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FINAL PROJECT REPORT ON INITIAL ASSESSMENT OF MINAMATA CONVENTION IN MADAGASCAR

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GLOSSARY

Environment :	All the compounds, both natural and artificial, defining humans, plant and animal life that involve biological, ecological, socio-economic, cultural and technological factors. All factors as at the basis of the spatio-temporal interactions between human being and the nature.
Surronding environment :	All material objects, human beings, physical, chemical, biological and social resources and systems; economic and cultural elements where these elements are in a constant state of interdependence.
Pollutants :	Any substance or cause likely to alter the surronding environment in such a way that it is no longer suitable for the use normally intended for it.
Standards :	It is a limit based on toxicity, ecotoxicity, etc. Of the pollutant considered above which disturbances of all or part of the components of the surronding environment and / or human health are likely to occur.
Pesticides :	Any substance intended to prevent, destroy, attract, repel or control harmful elements, including any undesirable species of plants or insects during the production, storage, transport, distribution and preparation of food, agricultural commodities or food for human being or animals, which can be administered to animals for the elimination of ectoparasites. This term includes substances used as plant growth regulators, defoliants, desiccants, disrupting agents or germination inhibitors, as well as substances applied to crops before and after transport. It normally excludes fertilizers, nutrients for plants and animals, food additives and veterinary drugs.
Limit value :	It is defined as the average value of the parameter considered not to exceed on a working day and tends to preserve the quality of the receiving environment.
Product life cycle :	From the extraction of the materials that constitute it to its end of treatment (upgrading or landfilling), through its manufacture, a product undergoes many stages that constitute its life cycle. This life cycle should be considered as a whole because each stage can have environmental impacts.
Hazardous wastes :	Hazardous waste is waste that contains, various amounts of toxic or hazardous elements that pose risks to human health and the environment.
Recycling. :	Direct reintroduction of a waste into the production cycle from which it is produced as a complete or partial replacement of a new material. For example: reflow broken bottles to make new ones. Newspapers, magazines and glass can be recycled if these are collected selectively. Textile products and fermentable materials can not be recycled.
Wastes treatment :	Reducing the initial pollutant potential of waste and / or waste streams to be landfilled under controlled conditions
Bioaccumulation :	The process by which a pollutant in a biotope enters and accumulates in all or part of a human being and can become harmful; by extension and the result of this process.

ACRONYMS AND ABBREVIATIONS

AMM	: Agence des Médicaments de Madagascar
BHCCPHCL	: Basic Health Care Center on the Primary Health Care Level
BHCCSHCL	: Basic Health Care Center on the Secondary Health Care Level
CDA	: Car Dealers Association
CIE	: Compatibility of Investments with the Environment
CIF	: Cost – Insurance – Freight
COP	: Conference Of the Parties
CPM	: Chemical Products of Madagascar
DGE	: Directorate General of Environment
DHC	: District Health Center
DIF	: Development Intervention Fund
EDBM	: Economic Development Board of Madagascar
FIOVA	: Fivondronan'ny Orinasan'i Vakinankaratra (Federation of Industries in the Area of Vakinakaratra)
FIV.MPA.MA	: Fivondronan'ny Mpandraharaha Malagasy(Federation of the Economical Agents in Madagascar)
FMG	: Franc Malagasy (Malagasy Currency)
FOB	: Free on Bord
FOFIFA	: Foibe Fikarohana momba ny Fambolena (Center for Agricultural Research)
FRHOM	: Federation of Restaurant and Hotels Owners in Madagascar
FTZCPO	: Free Trade Zone Companies and Partners' Organization
GASFM	: Group of Aquaculturists and Shrimp Fishermen in Madagascar
GCP	: Group of Companies Madagascar
GDP	: Gross Domestic Product
GEPAT	: Group of Private Enterprises in Toamasina(an area in the east part of Madagascar)
GMT	: Greenwich Meridian Time
GNI	: Gross National Income
GO TO MADA	: Groupement des Opérateurs Touristiques de Madagascar (Tour Operator's Group in Madagascar)
GOTICOM	: Group of Operators in Technologies of Information and Communication
GPCA	: Group of Profesional Clearing Agents
GPEM	: Group of Private Enterprises in Mahajanga(An area in the west part of Madagascar)
GSD	: Goals of Sustainable Development
HDI	: Human Development Index
HJRA	: Hôpital Joseph Ravoahangy Andrianavalona (University Hospital of Antananarivo the capital of Madagascar)
HSDP	: Health Sector Development Plan
HSE	: Health Safety Environment
ICT	: Information and Communication Technology
IEC/CBC	: Information, Education, Communication / Communication

	and Behavior Change
IESM	: Institute of Economics Studies of Madagascar
IFIRP	: Instituts de Formations Inter Régional des Paramédicaux(Training Institutes of Paramedical)
IMF	: International Monetary Fund
INSTAT	: Institut National des Statistiques(National Office of Data and Statistics)
INSTN	: Institut national des sciences et techniques nucléaires (National Institutes of Nuclear Technology)
ISD	: Information Systems Department
MALF	: Ministry of Agriculture, Livestock and Fisheries
MAM	: Medicines Agencies of Madascar
MEEF	: Ministry of Environment, Ecology and Forestry
MEESF	: Ministry of the Environment, Ecology, Sea and Forests
MFA	: Ministry of Foreign Affairs
MFB	: Ministry of Finance and Budget
MHE	: Ministry of Higher Education
MIA	: MINAMATA Initial Assessment
MOC	: Ministry Of Commerce
MID	: Mobile Intervention Department
MNESR	: Ministry of National Education and Scientific Research
MOA	: Municipality Of Antananarivo
MOI	: Ministry Of Industry
MPG	: Madagascar Petroleum Grouping
MPHFP	: Ministry of Public Health and Family Planning
MT	: Medical Training
MPW	: Ministry of Public Works
MTWS	: Ministry of Transport and Weather Service
MVA	: Manufacturing Value Added
NCAPR	: National Center for the Application of Pharmaceutical Research
NCER	: National Center of Environment Research
NCITR	: National Center for Industrial and Technological Research
NCOR	: National Center for Oceanographic Research
NDP	: National Development Program
NFP	: National Focal Point
NGOs	: Non Governmental Organization
NHWSF	: Non-Hazardous Waste Storage Facility
NOE	: National Office for the Environment
NSMDG	: National Survey for the Monitoring of the Millennium Development Goals
NWMPM	: National Waste Management Program in Madagascar
PHDC	: Public Health District Service
POPs	: Persistent Organic Pollutants
PPE	: Personal Protective Equipment

RCDH	: Referral Center of District Health
RMC	: Regional Medical Center
RPHB	: Regional Public Health Board
SAICM	: Strategic Approach to International Chemicals Management
SAMVA	: Service Autonome de Maintenance de la Ville d'Antananarivo (Waste Disposal Service for Municipality of Antananarivo the capital of Madagascar)
SF	: Special Facilities
SWOT	: Strengths Weakness Opportunities Threats
TOR	: Terms Of Reference
TUIM	: Trade Union of Industries of Madagascar
UBPWC	: Union of Building and Public Works Contractors
UH	: University Hospital
UNDP	: United Nations Development Programme
UNEP	: United Nations Environment Programme
UNIDO	: United Nations Industrial Development Organization
WB	: World Bank
WHO	: World Health Organisation

FOREWORD

Madagascar ratified the Minamata Convention on Mercury on 13 May 2015. This ratification shows the will to implement the Convention.

Various activities have been carried out in the framework of the preparation of this implementation in which this document of the project report on the initial assessment of the MINAMATA Convention (MIA project), carried out in 2015-2016 in Madagascar.

This document summarizes all the results of the MIA assessment. This includes the assessments of institutional capacity, infrastructure, national legislation, identification of issues and challenges, opportunities and needs, national inventories of mercury as well as recommendations for the implementation of the Minamata Convention.

The action plan by priority from the recommendations is also included in this document. These actions enable Madagascar to achieve its obligations under the Convention.

In Madagascar, the main sources of anthropogenic mercury releases, as reported in the National Mercury releases Inventory report, carried out in 2015-2016, are the use and disposal of mercury-containing products (Biocides and pesticides and mercury batteries), the incineration of informal waste, and the wastewater treatment system.

The activities of the action plan in this document define four specific goals, the first three of them describe the cross-cutting activities for all the articles of the Convention and the fourth goal describes just the actions specific to each article of the Minamata Convention.

Thus, with the collective efforts and support of all the concerned parties, including the private sector, non-governmental organizations and civil society, the objectives set in the action plan can be achieved within a reasonable deadline.

I would like to take this opportunity to thank all the organizations and the people who participated and contributed to the MIA project and to the preparation of this report.

I would also like to thank the GEF and UNEP for their technical and financial help in the implementation of the MIA project and the preparation of this report.

The General Director of Environment of the
Minister of the Environment, Ecology and Forests



EXECUTIVE SUMMARY

Madagascar is among the countries that have received funding from the Global Environment Facility to implement the MINAMATA Initial Assessment Project (MIA Project). This project has five components, namely:

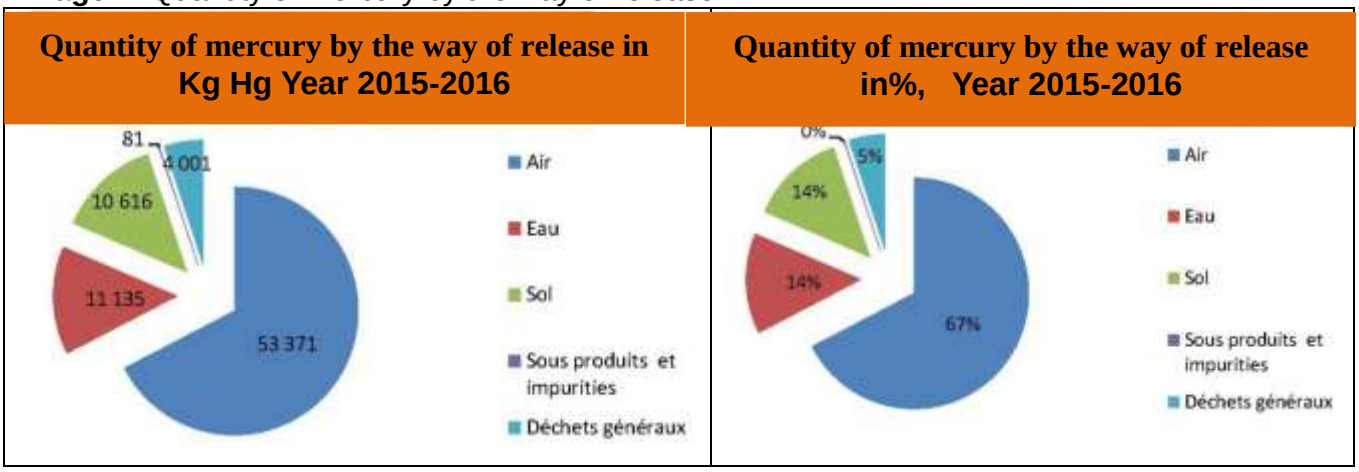
- assessment of institutional capacities,
- assessments of national infrastructure and legislation to manage mercury in Madagascar,
- the inventory on sources of mercury release into the environment according to the UNEP toolkit level II,
- identification of the issues or challenges, needs and opportunities to implement the MINAMATA Convention on Mercury in Madagascar; recommendations and the national action plan for the implementation of the MINAMATA Convention,
- as well as the preparation and achievement of the national project report in order to disseminate the results of the project.

The first four components of the MIA project were finalized and the national project report should be prepared to disseminate the results of this project.

1. **Results of the Inventory of Mercury Release Sources into the Environment, Years 2015-2016**

The results of this mercury inventory carried out in 2015-2016 indicated that the amount of mercury released was 79,204Kg per year. This amount is propagated by way of the discharge, so the 67.38% or 53,371 kg were in the air, 14.06% or 11,135 kg in water, 13.40% or 10,615.94 kg in soil, 0.10% or 81.29 kg of Hg in the by-products and 4 000.84 kg in the waste in general, what is to say 5.05%.

Image 1 Quantity of mercury by the way of release



Source: inventory of mercury release sources of Madagascar 2015-2016

Relevant sources of emissions and releases of mercury by main category source

Table 1: Relevant sources of emissions and releases of mercury by main category source and in descending order

Main category source	Total Releases		Estimation of mercury to each pathway , Kg Hg / y				
	Kg Hg	Percentage, %	Air	water	Land	By-products and impurities	General waste
5.5. Consumer products with intentional use of mercury (whole life cycle)	56 787,31	71,53	37 297,94	8 049,85	7 740,89	0,00	0,00
5.8. Waste incinération and burning	15 694,87	19,82	11 711,15	2 040,33	1 883,38	0,00	0,00
5.9. Waste deposition/landfilling and waste water	6 477,22	1,13	383,14	3 028,96	3 065,12	0,00	0,00
5.2. rimary (virgin) metal production	2 340,00	2,95	1 755,06	304,21	280 ;81	0,00	0,00
5.1. Extraction and use of fuels/energy sources	1 827,16	2,31	1 779,13	24,98	23,05	0,00	0,00
5.6. Other intentional product/process use	1 259,88	1,59	351,88	326,86	197,64	81,29	302,20
5.10. Crematoria and cemeteries.	485,00	0,61	0,09	0,00	484,92	0,00	0,00
5.3. Production of other minerals and materials with mercury impurities.	43,77	0,06	32,82	5,69	5,25	0,00	0,00

Source : Inventaire de rejet de mercure 2015 -2016 à Madagascar

For this purpose, it is the main source category of Consumer products with intentional use of mercury which marks the highest quantity, namely 56 787.31 kg Hg or 71.31% relative to the quantity of mercury which is 79 204 kg of Hg , Waste incineration will follow after, and lately the production of other minerals and materials with mercury impurities which is 43.77kg Hg or 0.06% Hg relative to the total amount of mercury which is 79,204Kg of mercury .

Relevant sources of emissions and releases of mercury by sub-category source and in descending order

Table 2 : Relevant sources of emissions and releases of mercury by sub-category source and in descending order

Source sub-category	Use	Amount of mercury releases in total and to each pathway, Kg/an					
		Total Releases	Air	Water	Land	By sub- - products and Impurities	General waste
5.5.6. Biocides and pesticides	Seed Treatment	46 420,00	34 815,00	6 034,60	5 570,40	0,00	0,00
5.8.5. Informal waste incineration	Waste disposal	15 514,02	11 635,52	2016,82	1861,68	0,00	0,00
5.5.4 Batteries with mercury	Power source in transistor-based equipment, in acoustic apparatus, watches, calculators, computers, smoke detectors, tape recorders, voltage regulators, radiation detection devices, In scientific equipment, beepers, metal oxygen monitors and portable electrocardiogram monitors	6 703,00	1 675,75	0,00	1 676. 5,75	-	3 351,50
5.9.4. Informal dumping of general waste	Informal garbage disposal without public supervision and no security to minimize pollutant discharges in the vicinity	3 831,40	383,14	383,14	3 065,12	0,00	0,00
5.9.5. Waste water system/treatment	Wastewater treatment systems are facilities that receive wastewater of industrial and domestic origin for cleaning,	2 645,82	0,00	2 645,82	0,00	0,00	0,00
5.2.2. Gold and silver extraction with mercury-amalgamation processes (ASM)	Artisanal technique for the extraction of gold (purification)	2 340,00	1 755,00	304,20	280,80	0,00	0,00
5.5.8. Cosmetics and related products	Products used in creams, in lightening soaps, Preservatives in cosmetic eye products	1 950,00	0,00	1 852,50	97,50	-	0,00
5.1.6. Biomass fired power and heat production	Combustion of biomass for the production of heat and energy	1 549,34	1 549,3	0,00	0,00	0,00	0,00
5.6.2. Manometers and gauges	In liquid column pressure measuring instruments.	865,63	185,16	255,97	171,38	0,00	253,12
5.5.2. Electrical switches and relays with mercury	A contactor for establishing or interrupting the passage of current from an electric or pneumatic control	613,00	183,90	0,00	245,20	-	183,90
5.5.7. Paints	Biocidal agent by preventing bacterial fermentation inside pots (preservative)	559,00	514,28	27,95	16,77	-	0,00

Source : Inventaire de rejets de mercure 2015 -2016 à Madagascar

Relevant sources of mercury emissions and releases were:

- Consumer products with intentional use of mercury due to the use of pesticides and biocides : 34 815 Kg Hg to air, 6 034,60 Kg Hg to waste, et 5 570,40 Kg Hg to land have been registered.
- the Informal waste incineration generates 11 635.52 kg Hg to air, 2 016, 82 Kg Hg to waste and 1 861,68 kg Hg to land.,
- Informal dumping of general waste generating 3 065.12 Kg Hg to land,
- wastewater treatment systems generating 2645 kg Hg to water
- Cosmetics and related products generating 1 852, 50 kg Hg to water.,
- Batteries with mercury producing 3 351,50 Kg Hg to products, 1,675.75 Kg Hg to air and to land,
- Cemeteries producing 484.82 kg Hg to land.

2. Policy, Regulatory and Institutional Framework Assessment

According to the texts of MINAMATA Convention, and by article of the Convention especially starting with Article 3 until Article 21, the situation in Madagascar is as:

- **Policy framework and regulatory texts**

The assessment of the national legislation on the management of mercury in Madagascar shows the non-existence of the laws and regulations relating to the application of the MINAMATA Convention.

- **Institutional framework**

The Ministry of the Environment (MEEF) the leader in the field of the environment. MEEF is responsible for implementing the National Policy on Environmental Actions.

The implications of other departments with activities related to mercury management are present in the MINAMATA National Implementation Committee.

Members of the National Committee for the Implementation of the MINAMATA Convention are cross sectoral and multidisciplinary.

NGOs and associations involved in chemicals management and protection of the environment are members of the MINAMATA Implementation Committee.

2. Summary of measures which were prioritized to implement the Convention (and the funding required for the implementation of this Convention).

Policy framework and regulatory texts

Preparing new texts or updating few current texts in inserting the fight against the pollution by mercury is necessary

- **Institutional framework**

To implement the MINAMATA Convention, Madagascar needs to strengthen its institutional capacity, namely, reinforcement coordination; involvement of the private sector, clarification of the roles and missions of each institution, capacity building of stakeholders; the reinforcement of control and surveillance for mercury management, partnership with research centers and the establishment of a mercury database.

In order to have an institutional and regulatory framework on the environmentally management of mercury and waste content with mercury in Madagascar, the amount of activities to achieve this objective is three hundred and eleven thousand US dollars or US $ 311,000

- **Sensitization Program**

For the implementation of the MINAMATA Convention in Madagascar, a sensitization, information and training program on the environmentally management of mercury must be set in place and implemented. The amount of activities to achieve this objective is four hundred thousand US dollars or (US $ 400,000).

- **Structures and Infrastructure for Environmentally Management of Mercury**

We need structures and infrastructure for the environmentally management of mercury to implement the MINAMATA Convention on Mercury. The amount of activities to achieve this objective is two million five hundred and thirty-two thousand US dollars or (US $ 2,532,000).

- **Endowment-building for the environmentally management of mercury, its compounds and wastes**

In contrast to what mentioned above, which are cross-cutting priorities for all articles of the Convention, these priorities include specific activities to be undertaken by articles. The cost of activities under this objective is eight hundred and fifty-eight thousand US dollars or (US $ 858,000).

In total, the cost of the action plan to implement the MINAMATA Convention in Madagascar amounts to four million one hundred thousand US dollars or (US $ 4 101 000).

ANALYTICAL SUMMARY

1. Results on mercury stock inventory summary, offer and trade and mercury contaminated sites

Madagascar Madagascar does not have stocks of mercury, sources of supply and trade in this substance officially.

Moreover, the mercury index exists in Madagascar, especially in the northern part of Madagascar. Thus the illicit trade in mercury exists.

In Madagascar, sites contaminated with mercury were identified in 2016, namely:

- gold mining in the Vatovavy Fitovinany Region, Ikongo District, Manampatrana Commune and Fokontany de Manampatrana, Bezamana, Amboanjombe center, and Manambato.
- The municipal waste dump in the Region of Analamanga, District of Antananarivo Avaradrano, Municipality of Ambohimangakely, Fokontany d'Andralanitra.
- The use of permanent mercury thermometer in the Ambatovy industry, Alaotra-Mangoro Region, Moramanga District, Moramanga Commune, Fokontany d'Ampitanimbe.

2. Main conclusion of the strategic, regulatory and institutional assessments

- **For strategic and regulatory assessment**

The analysis of the environmental provisions in Madagascar revealed that the main issue is the absence of any specific binding provision for the management of mercury or products content with. There are only a few basic provisions concerning the protection of the environment.

- **For the institutional assessment**

The lack of institutional capacity for the environmentally management of mercury prevents stakeholders from implementing the obligations of the MINAMATA Convention on Mercury. Monitoring and control structures are practically non-existent. Each actor of the administration works to fulfill the mission entrusted to them and to achieve the objectives set, without taking into account that these are complementary.

Stronger coordination among actors, greater involvement of the private sector is highly required.

Capacity building for all actors, which can take several forms: tooling (identification of products containing mercury, control tools, etc.), setting up of a database, training of the personnel involved must be implemented.

Strengthening the partnership with research centers also provides a platform for research into mercury substitutes, best available techniques and best environmental practices.

INTRODUCTION

Madagascar has ratified different international Conventions concerning the management of the pollution caused by chemical substances. These are in particular that of Stockholm on POPs, Basel on transboundary movement of hazardous waste and the Rotterdam on preliminary consent procedure knowingly governing few pesticides and hazardous chemical products which are subject to the international trade and very recently to the Convention of MINAMATA on Mercury.

Since 2001, Madagascar has been participating in the UNEP mercury program. The Great Island signed the MINAMATA Convention on Mercury during the Plenipotentiary Conference on this Convention on 10 October 2013 in Japan and ratified it on 13 May 2015.

The objective of the MINAMATA Convention is to protect human health and the environment from the anthropogenic emissions and releases of mercury and its compounds.

The parties to the Convention have major obligations to prohibit, on the date of entry into force of the Convention, primary mining of mercury, export and import of mercury except as allowed by the MINAMATA Convention, the permanent abandonment of imports, the manufacture and use of products containing mercury added in 2020, the phasing out of the use of dental amalgam, the preparation of national action plans indicating reduction targets use of mercury in artisanal gold mining, provisional storage of mercury and mercury compounds for use by a party under this Convention in an environmentally manner, appropriate measures for the environmentally management of mercury-containing wastes, development of strategies to identify and assess sites contaminated with mercury or mercury compounds, information exchange, information, awareness and education, research and development and monitoring within the framework of the MINAMATA Convention.

Madagascar benefited a funding from GEF / UNEP to implement the MIA (Initial Assessment of the MINAMATA Convention) project. The objective of this project is to ratify and implement the MINAMATA Convention on Mercury by the use of scientific and technical knowledge and tools by national actors in Madagascar.

In the framework of this project, five components were known, namely the establishment of a project coordination mechanism and the organization of a process, the assessment of infrastructure, legislation and national Management of mercury in Madagascar, development of a national mercury release inventory using the UNEP Toolkit and development of strategies to identify and assess mercury-contaminated sites, identification of issues or challenges, needs and opportunities to implement the MINAMATA Convention on Mercury and the preparation and validation of the national report and the sensitization and dissemination of the main results of the project.

During the implementation of the MIA project, the project coordination, composed of the members of the MINAMATA Implementation Committee, from various public and private institutions, and NGOs were consulted and evaluated the achievements of the activities to be undertaken within the framework of the project.

A launching meeting for the presentation of the project, strengthening the members of the Implementation Committee of the MINAMATA Convention, adoption of the project activity plan began in March 2015for the implementation of the MIA project

Consultants were recruited throughout the project to carry out the various assessments of the project and the inventory of sources of mercury releases. Interviews between consultants and stakeholders were conducted to gather information during evaluations.

Various meetings were organized to validate the work of the consultants. A consultant was recruited to prepare the draft of the final report of the MIA project. This draft has been validated by the members of the MINAMATA Convention Implementation Committee on Mercury.

According to evaluations carried out under the MIA project in Madagascar, the main challenges and issues identified are lack of institutional capacity, the lack of specific infrastructure for mercury management, the absence of legislative and regulatory texts relating to the implementation of the MINAMATA Mercury Convention and the lack of information, training and awareness programs on the MINAMATA Convention on Mercury.

The inventory of mercury releases in the environment in 2015 -2016 in Madagascar showed that the use of products content with mercury (biocides and pesticides, mercury thermometers, mercury tensionmeters, bulbs, and batteries), the use of dental amalgam and biomass as a source of energy, mismanagement of wastes content with mercury are the main sources of mercury releases in Madagascar.

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1. CHAPITER 1: NATIONAL BACKGROUND INFORMATION

1.1. Country Profile

1.1.1. Geography and population

- **Geography**

Madagascar is an island located in the south-west of the Indian Ocean, near the African continent, in the eastern part of which it is separated only by a distance of about 400 km off the Mozambique Channel.

The island of Madagascar has an area of 587,041 km square. It extends over a length of 1600 km, from Cape of Ambre to Cape of Sainte Marie, between 11 ° 57 'and 25 ° 39' South latitude, 43 ° 14 'and 50 ° 27' East latitude. In its widest width, Madagascar is about 570 km. The meridian 47 ° east of Greenwich shares the island in two parts roughly equal. Surrounded by the Mozambique Channel to the west part from Africa, and by the Indian Ocean to the East.

The island is crossed by the Tropic of Capricorn, a little below the latitude of Toliara, that is to say that its southern part is at the height of the African deserts of the southern hemisphere.

Because of its geographical position, Madagascar is subject to the influence of two major meteorological action centers that regulate the general atmospheric circulation conditions in the southwest of the Indian Ocean: intertropical low pressure zones and the oceanic cell of high pressure centered almost permanently in the South of Mascareignes. (Source : World Bank).

- **Population**

The population of Madagascar is estimated at 23 040 065 citizens in 2014. The 49.9% equals to 11 496 992 is the male population and 11 543 073 equals to 50.1% is the female population and the population growth is 619 977 or 2.76%, the number of deaths is 485 000 and the number of births is 1 104 977.

1.1.2. Political, legal and economic profile

- **Political profile**

The President of the Republic is elected by direct vote for a term of five years, renewable once. He appoints the Prime Minister. He can dissolve the National Assembly, which can vote a motion of censure demanding the resignation of the Prime Minister and his Government.

- **Legal profile**
  - **Form of State**

Madagascar is a unitary State based on a system of decentralized territorial composed of municipalities and regions in which competences and principles of administrative and financial autonomy are guaranteed by the Constitution and defined by the Law.

  - **Executive power**

The executive power is exercised by the President of the Republic and by the Government.

The President of the Republic is the Head of State. He is elected by direct vote for a five-year term renewable only once. The President appoints and dismisses the Prime Minister and may dissolve the National Assembly.
The Prime Minister implements the general policy of the State determined by the President of the Republic.

- **Lesgilative power**

Legislative power is held by the National Assembly and the Senate.

The National Assembly is composed of 150 deputies elected by direct vote for five years.

The Senate is composed of 44 senators, two-thirds of them are elected in equal numbers for each Province and one-third appointed by the President of the Republic.

- **Judicial power**

Justice is rendered in accordance with the Constitution and the law, in the name of the Malagasy people, by the Supreme Court, the Courts of Appeal, the attached courts and the High Court of Justice.

- **Economical profile**

Despite its wealth of natural resources, Madagascar is one of the under developed countries in the world. Political instability, weak institutions and poor governance hinder its economic growth. While the economic situation had deteriorated considerably between 2009 and 2013, a slight recovery was observed in 2014. The mining sector remained strong, agricultural production slowly recovered from the locust invasion of 2013 and tourism has recovered. Economic growth increased to 3.4% of GDP in 2015 but remains insufficient. However, a growth of 4.6% is expected in 2016.

1.1.3. Economic sector profile

1.1.3.1. Main sectors

The table below summarizes the production volume of the three key economic sectors in Madagascar

Table n° 3: VOLUME OF PRODUCTION ((in Billions of Ariary)[1]

	2012	2013	2014	2015	2012	2013	2014	2015
	PRIX CONSTANTS				PRIX COURANTS			
PRIMARY SECTOR								
Agriculture	478.28	417.11	435.98	423.36	15957.48	15529.71	17777.35	18318.32
SECONDARY SECTOR:	334.757	415.520	453.589	489.087	10249.36	11126.34	11933.28	12573.38
Extractive Industry	34.46	109.98	138.52	165.47	202.22	310.43	399.18	324.89
Energy	47.83	50.51	52.62	54.05	1225.68	1352.56	1418.86	1638.36
Paper sector	2.66	2.73	2.76	2.82	108.11	124.93	140.98	145.12
Others	3.81	3,89	3.93	4.06	16.62	17.98	19.26	20.74
TERTIARY SECTOR + Construction and Civil Engineering	1 533.93	1 554.59	1 590.33	1 643.66	57 636.2	65 017.5	71 612.0	80 885.0
Commerce	321.40	310.57	319.50	322.71	11234.81	11974.49	13107.05	14085.95

Source: INSTAT 2016 Madagascar

According to this table, there are three main economic sectors in Madagascar, namely the primary, secondary and tertiary sectors. It should be noted that the volume of production cited above is the monetary value divided into two, the value of the fluctuating price and the fixed price

[1] INSTAT MADAGASCAR 2015

a) Primary sector

- **Ministry of agriculture**

For the primary sector of agriculture, livestock and fisheries, the use of 2,321T of pesticides per year contains 46,420 kg of mercury (Hg) 34,815 kg in air, 6,034.60 kg in water and 5,570.40 kg in soil according to the inventory of mercury release sources in Madagascar carried out in 2015-2016.

b) Secondary sector

For the secondary sector which is about the industry

- **Ministry of mine : Extractive Industry ;**

According to this table, the following parts are included in the extractive industry:

First, extraction of 780Kg of gold in the amalgamation process results in 2,340Kg of mercury release into the environment, including 1,755.00 Kg Hg in air, 304.20 Kg Hg in water, and 280.80 in the soil according to the inventory carried out in 2015-2016.

Second, the production of 212,175 tons of lime and light aggregate furnaces generates 23.34 kg of mercury releases into the environment, of which 17.50 kg Hg in air, 3.03 kg Hg in water,2.80 kg Hg in the soil according to the inventory carried out in 2015-2016.

Lastly, the production of 185 000 tons of cement results in 20 kg of mercury release into the environment, of which 15.26 kg Hg in air, 2.65 kg Hg in water, 2.44 kg Hg in the soil according to the inventory carried out in 2015-2016.

- **Ministry of energy**

The use of 12,000 Tons of coal (anthracite and bituminous) emits the release into the air of 1.8 Kg of Hg.

The production of 12 911 162 Tons of energy and heat fueled by biomass generates 1549 kg Hg of mercury release into the air.

c) Tertiary sector

In addition, the tertiary sector is especially relevant to trade to which the following Ministries are affected:

- **Ministry of commerce**

Consumption products which intentionally use mercury (electrical switches and relays, light sources, batteries, polyurethane, paint, cosmetics and related products, chemicals and laboratory equipment) results in the release of 180.51 kg of mercury per year into the environment in Madagascar according to the inventory of the sources of mercury release carried out in 2015-2016.

d) Note of the Ministry of public health

It is not included in these three sectors, so it is considered a social sector.
The use of equipment content with mercury (thermometer, dental amalgam, gauge) results in the release of 1377.55 kg of Hg per year according to the inventory of sources of mercury release in 2015-2016 in Madagascar.

The incineration of 7 535 Tons of medical waste entails the release of 180.84 kg Hg.

1.1.3.2. Waste management

It should be noted that especially for waste management in Madagascar, no sorting has been done, it is either incinerated or buried.

- Informal waste incineration (open burning): 10 342 685 Tons of incinerated waste generates 15 514.03 Kg Hg, which distribution is 11 635.52 Kg Hg in air, 2 016.82 Kg Hg in Water, 1 861 kg Hg in the soil.
- Informal spill of general waste, 2 554 270 Tons waste generates 3 831 Kg Hg, of which 383.14 Kg Hg in air, 383, 14 Kg Hg in water, and 3 065 Kg Hg in soil.
- Wastewater system / treatment, 503,965,000,000 Cubic meter of wastewater generates 2,645.82 Kg Hg, of which 2,645.82 Kg Hg in water.

1.1.4. Overview of environment

Madagascar has one of the rarest wealth resources in the world: a unique and precious environment. Unfortunately, these wealth resources have been confronted with natural and human phenomena that destroy them: overexploitation, pollution, mismanagement. This results in degradation of the country's ecosystems and hinders development efforts. This situation leads to a diminishment of a large part of the population who is affected by poor health and often unsustainable poverty, which aggravates environmental degradation. Indeed, to satisfy their immediate vital needs, the populations are led to exploit, in an abusive and irrational way, the available natural resources.

- **National policy for the environment in Madagascar**

The Ministry of the Environment, Ecology and Forests has the task of guiding and coordinating the state's policy on environmental protection in order to improve the living conditions of the population. The ministry is responsible for the implementation of the Environmental Policy, the drafting of legislation and the supervision of actions in the field of the Environment. The National Environment Policy puts the human being at the center of environmental concerns.

- **Priorities of Madagascar in terms of environment**

The National Policy on the Environment is a policy taking into account the totality of environmental, social, economic and cultural problems.

The various existing sectoral policies will be tackled to ensure its compatibility and complementarity with the National Environment Policy.

In view of the current state of the environment in Madagascar, the main priorities of the National Environment Policy are:

- protection of the biodiversity;
- the fight against climate change;
- management of the various sources of air, water, sea and land pollution as well as intra-residential pollution, including the fight against mercury pollution;
- development of the environmental reflex;
- promotion of the public-public and public-private partnership in the management of the environment;
- the fight against bush fires
- accountability of the different levels (central and decentralized levels) in environmental management;
- the implementation of international and environmental conventions.

- **Texts related to the management of the environment in Madagascar**

The various texts related to the management of the environment in Madagascar are:

- **Law No. 2015-003 of February 19, 2015 on the Charter of the Malagasy Environment was updated.**

By the application of the polluter-pays principle, according to which the costs arising from measures to prevent, reduce pollution, fight and compensate against it must be charged by the polluter. Any natural or legal person must internalize the cost of protecting the environment when planning and implementing acts likely to harm the environment (Article 10).

- **Decree No 99-954 of 15 December 1999 amended by Decree No 2004-167 of 03 February 2004 on the compatibility of investments with the environment**

In accordance with the provisions of Article 10 of Law 2015-003 of 19 February 2015 on the updated Malagasy Environmental Charter, public or private investment projects, whether or not subject to authorization or approval by an administrative authority, or that these may be harmful to the environment; in that case these must be the subject of an impact assessment. (Article 3).

- **Decree No. 2003/464 of 15/04/03, classifying the surface of water and regulating the discharge of liquid effluents.**

The present text deals with the classification of surface of water and the standards for the discharge of aqueous effluents into the natural environment (Article 1).

- **Law No. 98-029 of 20 January 1999 on the Water Code**

All natural or legal person, whether public or private, carrying on an activity which is a source of pollution or which may present dangers to water and environmental health must consider any measure likely to check or prevent the observed or presumed danger. In the event of non-compliance with the requirements of the preceding paragraph, the pollution-maker shall be obliged to pay, in accordance with the polluter-pays principle, an amount determined by regulation in relation to the degree of pollution Caused (Article 12).

- **Law No. 99-021 of 19 August 1999 on the policy for the management and control of industrial pollution**
  - **Management of liquid discharges**

The implementation of a liquid effluent management system of industrial origin includes:

- a regulation limiting the release or discharge into the receiving environment, the public collection or sanitation network of substances, the action or reactions of which are likely to have adverse effects on human health, flora and fauna.
- permanent control by the competent authorities of liquid effluents from industrial activities. (Article 25).

  - **Waste management**

Solid industrial waste must be the subject of appropriate measures to allow:

- to limit and reduce the source of the quantity and toxicity of the wastes;
- recycle or upgrade manufacturing by-products;
- to carry out in accordance with the rules of good management the storage in landfill or the disposal of solid waste. (Article 28).

- **Management of air pollution**

The implementation of a management system for gaseous effluents from industrial sources includes:

- special regulations designed to limit or prevent an increasing concentration of polluting emissions in urban areas or industrial development;
- Continuous monitoring of gaseous emissions from industrial facilities by the competent authorities to verify compliance with the limit values for gaseous emissions (Article 35).

- **Law No. 2003 -044 Amending the Labor Code**

An employer is required to provide adequate equipment and clothing to collectively and individually protect the life and health of workers from all hazards inherent in the workplace(Section 110).

- **Law n ° 99-022 of 30 July 1999 on the mine code, consolidated version, as amended by Law n ° 2005-021 of 27 July 2005**

Any work related to mining activities, including the construction and maintenance of the infrastructure required for this purpose, shall be carried out in accordance with the environmental commitment plan or environmental impact study prepared in advance and approved. The procedures laid down by the relevant legal and regulatory provisions. For the beneficiaries of authorizations for gold panning or extraction and collection, the execution of their work shall be carried out in compliance with the specific environmental obligations laid down by regulation. (Article 100)

- **Decree No. 2012-753 of 07 August 2012 prohibiting the import of waste under the Basel Convention in Madagascar until the facility of the appropriate treatment centers**

- **Decree No. 2012-754 of 07 August 2012 on the procedure for the management of end-of-life products, sources of waste and hazardous wastes harmful to the environment in the context of the implementation of the Basel Convention**

Although the two decrees do not directly address the case of mercury, the technical characteristics of end-of-life products and the sources of hazardous waste are mentioned and the prohibition on imports of goods which nature and quality may pose a threat for human health and the environment; it may be applicable to products content with mercury.

- **National Policy on Medical Waste Management in Madagascar, 24 June 2015**

This policy considers the fight against the management of waste content with mercury.

- **Technical guide for medical waste management in Madagascar, September 2016**

- **Priorities for Mercury Management in Madagascar**

Madagascar ratified the MINAMATA Convention on Mercury on 13 May 2015. Following the assessment carried out under the MIA Project, the priorities for mercury management in Madagascar are:

- **Provide an institutional and regulatory framework for the environmentally management of mercury and waste content with mercury by 2018**
- **Arranging and implementing an awareness information and training program by 2021**

- **Have structures and infrastructure for the environmentally management of mercury by 2021**

- **Capacity-building for the environmentally management of mercury, its compounds and wastes by 2021, including:**

Article 3: Sources of Mercury offer and trade

- Apply the mine code;
- Prevent the importation and use of mercury for artisanal small-scale gold mining

Article 4: Products content with mercury

- Put in place deterrents to reduce and discourage the import and the use of products content with mercury and its compounds.

Article 7: Artisanal and small-scale mining of gold

- Develop an action plan on the elimination of artisanal mining of gold using mercury.

Article 8: Emissions

- Develop national emission standards for mercury in the environment.

Article 9: Releases

- Periodic inventory of sources of mercury release;
- Develop national standards for release of mercury into the environment.

Article 10: Provisionally storage of mercury, excluding mercury wastes

- Seek global partners for the transfer of technologies on the interim storage of mercury and its compounds;
- Create an environmentally interim storage platform for mercury or its compounds.

Article 11: Mercury wastes

- Develop national waste thresholds content mercury;
- Eliminate the reuse of waste content with mercury.

Article 12: Article 12: Contaminated Sites

- Train employees in contaminated sites;
- Sensitize people around these sites to protect them from exposure to mercury, especially women and the vulnerable population.

Article 14: Capacity-building, technical assistance and technology transfer

- Seek a partnership with developed countries;
- Strengthen the capacity of actors involved in mercury management by an international expert.

Article 16: Health aspects

- Develop a program to identify, protect and treat populations at risk;
- Sensitize and train health workers on mercury poisoning and the arrangements to be made in the event of a mercury spill;
- Create care services for the population affected by mercury pollution.

Article 17: Exchange of information

- Periodically update and disseminate information, research findings and new mercury-free substitutes.

Article 19: Research development and monitoring

- Seek partners to develop research on mercury management and monitoring;

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2. CHAPTER 2: INVENTORY AND IDENTIFICATION OF MERCURY RELEASE AND EMISSION SOURCES IN MADAGASCAR

This chapter is designed for:

- **Sources of mercury emissions to air**

The highest mercury source categories for air emissions were consumer products containing mercury, informal waste incineration, primary metal production, and extraction and use of fossil fuels / sources of mercury. energy.

- **Sources of Mercury Release to Land and Water**

The highest mercury source categories in water were mercury-containing consumer products, deposition / sewage treatment systems, informal waste incineration, other intentional product / process uses, and production Of primary (virgin) mercury.

The highest mercury source categories in the soil are mercury-containing consumer products, waste repositories and wastewater treatment systems, informal incineration of waste, crematoria and cemeteries, and The production of primary (virgin) mercury.

- **Overview of the initial inventory of mercury in the following categories**
  - **Stocks of mercury and / or mercury compounds, including an assessment of current storage conditions and an assessment of potential storage requirements in the future once the Convention is implemented.**

Madagascar does not have data on the stock of mercury or its compounds. Moreover, the inventory carried out in 2015-2016 showed that the quantity of mercury releases and emissions recorded is 79 204Kg / year. The latter is discharged in such a way that 67.56% or 53,371 kg were in the air, 14,06% or 11,135 kg in water, 13,34% or 10,616 kg in soil, and 4 000.84 kg in waste in general.

  - **Sources of mercury supplies, recycling activities and quantities**

With respect to mercury, mercury-free sources of mercury and mercury-containing products have not been registered for the re-use of mercury. On the other hand, there is an illegal mercury trade that deserves further investigation for sources of supply and the exact quantity of mercury in the Big Island.

  - **Relevant sources of mercury emissions and releases**

According to the inventory made in 2015-2016 in Madagascar, the relevant sources of emissions and releases of mercury were:

- consumer products content with mercury due to the use of pesticides and biocides: 34,815 Kg Hg in air, 6,034.60 Kg Hg in water and 5,570.40 Kg Hg in soil were Recorded.
- the incineration of informal waste generates 11 635.52 Kg Hg in air, 2 016.82 kg Hg in water, and 1 861.68 kg Hg in soil,
- Informal dumping of general waste generating 3 065.12 Kg Hg in the soil,
- wastewater treatment systems generating 2645 kg Hg in water,
- cosmetics and related products generating 1 852, 50 kg Hg in water,
- mercury batteries producing 3 351,50 Kg Hg in the products, 1,675.75 Kg Hg in the air and in the ground,
- cemeteries producing 484.82 kg Hg in the soil.

- **Sectors that use mercury or mercury compounds and quantity per year, including manufacturing processes and for the production of mercury-added products, ASGM.**
  - **Emission of mercury to air**

➢ The amount of mercury released into the air was 53,371 kg of Hg per year.

- **Primary sector:**

➢ The main emission routes for releases of mercury into the air were biocides and pesticides 34 815 Kg / Hg per year.

- **Secondary sector**

➢ Extraction of gold and silver in the amalgamation process results in the release of 1755 Kg / Hg / year.
➢ The production of energy and heat fueled with biomass releases 1549 Kg / Hg / year.

- **Tertiary sector**

➢ Manometers and gauges cause the discharge of 185, 16 Kg / Hg / year.
➢ Mercury batteries lead to the release of 1676 Kg / Hg / year,
➢ Informal incineration of waste results in the release of 11 635 Kg / Hg / year.

- **Releases of mercury into water**

The amount of mercury released into the water was 11,135 kg of Hg per year.
The main subcategories of sources of releases of mercury released into water were:

- **Primary sector**

➢ Biocides and pesticides releasing 6 034 kg Hg / year.

- **Tertiary sector**

➢ Cosmetics and related products releasing 1,853 Kg / Hg / year,
➢ Manometers and gauges rejecting 255, 97 Kg / Hg / year,
➢ Dental amalgam rejecting 42.43 kg / Hg / year,
➢ Informal incineration of waste releasing 2,016 Kg / Hg / year.

- **Releases of mercury into soil**

The amount of mercury released into the soil per year was 10,616 kg.
The main subcategories of mercury sources released into the soil were

- **Primary sector**

➢ Biocides and pesticides releasing 5,570.40 kg Hg / year.

- **Tertiary sector**

➢ Mercury batteries releasing 1676 Kg / Hg / year,
➢ Manometers and gauges rejecting 171, 38 Kg / Hg / year,
➢ Informal incineration of waste releasing 1,861 kg / Hg / year.

- **Trade in mercury and mercury-containing compounds, as well as the import and export of products containing mercury**

It should be noted especially that Madagascar is a country that does not officially extract mercury. As a result, all mercury-containing consumer products were imported from outside.

The amount of mercury released by products containing mercury is estimated to be 56 787 kg Hg per year, including:

- Mercury Thermometer: 405.55 Kg of Hg
- Electric mercury switches and relays: 613 Kg of Hg
- Mercury light sources: 5.43 Kg of Hg
- Mercury batteries: 6,703 Kg of Hg
- Polyurethane with mercury catalyst: 133.13 Kg of Hg
- Biocides and pesticides: 46,420 kg of Hg
- Paintings: 559 Kg of Hg
- Cosmetics and related products: 1,950 Kg of Hg.2.1

2.1. Summary of mercury releases, stockpiles, and supply and trade.

2.1.1. Mercury release source types present

Table 4: Identification of mercury release sources in Madagascar; sources present (Y), and possible but not positively identified (?).

Cat. no.	Source category	Source presence (y /?)
5.1	**Main category - Extraction and use of fuels/energy sources**	
5.1.2	Other coal combustion	Y
5.1.3	Extraction, refining and use of mineral oil	Y
5.1.5	Extraction and use of other fossil fuels	Y
5.1.6	Biomass fired power and heat production	Y
5.2	**Main category - Primary (virgin) metal production**	
5.2.2	Gold and silver extraction with the mercury-amalgamation process	Y
5.2.6	Gold extraction and initial processing by other processes than mercury amalgamation	Y
5.3	**Main category - Production of other minerals and materials with mercury impurities**	
5.3.1	Cement production	Y
5.3.2	Pulp and paper production	Y
5.3.3	Lime production and light weight aggregate kilns	Y
5.5	**Main category - Consumer products with intentional use of mercury**	
5.5.1	Thermometers with mercury	Y
5.5.2	Electrical and electronic switches, contacts and relays with mercury	Y
5.5.3	Light sources with mercury	Y
5.5.4	Batteries containing mercury	Y
5.5.6	Biocides and pesticides	Y
5.5.7	Paints	Y
5.5.8	Pharmaceuticals for human and veterinary uses	Y
5.5.8	Cosmetics and related products	Y
5.6	**Main category - Other intentional products/process uses**	
5.6.1	Dental mercury-amalgam fillings	Y
5.6.2	Manometers and gauges	Y
5.6.3	Laboratory chemicals and equipment	Y
5.6.4	Mercury metal use in religious rituals and folklore medicine	?
5.6.5	Miscellaneous product uses, mercury metal uses and other sources	?
5.7	**Main category - Production of recycled metals**	
5.7.1	Production of recycled mercury ("secondary production)	?
5.7.2	Production of recycled ferrous metals (iron and steel)	?
5.7.3	Production of other recycled metals	?
5.8	**Main category – Waste incineration**	
5.8.2	Incineration of hazardous waste	?
5.8.3	Incineration of medical waste	Y
5.8.5	Informal waste burning	Y
5.9	**Main category - Waste deposition/landfilling and waste water treatment**	
5.9.3	Informal local deposition of industrial production waste	?
5.9.4	Informal dumping of general waste	Y
5.9.5	Waste water system/treatment	Y
5.10	**Main category - Cremation and cemeteries**	
5.10.1	Crematoria	Y
5.10.2	Cemeteries	Y

Source: National inventory of mercury releases in Madagascar 2015 – 2016

2.1.2. Summary of mercury inputs to society

Table 5 : mercury inputs to society

C/ Sub-C	Source category	Calculat. Hg input to Society, Kg/y
	Main category - Extraction and use of fuels/energy sources	
5.1.2	Other coal combustion	1,80
5.1.3	Extraction, refining and use of mineral oil	192,99
5.1.5	Extraction and use of other fossil fuels	83,03
5.1.6	Biomass fired power and heat production	1 549,34
5.2	**Main category - Primary (virgin) metal production**	
5.2.2	Gold and silver extraction with the mercury-amalgamation process	2 340,00
5.2.6	Gold extraction and initial processing by other processes than mercury amalgamation	0,08
5.3	**Main category - Production of other minerals and materials with mercury impurities**	
5.3.1	Cement production	20,35
5.3.2	Pulp and paper production	0,08
5.3.3	Lime production and light weight aggregate kilns	23,34
5.5	**Main category - Consumer products with intentional use of mercury**	
5.5.1	Thermometers with mercury	405,55
5.5.2	Electrical and electronic switches, contacts and relays with mercury	613,00
5.5.3	Light sources with mercury	5,43
5.5.4	Batteries containing mercury	6 703,00
5. 5.6	Polyuréthane avec mercure catalyseurs	131,33
5.5.7	Biocides and pesticides	46 420
5.5.8	Paints	559,00
5.5.8	Cosmetics and related products	1 950,00
5.6	**Main category - Other intentional products/process uses**	
5.6.1	Dental mercury-amalgam fillings	175,36
5.6.2	Manometers and gauges	865,63
5.6.3	Laboratory chemicals and equipment	218,88
5.8	**Main category – Waste incineration**	
5.8.3	Incineration of medical waste	180,84
5.8.5	Informal waste burning	15 514,03
5.9	**Main category - Waste deposition/landfilling and waste water treatment**	
5.9.4	Informal dumping of general waste	3 831,41
5.9.5	Waste water system/treatment	2 645,82
5.10	**Main category - Cremation and cemeteries**	
5.10.1	Crematoria	0,9
5.10.2	Cemeteries	484,92
	Total	67 353,63

Source: National inventory of mercury releases in Madagascar 2015 – 2016

Note that the following source sub-categories made the largest contributions to mercury inputs to society were:

- Biocides and pesticides with mercury (46 420 Kg Hg/y),
- Informal waste burning 15 514 Kg/Hg/y
- Batteries with mercury (6703 kg Hg/y),
- Waste water system/treatment 2 645 Kg/Hg/y.
- Gold (and silver) extraction with mercury amalgamation processes (2 340 Kg Hg/y),
- Cosmetics and related products with mercury (1950 Kg Hg/y),
- Biomass fired power and heat production (1 549 Kg Hg/y) ,
- Manometers and gauges with mercury (866 Kg Hg/y),
- Electrical switches and relays with mercury (613 Kg Hg/y),
- Paints with mercury (559Kg Hg/y)
- Thermometers with mercury 406 Kg Hg/y.
- Incineration of medical waste 181 Kg/Hg/y

2.1.3. Summary of mercury releases

Table 6 : the amount of mercury to each pathway

C/ Sub-C	Source category	Calculated Hg output, Kg/y					
		Air	Water	Land	By-products and impurities	General waste	Sector specific treatment /disposal
5.1	**Source category: Extraction and use of fuels/energy sources**						
5.1.2	Other coal use	1,80	0,00	0,00	0,00	0,00	0
5.1.3	Mineral oils - extraction, refining and use	144,96	24,98	23,05	0,00	0,00	0
5.1.5	Other fossil fuels - extraction and use	83,03	0,00	0,00	0,00	0,00	0
5.1.6	Biomass fired power and heat production	1 549,34	0,00	0,00	0,00	0,00	0
5.2	**Source category: Primary (virgin) metal production**						
5.2.2	Gold (and silver) extraction with mercury amalgamation processes	1 755,00	304,20	280,80	0,00	0,00	0
5.2.6	Gold extraction and initial processing by methods other than mercury amalgamation	0,06	0,01	0,01	0,00	0,00	0
5.3	**Source category: Production of other minerals and materials with mercury impurities**						
5.3.1	Cement production	15,26	2,65	2,44	0,00	0,00	0
5.3.2	Pulp and paper production	0,06	0,01	0,01	0,00	0,00	0
5.3.3	Production of lime and light weight aggregates	17,50	3,03	2,80	0,00	0,00	0
5.5	**Source category: Consumer products with intentional use of mercury**						
5.5.1	Thermometers with mercury	81,11	121,67	81,11	-	121,67	0
5.5.2	Electrical switches and relays with mercury	183,90	0,00	245,20	-	183,90	0
5.5.3	Light sources with mercury	1,63	0,00	1,63	-	2,17	0
5.5.4	Batteries with mercury	1 675,75	0,00	1 675,75	-	3 351,50	0
5,5,5	Polyurethane	26,27	13,13	52,53	0,00	39,40	
5.5.6	Biocides and pesticides with mercury	34 815	6 034,60	5 570,40	-	0,00	0
5.5.7	Paints with mercury	514,28	27,95	16,77	-	0,00	0
5.5.8	Cosmetics and related products with mercury	0,00	1 852,50	97,50	-	0,00	0
5.6	**Source category: Other intentional product/process use**						
5.6.1	Dental mercury-amalgam fillings (b	2,56	42,44	0,00	81,29	49,08	0
5.6.2	Manometers and gauges with mercury	185,16	255,97	171,38	0,00	253,12	0
5.6.3	Laboratory chemicals and equipment with mercury	164,16	28,45	26,27	0,00	0,00	0
5.8	**Source category : Waste incineration*3**						
5.8.3	Incineration of medical waste	135,63	23,51	21,70	0,00	0,00	0
5.8.5	Informal waste burning	11 635,52	2 016,82	1 861,68	0,00	0,00	0
5.9	**Source category: Waste deposition/landfilling and waste water treatment**						
5.9.4	Informal dumping of general waste*1*3	383,14	383,14	3 065,12	0,00	0,00	0
5.9.5	Waste water system/treatment*2	0,00	2 645,82	0,00	0,00	0,00	0
5.10	**Source category: Crematoria and cemetaries**						
5.10.1	Crematoria/cremation	0,21	0,00	0,00	-	0,00	0
5.10.2	Cemeteries	0,00	0,00	1 000,00	-	0,00	0
		53 371, 21	11 135,05	10 615,94	81,29	3 961,44	

Source: National inventory of mercury releases in Madagascar 2015 – 2016

The quantity of mercury released is estimated 79,204 Kg Hg per year, of which 53,371,21 Kg of Hg to air, 11,135 Kg of Hg to water, 10,615.94 Kg Hg to,land , 81, 29 Kg of Hg in the by-product and impurities and 3,961.44 Kg of Hg to waste.

2.1.4. Summary of mercury stockpiles, and supply and trade.

Madagascar does not have officially stocks of mercury, source of supply and trade. On the other hand, there is an illegal mercury trade that merits further investigation for sources of supply and exact quantity of mercury in the Big Island.

2.2. Data and inventory on extraction and use of fuels/energy sources

2.2.1. Other coal use

➢ Coal combustion of hard coal (anthrasite and bituminous)

Concerning the sub category coal combustion of hard coal (anthrasite and bituminous), the table below shows the information for this source.

The activity rate in national level is from “Office Malgache des Hydrocarbures (OMH)” Madagascar, data 2014.

Tableau n°7 : Coal combustion of hard coal (anthrasite and bituminous

Name of specific source	Location	Activity rate	Input factor(s)	Pollution abatement systems	Output distribution factors	Stack height(s) in meter
OMH	National	12000 t	0,15gHg/t	Level 0: None	Air : 1	

Source: National inventory of mercury releases in Madagascar 2015 – 2016

This data is granted by OMH Madagascar and data in 2014. In the case of sources which technical control does not exist, most of the mercury in coal is likely to be released into air (100%) or 1.80 Kg Hg / y. Which is the case here, therefore, the main mercury releases from the other coal combustion is going into the atmosphere.

Tableau n° 8 : Estimation of mercury to each pathway

Coal combustion of hard coal (anthrasite and bituminous)	Unit	Production	Use	Disposal	Sum of releases to pathway from assessed part of life-cycle
Activity rate Input factor for phase Calculated input to phase	Coal, t/y g Hg/t Kg Hg/y	 0	12000 0,15 1,8	0 0	
Output distribution factors for phase: - Air	 unitless		 1		
Calculated outputs/releases to: - Air	 Kg Hg/y	 0	 1,80	 0	 1,80

Source: National inventory of mercury releases in Madagascar 2015 – 2016

2.2.2. Mineral oils - extraction, refining and use

For the year 2014 (source OMH) 96 104 765 tons of mineral oils are consumed, of which 43 382 t heavy oil, and 96 061 383 t petroleum products for transportation, home use ... etc.

➢ Oil combustion facilities

Tableau n° 9 : Use of heavy oil and petroleum coke: Oil combustion facilities

Name of specific source	Location	Activity rate	Input factor(s)	Pollution abatement systems	Output distribution factors	Stack height(s) in meter
OMH	National	43 382	Standard : 20mg Hg/t	Oil Combustion Facility with no emissions controls	Air : 1	

Source: National inventory of mercury releases in Madagascar 2015 – 2016

➢ Transportation and other uses other than combustion

Table 10 : Use of gasoline, diesel, light fuel oil, kerosene, LPG and other light to medium distillates: Transportation and other uses other than stationary combustion

Name of specific source	Location	Activity rate	Input factor(s)	Pollution abatement systems	Output distribution factors	Stack height(s) in meter
OMH	National	54 688 205 t/y	Standard : 2mg Hg/t	Oil Combustion Facility with no emissions controls	Air : 0.75 Water : 0.13 Land : 0.12	

Source: National inventory of mercury releases in Madagascar 2015 – 2016

➢ Residential heating with no controls

Table 11 : Use of gasoline, diesel, light fuel oil, kerosene, LPG and other light to medium distillates: Residential heating with no controls

Name of specific source	Location	Activity rate	Input factor(s)	Pollution abatement systems	Output distribution factors	Stack height(s) in meter
OMH	National	41 297 600 t/y	Standard : 2mg Hg/t	Oil Combustion Facility with no emissions controls	Air : 0.75 Water : 0.13 Land : 0.12	

Source: National inventory of mercury releases in Madagascar 2015 – 2016

➢ Other oil combustion facilities

Table 12 : Use of gasoline, diesel, light fuel oil, kerosene, LPG and other light to medium distillates: Other oil combustion facilities

Name of specific source	Location	Activity rate	Input factor(s)	Pollution abatement systems	Output distribution factors	Stack height(s) in meter
OMH	Nationale	75578 t/an	Standard : 2mg Hg/t	Combustion d'huile Installation sans contrôle des émissions	Air : 0.75 Eau : 0.13 Sol : 0.12	

Source: National inventory of mercury releases in Madagascar 2015 – 2016

➢ Oil combustion facilities

The activity rate is from Madagascar OMH, data 2014. Madagascar does not practice especially extraction and refining processes for mineral oils. Only, Madagascar imports mineral oils for their proper use, therefore, simply burning exists. The activity rate for this sub category reaches 43 382 Coal, t/y. Madagascar is a consumer of petroleum products, for this purpose, the mercury releases in this section are scattered in the atmosphere due to the combustion. The Calculated input factor is 0, 87 Kg Hg / y and this entire amount is scattered in the atmosphere.

Tableau n°13 : Estimation of mercury to each pathway

Oil combustion facilities	Unit	Production	Use	Disposal	Sum of releases to pathway from assessed part of life-cycle
Activity rate	Coal, t/y		43 382	0	-
Input factor for phase	mg Hg/t		20		-
Calculated input to phase	Kg Hg/y	0	0,87	0	-
Output distribution factors for phase:					
- Air	unitless		1		
Calculated outputs/releases to:					
- Air	Kg Hg/y		0,87		0.87

Source: National inventory of mercury releases in Madagascar 2015 – 2016

➢ Transportation and other uses other than combustion

The activity rate for transportation and other uses other than stationary combustion is 54 688 205t/y. The sum of releases of mercury to pathway from assessed part of life-cycle, about 75% or 82,03Kg Hg/y releases to air.

Table 14 : Estimation of mercury to each pathway

Transportation and other uses other than combustion	Unit	Production	Use	Disposal	Sum of releases to pathway from assessed part of life-cycle
Activity rate	Coal, t/y		54 688 205		-
Input factor for phase	mg Hg/y		2		-
Calculated input to phase	Kg Hg/y		109		-
Output distribution factors for phase:					
- Air	Unitless		0.75		
- Water	Unitless		0.13		
- Land	Unitless		0.12		
Calculated outputs/releases to:					
- Air	Kg Hg/y		82,03		82,03
- Water	Kg Hg/y		14,22		14,22
- Land	Kg Hg/y		13,13		13,13

Source: National inventory of mercury releases in Madagascar 2015 – 2016

➢ Residential heating with no controls

The activity rate for residential heating with no controls is 41 297 600 t/y. Most of mercury releases for this sub category are releases to air 61, 95 Kg Hg/y when 10, 74 Kg Hg/y to water and 9, 91 Kg Hg/y to land.

Table 15 : Estimation of mercury to each pathway

Residential heating with no controls	Unit	Production	Use	Disposal	Sum of releases to pathway from assessed part of life-cycle
Activity rate	Oil, t/y		41 297600		-
Input factor for phase	Mg Hg/t		2	0	-
Calculated input to phase	Kg Hg/y		82,6	0	-
Output distribution factors for phase:					
- Air	Unitless		0.75		
- Water	Unitless		0.13		
- Land	Unitless		0.12		
Calculated outputs/releases to:					
- Air	Kg Hg/y		61,95		61,95
- Water	Kg Hg/y		10,74		10,74
- Land	Kg Hg/y		9,91		9,91

Source: National inventory of mercury releases in Madagascar 2015 – 2016

➢ Other oil combustion facilities

The activity rate of other oil combustion facilities is 75 578 t/y. this sub category releases trace of mercury.

Table 16 : Estimation of mercury to each pathway

Other oil combustion facilities	Unit	Production	Use	Disposal	Sum of releases to pathway from assessed part of life-cycle
Activity rate	Coal, t/y		75 578		-
Input factor for phase	mg Hg/t		2		-
Calculated input to phase	Kg Hg/y		0,2	0	-
Output distribution factors for phase:					
- Air	Unitless		0.75		
- Water	Unitless		0.13		
- Land	Unitless		0.12		
Calculated outputs/releases to:					
- Air	Kg Hg/y		0,11		0,11
- Water	Kg Hg/y		0,02		0,02
- Land	Kg Hg/y		0,02		0,02

Source: National inventory of mercury releases in Madagascar 2015 – 2016

2.2.3. Other fossil fuels - extraction and use

This category includes extraction and use of other fossil fuels such as peat (which is a very young form of coal) and oil shale. Oil shale is a type of shale from which a dark crude oil can be re-covered by distillation. Like other fossil and non-fossil fuels these may contain traces of mercury, which can be mobilized by extraction and combustion.

Table 17 : the fossil fuels - extraction and use: Combustion of peat

Name of specific source	Location	Activity rate	Input factor(s)	Pollution abatement systems	Output distribution factors	Stack height(s) in meter
OMH	National	709 650 t/y	Standard : 117mg Hg/t		Air : 1 Water : 0 Land : 0	

Source: National inventory of mercury releases in Madagascar 2015 – 2016

The activity rate of other Combustion of peat is 709 650 t/y. All mercury releases from this sub category scatter to air (83, 03 Kg Hg/y).

Table18 : Estimation of mercury to each pathway

Combustion of peat	Unit	Production	Use	Disposal	Sum of releases to pathway from assessed part of life-cycle
Activity rate	Peat, t/y		709 650		-
Input factor for phase	mg Hg/t		117	0	-
Calculated input to phase	Kg Hg/y		83,03	0	-
Output distribution factors for phase:					
- Air	unitless		1		
Calculated outputs/releases to:					
- Air	Kg Hg/y		83,03		83,03

Source: National inventory of mercury releases in Madagascar 2015 – 2016

2.2.4. Biomass fired power and heat production

Thus, the charcoal used the year 2014 reached 12 911 162 T. They are mainly used as an energy source.

Table 19 : Biomass fired power and heat production: Charcoal combustion

Name of specific source	Location	Activity rate	Input factor(s)	Pollution abatement systems	Output distribution factors	Stack height(s) in meter
Ministry of Energy	National	12 911 162t/y	Standard : 117mg Hg/t		Air : 1 Water : 0 Land : 0	

Source: National inventory of mercury releases in Madagascar 2015 – 2016

The activity rate is from the Ministry of Energy in Madagascar data year 2012.All mercury releases from this sub category scatter to air (1549 Kg Hg/y).The population uses a first type of solid fuel for cooking in rural and urban areas because of its availability and its low acquisition costs.

Table 20 : Estimation of mercury to each pathway

Biomass fired power and heat production: Charcoal combustion	Unit	Production	Use	Disposal	Sum of releases to pathway from assessed part of life-cycle
Activity rate	Coal, t/y		12 911 162		-
Input factor for phase	g Hg/t		0,12	0	-
Calculated input to phase	Kg Hg/y		1549	0	-
Output distribution factors for phase:					
- Air	unitless		1		
- Products			-		-
- General waste treatment			-		-
- Sector specific waste treatment			-		-
Calculated outputs/releases to:					
- Air	Kg Hg/y		1549		1549
- Water	Kg Hg/y		0		0
- Land	Kg Hg/y		0		0
- Products			-		-
- General waste treatment			-		-
- Sector specific waste treatment			-		-

Source: National inventory of mercury releases in Madagascar 2015 – 2016

2.3. Data and inventory on primary (virgin) metal production

2.3.1. Gold (and silver) extraction with mercury amalgamation processes

- **From whole ore**

For the extraction with mercury amalgamation processes, 780 Kg of gold have been identified in Madagascar in the year 2014.**Table 21 :** Gold (and silver) extraction with mercury amalgamation processes: from whole ore

Name of specific source	Location	Activity rate	Input factor(s)	Pollution abatement systems	Output distribution factors	Stack height(s) in meter
Inventory in local source	Sud-Est de Madagascar (Manapatrana)	780 kg/y Gold produced,	Standard : 3 kg Hg/kg gold produced	Extraction from whole ore (no retort use)	Air : 0.75 Water : 0.13 Land : 0.12	

Source: National inventory of mercury releases in Madagascar 2015 – 2016

The activity rate of Gold (and silver) extraction with mercury amalgamation processes: from whole ore was 780 kg Hg/y. The mercury releases from this sub category was 2340 Kg Hg/y which most quantity of it releases to air 1 755,00 Kg Hg/y.

Table 22 : Estimation of mercury to each pathway

Gold (and silver) extraction with mercury amalgamation processes : from whole ore	Unit	Production	Use	Disposal	Sum of releases to pathway from assessed part of life-cycle
Activity rate	Gold produced, kg/y	780			-
Input factor for phase	kg Hg/kg gold produced	3			-
Calculated input to phase	Kg Hg/y	2340			-
Output distribution factors for phase:					
- Air	unitless	0.75			-
- Water	unitless	0.13			-
- Land	unitless	0.12			-
Calculated outputs/releases to:					
- Air	Kg Hg/y	1 755,00			1 755,00
- Water	Kg Hg/y	304,20			304,20
- Land	Kg Hg/y	280,80			280,80

Source: National inventory of mercury releases in Madagascar 2015 – 2016

2.3.2. Gold extraction and initial processing by methods other than mercury amalgamation

The extraction processes are a combination of general physiochemical unit operations and specific chemical processes designed to separate the gold from other constituents of the ore / concentrate used

Table 23: Gold extraction and initial processing by methods other than mercury amalgamation

Name of specific source	Location	Activity rate	Input factor(s)	Pollution abatement systems	Output distribution factors	Stack height(s) in meter
Office Malagasy de l'Or	National	5,476 Gold ore used, t/y	15 g Hg/t ore used		Air : 0.75 Water : 0.13 Land : 0.12	

Source: National inventory of mercury releases in Madagascar 2015 – 2016

The activity rate of gold extraction and initial processing by methods other than mercury amalgamation was 5,476 Gold ore used, t/y. The mercury releases from this sub category is just a trace to air 0,06 Kg Hg/y.

Table 24 : Estimation of mercury to each pathway

Gold extraction and initial processing by methods other than mercury amalgamation	Unit	Production	Use	Disposal	Sum of releases to pathway from assessed part of life-cycle
Activity rate	kg Hg/y	5,476			-
Input factor for phase	g Hg/tore used	15			-
Calculated input to phase	Kg Hg/y	0.08			-
Output distribution factors for phase:					
- Air	Unitless	0.75			-
- Water	Unitless	0.13			-
- Land	Unitless	0.12			-
Calculated outputs/releases to:					
- Air	Kg Hg/y	0,06			0,06
- Water	Kg Hg/y	0,01			0,01
- Land	Kg Hg/y	0,01			0,01

Source: National inventory of mercury releases in Madagascar 2015 – 2016

2.4. Data and inventory on intentional use of mercury in industrial processes

Madagascar does not manufacture and process products with intentional use of mercury

2.5. Data and inventory on waste handling and recycling

2.5.1. Incineration of medical waste

According to information issued by the head of the medical waste management to the Ministry for Health, it shows that 7 535 000 kg or 7535 t per year is the amount of waste to be incinerated.

Table 25: Incineration of medical waste

Name of specific source	Location	Activity rate	Input factor(s)	Pollution abatement systems	Output distribution factors	Stack height(s) in meter
Ministry of Health	National	7535 Waste incinerated, t/y	24 g Hg/t waste incinerated	No emission reduction devices	Air : 0.75 Water : 0.13 Land : 0.12	

Source: National inventory of mercury releases in Madagascar 2015 – 2016

The main pathways of mercury releases for this subcategory were to air 135,63Kg Hg/y, to water 23, 51Kg Hg/y and to land 21, 70 Kg Hg/y.

Table 26: Estimation of mercury to each pathway

Incineration of medical waste	Unit	Production	Use	Disposal	Sum of releases to pathway from assessed part of life-cycle
Activity rate	Waste incinerated, t/y			7535	-
Input factor for phase	g Hg/t waste incinerated			24	-
Calculated input to phase	Kg Hg/y			181	-
Output distribution factors for phase:					
- Air	Unitless			0.75	-
- Water	Unitless			0.13	-
- Land	Unitless			0.12	-
Calculated outputs/releases to:					
- Air	Kg Hg/y			135,63	135,63
- Water	Kg Hg/y			23, 51	23, 51
- Land	Kg Hg/y			21,70	21,70

Source: National inventory of mercury releases in Madagascar 2015 – 2016

2.5.2. Informal waste burning

In 2014, according to the Institut National de Statistics 23,040,065 people lived in Madagascar, which were divided into 22 regions, 119 districts and 1560 municipalities.

Table 27 : informal waste burning

Name of specific source	Location	Activity rate	Input factor(s)	Pollution abatement systems	Output distribution factors	Stack height(s) in meter
Ministry of Water and Sanitation	National	10 342 685 Waste burned, t/y	1,5 g Hg/t waste burned		Air : 0.75 Water : 0.13 Land : 0.12	

Source: National inventory of mercury releases in Madagascar 2015 – 2016

The main pathway of mercury releases for this subcategory were to air 11 635 Kg Hg/y, to water 2 017 Kg Hg/y and to land 1 862 Kg Hg/y.

Table 28: Estimation of mercury to each pathway

Informal waste burning (open fire waste burning on landfills and infomally)	Unit	Production	Use	Disposal	Sum of releases to pathway from assessed part of life-cycle
Activity rate	Waste burned, t/y			10 342 685	-
Input factor for phase	g Hg/t waste burned			1,5	-
Calculated input to phase	Kg Hg/y			15 514	-
Output distribution factors for phase:					
- Air	Unitless			0.75	-
- Water	Unitless			0.13	-
- Land	Unitless			0.12	-
Calculated outputs/releases to:					
- Air	Kg Hg/y			11 635	11 635
- Water	Kg Hg/y			2 017	2 017
- Land	Kg Hg/y			1 862	1 862

Source: National inventory of mercury releases in Madagascar 2015 – 2016

2.5.3. Informal dumping of general waste

Landfills in Madagascar are informal, uncontrolled. Waste sent to the landfills, are more fractions of hazardous waste, such as chemicals or solid residues from incineration. According to statistics and basic inventory of mercury releases in 2014, 2 554 270 t / year or 6998 t / day are buried waste in Madagascar

Table 29 : Informal dumping of general waste

Name of specific source	Location	Activity rate	Input factor(s)	Pollution abatement systems	Output distribution factors	Stack height(s) in meter
MEEF/ REM 2012	National	2554270 Waste dumped, t/y,	1.5g Hg/t waste		Air : 0.1 Water : 0.1 Land : 0.8	

Source: National inventory of mercury releases in Madagascar 2015 – 2016

The main pathway of mercury releases for this subcategory were to land 3 065, 12 Kg Hg/y, to water and air are 383, 14 Kg Hg/y.

Table 30 : Estimation of mercury to each pathway

1Informal dumping of general waste	Unit	Production	Use	Disposal	Sum of releases to pathway from assessed part of life-cycle
Activity rate	Waste dumped, t/y			2554270	-
Input factor for phase	g Hg/t waste			1,5	-
Calculated input to phase	Kg Hg/y			3 831,14	-
Output distribution factors for phase:					
- Air	Unitless			0.1	-
- Water	Unitless			0.1	-
- Land	Unitless			0.8	-
Calculated outputs/releases to:					
- Air	Kg Hg/y			383,14	383,14
- Water	Kg Hg/y			383,14	383,14
- Land	Kg Hg/y			3 065,12	3 065,12

Source: National inventory of mercury releases in Madagascar 2015 – 2016

2.5.4. Waste water system/treatment

The waste water produced is estimated at 503 965 million m3 / year, of which 301,430 million m3 for households, more than 200,000 manufacturing and the rest for other activities.

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Table 31 : Waste water system/treatment.

Name of specific source	Location	**Activity rate,** Waste water,	Input factor(s)	Pollution abatement systems	Output distribution factors	Stack height(s) in meter
Statistique FAO Madagascar Aquastate 2012	National	503 965 million waste water m3	5.25mg Hg/m^3 waste water	No treatment; direct release from sewage pipe	Air : 0 Water : 1 Land : 0	

Source: National inventory of mercury releases in Madagascar 2015 – 2016

The only pathway of mercury releases for this subcategory was to water 2 645, 82 Kg.

Table 32 : Estimation of mercury to each pathway

Waste water system / treatment	Unit	Production	Use	Disposal	Sum of releases to pathway from assessed part of life-cycle
Activity rate:	Waste water, million m^3/y	503965			
Input factor for phase:5	mg Hg/m^3 waste water	5.25			-
Calculated input to phase :25 637	Kg Hg/y	2.645,82			-
Output distribution factors for phase:					
- Air	Unitless	0			-
- Water	Unitless	1			-
- Land	Unitless	0			-
Calculated outputs/releases to:					
- Air:	Kg Hg/y	0		0	0
- Water:	Kg Hg/y	2 645		0	2 645
- Land:	Kg Hg/y	0		0	0

Source: National inventory of mercury releases in Madagascar 2015 – 2016

2.5.5. Test of wastewater default input factor

In the 2015-2016 inventory in Madagascar, the default factors were used to estimate mercury releases from waste. Default factors were based on bibliographic data on waste and wastewater mercury levels and were available only in developed countries. The positive calculations indicate that the default input factors for waste may overestimate mercury releases from these sources. Then, these source categories could be prioritized in subsequent inventory work.

In this inventory, default input factors were used to estimate mercury releases from wastewater treatment. Default factors were based on bibliographic data on waste and wastewater mercury levels and were available only in developed countries. The negative calculations indicate that the default factors for wastewater treatment do not necessarily overestimate mercury releases from these sub-categories.

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

2.6.1. General background data

In 2014, the quantity of mercury released from mercury-containing products reached 56 787 kg Hg, of which 46 420 kg of Hg was 81.74% for biocides and pesticides, 6 703 kg of Hg, ie 11.80% for mercury-containing products. Batteries and batteries, 1950 Kg of Hg ie 3.40% for cosmetics and related products, 613 Kg of Hg or about 1% for mercury switches and relays.

2.6.2. Thermometer with mercury

The number of mercury thermometers used in 2014 reached the value of 99 550 items, including 96 550 articles were for medical and only 3000 for industrial use in mining company extracting Cobalt and Nickel called Dynatec.

Table 33: Consumption of thermometers with mercury in 2014:

Name of specific source	Location	Activity rate	Input factor(s)	Pollution abatement systems	Output distribution factors	Stack height(s) in meter
INSTAT , Health Ministry Ambatovy	National Toamasina	Medical thermometers : 96 550 Items/y Industrial and special thermometers : 3 000 Items/y	1g Hg/item 103 g Hg/item	No separate collection. Informal waste handl. widespread	Air : 0,2 Water : 0,3 Land : 0,2 General waste treatment: 0,3	

Source: National inventory of mercury releases in Madagascar 2015 – 2016

The main pathway of mercury releases for this subcategory were to general waste treatment and water 121,67 Kg Hg/y, then to air and land were 81,11 Kg Hg/y..

Table 34 : Estimation of mercury releases to each pathway

Thermometers with mercury	Unit	Production	Use/disposal	Sum of releases to pathway from assessed part of life-cycle
Medical thermometers				
Activity rate Input factor for phase Calculated input to phase	Items/y g Hg/item Kg Hg/y		96 550 1 97	- - -
Industrial and special thermometers				
Activity rate Input factor for phase Calculated input to phase	Items/y g Hg/item Kg Hg/y		3 000 103 309	- - -
Output distribution factors for phase: - Air - Water - Land - Products - General waste treatment - Sector specific waste treatment	 Unitless Unitless Unitless Unitless		 0,2 0,3 0.2 - 0,3 -	 - - - - - -
Calculated outputs/releases to: - Air - Water - Land - Products - General waste treatment - Sector specific waste treatment	 Kg Hg/y Kg Hg/y Kg Hg/y Kg Hg/y		 81,11 121,67 81,11 0,00 121,67	 81,11 121,67 81,11 0,00 121,67

Source: National inventory of mercury releases in Madagascar 2015 – 2016

2.6.3. Electrical switches and relays with mercury

According to the toolkit, if the annual consumption of switches and relays containing mercury is not available, you can use the number of the population and the use of access to electricity for the input factor which is simply the average value of the absorption factor, and it is from this figure that is obtained the amount of mercury 613 Kg in switches and relays in 2014.

Table 34 : Electrical switches and relays with mercury:

Name of specific source	Location	Activity rate	Input factor(s)	Pollution abatement systems	Output distribution factors	Stack height(s) in meter
INSTAT	National	23 040 065 hab.	0,14	No separate collection. Informal waste handl. widespread	Air : 0,3 Water : 0 Land : 0,4 General waste treatment: 0,3	

Source: National inventory of mercury releases in Madagascar 2015 – 2016

The main pathways of mercury releases for this subcategory were to the land 245, 20 Kg Hg/y; to air and to general waste 183, 90 Kg Hg/y.

Table 35 : Estimation of mercury to each pathway

Electrical switches and relays with mercury	Unit	Production	Use/ Disposal	Sum of releases to pathway from assessed part of life-cycle
Activity rate	Inhabitant		23 040 065	-
Input factor for phase	g Hg/item		0,14	-
Calculated input to phase	Kg Hg/y		613	-
Output distribution factors for phase:				
- Air	unitless		0,3	-
- Water	unitless		0	-
- Land	unitless		0.4	-
- Products			-	-
- General waste treatment			0,3	-
- Sector specific waste treatment			-	-
Calculated outputs/releases to:				
- Air	Kg Hg/y		183,90	183,90
- Water	Kg Hg/y		0	0
- Land	Kg Hg/y		245,20	245,20
- Products			0	0
- General waste treatment	Kg Hg/y		183,90	183,90
- Sector specific waste treatment				

Source: National inventory of mercury releases in Madagascar 2015 – 2016

2.6.4. Light sources with mercury

Below the categories of lamps containing mercury estimated and actual use:

- Fluorescent U-tubes are used in appliances, fixtures and windows. They are useful when a fluorescent light is sought but that the available space is too small for traditional linear lamps.
- Compact fluorescents are often used as alternatives to conventional incandescent lamps in the hospitality industry, office and home lighting systems.
- Mercury vapor lamps are often found in several applications of high intensity discharge (HID). They serve as farm streetlights, public road, general lighting and parking lots.

Table 36 : Consumption of light sources with mercury: use and disposal

Name of specific source	Location	Activity rate	Input factor(s)	Pollution abatement systems	Output distribution factors	Stack height(s) in meter
INSTAT 2015	National	• Fluorescent tubes (double end): 201567 Items/y • Compact fluorescent lamp (CFL single end):38 562 Items/y • High pressure mercury vapour : 68 Items/y	25 g mg Hg/item 10 g mg Hg/item 30 g mg Hg/item	No separate collection. Informal waste handl. widespread	Air : 0,3 Water : 0 Land : 0,3 General waste: 0,4	

Source: National inventory of mercury releases in Madagascar 2015 – 2016

The main pathways of mercury releases for this subcategory were to general waste 2, 17 Kg Hg/y, to the land and to the air 1,63 Kg Hg/y.

Table 37 : Estimation of mercury to each pathway

Light sources with mercury	Unit	Production	Use / Disposal	Sum of releases to pathway from assessed part of life-cycle
Fluorescent tubes (double end)				
Activity rate	Items/y		201 567	-
Input factor for phase	mg Hg/item		25	-
Calculated input to phase	Kg Hg/y		5.04	-
Compact fluorescent lamp (CFL single end)				
Activity rate	Items/y		38 562	-
Input factor for phase	mg Hg/item		10	-
Calculated input to phase	Kg Hg/y		0.39	-
High pressure mercury vapour				
Activity rate	Items/y		68	-
Input factor for phase	mg Hg/item		30	-
Calculated input to phase	Kg Hg/y		0	-
Output distribution factors for phase:				
- Air	unitless		0,3	-
- Water	unitless		0	-
- Land	unitless		0,3	-
- Products				-
- General waste treatment			0,4	-
- Sector specific waste treatment				-
Calculated outputs/releases to:				
- Air	Kg Hg/y		1,63	1,63
- Water	Kg Hg/y		0	0
- Land	Kg Hg/y		1,63	1,63
- Products	Kg Hg/y		0	0
- General waste treatment	Kg Hg/y		2,17	2,17
- Sector specific waste treatment	Kg Hg/y		0	0

Source: National inventory of mercury releases in Madagascar 2015 – 2016

2.6.5. Batteries with mercury

Madagascar imported and consumed 9344 T of batteries with mercury in 2014, of which 8 792 tones for alkaline batteries and button cells, 180 T for silver oxide batteries, 97 T for alkaline button, and finally 275 t for zinc batteries –air. Madagascar does not export batteries with mercury

Table 38 : Consumption of batteries with mercury: Use and disposal

Name of specific source	Location	Activity rate	Input factor(s)	Pollution abatement systems	Output distribution factors	Stack height(s) in meter
INSTAT	National	Zinc-air button cells : 275 t/y Alkaline button cells: 97 t/y Silver oxide button cells: 180 t/y Alkaline, other than button cell shapes; 8792 t/y	12 Kg Hg/t Batteries 5 Kg Hg/t Batteries 4 kg Hg/t batteries 0,25 kg Hg/t batteries	No separate collection. Informal waste handl. widespread	Air : 0,25 Water : 0 Land : 0,25 General waste: 0,5	

Source: National inventory of mercury releases in Madagascar 2015 – 2016

The main pathway of mercury releases for this subcategory were to general waste 3 351,50Kg Hg/y, in the land and in the air 1675,75 Kg Hg/y.

Table 39 : Estimation of mercury to each pathway

Batteries with mercury	Unit	Production	Use/ Disposal	Sum of releases to pathway from assessed part of life-cycle
Zinc-air button cells				
Activity rate Input factor for phase Calculated input to phase	t/y Kg Hg/t Batteries Kg Hg/y		275 12 3 300	- - -
Alkaline button cells				
Activity rate Input factor for phase Calculated input to phase	t/y Kg Hg/t Batteries Kg Hg/y		97 5 485	- - -
Silver oxide button cells				
Activity rate Input factor for phase Calculated input to phase	t/y Kg Hg/t Batteries Kg Hg/y		180 4 720	- - -
Alkaline, other than button cell shapes				
Activity rate Input factor for phase Calculated input to phase	t/y Kg Hg/t Batteries Kg Hg/y		8792 0,25 2198	- - -
Output distribution factors for phase: - Air - Water - Land - Products - General waste treatment - Sector specific waste treatment	 unitless unitless unitless		 0,250 0,25 0,5	 - - - - - -
Calculated outputs/releases to*: - Air - Water - Land - Products - General waste treatment - Sector specific waste treatment	 Kg Hg/y Kg Hg/y Kg Hg/y		 1675,75 0 1675,75 0 3 351,50	 1 675,75 0 1 675,75 0 3 351,50

Source: National inventory of mercury releases in Madagascar 2015 – 2016

Note* Releases are calculated for the sum of the two life cycle phase use and disposal for this product type.

2.6.6. Polyurethane with mercury catalysts

Table 40 : Polyurethane with mercury catalysts

Name of specific source	Location	Activity rate	Input factor(s)	Pollution abatement systems	Output distribution factors	Stack height(s) in meter
INSTAT	National	23 040 065 hab.	0,03 g Hg/(y*inhabitant)	No separate collection. Informal waste handl. widespread	Air : 0,2 Water : 0,1 Land : 0,4 General waste: 0,3	

Source: National inventory of mercury releases in Madagascar 2015 – 2016

The main pathways of mercury releases for this subcategory were to land 52,53 Kg Hg/y, to general waste 39,40Kg Hg/y and to the air 26,27Kg Hg/y.

Table 41 : Estimation of mercury to each pathway

Polyurethane with mercury catalysts	Unit	Production	Use/ Disposal	Sum of releases to pathway from assessed part of life-cycle
Activity rate	Inhabitants		23 040 065	-
Input factor for phase	gHg/(y*inhabitat)		0,03	-
Calculated input to phase	Kg Hg/y		131	-
Output distribution factors for phase:				
- Air	Unitless		0,2	-
- Water	Unitless		0,1	-
- Land	Unitless		0,4	-
- Products	-		-	-
- General waste treatment	-		0,3	-
- Sector specific waste treatment	-		-	-
Calculated outputs/releases to:				
- Air	Kg Hg/y		26,27	26,27
- Water	Kg Hg/y		13,13	13,13
- Land	Kg Hg/y		52,53	52,53
- Products	Kg Hg/y		0	0
- General waste treatment	Kg Hg/y		39,40	39,40
- Sector specific waste treatment	Kg Hg/y		0	0

Source: National inventory of mercury releases in Madagascar 2015 – 2016

2.6.7. Biocides and pesticides with mercury

A major use cases of mercury compounds as a biocide was the seed treatment. The use of seed grains treated mercury-based, for production for the manufacture of bread was the cause.

Table 42 : Use and disposal of Biocides and pesticides with mercury.

Name of specific source	Location	Activity rate	Input factor(s)	Pollution abatement systems	Output distribution factors	Stack height(s) in meter
DPV, agricultural Ministry	National	2321 biocides and pesticides used T/y	20 kg Hg/t		Air : 0.75 Water : 0.13 Land : 0.12	

Source: National inventory of mercury releases in Madagascar 2015 – 2016

The main pathways of mercury releases for this subcategory were to air 34 815 Kg Hg/y, to water 6 034,60 Kg Hg/y and to land 5 570,40 Kg Hg/y.

Table 43 : Estimation of mercury to each pathway

Biocides and pesticides with mercury	Unit	Production	Use/ Disposal	Sum of releases to pathway from assessed part of life-cycle
Activity rate	, T/y		2321	-
Input factor for phase	kg Hg/t		20	-
Calculated input to phase	Kg Hg/y		46 420	-
Output distribution factors for phase:				
- Air	Unitless		0.75	-
- Water	Unitless		0.13	-
- Land	Unitless		0.12	-
- Products			-	-
- General waste treatment			-	-
- Sector specific waste treatment			-	-
Calculated outputs/releases to:				
- Air	Kg Hg/y		34 815	34 815
- Water	Kg Hg/y		6 034,60	6 034,60
- Land	Kg Hg/y		5 570,40	5 570,40
- Products			-	-
- General waste treatment			-	-
- Sector specific waste treatment			-	-

Source: National inventory of mercury releases in Madagascar 2015 – 2016

2.6.8. Paints with mercury

In 2014, Madagascar consumes 215 Tons of paints with mercury.

Table 44: Use+disposal of paints with mercury

Name of specific source	Location	Activity rate	Input factor(s)	Pollution abatement systems	Output distribution factors	Stack height(s) in meter
Ministry of Trade	National	215 Paint, t/y	Standard : 2.6 kg Hg/t	Use (application + when applicable.)	Air : 0,92 Water : 0.05 Land : 0.03	

Source: National inventory of mercury releases in Madagascar 2015 – 2016

The main pathway of mercury releases for this subcategory were to air 514,28 Kg Hg/y in the water 27,95Kg Hg/y and to land 16,77 Kg Hg/y

Table 45: Estimation of mercury to each pathway

Paints with mercury	Unit	Production	Use/ Disposal	Sum of releases to pathway from assessed part of life-cycle
Activity rate	Paint, t/y		215	-
Input factor for phase	kg Hg/t		2.6	-
Calculated input to phase	Kg Hg/y		559	-
Output distribution factors for phase:				
- Air	Unitless		0.92	-
- Water	Unitless		0.05	-
- Land	Unitless		0.03	-
Calculated outputs/releases to:				
- Air	Kg Hg/y		514,28	514,28
- Water	Kg Hg/y		27,95	27,95
- Land	Kg Hg/y		16,77	16,77

Source: National inventory of mercury releases in Madagascar 2015 – 2016

2.6.9. Cosmetics and related products with mercury

According to the Ministry of Trade, 70% of cosmetics products consumed in Madagascar contain mercury. This value equals 65 Tons of cosmetics and related products with mercury.

Table 46 : Cosmetics and related products with mercury

Name of specific source	Location	Activity rate	Input factor(s)	Pollution abatement systems	Output distribution factors	Stack height(s) in meter
Ministry of Trade	National	65 Cream and soap, t/y	30kg Hg/t	Use (application + when applicable.)	Air : 0 Water : 0.95 Land : 0.05	

Source: National inventory of mercury releases in Madagascar 2015 – 2016

The main pathway of mercury releases for this subcategory were to water 1 852,50Kg Hg/y and to the land 97,50 Kg Hg/y.

Table 47 : Estimation of mercury to each pathway**.**

Cosmetics and related products with mercury	Unit	Production	Use/ Disposal	Sum of releases to pathway from assessed part of life-cycle
Activity rate	Cream and soap, t/y		65	-
Input factor for phase	kg Hg/t		30	-
Calculated input to phase	Kg Hg/y		1 950	-
Output distribution factors for phase:				
- Air	Unitless		0	-
- Water	Unitless		0.95	-
- Land	Unitless		0.05	-
Calculated outputs/releases to:				
- Air	Kg Hg/y		0	0
- Water	Kg Hg/y		1 852,50	1 852,50
- Land	Kg Hg/y		97,50	97,50

Source: National inventory of mercury releases in Madagascar 2015 – 2016

2.6.10. Dental mercury-amalgam fillings

The dental filling amalgam is composed of an alloy of mercury, silver, lead and tin. The alloy is generally provided by dentists or in the form of:

- pure mercury with powder consisting of a mixture of other metals,
- small capsules containing mercury and the metal powder.

Since national data on dental fillings are not available for the special case of Madagascar, the default factor of absorption used is from the population of 23 040 065, and 23 dentists per 1000 000 persons are listed.

Table 48 : Dental mercury-amalgam fillings

Name of specific source	Location	Activity rate	Input factor(s)	Pollution abatement systems	Output distribution factors	Stack height(s) in meter
INSTAT	National	Preparations of fillings at dentist clinics (current mercury supply for amalgam fillings): 23 040 065 inhab. Use - from fillings in the mouth (releases from mercury supply for fillings 5-15 years ago) Disposal - from fillings in the mouth (releases from mercury supply for fillings 10-20 years ago)	0.2 g Hg /(y*inhabitant) 0.023 Dentist per 1000 inhabitants, country	Preparations of fillings at dentist clinics (input is current Hg supply for amalgam fillings) a)Use (input is Hg supply for fillings 5-15 years ago. b) In countries where only dental chair fiters/strainers are used in most clinics	Air : 0.2 Water : 0.14 Land : 0 Products: 0.6 General waste: 0.24	

Source: National inventory of mercury releases in Madagascar 2015 – 2016

The main pathways of mercury releases for this subcategory were to general waste 49, 08 Kg Hg/y and to water 42, 44 Kg Hg/y.

Table 49 : Estimation of mercury to each pathway

Dental mercury-amalgam fillings	**Unit**	**Production**	**Use**	**Disposal**	**Sum of releases to pathway from assessed part of life-cycle**
Preparations of fillings at dentist clinics (total current mercury supply for amalgam fillings):					
Activity rate Input factor for phase Calculated input to phase	Inhabitants gHg/(y*inhabitant) Kg Hg/y		23 040 065 0.2 128		- - -
Output distribution factors for phase: - Air - Water - Land - Products (the teeth) - General waste treatment - Sector specific waste treatment	 Unitless Unitless Unitless		 0.02 0.14 0 0.6 0.24 -		 - - - - - -
Use - from fillings in the mouth (releases from mercury supply for fillings 5-15 years ago) Use (input is Hg supply for fillings 5-15 years ago					
Activity rate Input factor for phase Calculated input to phase	Inhabitants gHg/(y*inhabitant) Kg Hg/y		23 040 065 0.023 81,29		
Output distribution factors for phase: - Air - Water - Land - Products - General waste treatment - Sector specific waste treatment	 Unitless Unitless Unitless		 0 0.02 0 0 0 0		 0 0.02 0 0 0 0
Use - from fillings in the mouth (releases from mercury supply for fillings 5-15 years ago) b) In countries where only dental chair fiters/strainers are used in most clinics					
Activity rate Input factor for phase Calculated input to phase	Inhabitants gHg/(y*inhabitant) Kg Hg/y		23 040 065 0.023 81,29		- - -
Output distribution factors for phase: - Air - Water - Land - Products - General waste treatment - Sector specific waste treatment	 Unitless Unitless Unitless		 0 0.3 0 0,06 0,24 0		 - - - - - -
Calculated outputs/releases to: - Air - Water - Land - Products (the teeth) - General waste treatment - Sector specific waste treatment	 Kg Hg/y Kg Hg/y Kg Hg/y	 81,29	 2,56 42,44 0 49,08 -	 - - -	 2;56 42,44 0 81,29 49,08 -

Source: National inventory of mercury releases in Madagascar 2015 – 2016

2.6.11. Manometers and gauges with mercury

According to the source from the Ministry of Health 105 468 medical gauges containing mercury are inventoried in 2014 and 10% of these devices are replaced per year in Madagascar.

➢ Medical blood pressure gauges

Table 50: Consumption of medical blood pressure gauges

Name of specific source	Location	Activity rate	Input factor(s)	Pollution abatement systems	Output distribution factors	Stack height(s) in meter
Ministry of Health	National	10 547 items/y	80 g Hg/item	No separate collection. Informal waste handl. widespread	Air : 0.2 Water : 0.3 Land : 0.2 Products: 0 General waste: 0.3	

Source: National inventory of mercury releases in Madagascar 2015 – 2016

The main pathway of mercury releases for this subcategory were to water and to general waste 253,11 Kg Hg/y and to air and land 168,74 Kg Hg/y

Table 51 : Estimation of mercury to each pathway

Use+disposal of medical blood pressure gauges	**Unit**	**Production**	**Use /Disposal**	**Sum of releases to pathway from assessed part of life-cycle**
Activity rate	Items/y		10 547	-
Input factor for phase	g Hg/item		80	-
Calculated input to phase	Kg Hg/y		843,7	-
Output distribution factors for phase:				
- Air	Unitless		0.2	-
- Water	Unitless		0.3	-
- Land	Unitless		0.2	-
- General waste treatment			0.3	-
Calculated outputs/releases to:				
- Air	Kg Hg/y		168,74	168,74
- Water	Kg Hg/y		253,11	253,11
- Land	Kg Hg/y		168,74	168,74
- General waste treatment			253,11	253,11

Source: National inventory of mercury releases in Madagascar 2015 – 2016

➢ Use and disposal of other manometers

Table 52: Consumption of other manometers and gauges with mercury:

Name of specific source	Location	Activity rate	Input factor(s)	Pollution abatement systems	Output distribution factors	Stack height(s) in meter
INSTAT	National	23 040 065 inhabitants	0,005g Hg/y*inhabitant		Air : 0.75 Water : 0.13 Land : 0.12	

Source: National inventory of mercury releases in Madagascar 2015 – 2016

The main pathway of mercury releases for this subcategory were to air 16,42 Kg Hg/y, to water 2,85 Kg Hg/y and to land 2,63 Kg Hg/y.

Table 53: Estimation of mercury to each pathway

Use and disposal of other Manometers	Unit	Production	Use /Disposal	Sum of releases to pathway from assessed part of life-cycle
Activity rate	inhabitants		23 040 065	-
Input factor for phase	g Hg/y*inhabitant		0,005	-
Calculated input to phase	Kg Hg/y		22	-
Output distribution factors for phase:				
- Air	Unitless		0.75	-
- Water	Unitless		0.13	-
- Land	Unitless		0.12	-
- Products				-
- General waste treatment				-
- Sector specific waste treatment				-
Calculated outputs/releases to:				
- Air	Kg Hg/y		16,42	16,42
- Water	Kg Hg/y		2,85	2,85
- Land	Kg Hg/y		2,63	2,63
- Products			0	0
- General waste treatment			0	0
- Sector specific waste treatment		-	-	-

Source: National inventory of mercury releases in Madagascar 2015 – 2016

2.6.12. Laboratory chemicals and equipment with mercury

To obtain the estimate of mercury used, we used the number of population in 2014 which is 23 040 065 and the access to electricity in Madagascar the same year which is 19% of the population to determinate the mercury releases from the laboratory chemicals.

Table 54 : Laboratory chemicals and equipment with mercury

Name of specific source	Location	Activity rate	Input factor(s)	Pollution abatement systems	Output distribution factors	Stack height(s) in meter
INSTAT	National	Laboratory chemicals 23 040 065 inhab. Other laboratory equipment (level 1 default for group) 23 040 065 inhab.	0,01 g Hg/y*inhabitant 0,04 g Hg/y*inhabitant		Air : 0.75 Water : 0.13 Land : 0.12	

Source: National inventory of mercury releases in Madagascar 2015 – 2016

The main pathways of mercury releases for this subcategory were to air 164,16Kg Hg/y, to water 28,45Kg Hg/y and to land 26, 27 Kg Hg/y.

Table 55: Estimation of mercury to each pathway

Laboratory chemicals and equipment with mercury	**Unit**	**Production**	**Use /Disposal**	**Sum of releases to pathway from assessed part of life-cycle**
Laboratory chemicals				
Activity rate Input factor for phase Calculated input to phase	Inhabitants g Hg /y *inhabitant Kg Hg/y		23 040 065 0,01 43,78	- - -
Output distribution factors for phase: - Air - Water - Land - Products - General waste treatment - Sector specific waste treatment	 Unitless Unitless Unitless		 0.75 0.13 0.12 - - -	 - - - - - -
Other laboratory equipment (level 1 default for group				
Activity rate Input factor for phase Calculated input to phase	Inhabitants gHg/y*inhabitant Kg Hg/y		23 040 065 0,04 175,10	- - -
Output distribution factors for phase: - Air - Water - Land - Products - General waste treatment - Sector specific waste treatment	 Unitless Unitless Unitless		 0.75 0.13 0.12 - - - -	 - - - - - -
Calculated outputs/releases to: - Air - Water - Land - Products - General waste treatment - Sector specific waste treatment	 Kg Hg/y Kg Hg/y Kg Hg/y		 164,16 28,45 26,27 0 0 0	 164,16 28,45 26,27 0 0 0

Source: National inventory of mercury releases in Madagascar 2015 – 2016

2.7. Data and inventory on crematoria and cemeteries

Population evolution

As estimated by INSTAT, Madagascar has a population of about 23 040 065 inhabitants in 2014. This population is unevenly distributed in the twenty-two regions of the island on a total area of 587 000 km2. For the whole period, average annual growth was recorded 2, 76 (2, 76465656)

Death rate: This is the number of deaths during a year by 1000 peoples. 485 000 are the number of deaths recorded in 2014 in Madagascar following the above statistics, of which 85 are incinerated in the crematorium, and the rest is directly buried .In general, incineration is not for everyone and is not the custom of the Malagasy, which explains the figure above.

2.7.1. Crematoria/cremation

Cremation is not a common practice in Madagascar, only about 85 cremations were done annually in Madagascar.

Table 56: Crematoria/cremation

Name of specific source	Location	Activity rate	Input factor(s)	Pollution abatement systems	Output distribution factors	Stack height(s) in meter
INSTAT	Antananarivo	85 Corpses cremated/y	1 g Hg/corpse		Air : 1 Water : 0 Land : 0	

Source: National inventory of mercury releases in Madagascar 2015 – 2016

The only pathway of mercury releases for this subcategory was to air 0,085 Kg Hg/y.

Table 57 : Estimation of mercury to each pathway

Crematoria/cremation	Unit	Production	Use	Disposal	Sum of releases to pathway from assessed part of life-cycle
Activity rate	Corpses cremated/y			85	-
Input factor for phase	g Hg/corpse			1	-
Calculated input to phase	Kg Hg/y			0,085	-
Output distribution factors for phase:					
- Air				1	-
- Water				0	-
- Land				0	-
Calculated outputs/releases to:					
- Air				0,085	0,085
- Water				0	0
- Land				0	0

Source: National inventory of mercury releases in Madagascar 2015 – 2016

2.7.2. Cemeteries

Table 58 : Cemeteries

Name of specific source	Location	Activity rate	Input factor(s)	Pollution abatement systems	Output distribution factors	Stack height(s) in meter
INSTAT 2015	National	484 915 Corpses burried/y	1 g Hg/corpse		Air : 0 Water : 0 Land : 1	

Source: National inventory of mercury releases in Madagascar 2015 – 2016

The only source of mercury releases for this subcategory was to land 484,915 Kg Hg/y.

Table 59: Estimation of mercury to each pathway

Cemeteries	Unit	Production	Use	Disposal	Sum of releases to pathway from assessed part of life-cycle
Activity rate	Corpses burried/y			484,915	-
Input factor for phase	g Hg/corpse			1	-
Calculated input to phase	Kg Hg/y			484,915	-
Output distribution factors for phase:					
- Air				0	-
- Water				0	-
- Land				1	-
- Products				0	-
- General waste treatment				0	-
- Sector specific waste treatment				0	-
Calculated outputs/releases to:					
- Air				0	0
- Water				0	0
- Land				484,915	484,915
- Products				0	0
- General waste treatment				0	0
- Sector specific waste treatment				0	0

Source: National inventory of mercury releases in Madagascar 2015 – 2016

2.8. Stocks of mercury and / or mercury compounds and storage conditions

Officially, Madagascar does not have stocks of mercury or mercury compounds. On the other hand, there is an illegal mercury trade that deserves further investigation for sources of supply and the exact quantity of mercury in the country.

2.9. Supply and trade of mercury or its compounds, including sources, recycling activities and quantities

Regarding statistics on the supply and trade of mercury or its compounds, including sources, recycling activities and quantity of mercury, no official statistics exist in Madagascar. Moreover, the mercury index exists in Madagascar, especially in the northern part of Madagascar. Thus the illicit trade in mercury exists.

 Maromokotra Index

Among the known clues, that of Maromokotra is of most interest. Discovered in 1967 by G. JOURDE and confirmed in 1970 by the alluvial and geochemical prospection of BRGM, this index of cinnabar is the main in Madagascar.

 Mahabenofy Index

Discovered by the alluvial prospection of the Bureau of Geological and Mining Research (BRGM) in 1970, this index was reworked by the Geological Survey in 1972. It is located on the southwest prolongation of the crest of the Maromokotra index, Separated by the Loky River.

 Ampanito Index

In 1970, the alluvial prospection of the BRGM shows some positive samples in the area of Ampanito, near the sedimentary base contact. The index is located 4 Km north-east of that of Maromokotra. In 1975, the Geological Survey carried out geochemical sampling (270 samples at the 100x100m mesh).

 Sambirano Index

This index was revealed by the Ambilobe mission in 1972 of the BRGM, mainly focused on the search for sulphurous lead mineralization of the zone of contact of the permo-triassic sedimentary formations with the basement.

Conclusion

In short, a specific inventory is strongly recommended in order to better know the actual information corresponding to the exploitation of these clues since the primary extraction of mercury does not officially exist in Madagascar.

2.10. Contaminated sites

Table 60 : Identified hot-spots of mercury contamination

Site name	Location	Original source of mercury contamination	Summary description	References to detailed descriptions
Local source in Manapatrana	Région de Vatovavy Fitovinany	Metal production : Artisanal and small gold mining with mercury amalgamation	Intentional use of mercury, unclean sector, estimated of mercury releases: 2 340 Kg Hg/y: - Air: 1 755 (Kg Hg/y) - Water: 304 (Kg Hg/y) - Land: 281 (Kg Hg/y)	Miners in ASGM in Manapatrana, Vatovavy Fitovinany, February 2016
Société Ambatovy	Région d'Alaotra-Mangoro	Use and disposal of products containing mercury intentionally: special industrial mercury thermometers	The firm of Ambatovy uses 3 000 thermometers with mercury per year. Estimated of mercury releases: 309Kg Hg/y - Air: 61,80 Kg Hg/y - Water: 92,70 Kg Hg/y - Land: 61,80 Kg Hg/y - General waste treatment: 92,70 Kg Hg/y	AMBATOVY Ankorondrano antananarivo M. Hajaniaina Andry Ramarovelo Project manager (Communication Department), January 2016

Source: National inventory of mercury releases in Madagascar 2015 – 2016

Contaminated sites occur as a result of small-scale activities such as artisanal gold mining, but this can have a significant impact on human health, especially in areas where these activities take place near local communities and Contaminate local food sources such as fish from local lakes and rivers. While each miner could use only small amounts of mercury..

In Madagascar we have identified according to our research according to the strategy document for the identification and assessment of sites contaminated with mercury in 2016, that the contaminated sites are:

- Mining of gold in the Vatovavy Fitovinany Region, Ikongo District:
  - Commune of Manampatrana and Fokontany of Manampatrana, of Bezamana, of Amboanjombe center, and Manambato.
  - Commune of Tolongoina, Fokontany of Ambalavero and Ambatovory
  - Commune of Ambinanintromby, Fokontany of Ambinanintromby.

- The uncontrolled discharge of municipal waste in the Region of Analamanga, District of Antananarivo Avaradrano, Commune of Ambohimangakely, Fokontany of Andralanitra.
- The use of permanent mercury thermometer in the Ambatovy industry, Alaotra-Mangoro Region, Moramanga District, Moramanga Commune, Fokontany d'Ampitanimbe.

2.11. Impacts of mercury on human health and the environment

- **Introduction**

Mercury exists in various forms: elemental (or metallic) mercury, inorganic (to which one can be exposed in the context of a professional activity) or organic (methyl mercury for example, to which one can be exposed by food), with A level of toxicity and variable effects on the nervous, digestive and immune systems, and on the lungs, kidneys, skin and eyes.

People may be exposed to different forms of mercury depending on the circumstances. However, exposure is mainly the result of the consumption of fish or crustaceans contaminated with methyl mercury and the inhalation of elemental mercury vapors during industrial processes. Cooking does not eliminate mercury.

2.11.1. Effects of exposure to mercury on health

National data on the effects of mercury on human health do not exist in Madagascar. Furthermore, according to WHO / UNEP information, elemental mercury and methyl mercury are toxic to the central and peripheral nervous systems. Inhalation of mercury vapors can have adverse effects on the nervous, digestive and immune systems, and on the lungs and kidneys, and can be fatal. Inorganic mercury salts are corrosive to the skin, eyes and gastrointestinal tract, and may be toxic to the kidneys if swallowed.

Image 2: Effects of mercury exposure on health



Source: Voarisoa Observatory battery project Madagascar

Neurological and behavioral disorders can be observed after exposure to various mercury compounds by inhalation, ingestion or dermal contact. Symptoms include tremors, insomnia, loss of memory, neuromuscular effects, headaches, and motor and cognitive dysfunctions. Moderate subclinical signs may be observed in persons exposed to work at a concentration of elemental mercury in air of 20 µg / m3 or more for several years. Effects on the kidneys have been reported, ranging from increased urine protein levels to renal insufficiency.

2.11.2. Effects of mercury on the environment

Most mercury released from human activities is released into the air. Some activities release mercury directly into soil or water. All mercury released into the environment ultimately ends up in soils or surface waters. Mercury from soil can accumulate in fungi.

Once mercury has reached surface waters or soils, micro-organisms can transform it into methyl mercury, a substance that can be absorbed quickly by most organisms and known to cause damage to mercury. Nerves. Fish are organisms that absorb significant amounts of methyl mercury from surface waters every day. Therefore, methyl mercury can accumulate in the fish and food chains to which they belong.

An important component of mercury impacts on the environment is its ability to accumulate in organisms and along the food chain. Although all forms of mercury may accumulate to some extent, methyl mercury is absorbed and accumulated more than others.

- **Fish**

Methyl mercury attaches itself firmly to fish proteins when it is absorbed by the gills or by ingestion of contaminated food sources. Bioaccumulation in fish is influenced by the amount of methyl mercury present, itself affected by local biogeochemical processes.

- **Birds**

High levels of mercury affect the reproduction of birds and also cause growth problems. These problems can lead to an increase in the mortality rate and a decrease in the birth rate and, consequently, a reduction in the abundance of natural populations.

- **Mammals**

Although reproduction and behavior of birds are generally affected by exposure to methyl mercury, neurological effects are often greater in mammals. The severity of the toxic effects is determined by the degree of exposure and can range from mild impairment to infertility or death.

- **Plants**

The accumulation of mercury in plants via the roots, which increases with the concentration of the underlying soil, is characterized by rapid kinetics and on-site storage of the element. Most of the contamination of tree foliage comes from atmospheric mercury, mainly by dry deposition, mercury or aerosols. The consequent mechanism of accumulation by the leaves is de cinétique lente.

In plants, exposure to mercury can affect photosynthesis, water exchange and cell membranes

3. CHAPTER 3: EVALUATION OF THE POLITICAL, REGULATORY AND INSTITUTIONAL FRAMEWORK

3.1. Evaluation of policy and regulation

3.1.1. National Legislation for the Management of Mercury in Madagascar

An analysis of the environmental provisions in Madagascar revealed that the main issue is the absence of any specific binding provision for the management of mercury or mercury-containing products. There are only a few basic provisions concerning the protection of the environment.

- **Law n ° 2015-003 of 19 February 2015 on the updated Charter of the Environment of Malagasy**

In Madagascar, it is the law n ° 2015-003 of February 19, 2015 bearing the Charter of the updated Malagasy Environment that sets the management of the environment in general. Of course, the provisions of the cited Act do not specifically address the case of mercury as a harmful and polluting substance. However, it is of paramount importance to point out the roles of the International Convention in solving global environmental problems. The provisions of the Preamble to the updated Malagasy Environment Charter reaffirm that "The participation of the country in solving environmental problems of a global nature translates into compliance with international commitments through the effective implementation of the International Environmental Conventions Ratified ".

- ✓ All sectoral legislative texts, policies, plans, programs and projects must take into account the management of the various sources of pollution and the health risks related to the environment".

- ✓ The general provisions for waste management and the release of pollutants into the environment are set out in Title III of the Act as rights and obligations.

- **Decree No. 2003-464 of 15 April 2003 to classify surface water and regulate the discharge of liquid effluents**

The provisions of this Decree concern the classification of surface waters and the setting of standards for the discharge of aqueous effluents into the natural environment. It applies to all public and private institutions and to all sectors of economic activity.

Standards for liquid effluent discharges are prescribed by Article 5. The minimum standards for the discharge of metals from sewage sludge are stipulated in Article 10. The case of mercury is considered in the provisions of this Article. decree. However, consideration must be given to other receptor media for the determination of rejection limit values in accordance with Article 8 of this Decree.

Even if the limit value for mercury discharge relates only to wastewater discharge and sludge spreading from wastewater treatment, other sources are not cited.

- **Decree No. 99-954 of 15 December 1999 on the compatibility of investments with the environment, as amended by Decree No. 2004-167 of 03 February 2004**

The purpose of the text is to determine the conditions for carrying out Environmental Impact Studies (EIA) for public or private investment projects likely to harm the environment. Annex I to this Decree provides that any plan, program or policy that may change the natural environment or the use of natural resources and / or the quality of the human environment in urban and / or rural Environmental impact assessment. The following activities should also be subject to these environmental impact assessments:

- Any industrial unit subject to authorization, in accordance with the provisions of the current regulations of Law No. 99-021 of 19 August 1999 on the policy of management and control of industrial pollution;
- Any physical or chemical treatment at the mining site;
- Any unit for the recovery, disposal or treatment of domestic, industrial and other hazardous wastes.

- **Decree No. 2012-753 of 07 August 2012 prohibiting the import of waste under the Basel Convention in Madagascar until the installation of the appropriate treatment centers**

- **Decree No. 2012-754 of 07 August 2012 laying down the procedure for the management of end-of-life products, sources of waste and hazardous wastes harmful to the environment in the context of the implementation of the Basel Convention**

Although the two decrees do not directly address the case of mercury, the technical characteristics of end-of-life products and the sources of hazardous wastes are mentioned, and the import prohibition of goods whose nature and quality may pose a threat For human health and the environment may be applicable to products containing mercury.

In Madagascar, mercury is an environmental and health issue. The sources of mercury emissions to the atmosphere are mainly due to the use of mercury-containing products, such as thermometers, mercury switches and relays, mercury, biocide and pesticide batteries, paints, Dental amalgam, landfill and mismanagement, according to the inventory of mercury release sources in 2016 in Madagascar.

- **Decree No. 2-01-1016 of 4 June 2002 regulating the conditions for labeling and presentation of foodstuffs and amending Decree No. 2-06-226 of 28 June 2007;**

This covers all chemicals. It is the basic text that governs the management and control of pollution caused by chemicals.

- **Law No. 99-021 of 19 August 1999 on the Management and Control of Industrial Pollution**

This law constitutes the corollary variation of the environmental charter. In the general principles of this Industrial Pollution Act, sources of industrial pollution are cited in a precise manner.

- **Decree No. 92-424 of 3 April 1992 regulating the importation of goods from abroad and the export of goods to foreign countries.**

Currently, liberalization allows products to be received directly at customs by importers.

In analyzing the provisions of this decree, in the absence of regulation of the legal and regulatory framework for mercury in the sector of trade and consumption, which is currently the case, the entry into the territory of the Republic of Madagascar of Products containing mercury remains free and unrestricted.

- **Law n ° 2011 -002 of 27 May 2011 on the Health Code: basic legal framework for public health**

This law devotes about twenty articles related to the management of the Environment and the preservation of human health. Particular emphasis is placed on measures to be taken against the harmful effects of hazardous products. The requirements for the protection of the population from environmental health risks, in particular those related to the handling of hazardous products and healthcare waste, are taken into account and can be characterized by carrying out health impact studies in Preventive measures.

- **Order No. 7451/92 of 14 December 1992 on the standardization of the labeling of agro-pharmaceutical packaging.**

The purpose of this Order is to:

- Mandatory labeling for any container and packaging;
- Indication of the label on the contents of the container and the instructions for use;
- Toxic color band port by label and graphic symbols indicating physical properties.

- **Law n ° 2005-021 of 17 October 2005 on the mining code**

However, Law No. 2005-021 of 17 October 2005 on the mining code is completely silent as regards the prohibition or the regulations applicable to amalgamation during extraction. Moreover, the legal provisions on the gold regime remain silent as to the prohibition of this practice. Thus, the adaptation of sectoral legislation on mines and oil to the requirements of th MINAMATA Convention is also a long way to go.

In summary, the assessment of the national legislation on the management of mercury in Madagascar shows the non-existence of the laws and regulations relating to the application of the MINAMATA Convention. Therefore, it is necessary to draft new texts or to update certain existing texts by introducing the fight against pollution by mercury.

3.1.2. Policy and Regulatory Measures in Place and Remaining Gaps

Table 60 : Article 3 - Mercury supply sources and trade

Description of Article:	Article 3 contains control measures aimed at limiting the global supply of mercury to complement and reinforce the demand reduction control measures and Products containing mercury The Article 3 provisions limit the sources of mercury available for use and trade, and specify procedures to follow where such trade is still allowed. In the area of trade, Article 3 establishes a prior-informed consent requirement for any trade of mercury to occur. The relationship and obligations between Parties to trade mercury are specified, and rules governing Party to non-Party trade are also elaborated in this article.
Succinct summary of provisions relevant to the country in question (source NRDC checklist[2])	• Not allow new primary mercury mining • Prevent the import and use of mercury from primary mercury mining for artisanal and small-scale gold mining (ASGM) • 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
Policy and regulatory measures in place that enable the country to comply with the above listed provisions:	
Title and reference/number of relevant Policy and Regulatory Measure, as well as date	Apply effectively the mining code on the prohibition of the extraction of heavy metals, especially mercury, even though there is no official mercury mine in Madagascar; Mining Code 2015.
Outstanding regulatory or policy aspects that would need to be addressed/developed to ensure compliance with the Convention's provisions *(only in relation to binding provisions)***:**	
- Not allow new primary mercury mining - Prevent the import and use of mercury from primary mercury mining for artisanal and small-scale gold mining (ASGM) - 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	

Source: National policy and regulatory mercury assessment in Madagascar 2016

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

Table 61 : Article 4 - mercury-added products

Description of Article:	Each Party shall not allow, by taking appropriate measures, the manufacture, import or export of mercury-added products listed in Part I of Annex A after the phase-out date specified for those products, except where an exclusion is specified in Annex A or the Party has a registered exemption pursuant to Article 6.
Succinct summary of provisions relevant to the country in question (source NRDC checklist[3])	• Not allow the manufacture, import, and export of products listed in Part I of Annex A not otherwise excluded following the phase out date 2021 • Phase down the use of dental amalgam through two or more measures listed in Part II of Annex A
Policy and regulatory measures in place that enable the country to comply with the above listed provisions:	
Title and reference/number of relevant Policy and Regulatory Measure, as well as date	**None**
Outstanding regulatory or policy aspects that would need to be addressed/developed to ensure compliance with the Convention's provisions *(only in relation to binding provisions)***:**	
- Not allow the manufacture, import, and export of products listed in Part I of Annex A not otherwise excluded following the phase out date 2021 - Phase down the use of dental amalgam through two or more measures listed in Part II of Annex A.	

Source: National policy and regulatory mercury assessment in Madagascar 2016

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

Table 62 : Article 5 - manufacturing processes in which mercury or mercury compounds are used

Description of Article:	The Convention will reduce mercury demand in the manufacturing sector utilizing similar measures for products under Article 4. The Convention will phase out mercury uses in two manufacturing processes, phase down or restrict mercury use in three others, require the review of remaining manufacturing processes for possible restrictions
Succinct summary of provisions relevant to the country in question (source NRDC checklist[4])	- The adoption of normative legislations for stating the limits of releases of mercury into the environment, standards for all elements of the environment (air, water, soil) and the implementation of the provisions relating to the control of these releases In the industrial process; - Legislation to prohibit the use of mercury in new facilities in the processes listed in Annex B to the Convention, with the exception of facilities using mercury catalysts to produce polyurethane; - Legislation to discourage new uses of mercury in industrial processes.
Policy and regulatory measures in place that enable the countryto comply with the above listed provisions:	
Title and reference/number of relevant Policy and Regulatory Measure, as well as date	**None**
Outstanding regulatory or policy aspects that would need to be addressed/developed to ensure compliance with the Convention's provisions *(only in relation to binding provisions)***:**	
- The adoption of normative legislations for stating the limits of releases of mercury into the environment, standards for all elements of the environment (air, water, soil) and the implementation of the provisions relating to the control of these releases In the industrial process; - Legislation to prohibit the use of mercury in new facilities in the processes listed in Annex B to the Convention, with the exception of facilities using mercury catalysts to produce polyurethane; - Legislation to discourage new uses of mercury in industrial processes.	

Source: National policy and regulatory mercury assessment in Madagascar 2016

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

Table 63 : **Article 6 -** exemptions available to a party upon request.

Description of Article:	A Party seeking additional time to comply with the deadlines for the phase-out of mercury use in products (Article 4) or industrial processes (Article 5) must use the procedures specified in Article 6. Under Article 6, two different procedures are established, each potentially allowing a Party to extend the deadline for five years. All exemptions expire ten years after the applicable deadlines...
Succinct summary of provisions relevant to the country in question (source NRDC checklist[5])	**None**
Policy and regulatory measures in place that enable the country to comply with the above listed provisions:	
Title and reference /number of relevant Policy and Regulatory Measure, as well as date	**None**
Outstanding regulatory or policy aspects that would need to be addressed/developed to ensure compliance with the Convention's provisions:	

Source: National policy and regulatory mercury assessment in Madagascar 2016

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

Table 64 : Article 7 - artisanal and small-scale gold mining

Description of Article:	Article 7 applies to artisanal and small-scale gold mining (ASGM), in which mercury is used to extract gold. Article 7 acknowledges the challenge of addressing mercury use in ASGM, especially for developing countries that rely on the economic benefits of mining, by providing these countries the flexibility to tailor their approach to the conditions of the sector in their jurisdiction. The mechanism for providing this flexibility is the National Action Plan..
Succinct summary of provisions relevant to the country in question (source NRDC checklist[6])	- Legislation to take measures for reducing and, where possible, removing mercury and mercury compounds used in artisanal and small-scale gold mining; - Define and formalize15 or regulate16 ASGM consistent with the Convention
Policy and regulatory measures in place that enable the country to comply with the above listed provisions:	
Title and reference /number of relevant Policy and Regulatory Measure, as well as date	**None**
Outstanding regulatory or policy aspects that would need to be addressed/developed to ensure compliance with the Convention's provisions	
- Legislation to take measures for reducing and, where possible, removing mercury and mercury compounds used in artisanal and small-scale gold mining; - Define and formalize15 or regulate16 ASGM consistent with the Convention	

Source: National policy and regulatory mercury assessment in Madagascar 2016

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

Table 65 : Article 8 - émissions

Description of Article:	The purpose of Article 8 is to reduce mercury emissions to air from five of the most significant source categories identified during the Convention negotiations.
Succinct summary of provisions relevant to the country in question (source NRDC checklist[7])	The adoption of normative legislations for describing the limits of releases or emission of mercury in the environment from standards for all elements of the environment (air, water, soil) and the implementation of the these releases or emissions in the industrial process.
Policy and regulatory measures in place that enable the country to comply with the above listed provisions:	
Title and reference/number of relevant Policy and Regulatory Measure, as well as date	Law n ° 2015-003 updating the Malagasy Environment Charter Article 10: By applying the polluter-pays principle, according to which the costs arising from measures to prevent, to reduce pollution, to control and to compensate against it, must be supported by the polluter. Any natural or legal person must adopt the cost of protecting the environment when planning and carrying out acts likely to harm the environment.
Outstanding regulatory or policy aspects that would need to be addressed/developed to ensure compliance with the Convention's provisions *(only in relation to binding provisions)***:**	
The adoption of normative legislations for describing the limits of releases or emission of mercury in the environment from standards for all elements of the environment (air, water, soil) and the implementation of the these releases or emissions in the industrial process.	

Source: National policy and regulatory mercury assessment in Madagascar 2016

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

Table 66 : Article 9 - releases

Description of Article:	Under Article 9, each Party must identify significant point sources of mercury releases to land and water that are not addressed by other provisions of the Convention. There is no required list of sources like in Article 8, so the sources controlled under Article 9 may vary from country to country
Succinct summary of provisions relevant to the country in question (source NRDC checklist[8])	The adoption of normative legislations for describing the limits of mercury discharge in the environment of standards to all elements of the environment (air, water, soil) and the implementation of the provisions concerning the control of these discharges in the industrial process;
Policy and regulatory measures in place that enable the country to comply with the above listed provisions:	
Title and reference/number of relevant Policy and Regulatory Measure, as well as date	• Decree No. 2003/464 on 15/04/03, classifying surface waters and regulating releases of liquid effluents. • Article 5: In order to preserve water resources (quality objectives), wastewater discharges must be colorless, odorless and must respect the following quality:mercury: 0.005 mg / l
Outstanding regulatory or policy aspects that would need to be addressed/developed to ensure compliance with the Convention's provisions *(only in relation to binding provisions)***:**	
The adoption of normative legislations for describing the limits of mercury discharge in the environment of standards to all elements of the environment (air, water, soil) and the implementation of the provisions concerning the control of these discharges in the industrial process;	

Source: National policy and regulatory mercury assessment in Madagascar 2016

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

Table 67 : Article 10 - environmentally sound interim storage of mercury, other than waste mercury

Description of Article:	Improper or inadequate care in the collection, handling, transport and storage of mercury and mercury compounds can result in emissions and releases of the toxic material that can eventually harm humans and the environment. To prevent the possible adverse effects of mercury as it is held in various locations prior to its intended use; the Convention requires countries to take measures to ensure the environmentally sound storage of mercury under Article 10.
Succinct summary of provisions relevant to the country in question (source NRDC checklist[9])	Legislation taking measures to ensure the storage of intermediate mercury is carried out in an environmentally sound manner.
Policy and regulatory measures in place that enable the country to comply with the above listed provisions:	
Title and reference/number of relevant Policy and Regulatory Measure, as well as date	**None**
Outstanding regulatory or policy aspects that would need to be addressed/developed to ensure compliance with the Convention's provisions *(only in relation to binding provisions)***:**	
Legislation taking measures to ensure the storage of intermediate mercury is carried out in an environmentally sound manner.	

Source: National policy and regulatory mercury assessment in Madagascar 2016

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

Table 68 : Article 11 - mercury wastes

Description of Article:	Article 11 is the provision of the Convention addressing these mercury wastes, and its implementation will eventually result in the final disposal of these hazardous wastes. The Convention is mutually supportive of the Basel Convention and complementary in addressing the mercury waste issue.
Succinct summary of provisions relevant to the country in question (source NRDCchecklist)	- Legislation to manage mercury waste in an environmentally sound manner, taking into account the guidelines developed under the Basel Convention and in accordance with the requirements of the COP to be developed. - Legislation to restrict mercury from the treatment or re-use of mercury wastes for permitted uses under the Convention.
Des mesures politiques et réglementaires en place qui permettent au pays de se conformer aux dispositions énumérées ci-dessus:	
Title and reference/number of relevant Policy and Regulatory Measure, as well as date	**Décret n° 2003/464 du 15/04/03,** portant classification des eaux de surface et règlementation des rejets d'effluents liquides Article 10: a) Les épandages de boues issues de traitement d'eaux usées ne peuvent se faire que dans les conditions suivantes : Elément concentration maximale dans la boue : 20 mg de mercure par kg de matières sèches Apport maximal de mercure (Hg) : 1 kg/ha/10 an Concentration dans le sol : 1,5 mg Hg /kg de matières sèches)
Outstanding regulatory or policy aspects that would need to be addressed/developed to ensure compliance with the Convention's provisions *(only in relation to binding provisions)***:**	
- Legislation to manage mercury waste in an environmentally sound manner, taking into account the guidelines developed under the Basel Convention and in accordance with the requirements of the COP to be developed. - Legislation to restrict mercury from the treatment or re-use of mercury wastes for permitted uses under the Convention.	

Source: National policy and regulatory mercury assessment in Madagascar 2016

Table 69 : Article 12 - contaminated sites

Description of Article:	Article 12 calls for the creation and adoption of guidance in approaching contaminated sites, but contains no mandatory obligations to propel progress in cleaning up contaminated sites. In this sense, Article 12 can be viewed as principally a capacity building provision, with governments largely left to their own devices to develop the legal framework, and the financial and technical capability, to remediate mercury contaminated sites.
Succinct summary of provisions relevant to the country in question (source NRDC checklist[10])	Legislation to protect the population at risk around one or more sites contaminated by mercury
Policy and regulatory measures in place that enable the country to comply with the above listed provisions:	
Title and reference/number of relevant Policy and Regulatory Measure, as well as date	**None**
Outstanding regulatory or policy aspects that would need to be addressed/developed to ensure compliance with the Convention's provisions *(only in relation to binding provisions)***:**	
Legislation to protect the population at risk around one or more sites contaminated by mercury	

Source: National policy and regulatory mercury assessment in Madagascar 2016

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

Table 70 : Article 13 - financial resources and mechanism

Description of Article:	The Convention recognizes that providing financial assistance to developing countries will improve the effective implementation of the Convention. (Article 13.2)
Succinct summary of provisions relevant to the country in question (source NRDC checklist[11])	• Access domestic resources as may be needed to implement Convention obligations • Access financial resources available under the Convention financial mechanism and other resources available from multilateral, regional, and bilateral funding sources
Policy and regulatory measures in place that enable the country to comply with the above listed provisions:	
Title and reference/number of relevant Policy and Regulatory Measure, as well as date	**None**
Outstanding regulatory or policy aspects that would need to be addressed/developed to ensure compliance with the Convention's provisions *(only in relation to binding provisions)***:**	
- Access domestic resources as may be needed to implement Convention obligations - Access financial resources available under the Convention financial mechanism and other resources available from multilateral, regional, and bilateral funding sources	

Source: National policy and regulatory mercury assessment in Madagascar 2016

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

Table 71: Article 14 - capacity-building, technical assistance and technology transfer

Description of Article:	Parties should cooperate to provide, within their respective capabilities, timely and appropriate capacity-building and technical assistance to developing country Parties, in particular LDCs and SIDS and Parties with economies in transition, to assist these countries in implementing their obligations under the Convention.
Succinct summary of provisions relevant to the country in question (source NRDC checklist[12])	**None**
Des mesures politiques et réglementaires en place qui permettent au pays de se conformer aux dispositions énumérées ci-dessus:	
Title and reference/number of relevant Policy and Regulatory Measure, as well as date	**None**
Outstanding regulatory or policy aspects that would need to be addressed/developed to ensure compliance with the Convention's provisions *(only in relation to binding provisions)***:**	

Source: National policy and regulatory mercury assessment in Madagascar 2016

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

Table 72: Article 16 - health aspects

Description of Article :	Article 16 provides guidance to health ministries on the activities they can undertake to minimize the mercury exposure of vulnerable populations, and the adverse consequences of such exposures
Succinct summary of provisions relevant to the country in question (source NRDC checklist[13])	• Promote the development and implementation of strategies to identify and protect populations at risk, such as developing fish consumption guidelines • Promote occupational exposure educational and prevention programs • Promote prevention, treatment, and care services for affected populations
Policy and regulatory measures in place that enable the country to comply with the above listed provisions:	
Title and reference/number of relevant Policy and Regulatory Measure, as well as date	**None**
Outstanding regulatory or policy aspects that would need to be addressed/developed to ensure compliance with the Convention's provisions *(only in relation to binding provisions)***:**	
- Promote the development and implementation of strategies to identify and protect populations at risk, such as developing fish consumption guidelines - Promote occupational exposure educational and prevention programs - Promote prevention, treatment, and care services for affected populationsPromouvoir les services de prévention, de traitement et de soins pour les populations touchées.	

Source: National policy and regulatory mercury assessment in Madagascar 2016

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

Tableau n°73 : Article 17 - information exchange

Description of Article:	Article 17 focuses on the exchange of information between countries. It identifies key information that Parties to the Convention need to share with each other and identifies mechanisms for sharing the information.
Succinct summary of provisions relevant to the country in question (source NRDC checklist[14])	• Share information on the health and safety of humans and the environment as non-confidential, in accordance with Article 17.5 • Report to the COP on progress in implementing Convention obligations under Article 21
Policy and regulatory measures in place that enable the country to comply with the above listed provisions:	
Title and reference/number of relevant Policy and Regulatory Measure, as well as date	**None**
Outstanding regulatory or policy aspects that would need to be addressed/developed to ensure compliance with the Convention's provisions *(only in relation to binding provisions)***:**	
- Share information on the health and safety of humans and the environment as non-confidential, in accordance with Article 17.5 - Report to the COP on progress in implementing Convention obligations under Article 21	

Source: National policy and regulatory mercury assessment in Madagascar 2016

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

Tableau n°74: Article 18 - public information, awareness and education**.**

Description of Article:	Each Party shall, within its capabilities, promote and facilitate: (a) Provision to the public of available information on: the health and environmental effects of mercury and mercury compounds; the alternatives to mercury and mercury compounds; The topics identified in paragraph 1 of Article 17; the results of its research, development and monitoring activities under Article 19; and the activities to meet its obligations under this Convention;
Succinct summary of provisions relevant to the country in question (source NRDC checklist[15])	• Share information on the health and safety of humans and the environment as non-confidential, in accordance with Article 17.5 • Report to the COP on progress in implementing Convention obligations under Article 21
Policy and regulatory measures in place that enable the country to comply with the above listed provisions:	
Title and reference/number of relevant Policy and Regulatory Measure, as well as date	**None**
Outstanding regulatory or policy aspects that would need to be addressed/developed to ensure compliance with the Convention's provisions *(only in relation to binding provisions)***:**	
• Share information on the health and safety of humans and the environment as non-confidential, in accordance with Article 17.5 • Report to the COP on progress in implementing Convention obligations under Article 21	

Source: National policy and regulatory mercury assessment in Madagascar 2016

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

Table 75: Article 19 - research, development and monitoring

Description of Article:	Article 19 seeks cooperation among countries to develop and improve on key areas of research that can support effective implementation of the Convention. These research areas include, among others, inventories of mercury use and consumption; the levels of mercury in people, aquatic food sources, and wildlife; and information on mercury commerce and trade.
Succinct summary of provisions relevant to the country in question (source NRDC checklist[16])	**None**
Policy and regulatory measures in place that enable the country to comply with the above listed provisions:	
Title and reference/number of relevant Policy and Regulatory Measure, as well as date	**None**
Outstanding regulatory or policy aspects that would need to be addressed/developed to ensure compliance with the Convention's provisions *(only in relation to binding provisions)***:**	

Source: National policy and regulatory mercury assessment in Madagascar 2016

Table 76 : Article 21 – reporting.

Description of Article:	The simplicity of Article 21 belies its importance. As stated above, the Article 21 reporting will be a principal basis for evaluating both individual government compliance and the overall effectiveness of the Convention. As drafted, Article 21 is largely a general grant of authority to the COP to develop the details of the reporting requirements and format..
Succinct summary of provisions relevant to the country in question (source NRDC checklist[17])	**None**
Policy and regulatory measures in place that enable the country to comply with the above listed provisions:	
Title and reference/number of relevant Policy and Regulatory Measure, as well as date	**None**
Outstanding regulatory or policy aspects that would need to be addressed/developed to ensure compliance with the Convention's provisions:	

Source: National policy and regulatory mercury assessment in Madagascar 2016

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

3.2. Institutional evaluation

3.2.1. National Institutional Framework

- **The Ministry of Environment**

The leader in the field of environment, MEEF is responsible for implementing the National Policy of Environmental Actions.

- **Other departments**

Departments with activities related to mercury management are involved in mercury management directly or indirectly even though ministry staff does not have knowledge of the Convention.

These ministries are represented on the National Committee for the Implementation of the MINAMATA Convention.

- **National Committee for the Implementation of the MINAMATA Convention**

The National Committee for the Implementation of the MINAMATA Convention on Mercury was established in December 2014, according to Order No. 36-802 / 2013 / MEEF on December 30, 2013. Members of this Committee are intersectoral and multidisciplinary. And its activities are coordinated by the national focal point of the MINAMATA Convention.

- **NGOs and associations involved in chemicals management and environmental protection.**

In addition to the institutions mentioned above, departments and NGOs involved in the management of chemicals exist such as industrial companies, hospitals, municipalities for the waste management...

3.2.2. Existing national institutional capacity and subsequent gaps

Table 77 : Article 3 - Sources of Mercury supply and trade

Description of article:	Article 3 is about the control and measures to limit the global supply of mercury to supplement and strengthen control measures for the reduction of mercury and products content with its compounds. The provisions of Article 3 limit the sources of mercury available for use or sale and specify the procedures to be followed when such trade is permitted. As for trade, Article 3 requires prior informed consent prior to any mercury trade. It specifies the relations and obligations between Parties in this regard and the rules governing trade between State Party and non-State Party.
Brief summary of the relevant provisions for the concerned country (source : NRDC checklist)	- Do not allow a new primary extraction of mercury; - Prevent the importation and use of mercury for artisanal small-scale gold mining (ASGM); - Not to allow the export of mercury unless the importing country consents in writing, mercury is for authorized use or environmentally storage.
National stakeholder:	
1. 1. Name of institution / stakeholder: **Ministry of the Environment**	**Role with regard to the provisions listed above:** **• Safeguarding the preservation of the environment and the unique natural resources for the protection of Malagasy people and the sustainable development of the country;** **• Ensure compliance with the obligations of Madagascar to the Convention and to prepare and send a report on the activities undertaken to the Secretary of the MINAMATA Convention;** • **• Ensure and coordinate the implementation of the MINAMATA Convention.**
	Relevant institutional capacity is in place to comply with the provisions listed above: **Existence of the National Committee for the Implementation of the MINAMATA Convention on Mercury**
2. 1. Name of institution / stakeholder: **Ministry of Commerce and Consumption**	**Role with regard to the provisions listed above:** **• Conduct the design, development, coordination, monitoring and assessment of the implementation of the State Policy on Trade and Consumption.** **• Contributing to the fight against the import, export, manufacturing and use of mercury and devices content with mercury.**
	Relevant institutional capacity is set to comply with the provisions listed above: **Existence of Representative in the MINAMATA Convention Implementation Committee on Mercury**
3. 1. Name of institution / stakeholder:	**Role with regard to the provisions listed above:** **Manage the effectiveness of surveillance and the fight against illicit traffick of mercury**
	Relevant institutional capacity set to comply with the

Ministry of Budget/Customs	**provisions listed above:** **Existence of Representative in the MINAMATA Convention Implementation Committee on Mercury**
4. Name of institution / stakeholder: Ministry of Industry	**Role with regard to the provisions listed above:** **Contribute to the fight against the use of mercury in industries and the management of waste content with in companies.**
	Relevant institutional capacity set to comply with the provisions listed above: **Existence of the MECIE Decree on Environmental Impact Assessment** **Existence of Representative in the MINAMATA Convention Implementation Committee on Mercury**
5. Name of institution / stakeholder: Ministry of public health, uniminox	**Role with regard to the provisions listed above:** **Change the use of devices content with mercury in the health sector through mercury-free alternatives.**
	Relevant institutional capacity set to comply with the provisions listed above: **Existence of Representative in the MINAMATA Convention Implementation Committee on Mercury**
6. Name of institution / stakeholder: Ministry of the Justice	**Role with regard to the provisions listed above:** **Prohibit the import, export, manufacturing and use of mercury and devices content with.**
	Relevant institutional capacity in to comply with the provisions listed above:
Persistent gaps of the capacity at the national level need to be addressed before the provisions can be followed:	
• The private sector and the main importer (wholesalers) of products content with mercury are unaware of the dangers of mercury to human health and the environment. • Presence of documents and the current process in Madagascar do not permit the identification of mercury and products content with mercury and those that do not contain mercury; • There are no tools to detect mercury in the imported product; • Law and regulations on mercury management do not exist in Madagascar;	

Source: Assessment of institutional capacity to manage mercury in Madagascar, 2015

Table n°78: Article 4 on the products content with mercury

Description of the article:	Each Party shall ensure, by taking appropriate measures, that no products content with mercury listed in Part I of Annex A are manufactured, imported or exported after the date of definitive abandonment fixed for those products, Except in the case of an exclusion specified in Annex A or pursuant to a derogation registered for a Party in accordance with Article 6.
Brief summary of the relevant provisions for concerned country (source : checklist of NRDC)	• Decrease the manufacturing, import, and export of products listed in Part I of Annex A of the MINAMATA Convention and not authorize from 2020; • Eliminate gradually the use of dental amalgam through two or more measures listed in Annex A, Part II.
National stakeholder:	
1. Name of institution / stakeholders: Ministry of Environment	**Role with regard to the provisions listed above:** **• Ensure and respect the obligations of the countries party to the Convention and prepare and send the report of activities undertaken to the Secretariat of the MINAMATA Convention;** • **Ensure and coordinate the implementation of the MINAMATA Convention**
	Relevant institutional capacity set to comply with the provisions listed above: **Existence of the National Committee for the Implementation of the MINAMATA Convention on Mercury**
2. Name of institution / stakeholders: Ministry of commerce and consumption	**Role with regard to the provisions listed above:** • **Contributing to the control of the import, export, manufactuing and use of mercury and materials contenet with mercury**
	Relevant institutional capacity set to comply with the provisions listed above: **Existence of Representative in the MINAMATA Convention Implementation Committee on Mercury**
3. Name of institution / stakeholders: Ministry of Budget/customs	**Role with regard to the provisions listed above:** **Manage the effectiveness of surveillance and control of illicit traffick of products content with mercury**
	Relevant institutional capacity set to comply with the provisions listed above: **Existence of Representative in the MINAMATA Convention Implementation Committee on Mercury**
4. Name of institution / stakeholders: Ministry of public health, UNIMINTOX	**Role with regard to the provisions listed above:** **Change the use of devices content with mercury in the health sector through mercury-free alternatives.**
	Relevant institutional capacity set to comply with the provisions listed above: **Existence of Representative in the MINAMATA Convention Implementation Committee on Mercury**
5. Name of institution / stakeholders:	**Role with regard to the provisions listed above:** **Contribute to the gradual reduction of the import, export, manufacture and use of mercury and devices content with**

Ministry of Justice	**mercury.**
	Relevant institutional capacity set to comply with the provisions listed above:
Name of institution / stakeholders: Large importers, importing companies	**Role with regard to the provisions listed above:** **Imports mercury-free alternatives and products**
	Relevant institutional capacity set to comply with the provisions listed above:
Persistent gaps of the capacity at the national level need to be addressed before the provisions can be followed:	
• The private sector and the main importer (wholesalers) are unaware of the dangers of mercury to human health and the environment. • Presence of documents and the current process in Madagascar do not allow identification of products content with mercury and those which are not; • It is difficult to control trade in products content mercury in Madagascar because the marketing system for these products has informal and formal channels • The current customs tariff does not identify imported products content with mercury; • And medical personnel are unaware of the adverse effects of mercury on human health. • There is no regulation to apply this role.	

Source: Assessment of institutional capacity to manage mercury in Madagascar, 2015

Table 79 : Article 5 on manufacturing processes in which mercury or mercury compounds are used

Description of the article:	The Convention will reduce the demand for mercury in the industrial sector through the same measures as for the products covered by Article 4. The Convention will phase out the use of mercury in manufacturing processes, eliminate or restrict the use of mercury, The revision of manufacturing processes with a view to possible restrictions within five years of its entry into force and will discourage the use of mercury in new manufacturing processes.
Brief summary of the relevant provisions for the concerned country (source : NRDC checklist)	• La législation visant à interdire l'utilisation du mercure dans de nouvelles installations dans les processus énumérés à l'annexe B de la Convention, à l'exception des installations utilisant des catalyseurs de mercure pour produire du polyuréthane; • La législation visant à décourager les nouvelles utilisations du mercure dans les procédés industriels.
National stakeholders	
1. Name of institution / stakeholders: Ministry of Environment	**Role with regard to the provisions listed above:** **Ensure compliance with obligations of countries party to the Convention, such as Madagascar does not use mercury and mercury compounds in the manufacturing process**
	Relevant institutional capacity set to comply with the provisions listed above: **Existence of the National Committee for the Implementation of the MINAMATA Convention on Mercury**
2. Name of institution / stakeholder: Ministry of Industry	**Role with regard to the provisions listed above:** **Regularly send reports on the manufacture and products content with mainly mercury in order to enable institutions to regularly monitor the effectiveness of mercury management.**
	Relevant institutional capacity set to comply with the provisions listed above: **Existence of Representative in the MINAMATA Convention Implementation Committee on Mercury**
Persistent capacity gaps at the national level need to be addressed before the provisions can be followed:	
• Lack of financial support for its activities • Inexistence of a collection mechanism, control structure and monitoring of mercury management in the industry sector; • Lack of involvement of research centers in this field.	

Source: Assessment of institutional capacity to manage mercury in Madagascar, 2015

Table 80 : Article 6 on exemptions available to a Party on request

<table>
<tr><td>Description of the article:</td><td colspan="2">A Party seeking an extension of time for the definitive phase-out of mercury use in products (Article 4) or industrial processes (Article 5) shall follow the procedure specified in Article 6. Article 6 establishes Two different procedures, which theoretically allow a Party to extend the deadline five years. Any derogation shall expire ten years after the time limit.</td></tr>
<tr><td>Brief summary of the relevant provisions for the concerned country (source : NRDC checklist)</td><td colspan="2">None</td></tr>
<tr><td colspan="3">Concerned national stakeholders:</td></tr>
<tr><td rowspan="2">1. Name of institution / stakeholder:

Ministry of Environment</td><td colspan="2">Role with regard to the provisions listed above:
Ensure the implementation of this request and send a letter to the Secretariat</td></tr>
<tr><td colspan="2">Relevant institutional capacity set to comply with the provisions listed above:
Existence of the National Committee for the Implementation of the MINAMATA Convention on Mercury</td></tr>
<tr><td colspan="3">Persistent capacity gaps at the national level need to be addressed before the provisions can be followed:</td></tr>
</table>

Source: Assessment of institutional capacity to manage mercury in Madagascar, 2015

Table 81 : Article 7 on artisanal and small-scale mining

Description of the article:	Article 7 deals with artisanal and small-scale gold mining (ASGM), where mercury is used to extract gold. Article 7 recognizes the challenge of addressing the use of mercury in the ASGM sector, especially in developing countries that depend on the economic benefits of mining, providing them with the necessary flexibility to adapt to the conditions of the sector within its jurisdiction. The mechanism to bring about this flexibility is the national action plan.
Brief summary of the relevant provisions for the concerned country (source : NRDC checklist)	• legislation to take measures to reduce and eliminate as soon as possible the mercury and mercury compounds used in artisanal and small-scale gold mining; • Define and formalize or regularize the ASGM in accordance with the Convention
Concerned national stakeholders:	
1. Name of institution / stakeholder: Ministry of the Environment	**Role with regard to the provisions listed above:** **• Ensure compliance with the obligations of the countries party to the Convention in this sector;** • **Coordinate activities to fight against the use of mercury in artisanal and small-scale gold mining (ASGM)**
	Relevant institutional capacity set to comply with the provisions listed above: **Existence of the National Committee for the Implementation of the MINAMATA Convention on Mercury**
2. Name of institution / stakeholder: Ministry of Mine	**Role with regard to the provisions listed above:** **Develop a policy to prevent the illegal extraction of gold and the use of substances that affect human health and the environment in mining extractions.**
	Relevant institutional capacity set to comply with the provisions listed above: **Existence of Representative in the MINAMATA Convention Implementation Committee on Mercury**
Ministry of the population	**Role with regard to the provisions listed above:** **Sensitizing the population on the harmful effects of the use of mercury in the ASGM**
	Relevant institutional capacity set to comply with the provisions listed above: **Existence of the National Committee for the Implementation of the MINAMATA Convention on Mercury**
Persistent capacity gaps at the national level need to be addressed before the provisions can be followed:	
• The exact information on the use of mercury in the ASGM is not known even this activity unofficially exists in Madagascar. • The exact amount of the extract of gold and mercury used in the ASGM is unknown due to the illegal action in ASGM	

Source: Assessment of institutional capacity to manage mercury in Madagascar, 2015

Table 82: Article 8 on the releases

Description of the article:	The purpose of Article 8 is to reduce atmospheric mercury emissions from five of the main source categories identified during the Convention negotiations.
Brief summary of the relevant provisions for the concerned country (source : NRDC checklist)	The adoption of normative legislation to define the limits of releases or emission of mercury in the environment from standards to all elements of the environment (air, water, soil) and the implementation of the control of these releases or emissions in the industrial process.
Concerned national stakeholders:	
1. Name of institution / stakeholder: Ministry of Environment	**Role with regard to the provisions listed above:** **Prevent and reduce sources of mercury pollution, and develop national strategies for pollution management.**
	Relevant institutional capacity in place to comply with the provisions listed above: **Existence of the National Committee for the Implementation of the MINAMATA Convention on Mercury**
2. Name of institution / stakeholder: Ministry of Industry	**Role with regard to the provisions listed above:** **Prevent and reduce sources of pollution, and develop national strategies for managing pollution from the industrial process.**
	Relevant institutional capacity set to comply with the provisions listed above: **Existence of Representative in the MINAMATA Convention Implementation Committee on Mercury**
Persistent capacity gaps at the national level need to be addressed before the provisions can be followed:	
• Prevent and reduce sources of mercury pollution, and develop national strategies for managing pollution from the industrial process. • Inexistence of the mercury emission standard, and regulations to manage emission sources in Madagascar.	

Source: Assessment of institutional capacity to manage mercury in Madagascar, 2015

Table 83 : Article 9 on the release

<table>
<tr><td>Description of the article:</td><td>According to Article 9, each Party shall identify relevant point sources of mercury releases to soil and water not considered in other provisions of the Convention. There is no list of sources to be drawn up, as in Article 8, so that the sources controlled by Article 9 may vary from one country to another.</td></tr>
<tr><td>Brief summary of the relevant provisions for the concerned country (source : NRDC checklist)</td><td>The adoption of normative legislation to define the limits of mercury discharge in the environment of standards to all elements of the environment (air, water, soil) and the implementation of the provisions concerning the control of these discharges in the environment. Industrial process;</td></tr>
<tr><td colspan="2">Concerned national stakeholders:</td></tr>
<tr><td rowspan="2">1. Name of institution / stakeholder: Ministry of Enviroement</td><td>Role with regard to the provisions listed above:
Prevent and reduce sources of mercury releases to the environment, and develop national strategies for pollution management</td></tr>
<tr><td>Relevant institutional capacity in place to comply with the provisions listed above:
Existence of the National Committee for the Implementation of the MINAMATA Convention on Mercury</td></tr>
<tr><td rowspan="2">2. Name of institution / stakeholder: Ministry of Industry</td><td>Role with regard to the provisions listed above:
Prevent and reduce sources of mercury pollution, and develop national strategies for managing pollution from the industry process.</td></tr>
<tr><td>Relevant institutional capacity set to comply with the provisions listed above:
Existence of Representative in the MINAMATA Convention Implementation Committee on Mercury</td></tr>
<tr><td colspan="2">Persistent capacity gaps at the national level need to be addressed before the provisions can be followed:</td></tr>
<tr><td colspan="2">• Inexistence of strategies to identify and control mercury releases to the environment.
• Inexistence of enforcement decree to enforce industrial pollution control and inspection.</td></tr>
</table>

Source: Assessment of institutional capacity to manage mercury in Madagascar, 2015

Table 84: Article 10 on non-polluting intermediate storage of mercury, other than mercury wastes

Description of the article:	Incorrect or inadequate management of the recovery, handling, transport and storage of mercury and mercury compounds may result in emissions and releases of toxic material that may be harmful to human health and the environment. To avoid possible negative effects of mercury while stored before use, the Convention requires countries to take measures to ensure the storage of environmentally sound mercury in accordance with Article 10.
Brief summary of the relevant provisions for the concerned country (source : NRDC checklist)	Legislation to take measures to ensure the storage of intermediate mercury is carried out in an environmentally sound manner.
Concerned national stakeholders:	
1. Name of institution / stakeholder: Ministry of the Environment	**Role with regard to the provisions listed above:** • Ensure compliance with the obligations of the countries party to the Convention and to prepare and send a report on the activities undertaken to the Secretary of the MINAMATA Convention; • Ensure and coordinate the implementation of the MINAMATA Convention
	Relevant institutional capacity set to comply with the provisions listed above: Existence of the National Committee for the Implementation of the MINAMATA Convention on Mercury
Persistent capacity gaps at the national level need to be addressed before the provisions can be followed:	
• Lack of infrastructure for temporary storage of mercury.	

Source: Assessment of institutional capacity to manage mercury in Madagascar, 2015

Table 85 : Article 11 on mercury waste

<table>
<tr><td>Description of the article:</td><td colspan="2">Article 11 establishes the provisions for such mercury wastes, the implementation of which could lead to the final disposal of such hazardous wastes. The MINAMATA Convention and the Basel Convention are mutually supportive and complementary to waste.</td></tr>
<tr><td>Brief summary of the relevant provisions for the concerned country (source : NRDC checklist)</td><td colspan="2">• Legislation to manage mercury waste in an environmentally sound manner, taking into account the guidelines developed under the Basel Convention and in accordance with the requirements of the COP to be developed.
• Legislation to restrict mercury from the treatment or re-use of mercury wastes to uses permitted under the Convention.</td></tr>
<tr><td colspan="3">Concerned national stakeholders:</td></tr>
<tr><td rowspan="2">1. Name of institution / stakeholder:
Ministry of the Environment</td><td colspan="2">Role with regard to the provisions listed above:
Ensure compliance with the obligations of countries party to the Convention on mercury management and prepare and send the report of activities undertaken to the Secretary of the MINAMATA Convention.</td></tr>
<tr><td colspan="2">Relevant institutional capacity set to comply with the provisions listed above:
Existence of the National Committee for the Implementation of the MINAMATA Convention on Mercury</td></tr>
<tr><td rowspan="2">2. Name of institution / stakeholder:
Urban and rural municipalities</td><td colspan="2">Role with regard to the provisions listed above:
Waste management in Madagascar</td></tr>
<tr><td colspan="2">Relevant institutional capacity set to comply with the provisions listed above:</td></tr>
<tr><td colspan="3">Persistent capacity gaps at the national level need to be addressed before the provisions can be followed:</td></tr>
<tr><td colspan="3">• There is no specific management for products and wastes containing mercury in Madagascar.
• There is no structure in place, nor legal text for the management or monitoring and control of mercury wastes</td></tr>
</table>

Source: Assessment of institutional capacity to manage mercury in Madagascar, 2015

Table 86: Article 12 on the contaminated sites

<table>
<tr><td>Description of the article:</td><td>Article 12 calls for the creation and adoption of guidelines for the identification and assessment of contaminated sites but does not require the initiation of the cleaning process for these sites. Nor does it encourage the development of a pollution responsibility framework that facilitates the rehabilitation of the site. In this sense, Article 12 can be seen as a Capacity Building clause, which leaves governments free to develop and implement their own law and financial and technical capacity to rehabilitate the sites.</td></tr>
<tr><td>Brief summary of the relevant provisions for the concerned country (source : NRDC checklist)</td><td>Legislation to protect the population at risk around one or more sites contaminated with mercury</td></tr>
<tr><td colspan="2">Concerned national stakeholders:</td></tr>
<tr><td rowspan="2">1. Name of institution / stakeholder:

Ministry of the Environment</td><td>Role with regard to the provisions listed above:
Ensure compliance with the obligations of the countries party to the Convention with regard to the site contaminated with mercury and prepare and send the report of the activities undertaken to the Secretariat of the MINAMATA Convention</td></tr>
<tr><td>Relevant institutional capacity set to comply with the provisions listed above:
Existence of the National Committee for the Implementation of the MINAMATA Convention on Mercury</td></tr>
<tr><td rowspan="2">Ministry of the population</td><td>Role with regard to the provisions listed above:
Raise awareness of the health and environmental impacts of mercury-contaminated sites</td></tr>
<tr><td>Relevant institutional capacity set to comply with the provisions listed above:
Existence of the National Committee for the Implementation of the MINAMATA Convention on Mercury</td></tr>
<tr><td colspan="2">Persistent capacity gaps at the national level need to be addressed before the provisions can be followed:</td></tr>
<tr><td colspan="2">• Funding for identification and awareness of the population around the contaminated site does not exist.</td></tr>
</table>

Source: Assessment of institutional capacity to manage mercury in Madagascar, 2015

Table 87: Article 13 on the financial resources and mechanism

<table>
<tr><td>Description of the article:</td><td>The Convention recognizes that financial assistance to developing countries will increase the effectiveness of the implementation of the Convention (Article 13.2).</td></tr>
<tr><td>Brief summary of the relevant provisions for the concerned country (source : NRDC checklist)</td><td>• Access national resources to implement the Convention Obligations
• Access available financial resources under the Convention's financial mechanism and other resources available through multilateral, regional and bilateral sources</td></tr>
<tr><td colspan="2">Concerned national stakeholders:</td></tr>
<tr><td rowspan="2">1. Name of institution / stakeholder:

Goverment</td><td>Role with regard to the provisions listed above:
Contributing financially to the fulfillment of the obligations of the countries party to the Convention</td></tr>
<tr><td>Relevant institutional capacity set to comply with the provisions listed above:
Existence of the National Committee for the Implementation of the MINAMATA Convention on Mercury within the Ministry of the Environment.</td></tr>
<tr><td colspan="2">Persistent capacity gaps at the national level need to be addressed before the provisions can be followed:</td></tr>
<tr><td colspan="2">• Inexistence of the government budget for activities related to the MINAMATA Convention</td></tr>
</table>

Source: Assessment of institutional capacity to manage mercury in Madagascar, 2015

Table 88: Article 14 on capacity-building, technical assistance and transfer of technology

Description of the article:	The Parties shall cooperate to provide, within their respective capacities, appropriate capacity-building and technical assistance in a timely manner to Parties that are developing countries, in particular least developed countries and small island developing States Developing countries and Parties with economies in transition to assist them in the implementation of their obligations under the Convention.
Brief summary of the relevant provisions for the concerned country (source : NRDC checklist)	None
Concerned national stakeholders:	
1. Name of institution / stakeholder: Ministry of the Environment	**Role with regard to the provisions listed above:** Ensure compliance with the obligations of the countries party to the Convention (search for partners to ensure transfer of technology, capacity building, and technical assistance)
	Relevant institutional capacity set to comply with the provisions listed above: Existence of the National Committee for the Implementation of the MINAMATA Convention on Mercury
Persistent capacity gaps at the national level need to be addressed before the provisions can be followed:	
• Ignorance of best environmental practices in mercury management in Madagascar	

Source: Assessment of institutional capacity to manage mercury in Madagascar, 2015

Table 89: Article 16 on the health aspects

Description of the article:	Article 16 provides guidance to ministries of health on the measures they can take to minimize exposure to mercury by vulnerable populations and the negative consequences of this exposure.
Brief summary of the relevant provisions for the concerned country (source : NRDC checklist)	• Promote the development and implementation of strategies to identify and protect populations at risk, such as the development of fish consumption guidelines • Promote occupational exposure education and prevention programs • Promote prevention, treatment and care services for affected populations
Concerned national stakeholders:	
1. Name of institution / stakeholder: Ministry of the Environment	**Role with regard to the provisions listed above:** Ensure compliance with the obligations of the countries party to the Convention
	Relevant institutional capacity set to comply with the provisions listed above: Existence of the National Committee for the Implementation of the MINAMATA Convention on Mercury
2. Name of institution / stakeholder: Ministry of public health, UNIMINTOX	**Role with regard to the provisions listed above:** ➢ Promote the development and implementation of strategies to identify and protect populations at risk; ➢ Promote education and prevention programs for occupational exposures; ➢ Promote prevention, treatment and care services for the population affected by mercury pollution.
	Relevant institutional capacity set to comply with the provisions listed above: Existence of the National Committee for the Implementation of the MINAMATA Convention on Mercury
Persistent capacity gaps at the national level need to be addressed before the provisions can be followed:	
- Existence of a program or strategy developed in this area	

Source: Assessment of institutional capacity to manage mercury in Madagascar, 2015

Table 90: Article 17 on the exchange of information

Description of the article:	Article 17 deals with the exchange of information between countries. It identifies the essential information that Parties to the Convention must share with each other and the mechanisms for sharing this information.
Brief summary of the relevant provisions for the concerned country (source : NRDC checklist)	- - Sharing information on the health and safety of persons and the environment, Non-confidential, in accordance with Article 17.5 - - Report to the Conference of the Parties on progress in the implementation of Article 21
Concerned national stakeholders:	
1. Name of institution / stakeholder: Ministry of health, Environment, Population, Education and scientific research	**Role with regard to the provisions listed above:** Ensure dissemination of research findings, information on activities undertaken for the MINAMATA Convention
	Relevant institutional capacity set to comply with the provisions listed above: Existence of the National Committee for the Implementation of the MINAMATA Convention on Mercury
Persistent capacity gaps at the national level need to be addressed before the provisions can be followed:	
- Inexistence of research in this field	

Source: Assessment of institutional capacity to manage mercury in Madagascar, 2015

Table 91: Article 18 on information, awareness and public education.

<table>
<tr><td>Description of the article:</td><td colspan="2">Each Party shall, within its means, encourage and facilitate the availability of information to the public on the health and environmental effects of mercury and mercury compounds, alternatives to mercury and compounds Mercury, the results of its research and development and monitoring activities under Article 19 and the activities it carries out to fulfill its obligations under this Convention.</td></tr>
<tr><td>Brief summary of the relevant provisions for the concerned country (source : NRDC checklist)</td><td colspan="2">- Share information on non-confidential health and safety of persons and the environment, in accordance with Article 17.5
- Report to the Conference of the Parties on progress in the implementation of Article 21</td></tr>
<tr><td colspan="3">Concerned national stakeholders:</td></tr>
<tr><td rowspan="2">1. Name of institution / stakeholder:
Ministry of health, Environment, Education, Population and Communication</td><td colspan="2">Role with regard to the provisions listed above:
Promote the development and implementation of awareness-raising strategies on the prevention of the adverse effects of mercury on human health and the environment.</td></tr>
<tr><td colspan="2">Relevant institutional capacity set to comply with the provisions listed above:
Existence of the National Policy on Environmental Education
Integration of environmental aspects into national education
National Communication Strategy
Existence of Representative in the MINAMATA Convention Implementation Committee on Mercury</td></tr>
<tr><td colspan="3">Persistent capacity gaps at the national level need to be addressed before the provisions can be followed:</td></tr>
<tr><td colspan="3">Non-existence of program and strategy developed</td></tr>
</table>

Source: Assessment of institutional capacity to manage mercury in Madagascar, 2015

Table 92 : Article 19 On research, development and monitoring.

<table>
<tr><td>Description of the article:</td><td>Article 19 seeks cooperation among countries in the development, implementation and improvement of research areas that can promote the effective implementation of the Convention. These areas of research include, but are not limited to, inventories of mercury use and consumption; rates
Mercury in humans, aquatic food sources and nature; And information on trade and trade</td></tr>
<tr><td>Brief summary of the relevant provisions for the concerned country (source : NRDC checklist)</td><td>None</td></tr>
<tr><td colspan="2">Concerned national stakeholders:</td></tr>
<tr><td rowspan="2">1. Name of institution / stakeholder:
Ministry of the Environment, Scientific research Research centers, such as CNRE, CNRIT, CNRO, FOFIFA, Institut Pasteur, INSPC, private and public universities</td><td>Role with regard to the provisions listed above:
Promote the development of research related to the impact of mercury pollution on human health and the environment, the alternative of mercury-containing devices</td></tr>
<tr><td>Relevant institutional capacity set to comply with the provisions listed above:</td></tr>
<tr><td colspan="2">Persistent capacity gaps at the national level need to be addressed before the provisions can be followed:</td></tr>
<tr><td colspan="2">- - No research or monitoring performed;
- - Absence of laboratory directly related to mercury management research.</td></tr>
</table>

Source: Assessment of institutional capacity to manage mercury in Madagascar, 2015

Table 93 : Article 21 On notification

Description of the article:	The simplicity of Article 21 masks its importance. As we have just explained, the assessment of a government's compliance in particular and the effectiveness of the Convention in general are mainly based on the reports of article 21. As drafted, article 21 is to a large extent a general recognition of the authority of the COP in defining the requirements and format of the reports. To this end, INC will need to prepare a guide to the dates and format of reports to be adopted
Brief summary of the relevant provisions for the concerned country (source : NRDC checklist)	None
Concerned national stakeholders:	
1. Name of institution / stakeholder: Ministry of the Environment	**Role with regard to the provisions listed above:** To report on activities carried out in connection with the MINAMATA Convention
	Relevant institutional capacity set to comply with the provisions listed above:
Persistent capacity gaps at the national level need to be addressed before the provisions can be followed:	

Source: Assessment of institutional capacity to manage mercury in Madagascar, 2015

The MINAMATA Convention requires in its implementation institutional structures and tools that will enable these institutions to perform their roles appropriately. This evaluation provided insight into the needs of Madagascar in the implementation of the MINAMATA Convention.

Stakeholders are aware of the danger of releasing mercury into the environment.

The lack of regulatory texts on the one hand, and the weak institutional capacities on the other, prevent them from implementing the obligations of the MINAMATA Convention on Mercury. Monitoring and control structures are practically non-existent. Each actor of the Administration works to fulfill the mission entrusted to it and to achieve the objectives set, without taking into account that of the others, while these are complementary.

Stronger coordination among actors, greater involvement of the private sector is highly desirable. First, actions must be taken to ensure that the private sector takes ownership of the importance of implementing the Convention before making them accountable. The actors who use a lot of products containing mercury will be the first to be sensitized: dentists, space beauty, industrial

Capacity building for all actors, which can take several forms: tooling (identification of products containing mercury, control tools, etc.), setting up of a database, training of the staff involved must be implemented.

Strengthening the partnership with research centers also provides a platform for research into mercury substitutes, best available techniques and best environmental practices.

4. CHAPITER 4: IDENTIFICATION OF RISK ON POPULATIONS AND GENERAL DIMENSIONS

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

Madagascar was unable to complete the preliminary screening of the population at risk and potential health risks during the MIA project due to the inadequate budget for its implementation. The only thing that has been done is to identify areas or places that are known to have potential populations at risk.

Concerning the preliminary steps at risk, these are divided into 4 in the WHO / UNEP guide, and in particular, in the case of Madagascar only the following step could be achieved:
1. Only identification of possible hazards.

But the following points could not be made due to lack of achievement budget
2. Hazard characterization, including dose-response assessment.
3. Assessment of exposure and
4. Risk characterization.

4.1.1. Identification of the population at risk

First

- **For dental amalgam:**

Madagascar still uses dental amalgam. A pregnant woman wearing amalgam exposes her fetus to the harmful effects of mercury.
The risk of preterm birth is high with the number of amalgams and fish consumption.

- **Workplaces**

Medical personnel in Madagascar are considered to be at-risk populations due to the persistent use of mercury medical devices and the abuse of medical waste. Electricians using switches and lamps are considered to be at-risk populations.
Gold miners using mercury are also considered at risk.
The use of biocides and pesticides content with mercury on seed treatment in agriculture is part of the population at risk for workers.

- **Populations live in the vicinity or wild discharge workers**

Landfills in Madagascar are known to be contaminated sites because of the non-existence of waste sorting from the population. These are either burnt or buried with consumer products content with end-of-life mercury. The most known in this sense is the Antananarivo dump, which is 1,400 Tons per day, but for the other six major cities in Madagascar, only wild dumps exist and these are part of the contaminated sites. As a result, people in the vicinity of the landfill and workers in landfills are among the at-risk population.

- **Population living in the littoral zone of Madagascar**

Madagascar is an island in the Indian Ocean, has 23,040,065 population in 2014 according to the inventory of mercury sources in 2016, and is divided into 22 Regions, 13 of which have seaside, both on the Indian Ocean and on the Mozambique Channel. Madagascar has an edge of 5000 km and the population on this part is 12 608 240, most of these people are fishermen or in connection with fishing, and it is known that the mercury level in sea fish is currently at the global level. In this case, the population who

practices fishing as a source of income is one of the populations at risk, and their meal will probably contain mercury.

- **Vulnerability or sensitive population**

Fetuses, newborns and children are particularly vulnerable to exposure to mercury due to the sensitivity of their developing nervous system. Mercury levels estimated to have no effect on adults or pregnant women may have persistent adverse effects in children.

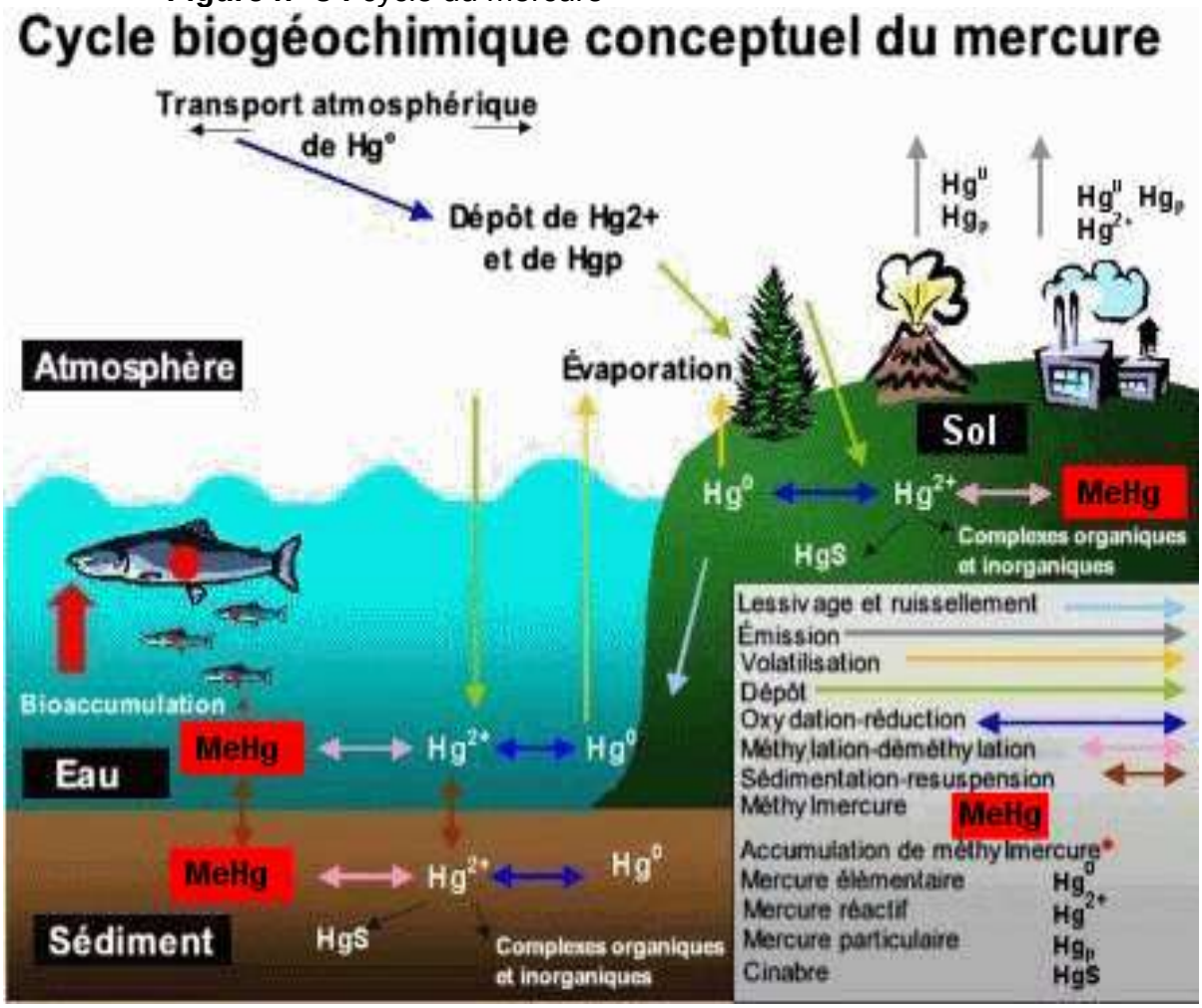
People with liver, kidney, nervous system and lung diseases are more likely to suffer from the toxic effects of mercury than the general population.

Individuals with dietary deficiencies (eg, zinc, selenium) and those with malnutrition may also be more vulnerable.

4.1.2. Mercury in the environment

Mercury (with the chemical symbol of Hg) is a natural element found in air, water and soil. It is distributed in the environment by natural and anthropogenic (human) processes.

Figure n° 3 : cycle du mercure



Source: Conceptual Biogeochemical Source of Mercury

Mercury is found in various inorganic and organic forms and persistent in the environment. The three predominant forms are:

- elemental mercury (chemical symbol of Hg0;
- ionic mercury (also known as inorganic mercury with the chemical symbol of Hg (II) or Hg2 +) this exists in nature as Hg (II) mercuric Compounds or complexes in solution;
- And (c) organic mercury with methyl mercury (the chemical symbol of Me Hg) being the most important.

Mercury in the atmosphere is deposited in water and on the ground. The mercury in the water can be sedimented. Mercury in water, soil and sediment can be methylated and demethylated. Methyl mercury in water can bioaccumulate in aquatic organisms.

- **Consumption of fish**

Considering that fish consumption dominates the route of exposure to methyl mercury for most human populations

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

4.2.1. Effects of exposure to mercury

- **Effects of exposure to mercury on child development**

Mercury presents a particular hazard to pregnant and lactating women. Methyl mercury ingested by a pregnant woman, or metallic mercury entering the body by inhalation of contaminated air, can be transmitted through the maternal blood to the fetus through the placental barrier.

The central nervous system of the infant is more sensitive to methyl mercury than the adult.

Methyl mercury is a powerful neurotoxic for the fetus: abnormalities in the psychomotor development of the child have been associated with maternal exposure to mercury during pregnancy without the symptoms of intoxication.

- **Effects on health**

All humans are exposed to low levels of mercury. Factors that determine the onset and severity of adverse health effects include:

- The chemical form of mercury;
- The dose;
- The age or stage of development of the exposed person (the fetus is considered the most likely);
- Duration of exposure;
- And the route of exposure (inhalation, ingestion and skin contact).
- Eating habits can increase exposure to a fish-bearing population when fish and seafood are contaminated with mercury.

- **Gender approach**

The health effects of chemical exposure have been linked to physiological differences between men, women and children, as well as differences at various stages of development.

From a gender perspective on the use of pesticides and biocides in agriculture, men may be exposed to a high risk of direct exposure to pesticides during application, while women and children are the most likely to be exposed indirectly during planting and harvesting.

Women and men who work in the same occupation (sanitary facilities, mines, landfills, etc.) are at the same risk of exposure to mercury in Madagascar.

Women often have a relatively greater physiological sensitivity to the effects of exposure to toxic chemicals, especially in relation to reproductive cycles. At particular stages in their lives, such as pregnancy, lactation and menopause, women's bodies undergo a rapid physiological change, making them more vulnerable to health damage from toxic chemicals.

4.2.2. Some pathologies linked to exposure to mercury in Madagascar

Table 92 : Some pathologies related to exposure to mercury, seen in the health facilities of Madagascar

Health Hazards to Mercury	Pathologies seen in health facilities	Number of cases seen in :			Total number
		BHCC	RCDH	RMC et UH	
Adverse effects on brain and fetal nervous system development	Neonatal pathology	4 052	ND	4 109	8 161
	Congenital malformations	ND	244	61	305
Harmful effects on the nervous system	Personality and behavioral disorders in adults seen on an outpatient basis	ND	ND	96	96
	Adult personality and behavioral disorder, hospitalization	ND	ND	117	117
	Toxic Encephalopathy	ND	ND	39	39
	Acute delusional puffiness	ND	ND	61	61
	Neuropsychiatry seen in outpatient clinic	ND	5 314	ND	5 314
Effects on the lung	Chronic Pulmonary Heart	ND	ND	54	54
	Asthma and respiratory allergy seen on an outpatient basis	61 466	7 825	3 145	72 436
	Asthma and respiratory allergy, hospitalization	ND	ND	1 025	1 025
Adverse effects on the kidneys	Chronic renal failure	ND	ND	48	48
Poisoning	Poisoning seen out-patient	ND	1 007	ND	1 007
	Intoxication, hospitalization	ND	931	ND	931

Source: Statistical yearbook of the Ministry of Health, year 2014

5. CHAPITER 5: AWARENESS AND UNDERSTANDING OF WORKERS AND THE PUBLIC; AND THE EXISTING TRAINING AND EDUCATIONAL POSSIBILITIES FOR THE TARGET GROUPS AND PROFESSIONALS

During the implementation of the MIA project, awareness sessions and dissemination of the main results of the project were carried out.

5.1. Awareness and dissemination of MIA project results first quarter 2015

During the first quarter of 2015, the following activities were carried out in order to raise awareness and disseminate the results of the MIA project:

- Inclusion of the article on the MINAMATA Convention on Mercury in the website of the Ministry of the Environment, Ecology, the Sea and Forests (http // www.mef.ecologie.gov.mg) And the MIA project, on 16 March 2015;
- Multiplication of 250 posters, 250 pamphlets relating to the implementation of the MINAMATA Convention on mercury, documents of the national inventory of products containing mercury in Madagascar and mercury-free substitute products as well as the training module On the management of wastes containing mercury under the Basel Convention Directive on 16 March 2015;
- Dissemination of the report of the workshop launching the project on the Initial Evaluation of the MINAMATA Convention on mercury in the television of Madagascar (TVM), Madagascar television (MaTV) and in the radio Madagascar on March 17, 2015 and Newspaper "Madagascar Laza" on 18 March 2015.

5.2. Awareness and dissemination of MIA project results second quarter 2015

- Awareness-raising meeting on the MINAMATA Convention and dissemination of the results of the MIA project in Madagascar, 28 May 2015. The objective of this meeting is to inform officials of the Ministry of the Environment, Ecology, On the content and obligations of the countries party to the Convention. Documents were distributed such as 250 leaflets and 250 posters relating to the implementation of the MINAMATA Convention, as well as interviews on television and written presses were carried out during this meeting.
- A second awareness-raising meeting on the MINAMATA Convention and dissemination of the results of the MIA project in Madagascar took place on 18 June 2015 in the conference room of the Ministry of the Environment, Ecology, the Sea and Forests at Antsahavola, Antananarivo.

5.3. Awareness and dissemination of MIA project results third quarter 2015

Validation workshops on national infrastructures and national legislation documents for the management of mercury in Madagascar on 11 and 14 September 2015, 500 posters and 250 brochures on the implementation of the MINAMATA Convention, and Document on institutional evaluation to manage mercury in Madagascar were distributed;

- Article on the results of the MIA project and the MINAMATA Convention, published on the website of the Ministry of the Environment (Web site: http://www.ecology.gov.mg) on 18 July 2015 and Magazine "SITRANO NY TONTOLO" in August 2015.

5.4. Awareness and dissemination of MIA project results, fourth quarter 2015

- A sensitization session was held on 3 December 2015 in Antananarivo during a workshop to upgrade the environmental cells of all ministerial departments in Antananarivo. Forty-four participants attended the meeting. Documents, 250 brochures and 200 posters relating to the implementation of the MINAMATA Convention and the MIA project have been distributed.
- During the training workshop on the inventory of mercury release sources in the environment, documents on the institutional evaluation to manage mercury in Madagascar, the evaluation of national infrastructures for the management of mercury in Madagascar, The evaluation of the national legislation on the management of mercury in Madagascar was distributed.
- Dissemination of the article on training on the inventory of sources of mercury discharge on the website of the Ministry of the Environment on 15 November 2015;
- Multiplication of the documentary film in 500 copies on the MINAMATA Convention on mercury in December 2015.

5.5. Awareness and dissemination of MIA project results second quarter 2016

- A meeting to disseminate the results of the activities already carried out under the MIA project was carried out on 20 May 2016 in the OLEP conference room Ambatobe Antananarivo. The objectives of this meeting are to inform the participants of the results of the assessments of institutions, legislation and national infrastructures for the management of mercury in order to reinforce collaborations between the various public and private institutions in carrying out the follow-up activities Of the MIA project, as well as the short- and medium-term prospects for the implementation of the MINAMATA Convention in Madagascar. Around seventy people, representatives of public and private institutions involved in the problem of mercury participated in this meeting.
- From the 1000 pamphlets, 475 posters were multiplied and distributed for stakeholders of the MINAMATA Mercury Convention during the final validation workshop of the national inventory report of mercury releases to the environment.

5.6. Awareness and dissemination of MIA project results second quarter 2016

- From magazine "SITRANO NY TONTOLO" including an article on the dissemination of the results of the MIA project in 60 copies was multiplied in August 2016.

6. CHAPITER 6: IMPLEMENTATION PLAN AND PRIORITIES OF ACTION

6.1. Objectives of the action plan

An action plan is a document defining a strategy to be applied to achieve a desired outcome. It is part of a three-stage process comprising a development phase, an implementation phase and a monitoring and evaluation phase.

- **Overall objective**

The overall objective of the Action Plan of the MINAMATA Convention on Mercury is to protect human health and the environment from the anthropogenic emissions and releases of mercury and mercury compounds by 2021 in accordance with the objective Of the Convention.

- **Specific objectives**

Specific objectives (SOPs) stem from this overall objective.

SO1: Provide an institutional and regulatory framework for the environmentally sound management of mercury and mercury-containing wastes by 2018.

SO2: Arrange and implement an awareness, information and training program by 2021.

OS3: Have structures and infrastructure for the environmentally sound management of mercury by 2021.

SO4: Have all the capacities required for the environmentally sound management of mercury, its compounds and waste by 2021.

6.2. Priority activities

The priority activities stem from the recommendations arising from the needs identified in the initial MINAMATA Convention assessments already validated by the members of the MINAMATA Implementation Committee with a view to achieving the specific objectives.

In the light of these needs and the recommendations adopted, priority activities financed by requests for funding from technical and financial partners at the national and international levels and contributions in kind from the Government of Madagascar are Tables below.

The activities listed in the first three objectives are cross-cutting for the articles of the Convention. However, the specific activities of each Article of the Convention are included in Objective 4 of the Action Plan.

6.2.1. Objective 1: Having an institutional and regulatory framework on the environmentally sound management of mercury and mercury-containing waste by 2018

Table 94 : Provide an institutional and regulatory framework for the environmentally sound management of mercury and mercury-containing wastes by 2018

According to evaluations carried out under the MIA project in Madagascar, the main challenges and challenges identified are insufficient institutional capacity, lack of legislative and regulatory texts related to the implementation of the MINAMATA Convention on Mercury				
Proposed actions / activities:	**Tasks**	**Lead Institution or stakeholders**	**Anticipated budget (US $)**	**Time limit**
Expand and strengthen the members of the MINAMATA Convention Implementation Committee	Identify and include in the Committee new members who should be involved in the implementation of the MINAMATA Convention	- - Focal Point of the MINAMATA Convention - - Members of the MINAMATA Convention Implementation Committee	**1 000**	2017
	Inform and train members of the Committee on the Environmentally Sound Management of Mercury	Focal Point of the MINAMATA Convention	**10 000**	2017
	Inform and train members of the Committee on the Environmentally Sound Management of Mercury	- Focal Point of the MINAMATA Convention - Members of the Private Sector Implementation Committee	**10 000**	2017
Subtotal 1			**21 000**	
Strengthen the capacities of the various actors involved in mercury management	Recruitment of consultants to develop draft texts and regulations related to mercury management	- Focal Point of the MINAMATA Convention - Members of the MINAMATA Convention Implementation Committee - Legal Consultant	**20 000**	2017
	Organize workshops to validate the work of consultants	Focal Point of the MINAMATA Convention, - Member of the Implementation Committee of the MINAMATA Convention, - Legal consultants	**20 000**	2017 - 2018
	Submit to the councils of Government, Ministers and Parliament the draft texts validated	Ministry of the Environment	**10 000**	2017 - 2018
Sobtotal 2			**50 000**	
Strengthen the capacities of the various actors involved in mercury management	Inform and train those responsible for the institutions and actors involved in the environmentally sound management of mercury (ministries, regional officials, private sector managers, etc.)	- Focal Point of the MINAMATA Convention, - Member of the MINAMATA Convention Implementation Committee	**200 000**	2017 - 2018
Subtotal 3			**200 000**	
Creating a Mercury or Observatory Database	Recruit a consultant to create the database on mercury in Madagascar	- Focal Point of the MINAMATA Convention - Consultant	**20 000**	2018
	Implementing the Mercury Database	- Focal Point of the MINAMATA Convention, - Member of the MINAMATA Convention Implementation Committee	**20 000**	2018
Subtotal 4			**40 000**	

Source: Recommendations for the implementation of the MINAMATA convention on mercury in Madagascar and action plan, year 2 016

6.2.2. Objective 2: To have and implement an awareness, information and training program by 2021

Table 95: Develop and implement an awareness, information and training program by 2021

According to evaluations carried out in the framework of the MIA project in Madagascar, the main challenge and challenges identified is the lack of information, training and awareness programs on the MINAMATA Mercury Convention.				
Proposed actions / activities:	**Tasks**	**Lead Institution or stakeholders**	**Anticipated Budget (US $)**	**Time limit**
Develop a communication plan	Recruit communication consultants to develop communication plan	- Focal Point of the MINAMATA Convention, - Members of the MINAMATA Convention Implementation Committee	10 000	2017
	Organize validation workshops for consultant work	- Focal Point of the MINAMATA Convention, - Consultant Members of the MINAMATA Convention Implementation Committee	5 000	2017
Subtotal 1			15 00	
Conduct advocacy sessions with decision makers, customary leaders and legislators	Identify decision makers, customary leaders and legislators to target in the 22 regions of Madagascar	- Focal Point of the MINAMATA Convention, - Members of the MINAMATA Convention Implementation Committee	2 000	2017
	Develop a timeline for advocacy sessions	- Focal Point of the MINAMATA Convention, - Members of the MINAMATA Convention Implementation Committee		2017
	Organize advocacy sessions in the 22 regions of Madagascar	- Focal Point of the MINAMATA Convention, - Members of the MINAMATA Convention Implementation Committee	150 000	2018-2019
Subtotal 2			152 000	
Informing, sensitizing and training media professionals	Identify the media at the levels of the six provinces of Madagascar to raise awareness	- Focal Point of the MINAMATA Convention, - Members of the Implementation Committee	2 000	2017
	Prepare awareness workshops	- Focal Point of the MINAMATA Convention, - Members of the Implementation Committee		2017
	Recruiting a trainer consultant	- Focal Point of the MINAMATA Convention, - Members of the MINAMATA Convention Implementation Committee	10 000	2017
	Organize awareness and training workshops on mercury for media professionals	- Focal Point of the MINAMATA Convention, - Training Consultant	60 000	2018
	Choose partner media at central and regional levels	- Focal Point of the MINAMATA Convention, - Members of the MINAMATA Convention Implementation Committee	1 000	2018
subtotal 3			73 000	
Design and develop awareness tools	Design, build and disseminate awareness tools by target group	- Focal Point of the MINAMATA Convention, - Members of the MINAMATA Convention Implementation Committee	60 000	2017
Subtotal 4			60 000	
Introduce the mercury management component into the environmental dimension to be integrated into school curricula	Prepare the document on the mercury management component to be included in the environmental dimension to be integrated	- Focal Point of the MINAMATA Convention, - Members of the MINAMATA Convention Implementation Committee	5 000	2018
Sub total 5			5 000	
Inform and sensitize the public and vulnerable groups on the adverse effects of mercury and the environmentally sound management of mercury	Organize awareness campaigns on the adverse effects of mercury and the environmentally sound management of mercury and its waste in the six provincial capitals as well as in contaminated sites	- Focal Point of the MINAMATA Convention, - Members of the MINAMATA Convention Implementation Committee	75 000	2018-2021
	Disseminate awareness-raising tools in identified media	Members of the MINAMATA Convention Implementation Committee	20 000	2018-2021
Sous total 6			95 000	
TOTAL			400 000	

Source: Recommendations for the implementation of the MINAMATA convention on mercury in Madagascar and action plan, year 2 016

6.2.3. Objective3: Have structures and infrastructure for the environmentally sound management of mercury by 2021.

Table 96 : Have structures and infrastructure for the environmentally sound management of mercury by 2021.

According to assessments carried out under the MIA project in Madagascar, the main challenge and challenges identified is the lack of specific infrastructure for mercury management,				
Proposed actions / activities:	**Tasks**	**Lead Institution or stakeholders**	**Anticipated Budget (US $)**	**Time limit**
Establish a monitoring and follow-up system for the implementation of the MINAMATA Mercury Convention	Establish a monitoring and follow-up subcommittee within the MINAMATA Convention Implementation Committee on Mercury	- Focal Point of the MINAMATA Convention, - Members of the MINAMATA Convention Implementation Committee	2 000	2017
Sous total 1			2 000	
Strengthen infrastructure to control emissions and release mercury	Establish a monitoring and follow-up subcommittee within the MINAMATA Convention Implementation Committee on Mercury	MINAMATA Convention Implementation Committee	1 000	2018
	Provide institutions (customs, Ministry of Industry, Ministry of Health, etc.) with equipment for monitoring emissions and releases of mercury.	- Focal Point of the MINAMATA Convention, - Members of the MINAMATA Convention Implementation Committee	1 000 000	2018-2020
	Collaborate with the Ministry of Industry and the Ministry of Health for installations and renovations of incinerators	Members of the MINAMATA Convention Implementation Committee	25 000	2018 – 2020
Subtotal 2			1 026 000	
Strengthen the material and technical capabilities of national research centers and laboratories	Identify the main research centers and institutions to be strengthened according to their field of mercury management	- Focal Point of the MINAMATA Convention, - Members of the MINAMATA Convention Implementation Committee	2 000	2018
	Identify and evaluate required equipment	- Focal Point of the MINAMATA Convention, - Members of the MINAMATA Convention Implementation Committee	2 000	2018-2021
	Provide national research centers and laboratories with mercury research equipment and equipment (INSTN,	- Focal Point of the MINAMATA Convention, - Members of the MINAMATA Convention Implementation Committee	1 500 000	2018-2021
Subtotal 3			1 504 000	
TOTAL			2 532 000	

Source : Recommendations for the implementation of the MINAMATA convention on mercury in Madagascar and action plan, year 2 016

6.2.4. Objective 4: Build capacity for environmentally sound management of mercury, its compounds and waste by 2021.

In contrast to the first three objectives above, the table below shows the specific activities to be undertaken by articles of the Convention, apart from the activities already listed in the first three objectives (institutional capacity building, infrastructure, legislation and awareness-raising) Because these three objectives are cross-cutting.

Table 97 : Article 3, Sources of Mercury Supply and Trade

Article 3: Sources of Mercury Supply and Trade					
Basic data and results of the mercury inventory report: Extraction of gold in the amalgamation process results in the release of 2,340 kg Hg / year. *MINAMATA Exceptional Convention Requirements to which the country must comply to honor its future commitments:* Each Party shall permit the continuation of primary mercury mining operations in its territory on the date of entry into force of the Convention in respect of that Party only for a period not exceeding 15 years after that date. During this period, the mercury thus obtained may only be used to manufacture products containing added mercury in accordance with Article 4 or to be used in processes referred to in Article 5. Otherwise, Eliminated in accordance with the provisions of Article 11 by operations which do not lead to recovery, recycling, regeneration, direct reuse or any other use. *Recommendations for later action:* - Do not allow a new primary extraction of mercury - Prevent the importation and use of mercury for artisanal small-scale gold mining (ASGM); - Not to allow the export of mercury unless the importing country consents in writing, mercury is for authorized use or environmentally sound storage. - Prepare regulatory texts to prevent the import of mercury and mercury. - Identify storage sites for mercury and mercury compounds. - Strengthen trade control measures for mercury at customs level.					
Priorities*	Proposed actions / activities:	**Tasks**	**Lead Institution or stakeholders**	**Anticipated Budget (US $)**	**Time limit**
- Do not allow a new primary extraction of mercury; - Prevent the importation and use of mercury for artisanal small-scale gold mining (ASGM); - Not to allow the export of mercury unless the importing country consents in writing, mercury is for authorized use or environmentally sound storage.	Apply mining code	Collaborate with the Ministry of Mines for the effective implementation of the Malagasy mining code	Ministry of Mines	1 000	4 2018 - 2021
	Prevent the importation and use of mercury for artisanal small-scale gold mining (ASGM);	Develop regulations to prohibit the import and use of mercury in the ASGM (already included in Activity 2 Objective 1	- Ministry of the Environment, Mines, Justice, - Members of the Implementation Committee of the MINAMATA Convention	0	2018
		Strengthen control to eliminate the use of mercury in ASGM at customs and ASGM sites	Government	0	2019 -2021
TOTAL				**1 000**	

Source: Recommendations for the implementation of the MINAMATA convention on mercury in Madagascar and action plan, year 2 016

Table 98 : Article 4 on the products content with mercure

Article 4 on the products content with mercure
Basic data and results of the mercury inventory report: Products containing mercury 56 787 Kg Hg / year of which • 46,420 Kg Hg of Pesticide Biocides • 6 703 Kg Hg Mercury batteries • 1 950 Kg Hg cosmetics and related products • 865.63 Kg Hg manometers and mercury gauges • 603 Kg Hg Electric mercury switches and relays • 559 Kg Hg paints with mercury • 405.55 Kg Hg Mercury Thermometers • 175,36 Kg Hg Amalgam of dental filling • 131.33 polyurethane with mercury catalysts • 5.43 kg Hg Mercury light sources *MINAMATA Exceptional Convention Requirements to which the country must comply to honor its future commitments:* Each Party shall ensure, by taking appropriate measures, that no added mercury-containing products listed in Part I of Annex A are manufactured, imported or exported after the date of definitive abandonment fixed for those products, Except in the case of an exclusion specified in Annex A or pursuant to a derogation registered for a Party in accordance with Article 6. Gradually reduce the use of dental amalgam in accordance with Part II of Annex A. *Recommendations for later action:* - Decrease the manufacture, import, and export of products listed in Part I of Annex A of the MINAMATA Convention and not authorize from 2020; - Gradually eliminate the use of dental amalgam through two or more measures listed in Annex A Part II - Extend mercury-free alternatives. - Inform the public about the adverse effects of mercury on human health and the environment. - Improve the customs code to identify imported products containing mercury. - Provide Customs with control of imported mercury-containing products

Priorities*	Proposed actions / activities:	Tasks	Lead Institution or stakeholders	Anticipated Budget (US $)	Time limit
- Decrease the manufacture, import, and export of products listed in Part I of Annex A of the MINAMATA Convention and not authorize from 2020; - Gradually eliminate the use of dental amalgam through two or more measures listed in Annex A, Part II.	Put in place deterrents to reduce and discourage the import and use of products containing mercury and mercury compounds	Organize workshops with customs officials and the Ministry of Commerce to identify measures to deter, eliminate imports of mercury-containing products	- Focal Point of the MINAMATA Convention, - Members of the MINAMATA Convention Implementation Committee	5 000	2018-2020
	Put in place deterrents to reduce and discourage the import and use of products containing mercury and mercury compounds	Submit to the Government Councils the draft text	Ministry of the Environment	1 000	2019-2020
TOTAL				**6 000**	

Source: Recommendations for the implementation of the MINAMATA convention on mercury in Madagascar and action plan, year 2 016

Table 99 : Article 7 On artisanal and small-scale mining

Article 7 On artisanal and small-scale mining					
Basic data and results of the mercury inventory report Extraction of gold and silver in the amalgamation process results in a rejection of 2,340 kg Hg / year. *MINAMATA Exceptional Convention Requirements to which the country must comply to honor its future commitments:* Each Party in the territory of which artisanal and small-scale gold mining and processing activities referred to in this Article are carried out shall take measures to reduce and, if possible, eliminate the use of mercury and Mercury in these activities and the consecutive emissions and releases of mercury into the environment. *Recommendations for later action:* - Legislation to take measures to reduce and, where possible, eliminate mercury and mercury compounds used in artisanal and small-scale gold mining; - The elaboration of an action plan on the elimination of artisanal gold mining using mercury. - The drafting of texts for the regulation of the artisanal and small-scale gold mining sector.					
Priorities*	Proposed actions / activities:	**Tasks**	**Lead Institution or stakeholders**	**Anticipated Budget (US $)**	**Time limit**
- Legislation to take measures to reduce and, where possible, eliminate mercury and mercury compounds used in artisanal and small-scale gold mining;	Develop an action plan on the elimination of artisanal gold mining	Recruit a consultant to develop an action plan on the elimination of artisanal gold mining using mercury and develop strategies to prevent and protect vulnerable populations	Focal Point and Members of the Implementation Committee of the MINAMATA Mercury Convention	500 000	2018
TOTAL				**500 000**	

Source: Recommendations for the implementation of the MINAMATA convention on mercury in Madagascar and action plan, year 2 016

Table 100: Article 8 on the emissions

Article 8 on the emissions

Basic data and results of the mercury inventory report:

For the 79,204 kilograms of mercury released per year, 53,371.21 kg Hg / year or 67.38% are emitted into the air;

The main emission paths for releases of mercury into the air were biocides and pesticides containing mercury 34 815 Kg / Hg p / yr, informal waste incineration 11 635 Kg / Hg / yr, Gold and silver in the process of amalgamatio1755 Kg / Hg / y, mercury batteries 1676 Kg / Hg / yr, Production of energy and heat fueled with biomass 1549 Kg / Hg / yr, gauges and gauges with Mercury 185, 16 Kg / Hg / year.

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MINAMATA Exceptional Convention Requirements to which the country must comply to honor its future commitments:

With regard to its existing sources, each Party shall include in any national plan and implement one or more of the following measures, taking into account its national situation and the technical and economic feasibility and affordability of the measures, As soon as possible but not later than ten years after the date of entry into force of the Convention in respect of

(A) A quantified target for monitoring and, as far as possible, reducing emissions from relevant sources;
(B) emission limit values for monitoring and, as far as possible, reducing emissions from relevant sources;
(C) Use of best available techniques and best environmental practices to control emissions from relevant sources;
(D) A multi-pollutant control strategy with related benefits in mercury control;
(E) Other measures to reduce emissions from relevant sources.

Recommendations for later action:

- The adoption of normative legislation to define the limits of releases or emission of mercury into the environment from standards to all elements of the environment (air, water, soil) and the implementation of the control provisions Of these releases or emissions in the industrial process.

- Monitor mercury emissions at the industry and hospitals level.
- Establish guidelines for incinerator installations or renovations.
- Set a limit value for mercury emission at the national level.
- Include mercury emissions in environmental standards for industrial installations and for production.
- Equipping and using in Madagascar tools and equipment for monitoring atmospheric emissions of mercury.

Priorities*	Proposed actions / activities:	Tasks	Lead Institution or stakeholders	Anticipated Budget (US $)	Time limit
The adoption of normative legislation to define the limits of releases or emission of mercury in the environment from standards to all elements of the environment (air, water, soil) and the implementation of the These releases or emissions in the industrial process.	Develop national emission standards for mercury in the environment	Recruit a consultant to develop an action plan on the elimination of artisanal gold mining using mercury and develop strategies to prevent and protect vulnerable populations	- Members of the Implementation Committee of the MINAMATA Convention on Mercury; - Ministry of Industry	10 000	2018
	Develop national emission standards for mercury in the environment	Organize workshops to validate the work of consultants	- Focal Point of the MINAMATA Convention, - Members of the MINAMATA Convention Implementation Committee	5 000	2018
Total				**15 000**	

Source: Recommendations for the implementation of the MINAMATA convention on mercury in Madagascar and action plan, year 2 016

Table 101: Article 9 the releases

Article 9 the releases

Basic data and results of the mercury inventory report:

The amount of mercury released into the water reaches 11,135 kg of Hg / year or 14,06%.

The main subcategories of sources of mercury releases to water were biocides and pesticides containing mercury 6,034 Kg Hg / yr, Informal incineration of waste 2,016 Kg / Hg / yr, cosmetics and related products 1853 Kg / Hg / yr, manometers and gauges with mercury255, 97 Kg / Hg / year, mercury dental filling amalgam 42.43 Kg / Hg / yr.

MINAMATA Exceptional Convention Requirements to which the country must comply to honor its future commitments:

A Party with relevant sources shall take measures to control releases and may develop a national plan setting out the measures to be taken to that end and the objectives, goals and expected results. The plan shall be submitted to the Conference of the Parties within four years of the date of entry into force of the Convention in respect of that Party. If a Party develops an implementation plan in accordance with Article 20, it may include a plan established pursuant to this paragraph.

Measures shall include, as appropriate, one or more of the following measures:

(A) Release limit values for monitoring and, to the extent possible, reducing releases from relevant sources;

(B) Use of best available techniques and best environmental practices to control releases from relevant sources;

(C) A multi-pollutant control strategy with associated benefits in controlling releases of mercury;

(D) Other measures to reduce releases from relevant sources.

Recommendations for later action:

- The adoption of normative legislation to define the limits of mercury discharge in the environment, from standards to all elements of the environment (air, water, soil) and the implementation of the provisions concerning the control of these releases In the industrial process;
- Make a regular inventory of the sources of mercury discharge into the environment.
- Reducing mercury releases through preventive measures: decreased consumption of mercury-containing products and materials, replacement of products, processes and practices that contain or use mercury by those that do not.
- Strengthen effluent control measures by upgrading the management of discharges.
- Regulate the treatment of mercury-containing wastes to avoid wild releases.
- Provide and use tools and materials to control anthropogenic mercury releases in Madagascar (including wastewater).

Priorities*	Proposed actions / activities:	Tasks	Lead Institution or stakeholders	Anticipated Budget (US $)	Time limit
The adoption of normative legislation to define mercury discharge limits in the environment, standards for all elements of the environment (air, water, soil) and the implementation of the provisions on the control of these releases in the environment. The industrial process;	Periodic inventory of sources of mercury release	Recruit a consultant to identify sources of mercury discharge	- Focal Point of the MINAMATA Convention, - Members of the MINAMATA Convention Implementation Committee	20 000	2021
	Elaborer des normes nationales de rejets de mercure dans l'environnement	Recruiting a consultant to develop national standards for releases of mercury into the environment	- Members of the MINAMATA Convention Implementation Committee - - Ministry of Industry	10 000	2018
TOTAL				**30 000**	

Source: Recommendations for the implementation of the MINAMATA convention on mercury in Madagascar and action plan, year 2 016

Table 102 : Article 10 On non-polluting intermediate storage of mercury, other than mercury wastes

Article 10 On non-polluting intermediate storage of mercury, other than mercury wastes					
Basic data and intermediate storage results No data available *MINAMATA Exceptional Convention Requirements to which the country must comply to honor its future commitments:* Each Party shall take measures to ensure that the provisional storage of mercury and mercury compounds for use by a Party under this Convention is provided in an environmentally sound manner, taking into account all guidelines And in accordance with all requirements adopted under paragraph 3. *Recommendations for later action:* - Legislation to take measures to ensure the storage of intermediate mercury is carried out in an environmentally sound manner. - To seek global partners for the transfer of technologies on the temporary storage of mercury and its compounds. - Establishment of environmentally sound interim storage sites for mercury or its compounds.					
Priorities*	Proposed actions / activities:	**Tasks**	**Lead Institution or stakeholders**	**Anticipated Budget (US $)**	**Time limit**
Measures to ensure the storage of intermediate mercury are carried out in an environmentally sound manner.	Search global partners for technology transfer on the interim storage of mercury and its compounds	Organizing training on the provisional storage of mercury and its compounds	- Focal Point of the MINAMATA Convention, - Members of the MINAMATA Convention Implementation Committee	20 000	2019-2020
	Create an environmentally sound interim storage platform for mercury or mercury compounds	Organizing training on the provisional storage of mercury and its compounds	- Focal Point of the MINAMATA Convention, - Members of the MINAMATA Convention Implementation Committee - Consultant	5 000	2020
		Building a temporary mercury storage platform	- Focal Point of the MINAMATA Convention, - Members of the MINAMATA Convention Implementation Committee - Specialist Technician	10 000	2021
Total				**35 000**	

Source: Recommendations for the implementation of the MINAMATA convention on mercury in Madagascar and action plan, year 2 016

Table 103 : Article 11 On mercury waste

Article 11 On mercury waste					
Basic data and results of the mercury inventory report: The releases of mercury into general waste were 3,961 Kg / Hg / n or 5%. The main subcategories of mercury releases were mercury batteries 3352 Kg / Hg / yr, mercury gauges and gauges 253, 12 Kg / Hg / yr and mercury dental filling amalgam 49.08 Kg / Hg / year . *MINAMATA Exceptional Convention Requirements to which the country must comply to honor its future commitments:* Each Party shall take appropriate measures to ensure that mercury wastes: - be managed in an environmentally sound manner, taking into account the guidelines developed under the Basel Convention and in accordance with the requirements of the Conference of the Parties. - In developing these requirements, the Conference of the Parties shall take into account the regulations and programs of the Parties with regard to waste management; - Recovered, recycled, reclaimed or reused directly for any use permitted by a Party under this Convention or for environmentally sound disposal *Recommendations for later action:* - Legislation to manage mercury waste in an environmentally sound manner, taking into account the guidelines developed under the Basel Convention and in accordance with the requirements of the COP to be developed. - Legislation to restrict mercury from the treatment or reuse of mercury waste for uses permitted under the Convention. - Raise public awareness of the dangers of mercury-containing wastes. - To promote the environmentally sound management of mercury-containing waste at national level. - Seek global partners for the transfer of technologies on the disposal of mercury-containing wastes.					
Priorities*	Proposed actions / activities:	**Tasks**	**Lead Institution or stakeholders**	**Anticipated Budget (US $)**	**Time limit**
- Legislation to manage mercury waste in an environmentally sound manner, taking into account the guidelines developed under the Basel Convention and in accordance with the requirements of the COP.	Develop national mercury waste thresholds	Recruit a consultant to develop mercury waste thresholds	- Members of the MINAMATA Convention Implementation Committee	10 000	2018
- Legislation to restrict mercury from the treatment or reuse of mercury wastes	Eliminate the reuse of waste containing mercury	Recruiting a consultant to develop a mercury waste management procedure manual	- Focal Point of the MINAMATA Convention, - Members of the MINAMATA Convention Implementation Committee	10 000	2018
		Organize a validation workshop	- Focal Point of the MINAMATA Convention, - Members of the MINAMATA Convention Implementation Committee - Consultants	5 000	2018
TOTAL				**25 000**	

Source: Recommendations for the implementation of the MINAMATA convention on mercury in Madagascar and action plan, year 2 016

Table 104 : Article 12 On Contaminated Sites

Article 12 On Contaminated Sites					
Basic data and results of the mercury inventory report: Mercury releases to soil per year were 10,616 kg Hg / year or 13.34%. The main subcategories of mercury sources released into the soil were informal waste incineration 1,861Kg / Hg / year, mercury batteries 1676 Kg / Hg / yr, mercury gauges and gauges 171, 38 Kg / Hg /year. Local source by extraction of gold in the amalgamation process in Manapatrana, Vatovavy Fitovinany region: 281 (Kg Hg / yr) Company Ambatovy, Alaotra-Mangoro Region, original source of use of Industrial thermometers with mercury: 61,80 Kg Hg / year *MINAMATA Exceptional Convention Requirements to which the country must comply to honor its future commitments:* Each Party shall endeavor to develop appropriate strategies for the identification and assessment of sites contaminated with mercury or mercury compounds. Actions to reduce the risks presented by these sites are carried out in an environmentally sound manner including, where necessary, an assessment of the risks to human health and the environment posed by mercury or the mercury compounds they contain. *Recommendations for later action:* Legislation to protect the population at risk around one or more sites contaminated with mercury • Train employees in contaminated sites on precautionary measures to protect themselves from exposure to mercury. • Sensitize the population around mercury-contaminated sites on the adverse effects of mercury on human health and the environment.					
Priorities*	Proposed actions / activities:	**Tasks**	**Lead Institution or stakeholders**	**Anticipated Budget (US $)**	**Time limit**
Protect the at-risk population around one or more sites contaminated with mercury	Train employees in contaminated sites	Recruit a consultant to train employees at contaminated sites	- Focal Point of the MINAMATA Convention, - Consultant - Members of the MINAMATA Convention Implementation Committee	50 000	2020-2021
	Sensitizing people around these sites to protect them from exposure to mercury, especially women and the vulnerable population	Sensitizing the population around the identified contaminated sites	- Focal Point of the MINAMATA Convention, - Members of the MINAMATA Convention Implementation Committee	50 000	2020-2021
TOTAL				**100 000**	

Source: Recommendations for the implementation of the MINAMATA convention on mercury in Madagascar and action plan, year 2 016

Table 105 : **Article 14 On capacity-building, technical assistance and transfer of technology**

Article 14 On capacity-building, technical assistance and transfer of technology					
Data on capacity building, technical assistance and transfer of technology No data available *MINAMATA Exceptional Convention Requirements to which the country must comply to honor its future commitments:* The Parties shall cooperate to provide, within their respective capacities, appropriate capacity-building and technical assistance in a timely manner to Parties that are developing countries, in particular least developed countries and small island developing States Developing countries and Parties that are countries with economies in transition to assist them in the implementation of their obligations under this Convention. *Recommendations for later action:* - Seek partnerships with developed countries for technical assistance and technology transfer for the environmentally sound management of mercury; - Strengthen the capacities of stakeholders on the environmentally sound management of mercury. -					
Priorities*	Proposed actions / activities:	**Tasks**	**Lead Institution or stakeholders**	**Anticipated Budget (US $)**	**Time limit**
	Seek partnership with developed countries	Initiate calls for expressions of interest for a technical partnership and transfer of technology for the environmentally sound management of mercury	- Ministry of the Environment - Focal Point of the MINAMATA Convention	1 000	2018
	Strengthen the capacity of stakeholders involved in mercury management by an international expert	Strengthen the capacity of stakeholders involved in mercury management by an international expert	- Focal Point of the MINAMATA Convention, - Members of the MINAMATA Convention Implementation Committee	20 000	2019-2020
Total				**21 000**	

Source: Recommendations for the implementation of the MINAMATA convention on mercury in Madagascar and action plan, year 2 016

Table 106 : Article 16 On the health aspects

Article 16 On the health aspects					
Basic data and results of the mercury inventory report: The quantity of mercury released in this area is estimated to be in the order of 1,249.55 Kg Hg per year, including: - Mercury Thermometer: 405.55 Kg of Hg - Manometers and gauges: 844 Kg of Hg *MINAMATA Exceptional Convention Requirements to which the country must comply to honor its future commitments:* Promote the development and implementation of strategies and programs to identify and protect at-risk populations, particularly vulnerable populations, that could include the adoption of scientific health guidelines on exposure to mercury and Mercury compounds setting targets for reducing exposure to mercury, where appropriate, and public education with the participation of the public health sector and other relevant sectors; - Promote the development and implementation of science-based education and prevention programs on occupational exposure to mercury and mercury compounds; - Promote appropriate health care services for the prevention, treatment and care of populations affected by exposure to mercury or mercury compounds; and - Establish and strengthen, as appropriate, the institutional capacities and capacities of health professionals for prevention, diagnosis, treatment *Recommendations for later action:* - Promote prevention, treatment and care services for populations affected by mercury pollution. - Develop a strategy or program to identify and protect populations at risk. - Appropriate health services for the prevention, treatment and care of the population affected by exposure to mercury - .					
Priorities*	Proposed actions / activities:	**Tasks**	**Lead Institution or stakeholders**	**Anticipated Budget (US $)**	**Time limit**
Promote prevention, treatment and care services for populations affected by mercury pollution.	Develop a program to identify, protect and treat at-risk populations	Recruiting a consultant to develop this program	- Focal Point of the MINAMATA Convention, - Members of the MINAMATA Convention Implementation Committee - Ministry of Health and UNIMINTOX	10 000	2018
		Organize validation workshops for consultant work	- Focal Point of the MINAMATA Convention, - Members of the MINAMATA Convention Implementation Committee - Ministry of Health and UNIMINTOX	5 000	2018
	Raise awareness and educate health care providers about mercury poisoning and how to deal with mercury spills	Organize training workshops for health workers	- Focal Point of the MINAMATA Convention, - Members of the MINAMATA Convention Implementation Committee - Ministry of Health and UNIMINTOX	20 000	2019 - 2021
	Creating health care services for the population affected by mercury pollution	Collaborate with the Ministry of Health in Madagascar	- Focal point, - Ministry of Health - And UNIMINTOX	50 000	2019 - 2020
TOTAL				**85 000**	

Source: Recommendations for the implementation of the MINAMATA convention on mercury in Madagascar and action plan, year 2 016

Table 107: Article 17 On the exchange of information

Article 17 On the exchange of information					
Data relating to the exchange of information Facilitation of information exchange in all areas of mercury management. *MINAMATA Exceptional Convention Requirements to which the country must comply to honor its future commitments:* **Each Party shall facilitate the exchange of:** - scientific, technical, economic and legal information on mercury and mercury compounds, including toxicological, ecotoxicological and safety information; - information on the reduction or elimination of the production, use, trade, emissions and releases of mercury and mercury compounds; - information on technically and economically viable alternatives for products containing added mercury; Manufacturing processes in which mercury or mercury compounds are used; And activities and processes that emit or release mercury or mercury compounds; Including information on risks to health and the environment and the socio-economic costs and benefits of such alternatives; and - epidemiological information on the health effects of exposure to mercury and mercury compounds, in close cooperation with the World Health Organization and other relevant organizations, as appropriate. *Recommendations for later action:* • Establish a database on mercury. • Organize periodic information exchange sessions (workshops, seminars, etc.) on mercury management in Madagascar.					
Priorities*	Proposed actions / activities:	**Tasks**	**Lead Institution or stakeholders**	**Anticipated Budget (US $)**	**Time limit**
	Periodically update and disseminate information and research findings and new mercury-free substtutes	Periodically update and disseminate information from the database	Focal Point of the MINAMATA Convention, Members of the MINAMATA Convention Implementation Committee	**20 000**	2019 - 2021
TOTAL				**20 000**	

Source: Recommendations for the implementation of the MINAMATA convention on mercury in Madagascar and action plan, year 2 016

Table 108: Article 19 Research, development and monitoring.

Article 19 Research, development and monitoring.					
Data on: **research, development and monitoring.** - Research centers do not have the technical and financial means to detect mercury despite their efforts and know-how. - The research infrastructures and equipment of the research centers are obsolete and the devices that exist are outdated by time. - The budget allocated to research is very insufficient. They are obliged to wait for donations and aid to be equipped with materials and equipment. - *MINAMATA Exceptional Convention Requirements to which the country must comply to honor its future commitments:* 1. The Parties shall endeavor to cooperate in developing and improving, taking into account their respective circumstances and means: . 2. Parties should, where appropriate, rely on existing monitoring networks and research programs in carrying out the activities referred to in paragraph 1. *Recommendations for later action:* - Have research infrastructures well equipped and capable of: - Detect mercury; - Conduct an ongoing review and monitoring mission; - Enhance the search for mercury-free substitutes, whose physico-chemical properties are valued. - Strengthen the partnership with foreign countries for the modernization of equipment and financing; - Develop a research program on best environmental practices.					
Priorities*	Proposed actions / activities:	**Tasks**	**Lead Institution or stakeholders**	**Anticipated Budget (US $)**	**Délai**
	Research partners to develop research on mercury management and monitoring	Develop terms of reference for partnership Choose partner research centers according to their field of action on mercury	- Ministère Chargé de l'Environnement - Point focal de la Convention de MINAMATA	10 000	2018
		Choosing partner research centers			2018
	Popular search results	Save results to databases, disseminate results in the media	- Focal Point of the MINAMATA Convention, - Members of the MINAMATA Convention Implementation Committee	10 000	2019 - 2021
TOTAL				20 000	

Source: Recommendations for the implementation of the MINAMATA convention on mercury in Madagascar and action plan, year 2 016

6.2.5. Sum of objective 4 per article: Capacity building for the environmentally sound management of mercury, its compounds and waste by 2021.

Table 109 : Total cost per article.

objective 4 : Build capacities for environmentally sound management of mercury, its compounds and waste by 2021	Budget ($ US)
• Article 3: Sources of Mercury Supply and Trade	1 000
• Article 4 On products content with mercury	6 000
• Article 7 On artisanal and small-scale mining	500 000
• Article 8 on the emissions	15 000
• Article 9 on the releases	30 000
• Article 10 On non-polluting intermediate storage of mercury, other than mercury wastes	35 000
• Article 11 On mercury waste	25 000
• Article 12 On Contaminated Sites	100 000
• Article 14 On capacity-building, technical assistance and transfer of technology	21 000
• Article 16 On the health aspects	85 000
• Article 17 On the exchange of information	20 000
• Article 19 Research, development and monitoring.	20 000
Total	**858 000**

Source: Recommendations for the implementation of the MINAMATA convention on mercury in Madagascar and action plan, year 2 016

6.2.6. Sum of priority activities by objective

Table 110 : Total cost of the action plan per specific objective

OBJECTIVES	Budgets anticipés ($UD)
• **Objective 1 : Provide an institutional and regulatory framework for the environmentally sound management of mercury and mercury-containing wastes by 2018**	**311 000**
• **Objective 2 : Develop and implement an awareness, information and training program by 2021**	**400 000**
• **Objective 3 : Provide structures and infrastructure for the environmentally sound management of mercury by 2021**	**2 532 000**
• **Objectives 4 Build capacities for environmentally sound management of mercury, its compounds and waste by 2021**	**858 000**
Total amount (US $)	**4 101 000**

Source: Recommendations for the implementation of the MINAMATA convention on mercury in Madagascar and action plan, year 2 016

ANNEX I: Stakeholder Engagement process

1. *ADONIS, Antananarivo, December 2015*
2. *Agence Nationale de la filière OR(ANOR), Antananarivo, Vololona, Février 2016*
3. *AMBATOVY Ankorondrano antananarivo, Hajaniaina Andry Ramarovelo, Project manager, January 2016*
4. *Cabinet PRISME, Antananarivo, ANDRIANIFAHANANA RALAMBO Chrystel, October 2015*
5. *Cabinet PRISME, Antananarivo, RAMAMONJISOA Sitraka, October 2015*
6. *Cabinet PRISME, Antananarivo, RAZAFY ANDRIANARIVO Robert , October 2015*
7. *Commune Urbaine de Maevatanana, RALAIHARISOA Jean Pierre, Maire et FANDAHARA, Adjoint au Maire, November 2015*
8. *CENTRE HOSPITALIER UNIVERSITE (CHU), Mahajanga, RAKOTONIRINA Léonard, Département Environnement, November 2015*
9. *CENTRE HOSPITALIER DE DISTRICT(CHD), Maevatanana, MANANKEVITRA Modeste, Chef d'établissement, November 2015*
10. *COMMUNE URBAINE ANTSIRABE, RABEMANANTSOA Maminirina, Responsable voirie, January 2016*
11. *COMMUNE URBAINE DE MAHAJANGA, RANDAFIARINTSON Tseheno, Chef de service nettoyage des ordures, November 2015*
12. *Comptoir de l'Or de Maévatanana, Mahajanga, RALAIHARISOA Jean Pierre, Maire, December 2015*
13. *Custom, Antananarivo, RAKOTOARISOA Antsa H. Salimo, Chef de Service des Statistiques et des Analyses Economiques, November 2015*
14. *Custom, Toamasina, Harizo, January 2016*
15. *Direction de Protection des Végétaux(DPV) Agricultural Ministry, 2015*
16. *Extraction de Charbon de Terre, ANJIAJIA, December 2015*
17. *FAO (2012) : Statistiques aquastate Madagascar*
18. *JIRAMA, Toliara, Jhony, Chef de Service de l'Environnement et de Contrôle, November 2015*
19. *INSTAT/ENSOMD, Antananarivo, 2012-2013*
20. *INSTAT /DSE/SSPB, Madagascar, 2014 (DSE: Direction des Statistiques économiques, SSPB : Service des Statistiques de Production des Biens)*
21. *INSTAT (2012) : Database, Antananarivo Madagascar*
22. *INSTAT (2012) : the birth rate of the basic, Antananarivo Madagascar*
23. *Institut National de Statistics de Madagascar (INSTAT), 2014*
24. *Institut National de Statistics de Madagascar (INSTAT), 2015*
25. *Inventory in Sud-Est of Madagascar, data December 2015*
26. *Institut National de Statistics de Madagascar (INSTAT), Ministry of Mine, Agence Nationale de la filière OR, Comptoire of gold in Maevatanana, 2015*
27. *MADACOMPOST, Mahajanga, MIHAJA. Gérante, November 2015*
28. *MADAGASCAR OIL, Antananarivo, RALIJAOHN Emma, Directeur Général Adjoint, November 2015*
29. *Ministry of Agriculture, Antananarivo, RASAMISON Ange Sabrina Décharly, November 2015*
30. *M AE P DIE ONE, Antananarivo 2011*
31. *Ministry of Energy, Antananarivo, Abdallah IBRAHIM, Directeur Général de l'Energie, November 2015*
32. *Ministry of Environment, Ecology and Forests, Antananarivo, RANDRIANOMENJANAHARY Hanitriniaina Liliane, Point focal de la Convention de MINAMATA, November 2015*
33. *Ministry of Environment, Ecology and Forests, Antananarivo, RAHELIMALALA Marthe Point Focal National SAICM, November 2015*
34. *Ministry of Environment, Ecology and Forests, Antananarivo, RAKOTOARISETRA Haritiana Point Focal National de la Convention de Stockholm, November 2015*
35. *Ministry of Environment, Ecology and Forests, Antananarivo, SALAMA Jean Claude Point Focal National Convention de Bâle, November 2015*
36. *Ministry of Environment, Ecology and Forests, Antananarivo, BERA Arsonina Point Focal National Convention de Rotterdam, November 2015*
37. *Ministry of Environment, Ecology and Forests, Antananarivo, RABEMANANJARA Rivo Point Focal National Convention de Vienne, November 2015*

38. *Ministry of Industry, Antananarivo, TSARAMODY Alfrédo, November 2015*
39. *Ministère de l'Economie et de Planification, Antananarivo, EDMOND Téodile, November 2015*
40. *Ministry of Trade, Antananarivo, RAZAFINDRAVOLA Sylvie Edmondine, December 2015*
41. *Ministry of Trade, Antananarivo, RAZANASETA Joséphine, November 2015*
42. *Ministère de la Pêche et des Ressources Halieutiques, Antananarivo, RAJAONARY Liva Eric, November 2015*
43. *Ministère des Finances et du Budget, Antananarivo, TATAGERA Brice Landry, December 2015*
44. *Ministère de la Population, Antananarivo, NOASIHARINALANOMENJANAHARY Philippine, January 2016*
45. *Ministry of Health, Antananarivo, TATA Venance, Chef de service Santé et Environnement, December 2015*
46. *Ministry of Health, Antananarivo, RAZAFINTSALAMA Onisoa, Service Santé et Environnement, January 2015*
47. *Ministry of Health, Antananarivo, MAFILAZA Victor, Expert en Santé et Environnement, January 2015*
48. *Ministry of Health, Antananarivo, RAKOTOARISON Norohasina, Point focal Santé et Environnement, January 2016*
49. *Ministère de l'Elevage, Antananarivo, LAHIMASY Ampiza, November 2015*
50. *Ministère des Affaires Etrangères, Antananarivo, RABESON Christian, Service des Affaires Environnementales, November 2015*
51. *Ministère de l'Aménagement des Territoires, ANDRIAMANANJARA Raoul François, December 2015*
52. *Ministère de la Fonction Publique, Antananarivo, RANDRIAMIARAMANANA Hary Hajaniaina, December 2015*
53. *Ministry of Mine, Antananarivo, RANDRIANIRINA Andréa, December 2015*
54. *Ministry of Energy, Madagascar, data 2012, Antananarivo, RANJEVASOA Mbolatiana, November 2015*
55. *Ministère de l'Enseignement Supérieur et de Recherche Scientifique, Antananarivo, TODIARIVO Pierre, November 2015*
56. *Ministry of Water and Sanitation, Madagascar 2015*
57. *Office Malgache des Hydrocarbures (OMH) Madagascar, data 2014 from OMH 2016*
58. *Office Malagasy de l'Or, 2014*
59. *SAMVA, Antananarivo, Serge, Directeur Général Adjoint, November 2015*
60. *Office Malgache for Mining (OMNIS), Antananarivo, RAKOTOSON, November 2015*
61. *QIT MADAGASCAR MINELAS, Antananarivo, RANAIVOMAHEFA Harilanto Lalasoa, Coordinatrice Transport et Douanes, December 2015*
62. *Syndicat des Industries de Madagascar, Antananarivo, RAJAONARIVELO Laurent, December 2015*
63. *Société HOLCIM, Ibity Antsirabe, January 2016*
64. *Université de Tuléar, Institut Halieutiques et des Sciences Marines (I.H.S.M), Jackie, Ex-Chef de Département Formation, November 2015*

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ANNEX II: UNEP TOOLKIT Calculation Spreadsheet

Executive summary table of estimated mercury releases

Source category	Calculated Hg output, Kg/y						Total releases by source category	Percent of total releases*3*4
	Air	Water	Land	By-pro-ducts and impurities	General waste	Sector specific treatment /disposal		
5.1: Extraction and use of fuels/energy sources	1 779,13	24,98	23,05	0,00	0,00	0,00	1 827,16	2,31
5.2: Primary (virgin) metal production	1 755,06	304,21	280,81	0,00	0,00	0,00	2 340,08	2,95
5.3: Production of other minerals and materials with mercury impurities*1	32,82	5,69	5,25	0,00	0,00	0,00	43,77	0,00
5.4: Intentional use of mercury in industrial processes	0,00	0,00	**0,00**	0,00	0,00	0,00	0,00	0,00
5.5: Consumer products with intentional use of mercury (whole life cycle)	37 297,94	8 049,85	7 740,89	0,00	3 698,63	0,00	56 787	71,70
5.6: Other intentional product/process use*2	351,90	326,9	197,6	81,29	302,2	0,00	1 260	1,59
5.7: Production of recycled metals	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00
5.8: Waste incineration and burning (open waste burning)	11 771,15	2 040,33	1 883,38	0,00	0,00	0,00	15 694,87	19,82
5.9: Waste deposition/landfilling and waste water treatment*3*4	383,14	3 028,96	3 065,12	0,00	0,00	0,00	6 477,22	8,18
5.10: Crematoria and cemeteries	0,21	0,00	1 000,00	0,00	0,00	0,00	1 000,21	1,26
SUM OF QUANTIFIED RELEASES*3*4	**53 371,21**	**11 135**	**10 616**	**81,29**	**4 000,84**	**0,00**	**79 204**	**100,00**

Summary of estimated mercury releases

C/ Sub-C	Source category	Exists? (y/n/?)	Calculat. Hg, input to society, Kg/y	Calculated Hg output, Kg/y					
				Air	Water	Land	By-products and impurities	General waste	Sector specific treatment /disposal
5.1	**Source category: Extraction and use of fuels/energy sources**	y							
5.1.1	Coal combustion in large power plants	N							
5.1.2	Other coal use	Y	1,80	1,80	0,00	0,00	0,00	0,00	0
5.1.3	Mineral oils - extraction, refining and use	Y	192,99	144,96	24,98	23,05	0,00	0,00	0
5.1.5	Other fossil fuels - extraction and use	Y	83,03	83,03	0,00	0,00	0,00	0,00	0
5.1.6	Biomass fired power and heat production	Y	1 549,34	1 549,34	0,00	0,00	0,00	0,00	0
5.1.7	Geothermal power production	N							
5.2	**Source category: Primary (virgin) metal production**	y							
5.2.1	Mercury extraction and initial processing	N							
5.2.2	Gold (and silver) extraction with mercury amalgamation processes	Y	2 340,00	1 755,00	304,20	280,80	0,00	0,00	0
5.2.3	Zinc extraction and initial processing	N							
5.2.4	Copper extraction and initial processing	N							
5.2.5	Lead extraction and initial processing	N							
5.2.6	Gold extraction and initial processing by methods other than mercury amalgamation	Y	0,08	0,06	0,01	0,01	0,00	0,00	0
5.2.7	Aluminum extraction and initial processing	N							
5.2.8	Other non-ferrous metals - extraction and processing	N							
5.2.9	Primary ferrous metal production	N							
5.3	**Source category: Production of other minerals and materials with mercury impurities**	y							
5.3.1	Cement production	Y	20,35	15,26	2,65	2,44	0,00	0,00	0
5.3.2	Pulp and paper production	Y	0,08	0,06	0,01	0,01	0,00	0,00	0
5.3.3	Production of lime and light weight aggregates	Y	23,34	17,50	3,03	2,80	0,00	0,00	0
5.3.4	**Source category: Others minerals and materials**	N							
5.4	Intentional use of mercury in industrial processes								
5.4.1	Chlor-alkali production with mercury-technology								
5.4.2	VCM (vinyl-chloride-monomer) production with mercury-dichloride (HgCl2) as catalyst								
5.4.3	Acetaldehyde production with mercury-sulphate (HgSO4) as catalyst								
5.4.4	Other production of chemicals and polymers with mercury compounds as catalysts								
5.5	**Source category: Consumer products with intentional use of mercury**	y							
5.5.1	Thermometers with mercury	Y	405,55	81,11	121,67	81,11	-	121,67	0
5.5.2	Electrical switches and relays with mercury	Y	613,00	183,90	0,00	245,20	-	183,90	0
5.5.3	Light sources with mercury	Y	5,43	1,63	0,00	1,63	-	2,17	0
5.5.4	Batteries with mercury	Y	6 703,00	1 675,75	0,00	1 675,75	-	3 351,50	0
5,5,5	Polyurethane	y	131,33	26,27	13,13	52,53	0,00	39,40	
5.5.6	Biocides and pesticides with mercury	Y	46 420	34 815	6 034,60	5 570,40	-	0,00	0
5.5.7	Paints with mercury	Y	559,00	514,28	27,95	16,77	-	0,00	0
5.5.8	Cosmetics and related products with mercury	Y	1 950,00	0,00	1 852,50	97,50	-	0,00	0
5.6	**Source category: Other intentional product /process use**	y							
5.6.1	Dental mercury-amalgam fillings (b	Y	175,36	2,56	42,44	0,00	81,29	49,08	0
5.6.2	Manometers and gauges with mercury	Y	865,63	185,16	255,97	171,38	0,00	253,12	0
5.6.3	Laboratory chemicals and equipment with mercury	Y	218,88	164,16	28,45	26,27	0,00	0,00	0
5.6.4	Mercury metal use in religious rituals and folklore medicine	?							
5.6.5	Miscellaneous product uses, mercury metal uses, and other sources	?							
5.7	**Source category: Production of recycled metals ("secondary" metal production)**								
5.7.1	Production of recycled mercury ("secondary production")	?							
5.7.2	Production of recycled ferrous metals (iron and steel)	?							
5.7.3	Production of other recycled metals	?							
5.8	**Source category : Waste incineration*3**	y	0,00						
5.8.1	Incineration of municipal/general waste	N	0,00	0,00	0,00	0,00	0,00	0,00	0

5.8.2	Incineration of hazardous waste	?	0,00	0,00	0,00	0,00	0,00	0,00	0
5.8.3	Incineration of medical waste	Y	180,84	135,63	23,51	21,70	0,00	0,00	0
5.8.4	Sewage sludge incineration	N	0,00	0,00	0,00	0,00	0,00	0,00	0
5.8.5	Informal waste burning	Y	15 514,03	11 635,52	2 016,82	1 861,68	0,00	0,00	0
5.9	**Source category: Waste deposition/landfilling and waste water treatment**								
5.9.1	Controlled landfills/deposits	N							
5.9.2	Diffuse deposition under some control	N							
5.9.3	Informal local disposal of industrial production waste	?							
5.9.4	Informal dumping of general waste*1*3	Y	3 831,41	383,14	383,14	3 065,12	0,00	0,00	0
5.9.5	Waste water system/treatment*2	Y	2 645,82	0,00	2 645,82	0,00	0,00	0,00	0
5.10	**Source category: Crematoria and cemetaries**	y							
5.10.1	Crematoria/cremation	Y	0,21	0,21	0,00	0,00	-	0,00	0
5.10.2	Cemeteries	Y	1 000,00	0,00	0,00	1 000,00	-	0,00	0
	SUM OF QUANTIFIED INPUTS AND RELEASES *1*2*3*4		**67 210, 30**	**53 371, 21**	**11 135,05**	**10 615,94**	**81,29**	**3 961,44**	

ANNEX III : Ressources consulted

- **MINAMATA Convention Website:** http://www.mercuryconvention.org/
- **MINAMATA Convention Text** http://www.mercuryconvention.org/Convention/tabid/3426/Default.aspx
- **Materials developed by the interim secretariat of the MINAMATA Convention** http://www.mercuryconvention.org/AwarenessRaising/Resources/tabid/3873/Default.aspx
    - Becoming a Party to the MINAMATA Convention on Mercury (FACT SHEET)
    - MINAMATA Convention on Mercury at a glance (FACT SHEET)
    - Overview of the negotiations process (PPT)
    - Overview of the MINAMATA Convention on Mercury (PPT)
    - Provision of the Convention on financial and technical support (PPT)
    - Practical steps of the ratification, acceptance, approval or accession processes and notifications under the MINAMATA Convention (PPT)

- **Toolkit for Identification and Quantification of Mercury Releases (UNEP)**http://www.unep.org/chemicalsandwaste/Metals/MercuryPublications/GuidanceTrainingMaterialToolkits/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
- **Checklist of legal authorities to implement MINAMATA Convention on Mercury [Natural Resources Defense Council - NRDC].** http://docs.nrdc.org/international/files/int_15101301a.pdf
- **MINAMATA Convention on Mercury - Ratification and Implementation Manual[Zero Mercury Working Group, Natural Resources Defense Council, Ban Toxics]** http://www.zeromercury.org/phocadownload/Developments_at_UNEP_level/MINAMATAmanual_eng_january%202015%20final.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
- **Draft guidance on identification of individual stocks of mercury or mercury compounds exceeding 50 metric tons, as well as sources of mercury supply generating stocks exceeding 10 metric tons per year**
- **Cycle de mercure** http://www.mercuryconvention.org/Portals/11/documents/meetings/inc7/English/7_4_e_stock.pdf http://tpe-securitealimentaire.weebly.com/i-la-pollution-au-mercure-en-guyane
- **Photo image Effets de mercure, Observatoire Voarisoa**