both cases, in the absence of any local distribution data.

3.2.4 Geothermal power production and use

There is no geothermal power production and use in Cameroon, though the potential exists along the Cameroon volcanic line, a within plate volcanic setting that stretches from the Atlantic Ocean in the South West through the Lac Chad in the North East.

3.3 Data and inventory on domestic production of metals and raw materials

This category covers mercury releases from the mining and processing of metal-containing ores for the purposes of primary (virgin) metal production (UNEP, 2013).

3.3.1 Primary metals not produced in Cameroon

There is no significant primary metal production in Cameroon for the following Toolkit sub-categories: mercury, zinc, copper and lead. This information is confirmed by the Ministry of Mines and Energy. There are currently no extraction nor exploration permits granted for Mercury but a number of mining and/or exploration permits have been granted for some other primary metals in Cameroon including gold:

- Géovic (American) for cobalt and nickel exploration in Nkamouna (Lomié)
- Cam Iron (Cameroono-Australians joint-venture) for iron exploration and production in Mbalam
- Sicamines (British) for tin and colombo-tantalite exploration in Mayo-Darlé, and rutile in Ayos and Akonolinga, and the nepheline syenite in Kribi
- NU Energy (British) for uranium and nickel/cobalt exploration in Poli
- C et K Mining (South Corean) for diamond and gold exploration in Mobilong (in joint-venture with Capam)
- Kocam Mining (South Corean) for saphir and gold mining in Colomines
- Sinosteel (Chinese) for iron exploration in Kribi
- African Aura (South-African) for gold in Batouri, Tcholliré, Akonolinga or Rey-Bouba
- Cimencam (Franco-Cameroonian) for claystones extraction in Figuil
- FMRC/Fametal Mining Resources Cameroon (Chinese) for gold exploration in Mang, Boulou, Mompwe (East)

- Caminco (South African) for gold in the North Cameroon The majority of ASGM activities (formal and informal) take place in the East Region (about 85 percent), in the South (Lolodorf), Adamawa, North Regions and most recently (2017) in the Centre Region (Eseka). A 2011 study estimated to about 100,000 the number of person involved in ASGM in Cameroon.

3.3.1.1 Gold and silver, using mercury amalgamation

Artisanal and Gold Mining has been practiced in Cameroon since the 1930s, using mostly rudimentary techniques (shovel, pickaxe, pan). Semi-mechanized Gold Mining (the use of a mechanical arsenal such as excavators, washing machines etc.) appeared in 2007 in of the recovery of gold that would be buried during the impoundment of the dam by Lom Pangar , thus dedicating the introduction of the use by the Chinese miners of mercury in the processes of gold recovery.

Depending on the type of media, the gold is in the form of flakes, nuggets, grains or dust. The activity can be alluvial (gold water) or eluvial (gold pebbles). Gold is exploited in 8 of the 10 Regions of Cameroon but especially in the eastern regions (Bétaré -Oya, Colomine, Batouri, Kette) of Adamawa (Meiganga Tignère), South (Mintom , Akom II, Bipindi , Lolodorf , Ebolowa, Sangmelima) and Center (Eséka). This activity is practiced by 15,000 to 20,000 people in rural areas, and the population is cosmopolitan, composed of Cameroonians (85%)[3] and some foreigners (Central African, Chadians, Malians (10%) and Asians (5%). Gold panning is mainly practiced by men (70 %), women (25%) and children (5%), the annual production is estimated at 1 ton. Mercury is mainly used in the processing of fine gold (Dust and fine grains) for its amalgamation capacity.

In general, the knowledge of the risks related to the use of mercury on human health and the environment are unknown to the majority (manipulation of mercury with bare hands by the craftsmen, burning of amalgam in the open air, presence pregnant women and children in washing tubs, dumping mercury waste in waterways ... etc). The supply chain is informal and not mastered. Even though the use of mercury amalgamation in the artisanal and small-scale gold mining (ASGM) in Cameroon has been banned in 2014 following the adoption of the Minamata Convention on Mercury in 2013 with the active participation of the Cameroon delegation to all the five sessions of intergovernmental negotiation committees (mercury INCs), illegal gold mining with mercury amalgam is still practised in Cameroon due to the limited resources in the possession of the government to enforce the fresh regulation in one hand, and lack of training and capacity building on alternative mercury-free methods, in the other hand. A Cameroon well known business news magazine “Investir au Cameroun” in 2012 revealed using the data from CAPAM that the average monthly production of gold by each of the 8 small companies is 10 kg; this is equivalent to 0,96 tonnes per year for 8 artisanal companies. Considering the multitudes of individual miners, whose total annual production was estimated at 1.2 tonnes, we can reasonably estimate a total production of 2.16 tonnes per year from all sources. There is no consolidate and credible source on information on annual gold production in Cameroon, however from available data a good estimate of the annual production between 2013 and 2014 could be about 4 tonnes of gold produced through both mercury amalgamation and gravity processes. Again, in the absence of consolidated national information on the quantity of gold produced through each of the two

[3] CAPAM (framework to Support and Promote Artisanal Mining (in French acronym CAPAM))

above processes, it will be wise to consider 50 percent of the annual production to be from mercury amalgamation and concentrate without using the retort and the remaining 50 percent through gravity only (no mercury used). The toolkit recommends the default factors of 0.77; 0.12 and 0.11 for the releases to air, water and land media respectively. In the absence of national emission factor data, we have used the toolkit default factors in this report. The mercury input and output calculations for gold production using mercury are shown in **Error! Reference source not found.**.

Table 28: Input and output estimates for gold production using mercury

Source	Annual Mercury Inputs, kg/yr	Annual Mercury Outputs, kg/yr		
		Air	Water	Land
Gold mercury	2600	2002	312	286

3.3.1.2 Gold production not using mercury amalgamation, but probably cyanide

From the field investigation conducted in 14 mining sites in the East regions of Cameroon in October 2018 by CREPD. Considering that the sites visited are the most prominent ASGM hotspots in Cameroon, we can infer that cyanide is not use by artisanal miners in Cameroon. For this reason, Hg inputs calculation from gold production not using mercury amalgamation is not relevant in this case using the toolkit.

3.3.1.3 Aluminium production

The Toolkit covers two stages in the aluminium production cycle; initial refining of alumina from bauxite, and the production of aluminium metal from alumina, by smelting. The only primary aluminium production plant in Cameroon is the aluminium smelter ALUCAM in Edéa in the portfolio of the Canadian company ALCAN in joint venture with the government of Cameroon. The alumina processed at this plant is imported from Guinea Conakry in a highly refined form, and is believed to contain no significant concentrations of mercury The Toolkit indicates that there may be some mercury releases from aluminium smelting, but does not provide any references to published data or recommended input factors. In addition, for the bauxite refining process it shows that all of the mercury is released to the environment, with no residual mercury in the alumina product. This tends to support the suggestion that the alumina brought into Cameroon is essential mercury-free.

Therefore, the inputs and outputs from primary aluminium manufacture have been assessed as zero. In level 1 inventory, it was mistakenly inferred that refining of alumina from bauxite was carried out at ALUCAM Edéa, which is not true.

According to USGS (2015), production from bauxite in Cameroon seems to be planned for operation in 2018.

3.3.2 Summary for this category

The estimated inputs and outputs for the Primary Metal Production category are summarised in **Error! Reference source not found.**. From this it can be seen that the inputs are totally dominated by the use of ore in gold and silver production, most of which is returned to the land by disposal in the tailings dump.

Table 29: Summary of inputs and outputs for the primary metal production category

Category	Mercury Inputs, kg/year	Mercury Outputs, kg/yr				
		Air	Water	Land	Product	Waste
Mercury	-	-	-	-	-	-
Gold with mercury amalgamation	2600	2002	312	286	-	-
Zinc, copper, lead, other	-	-	-	-	-	-
Gold without mercury						-
Aluminium	-	-	-	-	-	-
Totals	**2600**	**2002**	**312**	**286**	**-**	

3.3.3 Production of minerals and materials with mercury impurities

This category covers mercury releases from the production of minerals and related materials with mercury impurities (UNEP, 2013).

3.3.3.1 Cement production

There are six cement plants in Cameroon; CIMENCAM Douala, CIMENCAM Figuil, DANGOTE, CIMAF, ADDHOH and MECDEM in Douala, and Figuil. CIMENCAM in Douala uses heavy fuel as the primary fuel, and biomass in co-combustion for an annual total production of 1,500,000 tonnes; in Figuil, CIMENCAM uses heavy fuel, coke and waste lubricating oil in co-combustion for an annual total production of 400,000 tonnes. DANGOTE during our data collection meeting with the private sector in Douala clamed to use heavy fuel and natural gas for their production with an annual total production of 1,050,000 tonnes. The remaining companies CIMAF, ADDHOH and MECDEM did not attend the meeting and did not provide the data we requested from them. However, we learnt from the representative of the cement companies present at the meeting that they use heavy fuel and natural gas

Figure 8: Cement factory at Figuil

as primary fuel. Their individual annual production is estimated to be 1,000,000 tonne each. This rounds to a total annual production of 4,050,000 tonnes for DANGOTE, CIMAF, CIMAF, ADDHOH and MECDEM. In this report we assume that ¾ of this production occur through the use of heavy fuel, while the remaining ¼ is through natural gas. The primary raw ingredients for cement manufacture in Cameroon are pozzolan, clinker and gypsum, which contains traces of mercury. There is also mercury in the heavy fuel, natural gas, coal, biomass, and in certain levels waste lubricating oil used as primary and supplementary fuels as indicated above. The mercury content of the actual fuels used is unknown.

The total annual production rate of 6,049,500 tonnes of cement split according to each type of fuel used as follow:

- Heavy oil (fuel oil in the toolkit): 4,187,500 tonnes
- Natural gas: 1,012,000 tonnes
- Coke: 300,000 tonnes
- Waste lubricating oil co combustion: 50,000 tonnes
- Biomass: 500,000 tonnes

Bringing down to the two sub categories of cement production without co-incineration of waste and cement production with (significant) co incineration of waste, this corresponds to 5,499,500 tonnes and 550,000 tonnes respectively. However, the wastes are known to be waste oil (counted here as similar to fuel oil) and biomass. Biomass generally has significantly lower mercury concentration than waste, so this is also included as if oil, as oil has the closest (general) mercury concentration to biomass in the calculation system designed for cement in the Toolkit (the error introduced because of this is marginal).

The Toolkit indicates that there is some partitioning of the mercury between the air emissions and the cement product. In the Toolkit terminology, all the Cameroon cement plants would be described as having simple particulate control systems, with output distribution factors of 0.6 (60%) to air and 0.2 (20%) to product, and 0.2 (20%) to sector specific treatment/disposal.

The toolkit does not provide a default factor for Hg inputs from Lime production facility. ROCAGLIA produces about 500 000 tonnes of lime per year in its facility in Figuil.

The mercury input and output estimates for cement production are shown in **Error! Reference source not found.**.

Table 30: Input and output estimates for cement production

Source	Activity Rate, tonnes/yr	Annual Mercury Inputs, kg/yr	Annual Mercury Outputs, kg/yr		
			Air	Product	Sector specific treatment/disposa
Total cement production without co incineration of waste and with co incineration of waste	6 049 500	671	402.48	134.16	134.16

3.3.3.2 Production of lime

This Toolkit sub-category covers the production of burnt lime from the high-temperature treatment (calcination) of limestone, and the similar processes used for manufacturing light-weight aggregate from clay, shale or slate, which is used in making concrete products. There is only one lime producer in Cameroon known as ROCAGLIA company in Figuil. North Region.)

The Toolkit doesn't recommend any default factors for lime manufacture because the available data is very limited. Reference Document on Best Available Techniques in the lime production in the European Union reports a mercury emission of less than 0.00005 -0.0005 kg per tonne of lime produced (EU, 2010). It is inferred that in Figuil, emission can be in the same range. No mercury emissions data is available from ROCAGLIA . In the absence of any recommended Toolkit factors, we have use a default factor of 0.5 g/tonne. for the mercury inputs estimates. In accordance with the Toolkit guidance, the output distribution factors are 70% to air and 30% in product.

The mercury input and output estimates for lime production are shown in **Error! Reference source not found.**. The figures shown in brackets are the means of the reported ranges.

Table 31: Input and output estimates for lime production

Source	Activity Rate, tonnes/yr	Mercury content, g/t	Annual Mercury Inputs, kg/yr	Annual Mercury Outputs, kg/yr	
				Air	Product
Lime production	500000	0.5	250	175	75

Similar data in level 1 inventory because the annual production of lime by ROCAGLIA is assumed to be the same 500,000 tonnes as in 2011.

3.3.3 Summary for this category

The estimated inputs and outputs for the minerals category are summarised in **Error! Reference source not found.**, which shows that the inputs and outputs are totally dominated by the application of superphosphate to land.

Table 32: Summary of inputs and outputs for production of minerals and related materials with mercury impurities

Source	Annual Mercury Inputs, kg/yr	Annual Mercury Outputs, kg/yr		
		Air	Product	Sector specific treatment/disposa
Cement production without co incineration of waste	677	406.20	135.40	135.40
Production of lime	25	17.5	7.5	
Total	**702**	**427.70**	**142.90**	**135.40**

3.4 Data and inventory on domestic production and processing with intentional mercury use

This category covers mercury releases from several industrial chemical processes (UNEP, 2013), none of which exist in Cameroon.

3.5 Data and inventory on waste handling and recycling

This category covers mercury uses in a wide range of different consumer products (UNEP, 2013).

3.5.1 Mercury thermometers

Currently, there is no manufacturer of glass thermometer in Cameroon.

3.5.1.1 Imports/sales of glass liquid thermometers

Import data for Customs' code 9025.11.00.00 (liquid-filled, direct-reading, thermometers and pyrometers) was obtained from Statistics Cameroon for the period 2012 – 2015. We found the data for 2015 reporting 16,898 kg gross weight of glass thermometers in Cameroon much close to the reality.

In the market, thermometer offered to customers are the same as those that were sold in 2013 when a comprehensive study on mercury input from liquid thermometer was conducted (Kuepouo, 2013). The study estimated at 18.3g the weight of one liquid thermometer item. Base on this data, we can easily derive the total liquid thermometer items corresponding to the reported 16,898 kg gross weight. Considering the fact that there is no scheme of collection for sound disposal or export of discarded liquid thermometers, all the imported thermometers in stock or in circulation will end up in the national environment. So, it is rational to consider this figure as the lowest estimate for the mercury inputs from liquid thermometers for the reference year.

The Toolkit indicates that medical thermometers typically contain 0.5 – 1.5 grams of mercury each with average of 1 grams recommended. We use this average of 1 gram for inferred mercury inputs calculation from liquid thermometers in this report.

3.5.1.2 Ambient, industrial and other types of glass thermometers

For this group of thermometers that have longer lifespan in use than glass liquid thermometer for body temperature control, we have estimated a minimal number that are inferred to become waste per year as follow:

- Ambient thermometers 500 units. Currently in Cameroon, there are at least 579 hotels (INS, 2015). If we consider an average of 30 rooms, this sums to 17370 rooms. If we further consider that 20 percent of those rooms have ambient thermometers in the remote controls set, this is equivalent to 3474 units of ambient thermometers. Given a lifetime span of 6 years, we can carefully assume about 500 units become non-functional every year with some uncertainty margin.
- Industrial thermometers 10 units. There is a minimum of 50 industries from cement production, pharmaceutical, cosmetics, food processing, metal smelters, hazardous waste incinerators etc. that use at least one industrial thermometer in their installations. Using a lifespan time of 10 year, we confidently infer that per year we can have 10 units that become non-functional.
- Other glass thermometers 50 units. Similar reasoning as above is applied on other glass thermometers.

In estimating outputs, the Toolkit recommends distribution factors of 0.2 (20%) to air, 0.3 (30%) to water 0.2 (20%) to land and 0.3 (30%) to waste, for countries with no waste separation or sorting scheme in place and those with widespread informal waste handling system like is case in Cameroon and many other developing countries. Mercury inputs from end of life equipment were computed using the average mercury contents provided in the toolkits as follows; 3.5 g per item for ambient thermometers, 103 g per item for industrial thermometers, and 20.5 g per item for other glass thermometers. The Toolkit makes no provision for existing stocks such as those noted here.

The mercury input and output estimates for the use of glass liquid thermometers are shown in **Error! Reference source not found.**.

Table 33: Input and output estimates for mercury thermometers

Source	Activity Rate, units/yr	Mercury content, g/unit	Annual Mercury Inputs, kg/yr	Annual Mercury Outputs, kg/yr				
				Air	Water	Land	Waste	
Annual consumption or import	895574	1	896	180	270	180	270	
Ambient thermometers	500	3.5	2	0.4	0.6	0.4	0.6	
Industrial thermometers	10	103	1	0.2	0.3	0.2	0.3	
Other glass thermometers	50	20.5	1	0.2	0.3	0.2	0.3	
Totals			**900**	**180.8**	**271.2**	**180.8**	**271.2**	

3.5.2 Electrical and electronic switches, contacts and relays

It is inferred that mercury has been used, and continues to be used in many varieties of electrical switches and relays, most likely also in Cameroon. They can be found in stocks in equipment and infrastructures in use like cars boot light switches and ABS braking systems, electrical thermostats in old and second-hand refrigerators, flame sensors in big hotels, offices (the electricity network operator), oil and gas field cabins, bilge pump for boats, etc. (UNEP, 2013). Switches and relays are all imported to Cameroon as build in devices in equipment and cars and others. There is no separate collection system for switches and relays at the end of their useful life in Cameroon. A typical small switch has a mercury content of about 1 gram per switch, while a typical relay has about 6 grams of mercury. Considering the short lifespan of these items in second hand products in one hand, and the number of Cameroonian who can afford to buy a new refrigerator, the number of public, Para public and private infrastructures which can have flame sensors, the total quantities of mercury inferred to be released per year in Cameroon from switches and relays could be significant. The major difficulty we faced in the inventory of switches and relays in Cameroon was that there was no distinction between that which may contain mercury and those that do not from the HS codes on UN Comtrade that gives a very insignificant quantity of switches and relays imported to Cameroon per year.

Input and output estimates

The Toolkit recommends default factors of 0.02 – 0.25 grams/year per capita with an average of 0.14 grams/year per capita for estimating current mercury inputs via electrical switches and relays. In this report, the average of 0.14 was used based on the fact that the current stock of mercury in switches and relays are mostly in second hand equipment or in infrastructures with no or less maintenance (replacement of flame sensors for instance) since they were built. The toolkit also recommends the use

of the percentage of the population (23 130708 inhabitants) having access to electricity (World Bank, Sustainable Energy for All (SE4ALL) database from World Bank, Global Electrification database (2017)) to estimate the mercury releases from the annual use. The 2017 World Bank Sustainable Energy data base indicates that 56.8 percent of the total population of Cameroon have access to electricity. We further use the output scenario a2: No separate collection. Informal waste handling to compute the mercury outputs. For outputs, the Toolkit recommends distribution factors of 0.3 (30%) to air, 0.4 (40%) to land and 0.3 (30%) to general waste, for countries with no separate collection. Informal waste handling. These factors have only been applied to the per capita inputs estimated using the Toolkit factors.

The mercury input and output estimates for mercury switches and relays are shown in Table 7-3. The figures shown in brackets are the means of the reported ranges.

Table 34: Input and output estimates for mercury switches and relays

Source	'Activity' (population)	Mercury input rate, g/capita	Annual Mercury Inputs, kg/yr	Annual Mercury Outputs, kg/yr		
				Air	Land	Waste
Annual usage	13138242	0.14	1045	313.43	417.90	313.49

3.5.3 Light sources lamps

The UNEP global mercury assessment report in 2013 indicates that mercury is used in small amounts (per lamp) in fluorescent tubes (LFLs) and compact fluorescent lamps (CFLs), and in high-pressure discharge types, such as metal halide, mercury vapour, sodium, and neon lamps. Though Cameroon does not manufacture all these products, they are commonly imported and used in the country. The most common use for the discharge lamps is definitely in street lighting. Other light sources reported to contain mercury include: lamps used in photography, laboratory analysers, ultraviolet sterilisers, and the back lights for the LCDs and some of the other flat-screen systems used in computers, televisions and, possibly, older mobile phones. The uses in flat screen application are discussed in the next section.

Figure 9: Some light source commonly used

3.5.3.1 Fluorescent lamps LFLs and CFLs

Import data for fluorescent lamps and tubes was obtained from Un Comtrade database for 2015 of 1577354 units, which does not make the distinction between LFls and CFls. The indicated total annual imports of fluorescent lamps of between 1577354in 2015. In Cameroon, we estimated that the ratio of use between LFLs and CFLs could be 1:4 (25 percent LFLs and 75 percent CFLs), and the current mercury contents are 15 and 10 mg/lamp, respectively as indicated in the toolkit.

3.5.3.2 Other discharge lamps

For other imported lamps, the UN Comtrade data was used to estimate the quantities of High pressure mercury vapour lamps, High-pressure sodium lamps (CARPA, 2015), UV light for tanning, and Metal halide lamps in 2014 (HS Code: 853941).

3.5.3.3 Input and output estimates

The total estimates for mercury inputs for all types of lamps are summarised in Table 6.3. This was based on the mercury content information given above or the Toolkit default factors when local information was not available.

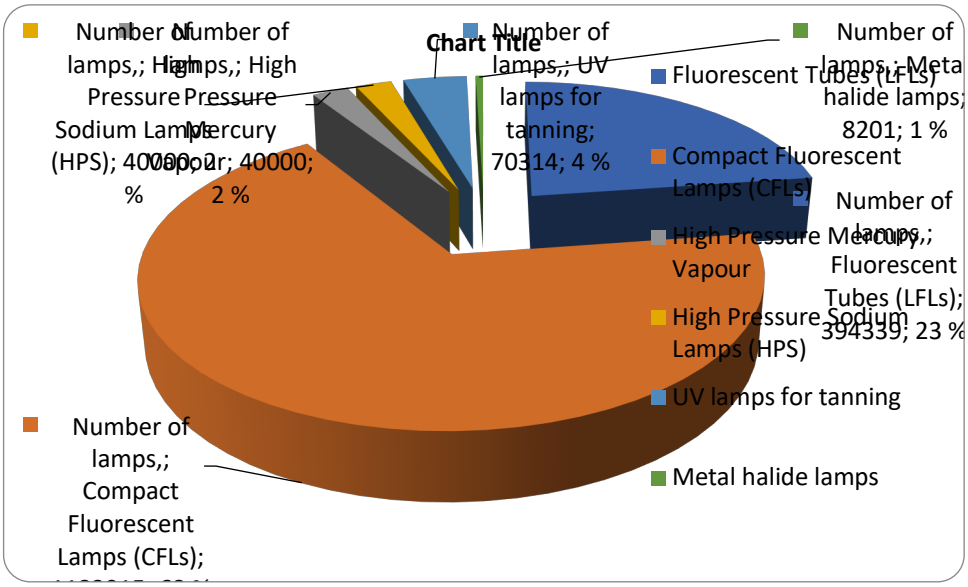


Figure 10: Estimates of lamps used

3.5.4 Batteries

Mercury has been used extensively in batteries in the past, and it is still an essential component in mercury oxide batteries, where it accounts for 32% of the total battery weight. In most other batteries it is used as a reaction modifier and as a corrosion inhibitor. Its uses are predominantly restricted to non-rechargeable (primary) batteries (UNEP, 2013).

HELLESENS is the only private company in Cameroon that manufactures batteries in Douala Bonaberi. This company produces only cylindrical batteries of types D and AA, that do not contain mercury.

The methodology used for estimating mercury inputs from alkaline button cell batteries that are commonly used in Cameroon was through the average number of total number of each category of inferred mercury contained batteries imported from all the Cameroon's trade partners in the World between 2012 and 2015 (UN ComTrade Data). We use the average number to overcome the disparity in the net imported quantity from one year to another. The toolkit gives a total mercury inputs from battery products of 8466 kg/yr. The input and output calculations based on the toolkit default factors and on the output scenario of no separate collection with informal waste handling is 0.25 (25 %) in air, 0.25 (25 %) on land, and 0.5(50%) in general waste are shown in Table 6-5.

Table 35: Input and output estimates for batteries

Source	Annual	Annual Mercury Outputs,

	Mercury Inputs, kg/yr	kg/yr		
		Air	Land	General waste
Batteries	8466	2116.51	2116.51	4233.03

3.5.5 Polyurethanes with mercury catalyst

Cameroon manufactures polyurethanes matrass, but there is no production of polyurethanes compounds facility registered in Cameroon. For this reason, his sub-category is not further considered in this report, though it was wrongly considered in Level 1 inventory..

3.5.6 Paints

In the course of this inventory, a meeting was held in Douala with paint manufacturers. Information gathered from this meeting reveals that mercury pigments are not used in paint formulation of oil-based paints by local paint manufacturers. However, it is not certain whether some of the imported paints and coatings are mercury free. In the other hand mercury preservative may be present in some oil based and or synthetics paints with antibiotics properties from import origins available on the market This needs to be investigated further in the course of the Minamata Convention implementation in Cameroon.

3.5.7 Pharmaceuticals for human and veterinary use

Mercury compounds have been used in the past in various pharmaceuticals such as vaccines, eye drops, topical antiseptics, and other products, functioning mainly as a preservative. In addition, it is still used today in animal vaccines, with the most common additive being Thiomersal. This chemical is listed in the specific exclusions given in Annex 1 of the final text of the Minamata Convention.

It is inferred that the mercury compounds are still in used in human vaccines in Cameroon, though attempts to get confirmation from the Ministry of public health were unfruitful.

3.5.8 Cosmetics and related products

The use of chemical substances in cosmetics is not strictly controlled in Cameroon. The only legal instrument of relevance is the 2011 Decree of the Prime Minister on hazardous and toxic substances and its 2017 amendment. One cosmetic product manufacturer (Strides Pharma Cameroon SA) reported to use about 2.8 tonnes of mercury compounds in the formulation of its cosmetic products per year. The majority of the cosmetics products marketed in Cameroon come from importations to complement the local production. It is estimated that about 156 tonnes of soap and or creams containing mercury are used in Cameroon per year. The mercury inputs and outputs are derived from these activities rates based on the Toolkit default factors of 1kg per tonne of cosmetic produced and 30 kg of mercury per tonne of other products (soap and creams). The Toolkit indicates that during the use of cosmetics products, the mercury outputs go to water (95%) and land (5%).

3.5.8.1 Summary for this category

The estimated inputs and outputs for the consumer products category are summarised in Table 6-7,

Table 36: Summary of inputs and outputs for consumer products with intentional use of mercury

Category	Mercury Inputs, kg/year	Mercury Outputs, kg/yr					Stocks, kg
		Air	Water	Land	Impurities in Product	Waste	

Thermometers with mercury	900	180.8	271.22	180.8		271.2	
Electrical switches, contacts and relays	1045	313.43		417.90	-	313.49	
Light sources - lamps	24	7.5	-	7.5	-	10	-
Batteries containing mercury	8466	2116.51	-	2116.51	-	4233.03	-
Polyurethane with mercury catalyst		-	-	-		-	-
Biocides and pesticides	-	-	-	-	-	-	-
Paints	-	-	-	-	-	-	-
Pharmaceuticals for agriculture, public health and veterinary uses		-	-	-		-	-
Cosmetics and related products	4683	4446.02	234.3	0.00	0.03	0.03	-
Totals	**15118**	**7064.26**	**505.52**	**2722.71**	**0.03**	**4827.75**	

3.6 Data and inventory on general consumption of mercury in products, as metal mercury and as mercury containing substances

This category covers mercury uses in a wide range of different consumer products (UNEP, 2013)..

3.6.1 General background data

This category covers mercury uses in a range of other intentional products and uses (UNEP, 2013).

3.6.2 Dental mercury amalgam fillings

Dental amalgam is a mixture of 50% silver alloy (silver 30% and 20% other metals: tin and copper and sometimes zinc, palladium or indium) and 50% mercury (Hardy and James, 1998; SDPI, 2013). It is widely used in Cameroon and is the preferred dental restorative material by dental practitioners because it is very strong, durable, cheap and easy to use. Dental amalgams are still used in Cameroon, as well as non-mercury alternatives (CREPD's study report, 2016; pers comm, from the Cameroon Order of Dentists 2016). Mercury is still used in a range of dental amalgams, with the mercury content typically around 50% in the metallic alloy.

Import data from Comtrade database using the customs code HS 3006.40.01.00, provides 0.6 and 0.01 kg of dental amalgam imported in Cameroon in 2014 and 2015 respectively. This number is obviously not reflecting the actual situation of dental amalgams importation and use in the country. In 2015, CREPD conducted a detailed pilot survey on dental amalgam in six selected dental clinics in Yaoundé representing the array of dental clinics standards (low to high) in the country. By that time, there were 280 dentists in Cameroon operating in both rural and urban cities. The results indicated that 45 % of dentists clamed not to use dental amalgams, while 55% clamed to use them. Of the 54.55% that used dental amalgams mostly in the encapsulated forms. This was mostly due to the fact that Cameroon severely restricted trade of metallic mercury in 2017 (Amended Prime Minister Decree on hazardous and toxic substances). It was estimated in the study that about 775 capsules of dental amalgam, that is about 388 g of mercury was used in a year by clinics. This quantity of mercury is the equivalent used by 3 dentists in 2015. That is about 129 g of mercury per dentist. Applying the percentages above and a number of 280 dentists in Cameroon in 2015, we can estimate that a total of 240 dentists use dental amalgam; this corresponds to a total of 31,040 g (31 kg/year) used in dental amalgam in 2015.

3.6.2.1 Input and output estimates

The Toolkit recommends default factors of 0.05 – 0.2 grams/year per capita for estimating current mercury inputs via dental amalgams. In this study, we consider the lowest default factor ue to the fact that almost all the dental amalgams used are in the encapsulate forms, with inferred moderate left over or discharged mercury in the environment compared to the situation where crude mercury is used to make amalgam in the clinics , which gives input rate for Cameroon (pop. 23130708; and 0.014266 Dentists for 1000 inhabitants of 80 kg/year.

The output factors given in the Toolkit are 0.02 (2%) to air, 0.14 (14%) to water, 0.6 (60%) in products (ie teeth), and 0.24 (24 %) to waste. The survey indicated that the high efficiency amalgam filters are not used in Cameroon.

The mercury input and output estimates for mercury dental amalgam are shown in 1.

Table 37: Input and output estimates for mercury dental amalgam

Source	Activity, population	Annual Mercury Inputs, kg/yr	Annual Mercury Outputs, kg/yr					
			Air	Water	Land	Product	Waste	Disposal
Dental amalgam	23130708	80	1.59	35.02	6.37	4.78	15.92	15.92

3.6.3 Manometers and gauges

The most common uses of mercury in this sub-category are in blood pressure devices (sphygmomanometers) and in barometers. However, mercury may also be used for pressure (or vacuum) measurement in a range of industrial and laboratory applications (UNEP, 2013).

Attempt to obtain data from the competent division of the Ministry of Public Health or from the national statistics database was unfruitful. Interviews with three workers in private medical centres indicated that sphygmomanometers are use in healthcare services. The relatively long-life span of this equipment infers that relatively a very small amount of the manometers is disposed as waste per year. Therefore, the majority of the mercury content in manometers are stocked in the equipment in use. In this report, we use activity data on consumption one lifetime ago 5-10 years ago ideally and not only the quantity that can become waste in a year. Based on the fact that there are 2387 healthcare centres in Cameroon according to the 2016 estimate, and assuming that each of the healthcare centres has one manometer, which is the lowest estimate, the total manometers used for activity data would be $2387/5 \sim 477$." The Toolkit indicates that each unit of manometer comprises 70 and 85 grams of mercury, but suggests an average of 80 grams. In this report, we use the average value. In the case of barometers, it is not sure that Cameroon has any Meteorological Station in service at the period of this report. The total mercury input to society from this source is 38.2 kg/year.

3.6.4 Laboratory chemicals and equipment

The uses of mercury within universities is not documented and it is likely that it does not occur. So is the other uses in laboratories that are not certain, and including them in this report will add unnecessary total of 656.91 kg of Hg per year base on just population and not the factual evidence.

3.6.5 Mercury use in religious rituals and folklore medicine

According to the Toolkit, mercury is used in certain cultural and religious practices, such as some Latin American and Afro-Caribbean communities, in the USA, Mexico, and probably elsewhere. In Asia, mercury use in monument plating is recently reported (Nepal, India). In Cameroon, there is no known records of mercury use in religious rituals and folklore medicine. Miscellaneous product uses and other sources

The only other possible use considered for this category were explosives. Mercury fulminate has been used as an explosive in the past, but it is believed that this use was phased out about 50 or more years ago. There is no records of the presence and use of such products in Cameroon.

3.6.6 Summary for this category

The estimated inputs and outputs for the other intentional product/process uses are summarised in 3.

Table 38: Summary of inputs and outputs for other intentional product/process uses

Category	Mercury Inputs, kg/year	Mercury Outputs, kg/yr					
		Air	Water	Land	Product	Waste	disposal
Dental mercury amalgam fillings	80	1.59	35.02	6.37	4.78	15.92	15.92
Manometers and gauges	38.2	7.64	11.46	7.64	-	11.46	-
Laboratory chemicals and equipment				-	-		
Mercury use in	-	-	-	-	-	-	-

religious rituals and folklore							
Miscellaneous product uses, mercury metal, other sources	-	-	-	-	-	-	-
Totals	**118.2**	**9.23**	**46.48**	**14.01**	**4.78**	**27.38**	**15.92**

3.6.7 Production of recycled metals (secondary metal production)

This category covers mercury releases from the production of recycled metals, which is also referred to as secondary metal production (UNEP, 2013).

3.6.7.1 Ferrous metals (secondary steel)

Few secondary steel mills exist in Cameroon, notably Prometal, Acierrie du Cameroon and Metafrique in Douala. These plants processes scrap steel received from the scrap collectors in the main cities and rural areas in Cameroon. The Toolkit gives particular attention in this sub-category to the potential for mercury contamination arising from the use of mercury switches in motor vehicles. In Cameroon, the initial processing of steel or metal waste materials from all vehicles is done by old car breakers found almost everywhere in cities and villages. It is inferred that most of the mercury item are separated from the scraps that reach the processing plants. The mercury containing items are dumped directly in the environment since there is a lack of knowledge of the items that contain mercury and the need to handle them as dangerous waste. This metallic waste is generally throwed out in the environment near the breaking place, or may be kept as spare parts to resell. So, there is no fear of double counting in the inputs from the disposal of the municipal waste.

The Toolkit does not provide any specific input factors for secondary steel mills, except for vehicles, because they are highly dependent on the quality of the incoming scrap. However, they do indicate default distribution factors for the mill outputs, which are 0.33 (33%) to air, 0.34 (34%) to land and 0.33 (33%) to wastes. These factors have been used in this report to estimate the quantity of mercury released to the environment by the informal breakage of used cars. We estimated to 5000 the total of cars broken in 2014 by the informal breakers in Cameroon based on informal interviews with the actors of the sector in Yaoundé and extrapolation of the situation to the whole country. With this reasoning, we obtained a total mercury input of 5.5 kg/year.

The mercury input and output estimates for secondary steel production are shown in Table 9-2.

Table 39: Input and output estimates for secondary steel production

Source	Activity Rate, Amount of	Annual Mercury	Annual Mercury Outputs, kg/yr	
			Air	Waste

	vehicles scraped per year	Inputs, kg/yr		
Secondary steel production	5000	5.5		5.5

The estimated inputs and outputs for the metal recycling category are summarised in **Error! Reference source not found.**.

Table 40: Summary of inputs and outputs for production of recycled metals

Category	Mercury Inputs, kg/year	Mercury Outputs, kg/yr				
		Air	Water	Land	Product	Waste
Recycled mercury		-	-	-		-
Ferrous metals (iron and steel)	5.5		-	-	-	5.5
Other recycled metals	-	-	-	-	-	-
Totals	**5.5**		**-**	**-**		**5.5**

3.7 Data and inventory on waste handling and recycling

This category covers mercury releases from the disposal of solid and liquid wastes by landfilling, dumping, or discharge to wastewater treatment systems (UNEP, 2013). One of the key points to recognize for this category is that it includes the wastes that are generated by many of the sources discussed under previous categories. This means that there is inevitably some double accounting. To accommodate this, at least in part, the mercury inputs calculated in this section will not be added to the totals determined for all other source categories.

3.7.1 Sub-category - Waste incineration

3.7.1.1 Municipal waste incineration

There are no municipal waste incinerators in Cameroon (MINEPDED)

3.7.1.2 Hazardous waste incineration

There are two high-temperature hazardous waste incinerator facilities currently permitted in Cameroon (MINEPDED), namely BOCOM Recycling and BOCAM. They are used for the treatment and disposal hazardous industrial wastes. MINEPDED's division of standards and control of the Ministry of Environment indicates that about 974214 tonnes of hazardous waste are generated in Cameroon in 2016. To avoid double counting under the section on medical waste incineration below, because in Cameroon, medical wastes are considered as Hazardous wastes, we consider only 18400 tonnes of waste indicated in the Waste Management National Strategy Document of the Ministry of Environment (2015) under this section to remain realistic.

Input and output estimates

The Toolkit recommends defaults factors of 8-40 with an average of 20 g Hg per tonne of hazardous waste incinerated. In this report, we use the average default factor in the absence of data from the direct measurement from the facilities. The facilities operate with PM reduction, simple ESP or similar emissions control devices. Then the annual mercury inputs are 442 kg/year

The output factors given in the Toolkit based on the operation condition indicated above indicate about 90% of the mercury in the gas is carried over into air (ie 397.8 kg/year), and the remainder 10% (i.e. 44.2%) is going to sector specific treatment/disposal or in wastes.

3.7.1.3 Medical waste incineration

As from 2014 estimate, Cameroon has about 2387 health care facilities all categories included. The medical waste management national strategy indicates that the total annual production of the medical wastes national wide is 15700 tonnes. Almost all these medical waste, are incinerated on site in very low standard incinerators (Dioxins and Furans Inventory Report, 2011) with no emission reduction devices in place. No data has been obtained on the mercury content of any of the medical waste incinerator inputs. The Toolkit default factor of 8-40 g/tonne with an average of 24 g/tonne for medical waste are suggested. In this report, we used the average default factor of 24 g/tonne for the input calculations, to give a mercury input medical waste incineration of 377 kg/year.

The Toolkit indicates that 100% of the mercury inputs to medical waste incineration are lost through releases to air; that is 377 kg/year mercury outputs to air.

3.7.1.4 Informal incineration

This Toolkit category covers unregulated waste disposal practices such as backyard rubbish burning. The Dioxin Inventory (MINEPDED, 2011) estimated that the quantity of domestic wastes burned annually in Cameroon, in 2009, was about 56700 tonnes. Recent data from the national Institute of statistics reports (INS, 2015) and scientific studies (PhD theses, NGAMBI J, 2015: Déchets solides ménagers dans la ville de Yaoundé Page 225) estimate the total annual volume of solid municipal waste going to dumping sites to 959991 tonnes in 2015. Wiedinmeyr et al (2014), in a more comprehensive study estimated a total municipal waste amount of 5.6 million t/y generated in Cameroon, of which 4.1 t are not collected formally and 2.4 million t/y is burned informally and 0.9 t/y is burned on waste dumps (after collection), this gives a total quantity of the waste burned of 3.3 (73 percent) million tons per year. In this report, we will update this data to the most recent population estimate of 23 130708 inhabitants compared to 20 000 000 inhabitants in 2014 to obtain a total of 4,74 million tonnes that are diverted from landfill disposal. Inferring that 50 percent of this amount (2372500 tonnes) is destroyed through open burning, considering the waste management practices in Cameroon seems very appropriate.

There is no data available on the mercury content of Cameroon municipal solid wastes, but the Toolkit recommends default factors of 1 – 10 g/tonne; and an average default factor of 5 g/tonne. In this report, we applied the average default factor to the annual waste quantities that indicates an annual mercury input of 11863 kg/yr. For the output calculations, the Toolkit indicates that that all of the mercury will be discharged to air; that is 11863 kg/year.

3.7.2 Summary for this category

The estimated inputs and outputs for waste incineration are summarised in **Error! Reference source not found.**.

Table 41: Summary of inputs and outputs for waste incineration

Category	Mercury Inputs, kg/year	Mercury Outputs, kg/yr				
		Air	Water	Land	Product	Waste
Municipal waste incineration	-	-	-	-	-	-
Hazardous waste incineration	442	397.8	-	-	-	44.2
Medical waste incineration	377	377	-	-	-	-
Sewage sludge incineration	-	-	-	-	-	-
Informal waste incineration	11863	11863	-	-	-	-
Totals	**12682**	**12637.8**	**-**	**-**	**-**	**44.2**

3.8 Waste deposition/landfilling and wastewater treatment

This category covers mercury releases from the disposal of solid and liquid wastes by landfilling, dumping, or discharge to wastewater treatment systems (UNEP, 2013). The various sub-categories and the primary release pathways are summarised in **Error! Reference source not found.**, which has been copied directly from the UNEP Toolkit.

Table 42: Toolkit framework for category 9 – waste deposition/landfilling and wastewater treatment

Toolkit Chapter	Sub-category	Air	Water	Land	Product	Waste/ residue	Main approach
5.9.1	Controlled landfills/deposits	x	x	**X**		**X**	OW
5.9.2	Diffuse deposition with some control	x	**X**	**X**		**X**	OW
5.9.3	Informal local disposal of industrial wastes	**X**	**X**	**X**			PS
5.9.4	Informal dumping of general waste	**X**	**X**	**X**			OW
5.9.5	Wastewater treatment systems	x	**X**	**X**		x	OW/PS

Notes: PS = Point source by point source approach; OW = National/overview approach;

X - Release pathway expected to be predominant for the sub-category;

x - Additional release pathways to be considered, depending on specific source and national situation.

One of the key points to recognise for this category is that it includes the wastes that are generated by many of the sources discussed under previous categories. This means that there is inevitably some double accounting. To accommodate this, at least in part, the mercury inputs calculated in this section will not be added to the totals determined for all other source categories.

3.8. Controlled landfill/deposition

Elsewhere, the mercury content in the general municipal waste stream has been reported to come from four main sources: 1) intentionally used mercury in spent products and process wastes such as glass thermometers, energy saving lamps, switches and relays, etc; 2) mercury impurities in bulk materials (eg. paper, plastics, and metals); 3) mercury as an anthropogenic trace pollutant in bulk materials, and; 4) trace levels of mercury contamination of food wastes. This is true for Cameroon also.

The key requirements for quantifying the inputs and outputs for this source are the total quantities of waste disposed to landfill in each year, and the average mercury content of that waste. None of this is available in Cameroon. The General Manager of HYSACAM, the unique waste picker company in Cameroon that operates in the major cities recently reported (RFI radio) that his company collects slightly more than 4000 tonnes of waste in Cameroon per day, the equivalence of a total of 1,5 million

tonnes of waste that are virtually disposed in landfills per year. If we use the total volume of 5.6 million tonnes from and al. (2014) as a baseline based on an estimated population of 20 million inhabitants at that time, and using the most recent population estimate of 23130807 inhabitants used in this study, a corresponding estimated total waste generated is 6.5 million tonnes. Referring to the same study, about 3.3 tonnes (27 percent) of waste were collected (by HYSACAM) for land filling disposal virtually. Using the same reasoning, the most recent estimated quantity of waste collected for landfilling disposal should be around 1.7 million tonne, which is nearly the same reported by HYSACAM (1.5 million tonne).

. In the absence of this national data on mercury content in municipal waste in Cameroon, the Toolkit factors have been used. These recommend default factors of 1 – 10 g/tonne with an average of 5 g/tonne of waste for estimating the reasonable inputs, and output distribution factors of 0.01 (1%) to air and 0.0001 (0.01%) to water, with the remainder of the inputs being regarded as disposal to underground system (water reservoir).

The mercury input and output calculations for controlled landfill based on the average default factor of 5 g/tonne are shown in 1.

Table 43: Input and output estimates for controlled landfill

Source	Activity Rate, tonnes/yr	Mercury Content, g/tonne	Annual Inputs, kg/yr	Annual Mercury Outputs, kg/yr		
				Air	Water	Disposal
Landfilling of municipal wastes	1700000	5	8500	850	0.85	-

1.1 Diffuse deposition, informal disposal and dumping

These 3 Toolkit sub-categories have not been assessed. The first, controlled diffuse deposition, relates to the use of industrial wastes in road and building foundations. It is not known whether this occurs to any extent within Cameroon, hence, it is ignored in this report.

Informal disposal also relates to industrial wastes, and especially those that may have been dumped in the past without any regulatory control. If this has occurred in Cameroon, the sites should show up in the list of hot-spots (ie mercury contaminated sites) discussed in section 13.

Finally, the informal dumping category relates to uncontrolled dumping of general wastes. As indicated in the precedent session, 50 % (2372500 tonnes) of the general waste that are not collected by HYSACAM and are not inferred to be destroy through open burning ends up in uncontrolled dumping sites. The average Toolkit factor of 5 g/tonne has been used as previously to estimate mercury inputs at 11863 kg/year. And with output distribution factors of 0.1 (10 %) to air and 0.1 (10 %) to water, and 0.8 (80 %) to land the results are indicated in the table below.

Table 44: Input and output estimates for uncontrolled dumping

Source	Activity Rate,	Mercury Content,	Annual Inputs,	Annual Mercury Outputs, kg/yr		
				Air	Water	Disposal

	tonnes/yr	g/tonne	kg/yr			
Diffused deposition of industrial waste	-	-	-	-	-	-
Informal disposal of industrial waste	-	-	-	-	-	-
Informal dumping of municipal wastes	2372500	5	11863	1186.3	1186.3	9490.40

1.2 Wastewater treatment systems

The most important factors determining releases of mercury from wastewater are the amount of mercury-containing wastes that are discharged to the system and the concentration of mercury in those wastes. Mercury content in wastewater mainly originates from two source groups: 1) intentionally used mercury in products and processes (such as from dental amalgams, lightening skin cosmetics, spillage from thermometers and other devices, and industrial discharges); and 2) atmospheric mercury washed out by precipitation and carried along in running water bodies. As such, waste water treatment is an intermediate mercury release source where mercury inputs from original mercury contamination are treated and then re-distributed to water, land (through the application of sludge) and air (through sludge incineration). In addition, some sludge is disposed to landfill (UNEP, 2013).

The ministry of Mines, water and Energy (MINEE, 2015) evaluates the total volumes of liquid wastes treated through Cameroon wastewater plants to about 6,027,342 cubic meters in 2015. In 2013, the national water utility company (CDE, Camerounaise des Eaux) reported about 235.7 million cubic meters of water produced and distributed in Cameroon (INS, 2013). There is a significant gap between the volume of the treated wastewater reported and the one derived from calculation using the NU WATER (2017) methodology that suggests 8 percent of water produced are treat in developing countries. Using this approach, we obtain about 18856000 cubic meters of wastewater treated in Cameroon per year.

There is no information available on the average mercury content of the wastes entering Cameroon wastewater plants. The Toolkit recommends default factors of 0.5 – 10 mg Hg/m3 with an average of 5.25 mg Hg/m3, and output factors of 0.5 (50%) to water, 0.2 (20%) to land, and 0.3 (30%) to waste. The average value of the default factor was used in this report.

The mercury input and output calculations for wastewater treatment plants are shown in Table 454. The figures shown in brackets are the means of the reported ranges.

Table 45: Input and output estimates for wastewater treatment plants

Source	Activity Rate,	Mercury	Annual		Annual Mercury Outputs, kg/yr

	m3s/yr	Content, mg Hg/m3	Inputs, kg/yr	Air	Water	General waste	Disposal
MINEE	18856000	5	99	-	49.50	29.70	19.80

Comparison with level 1 inventory estimates

The mercury inputs and outputs for wastewater treatment plants were discussed in the level 1 Inventory Report were 18 kg/year.

1.3 Summary for this category

The estimated inputs and outputs for waste deposition/landfilling and wastewater treatment are summarised in Table 11-5.

Table 46: Summary of inputs and outputs for waste deposition/landfilling and wastewater treatment

Category	Mercury Inputs, kg/year	Mercury Outputs, kg/yr				
		Air	Water	Land	Waste	Disposal
Controlled landfills/deposits	8500	850	0.85	-	-	-
Diffuse deposition of industrial waste	-	-	-	-	-	-
Informal local disposal of industrial wastes	-	-	-	-	-	-
Informal dumping of general waste	11863	1189.3	1186.3	-	-	9490.40
Wastewater treatment	99	-	49.50		29.70	19.80
Totals	**20462**	**2036.3**	**1236.65**	**-**	**29.7**	**9510.2**

3.10 Crematoria and cemeteries

This category covers mercury releases from cremation and burial of human bodies (UNEP, 2013).

3.10.1 Sub-category Crematoria and cemeteries

The mercury releases from this source, and also in cemeteries, comes from the mercury present in the corpses, mainly as a result of the mercury in dental amalgam fillings. In cremation, this is predominantly released to air, while in cemeteries it is released to land.

Annual data obtained from Statistics Cameroon show that in 2014, the mortality rate was 10.4 deaths per 1000 inhabitants from a total population estimated to about 23130708 inhabitants (Mundi Index). With these parameters, we calculated that the total number of deaths in Cameroon was 240560. None of these people is inferred to be and that cremated according to our way of dealing with death corps.

Table 47: Summary of inputs and outputs from crematoria and cemeteries

Category	Mercury Inputs, kg/year	Mercury Outputs, kg/yr				
		Air	Water	Land	Waste	Disposal
Crematoria	-	-	-	-	-	-
Cemeteries	240.56	-	-	-	-	-
Totals	**240.56**	-	-	**240.56**	-	-

3.11 Contaminated sites

In the context of Cameroon, mercury-contaminated site is defined as an extensive soil, water or sediment where there is an accumulation of mercury or mercury compounds that can affect soil quality condition, groundwater, sediment and even air at levels that pose a risk to ecosystems, human health and the environment. These levels may be above the recommended safety limits in national and international instruments for a specific purpose. The threshold concentration that will tell if the site is contaminated or not is 2 parts per million (2 ppm).

Historically, various activities can lead to contamination of sites by mercury due to the lack of, or weak regulations and environmental standards that leads to the use of polluting technology and bad waste and effluents control devices to control mercury releases from activities that use mercury or products containing mercury such as dental clinics, cosmetics companies, artisanal and small-scale gold mining, etc...

Atmospheric depositions may contribute to pollution of some sites away from their source activities through a long-range transport. These source activities include: the mines and quarries of mercury, alkaline chlorine, coal power plants, cement plants, the iron production industries, steel and nonferrous metals production plants, waste management (waste incineration), the production sites of chemicals, fertilizers, pharmaceuticals and catalysts, batteries and fluorescent lamps.

Currently, the largest sources of mercury emissions and releases in Cameroon are related to the techniques and practices used in waste management and life cycle management of products containing mercury or mercury compounds. Main industrial activities representing stationary sources of mercury emission and/or release are cement and aluminum production (ALUCAM). Uncertainties remain on to what extent is the contribution of the ASGM in the emissions and releases of mercury in Cameroon.

Industrial production of pulp activity (CELUCAM) took place in Cameroon in the 1980s and if the technology used mercury as a catalyst, the location of this former factory is therefore suspected to be a potential site contaminated by mercury.

Under the Minamata Convention, Parties are called upon to cooperate in the formulation of strategies and activities to identify, measure, classify in function of priorities, manage, and, if necessary, clean up contaminated sites. This strategy encompasses short- and medium-terms vision.

Mercury contaminated sited identification strategy in Cameroon

Within the context of this project, a strategy to identify mercury contaminated sites was developed based on IPEN guidance for identification, characterization and remediation of mercury contaminated sites.

Within the said strategy,

1. The first step for mercury contaminated sites identification in Cameroon is to conduct a survey of current and former industrial sites that have hosted industrial activities likely to have used mercury or mercury compounds - intentionally or not - in their processes that might have released mercury into the environment. Sites with significant abnormalities of mercury in the soil, air, water, and/or sediments compared to the local geochemical background levels using a rapid portable screening device (portable XRF) should be considered as potential mercury contaminated sites for complementary investigations.
2. The next step consists to perform on site studies in order to characterize and map the pollution in its size before moving to site remediation and or containment activities. To characterize the pollution, Cameroon intends to adopt the proven approach used elsewhere, including in the Mediterranean region, which consist for instance to determine:

i. The forms of mercury present (metallic mercury, inorganic mercury, methylmercury);
ii. The amount of mercury present;
iii. The compartments of the environment (air, water, soil, sediment) affected;
iv. The extent of the contaminated area.
v. The behaviour or fate of mercury in the compartments of the environment affected;
vi. The consequences of pollution, both on and off site.

In the strategy, two main approaches can be used on the site to identify mercury contaminated sites:

1) Conduct background studies: This includes literature review and the interviews of the workers and communities living near a suspected site to assess past or present industrial and environmental practices on the site in order to identify specific areas that could be potentially polluted.
2) Conduct hydrogeological studies: Hydrological studies will help to assess soil, water, or sediment characteristics and conceptualize the underground hydrological networks (water flow direction, connection between groundwater depths, variation in levels of surface water...). The results will help in the identification of potential mass transfers and to outline the possible extent of pollution.

Information and data from the previous steps will help to identify assets and resources needed for decision making including action to protect the site in the event the pollution is scientifically proved. for instance, measures to protect local population, biodiversity and natural resources (fishing, drinking water, swimming areas, pedestrian zones). Environmental matrixes to be sampled and analyzed are water (superficial, underground), biota (fish, plants. etc...), soil, soil gas, sediment and air. Sampling and analyses should be performed according to the standards and protocols agreed upon within the convention's effectiveness and monitoring guidance.

Two sets of reports are anticipated in the national strategy to identify mercury contaminated sites: Preliminary report and complementary report.

Preliminary report
The preliminary report should contain a theoretical model of the site contaminated with mercury that builds on all the already known information from the two steps described above, and include the following information:

i. The location, the size and details of the natural area of the site.
ii. Historical data about the site and the surrounding area (climatology, etc.)
iii. Past, present and future site uses.
iv. The analytical data from previous studies, if applicable.
v. A study of the site and its surroundings.
vi. A list of the activities and processes that took place on the site associated with the use of mercury and the estimated volume of waste containing mercury.

Complementary report
This report will contain the necessary information to draw conclusions and determine whether or not further analysis is required on the site. For this, a preliminary inspection of the site will be made to meet three specific objectives: a) describe the site, b) consider the type of mercury contamination, and c) to define mechanisms for mobility of mercury and points of exposure. If detailed studies of the site are required, environmental characterization stage will be carried out.

NB: Mercury contamination type
Unless chemical analyses have been carried out, it is difficult to determine with precision the contaminants on a site. However, during a site visit, it is possible to define with sufficient clarity the type of mercury contamination which took place. To achieve this, it is essential to learn about the activities and operations carried out in the site (area of interest), through interviews with local authorities and the population of the surrounding area, coupled with background research work at the level of relevant ministries (industry, environment, mine). The information collected in this way should always be summarized and sorted, particularly if the polluting activity has been halted for a long time ago.

Based on this strategy, a generic list (non-exhaustive) of the types of sites that might be for consideration for mercury contamination identification in Cameroon includes:

- Artisanal and small-scale gold mining using mercury amalgamation in the East Region of Cameroon
- Closed landfills
- Former agricultural sites, include pesticide reformulation and storage sites
- Old industrial sites, such as paper pulp plan in Edea,
- Some category of infrastructure (public and private) including dental clinics (they don't use separators), dental schools and defence bases
- Boat repair yards (Chantier Naval) and slipways
- Car Breaking sites (Komodo Douala)

3.12 Impacts of mercury in human health and the environment

Very few studies exist on mercury monitoring in Cameroon's population. One study conducted by the Research and Education Centre for Development/Centre de Recherche et d'Education Pour le

Developpement (CREPD) in 2013 on hair samples collected from Douala revealed that 76% of the samples exceeded the reference dose of 1 ppm.

High levels of mercury in the hair of volunteers from the fishing community in Douala provoke questions about how the mercury treaty might mandate actions to eliminate mercury pollution from a broad range of industries, including their waste handling practices.

The current treaty text offers some vague options for controlling air emissions from existing cement kilns and waste incinerators if they are above a certain output threshold (not yet determined). However these provisions may not reduce mercury emissions from individual plants on a scale sufficient to offset the new mercury emissions that come from increased numbers of cement kilns or incinerators. Neither cement kilns nor waste incinerators are included as a possible source of mercury releases to land or water. There is also no agreement about whether to include oil and gas production and processing facilities in the treaty so this possible source of mercury may not be addressed.

The contribution of mercury-containing products to exposure has not been fully assessed in this study, though it may play a role, especially in the two samples with very high levels of mercury. The current treaty text prohibits soaps and cosmetics containing mercury but there is no agreement on the phase-out date. Kaolin is not covered and may be exempted under a clause which allows continued sale of mercury-containing products for cultural/heritage uses. The current treaty text also permits new mercury-added products to be introduced into the market if it can be justified based on "compensating environmental or human health benefits…"

In the case of Douala it would also be helpful to insure protection of human health and environment from toxic mercury wastes. To prevent problems related to the generation of mercury waste in the future, it would be helpful for the treaty to require the minimization and prevention of generating mercury-containing waste, but the current text does not do this (UNEP (DTIE) 2012). b Used electronic devices such as computers and/or e-waste could also be one of potential sources of mercury releases in Douala as it is in other African countries. The current treaty text does not include open burning of these types of wastes as an air emission source. In addition, the current text passes most of the responsibility for waste issues including e-waste to the Basel Convention, so the problem of releases of mercury from irresponsible handling of e-waste and/or end of life electronic products will not be regulated by the new mercury treaty.

Many cities and countries are likely to find themselves in a situation to Douala – significant mercury exposure with a number of possible sources. Until these sources can be identified and the problems rigorously addressed, mercury will continue to contaminate both the local area and contribute to global mercury pollution.

CHAPTER IV: IDENTIFICATION OF POPULATIONS AT RISKS AND GENDER DIMENSIONS

4.1 Preliminary review of potential populations at risk and potential health risks

Fish is a common part of the diet in Cameroon and is especially common in the fishing community of the coastal areas. This is the most likely reason for the high levels of mercury in hair found in a study conducted by CREPD in 2013. The two samples with extremely high levels of mercury may be caused by additional mercury exposures. According to a review of high levels of mercury in hair by Nuttall (2006), one of the potential sources of high exposure to mercury can be skin-lightening products containing mercury (Harada, Nakachi et al. 2001). Another potential explanation could be consumption of clay or kaolin. Kaolin from Cameroon can contain significant levels of heavy metals including mercury (Bonglaisin, Mbofung et al.2011), Fish from the Wouri River can be contaminated with mercury from the large number of industrial and waste activities in Douala and the surrounding area, however we cannot point to a single mercury source from the mixture of industrial and waste activities that likely caused the high mercury levels in hair.

Information on occupational exposure to mercury in Cameroon is also non-existent. The national mercury inventory developed as part of the MIA found that dental amalgams are still high in use in Cameroon. Therefore, it can be assumed that dental hygienists and others working in dental clinics are at risk of mercury exposure through the processing of dental amalgams. Waste management practices (e.g., incineration, informal dumping) represents a significant pathway for mercury releases in Cameroon and as such, workers that are involved in municipal waste collection, incineration, or landfill management where burning occurs may be at risk of exposure to mercury. Cement production represents a significant source of mercury emissions to air in Cameroon. Workers that are processing raw material in and around cement factories may be at risk of exposure to mercury that is released during manufacturing.

While not determined to be of mercury, the mining sector is one of the most significant source of exposure through ASGM practices. Communities engaging in ASGM, or living close to ASGM activity, are likely to be exposed to mercury that is widely used. ASGM is largely carried out by the rural and vulnerable poor. Women form a significant proportionof the workforce and they are often accompanied by their children, some of whom also work. The major pathway of exposure for these workers is the inhalation of mercury vapour as mercury, added to the gold ore or concentrate to create an amalgam, is volatilized as the amalgam is heated to recover the gold. Mercury may also be absorbed directly through the skin as the amalgamation process is typically done by hand without personal protective measures.

Public health surveys coupled with assessments of mercury concentrations in environmental media are needed for Cameroon to identify potential populations at risk of mercury exposure. Such surveys could be conducted in collaboration with WHO, the Cameroonian Ministry of Public Health and local researchers to establish a baseline of mercury exposure in the country.

4.2 Assessment of potential gender dimensions related to the management of mercury.

The institutional gap analysis revealed that there is no mechanism to facilitate a unified chemicals information management system in the country. As a result, there is no mechanism to promote gender balance among stakeholders or participants. The Steering Committee overseeing the MIA development

included mostly male participants. Future work on ratification and implementation of the Convention should ensure that participation in the process is gender balanced.
One of the most vulnerable segments of any population is women of childbearing age and the fetus. The most common pathway for exposure is through fish consumption and in Cameroon the severity of risk that fish consumption represents was demonstrated by the study above.
There is a gender component to the risk associated with occupational exposure to mercury. For instance, waste collectors and landfill workers are likely to be predominantly male. The same is likely to be true for cement factory workers and miners. No information is available on the gender distribution of employees at laboratories where mercury-containing measuring devices may represent potential occupational exposure risk.

In the event of breakage of any household item containing mercury (e.g., compact fluorescent lamps or thermometers), the risk of exposure will depend on who the primary care giver is at the home. In Cameroon, there is a gendered division of household labor and such accidents may represent a disproportionate risk to women. Such accidental spills may also represent a significant risk of exposure to young children in the home.

CHAPTER V: AWARENESS RAISING STRATEGY

Awareness regarding mercury and its risks is very low in Cameroon, in general. The subject is new, with very little studied and researched before, thus the lack of information in the field is evident.

The potential risks and threats posed by mercury and mercury compounds have raised global awareness and international mobilization for their production and use, the disposal of mercury waste and mercury releases. Cameroon, by signing the Minamata Convention on 24 September 2014 and beginning the process of ratification at the national level, has made a firm commitment, along with the other signatory countries, to contribute to efforts to protect the global environment against mercury and mercury compounds.

In view of the national situation, to better honour this commitment, Cameroon should, as a matter of priority, facilitate the promotion of the exchange of information, in accordance with Article 10 of the Minamata Convention. This article recommends that each Party facilitate, or undertake, the exchange of information relating to the reduction or elimination of the production, use and release of mercury, their alternatives, including their risks as well as their economic and social costs. This information concerns the health and safety of persons and the safety or protection of the mercury environment.
To meet these conditions, a national strategy for the exchange of information and public awareness was developed during the draft MIA Project

5.1 Objectives of the strategy

The main objectives assigned to the National Dissemination and Awareness Strategy for the Mercury Initial Assessment Project in Cameroon are:

- Provide the public with relevant information and data on mercury and preventive and curative measures to mitigate the risks of exposure to these hazardous substances.
- Encourage the adoption of an information exchange network between the different national institutions involved in mercury management. This mechanism may be connected to other networks established or to be established under the Strategic Approach to International Chemicals Management (SAICM) or any other international agreement on chemicals. Providing national and international institutions with information on actions taken to manage mercury.
- Facilitate the dissemination of information on Cameroon's obligations vis-à-vis the Minamata Convention once it becomes a Party.
- Disseminate to all national stakeholders the steps taken by Cameroon to protect its citizens against mercury pollution, including:
  - Regulatory texts relating to chemicals in general and mercury in particular;
  - Control measures of import flows of hazardous chemicals;
  - Inventories of mercury in Cameroon;
  - Sites potentially contaminated with mercury;
  - Benefits to Ratify and Implement the Minamata Convention on Mercury
- Strengthen public participation in the implementation of the National Mercury Action Plan.

5.2 Components of the strategy

The main activities selected for the implementation of a National Dissemination and Awareness Strategy on the initial mercury assessment project in Cameroon are as follows:

1. The creation of a national mercury website in Cameroon that includes the digital version of the MIA report easily downloadable by all.
2. The realization of information campaigns through the print and audio-visual press on the results of the initial evaluation of mercury in Cameroon for the public.
3. The development of a guide to sources of information on business lines and processes that involve mercury.
4. Design key messages for private, public, and informal sector actors involved in the various fragments of the mercury life cycle.

5.2.1 Realization of a national website on mercury in Cameroon

The Internet is the best contemporary tool for exchanging information even in the most remote corners thanks to the high rate of ICT penetration in our communities. Thus, the establishment of a mercury website will allow and will further facilitate access to useful data on mercury, on the MIA report, on the various sources of mercury release and emission in Cameroon, on actions to be taken at local, regional and national level to counter mercury pollution. But it should be noted that this tool alone cannot serve the same level all social categories (rural and illiterate) who are also, if not more concerned with exposure to mercury pollution.

A dedicated website for mercury will be developed that provides the possibility to collect the feedbacks, suggestions and requests of the visitors for improvement, which will help to better communicate with other Cameroonians who do not have access to the internet .The mercury website in Cameroon will offer, on the one hand, a platform for updating data, public participation and, on the other hand, a space for debate on specific themes according to events on mercury and chemicals.

5.2.2 Conducting information campaigns

It emerged from the preliminary mercury sensitization campaign conducted in synergy with the CREPD during the MIA process that mercury and its effects are still largely ignored by the populations, regardless of social and socio-occupational class. No institution in charge of chemicals issues, nor any private sector actor has set up medium- and long-term mercury awareness programs. Meanwhile, it is useful for a company to maintain good working relationships with local communities. Thus, it is proposed that any company that releases mercury in its operations could have a written plan for managing specifically this substance. Information campaigns will aim to educate the public and communities about exposure sources, exposure hazards, mercury-added products, and the best behaviors to avoid exposure opportunities (nutrition, choice of products to buy etc.) and guide on or find information and help when faced with a mercury problem.

The activities selected in this context are:

- The production and distribution of documents (brochures, posters, banners, posters, etc.) to the public.
- The use of visual audio media of national and local coverage (radio, television, print media, etc.) to inform and educate the public with simple and understandable language.
- The realization of information and awareness campaigns in rural areas, with active participation of the traditional, administrative authorities and the citizens of these areas.
- The organization of information workshops, forums and seminars to facilitate consultations and partnerships between the private sector concerned, civil society and public institutions.
- Strengthening the capacity of medical staff to respond to the symptoms of mercury exposure poisoning that is currently lacking.

- Create a framework for dialogue and consultation between the industrial, mining and health sectors involved in the management of mercury.
- Establish a mechanism that encourages holders of mercury stocks or mercury-containing wastes to declare them in view of their securing and environmentally sound destruction.

The detailed communication and awareness plan will be developed in a timely manner by an expert. It will contribute to the coordination of all actions and interventions, create the basis for a real action of information, communication, education and awareness on mercury, and strengthen national capacities to the production of appropriate communication tools and their effective use by all stakeholders.

5.2.3 Development of a guide on sources of information

The Ministry of Environment and Sustainable Development, in charge of the coordination of national activities on mercury and the monitoring and evaluation of the implementation of the Minamata Convention, will publish a review mercury sources in collaboration with the private sector and NGOs. This review will include relevant information on the status of mercury in Cameroon, an assessment of the implementation actions of the Minamata Convention, and recommendations on the involvement and participation of parliamentarians, communities and the public in the implementation of the Minamata ConventionThe plan and detailed budget for this activity will be developed by a national expert.

5.2.4 Design key messages for stakeholders

It is important to design and disseminate the key messages for each group of stakeholders involved in managing a given mercury lifecycle stage such as product, waste, or unintentional emissions. MINEPDED, in collaboration with relevant NGOs, will develop key messages for all stakeholders and the public who are directly or indirectly responsible for the mercury emissions and releases listed in the national mercury inventory in Cameroon. The aim of the project is to raise awareness, change behavior or practices that have hitherto been practiced in the various sectors of activity and processes with direct consequences on the increase of mercury emissions and releases in Cameroon. These include:

- Key messages for municipalities, local authorities and waste management services
- Key messages for companies manufacturing products containing mercury add or importers of these products, in addition to those used in the health sector
- Key messages for companies that unintentionally release mercury into their processes
- Key messages for the health sector
- Key Messages for the Mining Sector
- 6 Key Messages for the Metal Recycling Sector
- Key messages for the public

CHAPTER VI: PRIORITIES FOR ACTION

Cameroon is preparing to become a Party to the Minamata Convention on Mercury. The goal of this treaty, and thus of Cameroon as a Party to it, is to protect human health and the environment from anthropogenic emissions and releases of mercury and mercury compounds. To meet its obligations under the treaty, a range of actions needs to be taken to address the many aspects of the anthropogenic use of mercury. These actions include making the necessary regulatory and administrative arrangements for the proper work of the convention at the national level; working with the private sector and investors to ensure that emissions and releases from industrial point sources are controlled and minimized; prohibiting or the use of mercury-containing products and encouraging consumers to accept alternatives; assisting vulnerable populations engaged in ASGM to halt practices that have serious impacts on health and the environment; preventing mercury and mercury-containing products from entering waste streams.

Priority1: eveloping and implementing an Artisanal and Small-Scale Gold Mining (ASGM) national action plan

ASGM in Cameroon demonstrates many of the characteristics that typify ASGM worldwide. The use of mercury amalgamation mining communities , poorly skilled. Conditions favoring use include: affordability relative to the price of gold; ready accessibility; ease of use; and ability to be used in many locations. Mercury use allows miners to produce gold quickly, often in one day. Information collected from miners indicate that the buy this mercury from the Chinese who in turn buy the gold processed using the mercury. A detailed action plan for ASGM will be developed to meet the requirements of Article 7 ASGM and Annex C. This action plan will need to address mercury use in ASGM within the broader socioeconomic context of the communities engaged in the practice. It follows that a broad spectrum of stakeholders within government, civil society organizations and the communities will need to be involved in its preparation. The objective of this plan would be to radually eliminate the use of mercury in gold mining by introducing alternative methods to recover dust and fine gold grains. Such an action plan whose. might consider inter alia, the need to:

- Create strong incentives for formalization of the ASGM activity to enhance the security of tenure of resources against enhanced responsibilities (including, for examples, government purchasing of ASGM gold at prices slightly above market prices, tax exemptions for ASGM miners, free and easily obtainable mining licenses requiring retort use, etc.);
- Establish responsibilities and promote coordination amongst relevant regulatory agencies at national, state and local levels to implement the action plan;
- Develop baseline estimates of mercury used and the techniques employed;
- Promote increased awareness of the health impacts of continued poorly-controlled ore processing, including mercury amalgamation;
- Prohibit whole ore amalgamation, open burning o amalgam - within residential areas, and cyanide leaching of mined materials to which mercury has been added but not removed;
- Strengthen national monitoring and enforcement programmed to ensure that up to date emission and releases controls are in place and in use;
- Develop national safety guidelines to protect the populace from the cumulative long-term health impacts of mercury exposure.

It is expected such actions would lead to:

1. Worst practices of mercury amalgamation eliminated;

2. Miners trained in and using alternative processing techniques that minimize or eliminate mercury emissions and releases;
3. Vulnerable populations protected from mercury exposure;
4. Mercury emissions and releases to the environment minimized or eliminated

Priority 2: Measures to Phase Down the Use of Dental Amalgam and other mercury in products

Dental amalgam is likely to remain an important restorative material for use in Cameroon for the foreseeable future. Article 4 and Annex A Part II of the treaty will be required to reduce dental amalgam use, to reduce the exposure of patients and dental health care personnel to mercury during dental treatment, and to avoid releases of dental amalgam from dental clinics.

Table 48: products to be phased out

Mercury-added products	Date after which the manufacture, import or export of the product shall not be allowed (phase-out date)
Batteries, except for button zinc silver oxide batteries with a mercury content < 2% and button zinc air batteries with a mercury content < 2%	2020
Switches and relays, except very high accuracy capacitance and loss measurement bridges and high frequency radio frequency switches and relays in monitoring and control instruments with a maximum mercury content of 20 mg per bridge, switch or relay	2020
Compact fluorescent lamps (CFLs) for general lighting purposes that are ≤ 30 watts with a mercury content exceeding 5 mg per lamp burner	2020
Linear fluorescent lamps (LFLs) for general lighting purposes: (a) Triband phosphor < 60 watts with a mercury content exceeding 5 mg per lamp; (b) Halophosphate phosphor ≤ 40 watts with a mercury content exceeding 10 mg per lamp	2020
High pressure mercury vapour lamps (HPMV) for general lighting purposes	2020
Mercury in cold cathode fluorescent lamps and external electrode fluorescent lamps (CCFL and EEFL) for electronic displays: (a) short length (≤ 500 mm) with mercury content exceeding 3.5 mg per lamp (b) medium length (> 500 mm and ≤ 1 500 mm) with mercury content exceeding 5 mg per lamp (c) long length (> 1 500 mm) with mercury content exceeding 13 mg per lamp	
Cosmetics (with mercury content above 1ppm), including skin lightening soaps and creams, and not including eye area cosmetics	2020

where mercury is used as a preservative and no effective and safe substitute preservatives are available[4]	
Pesticides, biocides and topical antiseptics	2020
The following non-electronic measuring devices except non-electronic measuring devices installed in large-scale equipment or those used for high precision measurement, where no suitable mercury-free alternative is available: (a) barometers; (b) hygrometers; (c) manometers; (d) thermometers; (e) sphygmomanometers.	2020

Priority 3: Strengthening the Legal and Institutional Framework

The legal and institutional framework in Cameroon as elaborated in chapter 2 of this report requires updating and reinforcing to enable the country to implement the obligations of the Minamata Convention. It was determined that an overall, comprehensive view of existing legislation is required to ensure that Cameroonian law allows for full compliance with the Convention.

Level 2 mercury inventory identified the use and disposal of Hg-added products as a significant source of Hg emissions and releases. In addition, there are no existing regulations that specifically address these products, their importation, use, or disposal. It is anticipated that updated legislation will assist with the implementation of Article 4 and will have a long-term benefit of reducing Hg emissions and releases.

In addition, it was recognized that there is an overall lack of coordination at the ministerial level related to chemicals management in general, and mercury specifically. There is a need to foster greater communication between ministries and to establish a coordinating mechanism that can facilitate activities related to the Minamata Convention and other multilateral environmental agreements that focus on chemicals management

Priority 4: Education and Awareness Raising

During the MIA project, a National Strategy for the Dissemination and Awareness of the Mercury Initial Assessment was developed (see Chapter V for details). This strategy will have to be implemented to sensitize decision makers and the general public about mercury related health risks and pathways for exposure. A continued, consistent messaging related to mercury and the implementation of the Minamata Convention will facilitate the ratification process. A targeted education program on sorting Hg-containing waste will be an important component of the larger effort related to Hg-containing waste. The renewed focus on education and awareness related to Hg should also include targeted training for Customs officials. Customs officers will play an important role in enforcing rules associated with the importation of Hg-added products and the movement of Hg-containing waste.

Priority 5: environmentally sound management of mercury containing waste

The environmental sound management (ESM) requires that should not be mixed with or discarded in landfills o be incinerated with pollution control systems in place, and treated to immobilize mercury (UNEP, 2015). ESM encourages recovery and recycling of and -containing compounds and, in the

[4] The intention is not to cover cosmetics, soaps or creams with trace contaminants of mercury.

cases where disposal is a viable option, the material must first be stabilized and/or solidified prior to being placed in a specially engineered landfill or permanent underground storage facility.

Waste management practices in Cameroon represent an important source of mercury emissions, releases and site contamination. In Cameroon, there is currently no facility with the capabilities for interim storage of -containing waste. Nor is there a mechanism for sorting, collecting and/or recycling -containing waste. The country is also a party to the Basel Convention and there has been some effort taken towards establishing a regulatory framework related to the movement of hazardous waste (e.g., the Decree on sorting, collecting, transporting, valorizing and elimination of wastes). However, the legislative and institutional gap analysis as well as feedback from the Project Steering Committee identified waste management as a key area for further strengthening. The development of actions to reduce the impacts from poor management of waste will need to be taken up in coordination with key stakeholders across Regions and decentralized local government within the broader context of improving waste disposal practices and services in Cameroun.

Activities will likely include:

1. eparation mercury-containing products from municipal waste streams through the initiation of a producer responsibility program that incorporates sorting and recycling of Hg-added products.
2. eparation of discarded medical devices containing mercury from clinical wastes
3. application to e-waste practices of techniques that minimize or prevent mercury emission and release
4. evelopment of environmentally sound interim storage for mercury waste prior to disposal under the terms of the Basel Convention.

Priority 6: Improve Monitoring and Reporting Capacity on Mercury levels in food, soil, water and air.

Research, monitoring and reporting will become a vital component moving forward. During the inventory development, it became apparent that there is a general lack of information on Hg exposure in humans and there is also limited information onHg concentrations in environmental media (e.g., fish, birds) that are important for future effectiveness evaluation ofthe Minamata Convention.

In addition, MINEPDED officials will be required to meet regular reporting requirements for the Convention. Although monitoring of several environmental media is conducted, this doesn't seem to take place on a frequent basis and results are not available to the general public nor shared among stakeholders. Although fish for export is being sampled for Mercury content, no other biological samples are taken/analyzed. Firstly, there is a clear need for more regular and frequent monitoring of environmental media. Secondly capacity of Cameroonians needs to be built to monitor Hg in air and emissions, and to analyze biological samples on a more frequent basis. Thirdly this capacity needs to be applied to monitor Mercury point sources of concern (those where the most significant releases to the environment occur) as well as monitor population groups at risk, to determine the exposure these phases on a day-to-day level and identify actions that can rapidly decrease their exposure and resulting Mercury levels.

ANNEXES

ANNEX I: STAKEHOLDER ENGAGEMENT PROCESS

CONTACT LIST (all institutions and persons interviewed and engaged with during the preparation of the MIA Report, Mercury Inventory and other aspects of the MIA project).

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USEFUL RESOURCES

UNEP. (2015). UN Environment and International Solid Waste Association. UNEP.
MINEPDED (2018) Mercury Inventory for Cameroon
FMEnv (2017) Minamata convention on mercury Initial assessment report for nigeria
MoENRP (2017) Minamata Initial Assessmentfor Georgia
Republic of Cameroon 2012, NBSAP II – MINEPDED

Website visited

Minamata Convention Website: http://www.mercuryconvention.org/
Minamata Convention Text http://www.mercuryconvention.org/Convention/tabid/3426/Default.aspx
Toolkit for Identification and Quantification of Mercury Releases
(UNEP)http://www.unep.org/chemicalsandwaste/Metals/MercuryPublications/GuidanceTraining MaterialToolkits/MercuryToolkit/tabid/4566/language/en-US/Default.aspx
MercuryLearn Platform (UNITAR/UNEP)
http://mercurylearn.unitar.org/
List of Country Mercury Release Inventories
(UNEP)http://www.unep.org/chemicalsandwaste/hazardoussubstances/Mercury/Informationmaterials/ReleaseInventories/tabid/79332/Default.aspx
NRDC checklist of legal authorities to implement Minamata Convention on Mercury
http://docs.nrdc.org/international/files/int_15101301a.pdf
Guidance for identifying populations at risk from mercury exposure
(WHO/UNEP)http://www.who.int/foodsafety/publications/risk-mercury-exposure/en/
Developing a National Action Plan to Reduce, and Where Feasible, Eliminate Mercury Use in Artisanal and Small Scale Gold Mining (UNEP, 2015)
http://www.unep.org/chemicalsandwaste/NationalActionPlan/tabid/53985/Default.aspx
Chemicals Management: The why and how of mainstreaming gender (UNDP, 2007)
http://www.undp.org/content/undp/en/home/librarypage/environment-energy/chemicals_management/chemicals-management-the-why-and-how-of-mainstreaming-gender.html