



# Minamata Convention Initial Assessment in SUDAN



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# List of Acronyms and Abbreviations

<b>ASGM</b>	Artisanal small-scale gold mining
<b>CBS</b>	Central Bureau of Statistics
<b>CSOs</b>	Civil Society Organizations
<b>DNFP</b>	Designated National Focal Point
<b>EHFCA</b>	Environmental Health and Food Control Administration
<b>FMoA</b>	Federal Ministry of Agriculture
<b>FMoH</b>	Federal Ministry of Health
<b>FMoIT</b>	Federal Ministry of Industry and Trade
<b>GCA</b>	General Customs Administration
<b>GDP</b>	Gross Domestic Product
<b>GDoEH</b>	General Directorate of Environmental Health
<b>GEF</b>	Global Environment Facility
<b>HCENR</b>	Higher Council of Environment and Natural Resources
<b>Hg</b>	Mercury
<b>HSE</b>	Health, Safety and Environment
<b>IRCC</b>	Industrial Research and Consultation Center
<b>INC</b>	Interim National Constitution

# List of Acronyms and Abbreviations

<b>IOMC</b>	Inter- Organization Programme for Sound Management of Chemicals
<b>MIA</b>	Minamata Initial Assessment
<b>MDGs</b>	Millennium Development Goals
<b>MHESR</b>	Ministry of Higher Education and Scientific Research
<b>MI&amp;C</b>	Ministry of Industry and Commerce
<b>MoOG</b>	Ministry of Oil and Gas
<b>MoMR</b>	The Ministry of Mineral Resources
<b>MoOG</b>	Ministry of Oil and Gas
<b>NCL</b>	National Chemical Laboratories
<b>NDPB</b>	National Drugs and Poisons Board
<b>NGOs</b>	Nongovernmental organizations
<b>NMA</b>	National Mining Association
<b>NPC</b>	National Pesticide Council
<b>NSCD</b>	National Strategy for the Comprehensive Development
<b>NSS</b>	National Statistical System
<b>NSDS</b>	National Strategy for the Development of Statistic
<b>OHD</b>	Occupational Health Department

# List of Acronyms and Abbreviations

PPE	Personal Protective Equipment
POPs	Persistent Organic Pollutants
PPD	Plant Protection Directorate
UNIDO	United Nations Industrial Development Organization
UNITAR	United Nations Institute for Training and Research
SCPS	Sudanese Consumer Protection Society
SDGs	Sustainable Development Goals
SECS	Sudanese Environment Conservation Society
SMRC	Sudanese Mineral Resources Company
SSMO	Sudanese Standard and Metrology Organization
SWGU	Sudanese Women General Union
SNA	System (survey) of National Accounts
SSDS	Sectoral Strategy for the Development of Statistics
WCO	World Customs Organization

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# FOREWORD

Mercury is released in the environment through either natural sources such as volcanic activity, weathering of rocks, water movements, biological processes or anthropogenic sources including human activities that involve the use of mercury, mercury compounds or mercury containing raw materials, products, equipment and wastes. The Minamata Convention on Mercury is a global treaty to protect human health and the environment from the anthropogenic emissions and releases of mercury and mercury compounds. Mercury in its elemental or organic forms is a persistent pollutant in the environment that can circulate globally before being deposited on land or into water bodies and further transported or re-emitted to the atmosphere. It is known to bio-accumulate in the food chain, at levels that adversely affect human health and ecosystems. Elemental and methyl mercury are toxic to the neurological, digestive and immune systems, lungs, kidneys and liver. Effects may be fatal in severe cases. Methyl mercury can affect the brain of developing fetuses, therefore it has particular concern to pregnant women and women of childbearing age. Mercury can also cause learning disabilities in children and interfere with reproduction in birds and mammals.

The Republic of Sudan has signed the Minamata Convention on the 24th of September, 2014, and has undertaken several steps towards the ratification of the Convention. Sudan's government Council of Ministers approved the ratification on the 6th of April, 2021, and now awaiting the final endorsement by the joint meeting of the Council of Ministers and the Sovereign Council.

In order to facilitate the ratification process, the Higher Council for Environment and Natural Resources (HCENR) has executed a Global Environment Facility (GEF) funded project on the "Development of the Minamata Initial Assessment (MIA) in the Sudan". The project was implemented under the support of the United Nations Industrial Development Organization (UNIDO) in collaboration with the United Nations Institute for Training and Research (UNITAR) for technical assistance. This project improved the national capacity for ratification and made the country better prepared for implementation of the Minamata Convention following the ratification. The project delivered four outputs:

1. Identification of institutional gaps and establishment of national coordination body for mercury
2. Review of existing mercury related regulations and identification of needed policy reforms for implementation of the Minamata Convention.
3. Establishment of national mercury profile based on the initial inventory and identify key sectors for intervention and investment to reduce, and where possible eliminate, mercury use, release, and emissions.
4. Dissemination of information among relevant stakeholder groups (academia, public and private sectors, and civil society).

Results of the various assessment activities were compiled in this MIA report which is organized according to the model developed by UNIDO in collaboration with UNITAR.

The MIA identified 28 major and 11 minor sources of mercury present in the country . Gold extraction with mercury amalgamation (from whole ore) was found to be the main source, contributing 81% of all mercury releases in the country; followed by primary metal production, which is contributing 13%; the use and disposal of other products contributing 3%; and mercury release from waste stream related activities.

The development and adoption of this document - Minamata Convention on Mercury Initial Assessment report for Sudan is a practical demonstration of the commitment of the Government of Sudan towards the completion of the ratification process and implementation of the provisions of the Minamata Convention on Mercury. The document will be presented to all stakeholders and development partners to ensure their support during implementation of the provisions of the convention. Our ultimate goal is to protect human health and the environment from the anthropogenic emissions and releases of mercury and mercury compounds. We hope that this document will pave the way for proper implementation of the convention.

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# ACKNOWLEDGEMENTS

The Higher Council for Environment and Natural Resources (HCENR) of the government of Sudan in collaboration with the United Nations Industrial Development Organization (UNIDO) and the United Nations Institute for Training and Research (UNITAR), under the guidance of the project's National Steering Committee (NSC) coordinated the development of this document "Minamata Convention on Mercury Initial Assessment (MIA) in Sudan". This document is a result of the hard work, commitment, dedication and inclusive participation of all relevant stakeholders including individuals, governmental and non-governmental institutions.

HCENR hereby expresses its sincere gratitude and deep thanks to the members of the National Steering Committee and all national stakeholders who made contributions to the development of this document. The efforts of the project Team and consultants are highly acknowledged for their hard work, commitment and smooth cooperation during the execution of the project. The project team was comprised of Ms. Sit Nour Hassan and her successor Mrs. Namarig Yassin (project coordinator), Mr. Ali Mohamed Ali (National consultant), Professor Azhari Omer Abdelbagi, (National consultant for mercury inventory and identification of priorities and proposal of intervention plans), Dr Eltayib Murkaz (national consultant for review of legal framework), professor Asim Maghrabi (national consultant for institutional capacity assessment), Dr Ahmed Mohamed Ali Hammad (national consultant for identification of population at risk), Mr. Samir Badar (National consultant from the ministry of Energy and Mining), Miss. Ahlam Mukhtar Abdelgalil (national consultant from occupational Health Department, Ministry of health) and Mrs. Handi Atta E. Mohamed, (national consultant from the Ministry of Industry and Trade).

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The Government of Sudan is committed to protection of human health and the environment from the hazards of mercury. This document provides initial assessment of mercury management in Sudan and will be distributed to all stakeholders in the country for their participation in the implementation of the provisions of the convention.

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## Mercury

Mercury in its elemental or organic forms is a persistent pollutant in the environment that can circulate globally before being deposited on land or into water bodies and further transported or re-emitted to the atmosphere. It is released through natural sources that include volcanic activity, weathering of rocks, water movements, biological and processes and anthropogenic sources including all human activities that involve the use of mercury, mercury compounds or mercury containing raw materials, products, equipment and wastes.

Mercury is known to bio-accumulate in the food chain, at levels that adversely affect human health and ecosystem. Elemental and methyl mercury are toxic having harmful effects on the neurological, digestive and immune systems, lungs and kidneys, liver and may be fatal. Methyl mercury can affect the developing fetuses brains being a particular concern to pregnant women and women of childbearing age. Mercury can also cause learning disabilities in children and interfere with reproduction in birds and mammals.

## Country Profile

Sudan is the third largest country in Africa having an area of 1.88 million square kilometers. It is situated in northern Africa and is bordered by Egypt, Eritrea, Ethiopia, South Sudan, the Central African Republic, Chad, Libya and the Red Sea. Sudan has a federal system of government with 18 states.

Sudan's landscape consists of gentle plains and few dotted hills. The Nile river, together with its tributaries (The Blue Nile, White Nile and Atbra River) flows northwards through Egypt to the Mediterranean Sea. The Sudan climatic conditions constitute zones ranging from the desert in the north to the wet monsoon in the extreme south. The average annual rainfall increases from north to south, ranging in amount from almost zero mm in the arid north to over 800 mm in the tall grass savannah regions and from a few days to four months in duration. Temperature in summer ranges between 37 to 44°C. The mean maximum temperature in the coldest month ranges between 18°C to 21°C.

In 2017, the Sudan population was estimated as 40.78 million (CBS 2018). About 70.2% of this population resides in rural areas and is directly dependent on natural resources for its livelihood and employment. Agriculture is the mainstay of the national economy with about 80% of the people engaged in crop and animal production (Mohamed 2020).

Agriculture is the leading sector in the national economy contributing to over 37.2% of GDP, and the share of agriculture commodities from the total value of the export in 2018 was 8.5%. The main agricultural crops and products are cotton, groundnuts, sesame, sorghum, sunflower, wheat, millet, Arabic gum sugar cane, onions and banana.

Sudan is a country with substantial water resources that include, besides precipitation, rivers, seasonal streams, lakes and groundwater aquifers. The country also opens on the Red Sea with a 750-km coast.

The geology of the Sudan is dominated by the basement complex formations of the Pan-African terrains that cover more than 50% of its area.

Rich mineral resources available in Sudan have not been fully explored (though include petroleum, natural gas, gold, silver, chromite, manganese, gypsum, mica, zinc, iron, lead, uranium, copper, kaolin, cobalt, granite, nickel and tin (Elsamani 2015).

The most important industries are textiles, cement, oil, sugar, soap, tanneries, food stuff, mining and transformational industries.

Sudan has plentiful resources for export where animal resources, gum Arabic, cotton, oil seeds and gold are significant sources for the Treasury of the country, besides other minerals and agriculture products.

## The Minamata Convention

The Minamata Convention on Mercury is a global treaty to protect human health and the environment from the anthropogenic emissions and releases of mercury and mercury compounds (UNEP 2013c), Japan. The Convention entered into force on 16 August 2017, and the first conference of parties was held on the last week of September 2017. 128 countries had signed the treaty and yet 125 had ratified it. Sudan signed the Convention in 2014 and has undertaken meaningful steps towards the ratification.

# The Minamata Initial Assessment (MIA) Project

The Higher Council for Environment and Natural Resources of The Sudan executed a Global Environment Facility-funded project on the 'Minamata Initial Assessment (MIA) in the Sudan'. The project is implemented by the United Nations Industrial Development Organization with technical assistance of the United Nations Institute for Training and Research. The project objective was to complete the pre-ratification activities under the Minamata Convention so as to enable policy and strategic decision making and to prioritize areas for future interventions.

The National Inventory of Mercury Releases in Sudan 2019 was carried out applying the data for the year 2017 to the UNEP mercury inventory toolkit.

The summary of the results of the inventory of mercury in Sudan are represented in Table (1).

Table (1) Summary of Sudan mercury inventory results

Source	Percentage				
<b>Source group of major mercury inputs to society</b>	Gold extraction with Hg amalgamation <b>81%</b>	Primary metal production (excluding gold production by Hg amalgamation) <b>13%</b>	Use and disposal of other products <b>3%</b>	Waste incineration and open waste burning <b>1%</b>	Cemeteries <b>1%</b>
<b>The highest mercury inputs sub-categories</b>	Gold extraction from whole ore amalgamation with mercury <b>80.8%</b>	Primary metal production (excluding gold production by amalgamation) <b>14.6%</b>	Use and disposal of other products <b>2.99%</b>	Informal dumping of general waste <b>2.4%</b>	Informal open burning of waste and on landfills <b>1.4%</b>
<b>Sub-categories with the highest mercury releases to the atmosphere</b>	Gold extraction with mercury amalgamation <b>83.8%</b>	Waste incineration and open burning of waste <b>7.39%</b>	Use and disposal of other products <b>3.07%</b>	Primary metal production (excluding gold production by amalgamation) <b>3.05%</b>	

Source	Percentage					
<b>The major sources of release to water</b>	Gold extraction with mercury amalgamation <b>96.41%</b>	Use and disposal of other products <b>1.7%</b>	Primary metal production (excl. gold production by amalgamation) <b>0.87%</b>			
<b>The major sources of release to land</b>	Gold extraction with mercury amalgamation - from whole ore <b>68.99%</b>	Primary metal production (excluding gold production by amalgamation) <b>28.11%</b>	Informal dumping of general waste <b>4.12%</b>	Use and disposal of other products <b>1.53%</b>	Open burning of waste <b>1.4%</b>	Cemeteries <b>1.34%</b>
<b>Flows of mercury with waste and waste water</b>	other products use and disposal <b>96.05%</b>	application, use and disposal of dental amalgam fillings <b>3.81%</b>				

## Data gaps

The identified data gaps include; mercury content in the tailings of artisanal gold mining, recycled mercury in the gold mining sector, local production of skin lightening soaps and creams with mercury, the mercury contents in imported paints, national statistics on light sources and batteries with mercury.

## Policy, regulatory and Institutional Framework assessment

The existing mercury related policies, regulations and institutions were reviewed and evaluated so that Sudan can be prepared for implementation of the Minamata Convention .

Sixteen national laws and regulations relevant to the implementation of the Minamata Convention have been assessed. These include: the Environment Protection Act 2001, Environment Health Act 2009, Penal Code 1991, Pesticide and Pests' Products Control Act 1994, Standards and Metrology Act 2008, Minerals Resources Development Act 2015, Regulations for the Organization of Mercury Importation, Use and Circulation 2012, Regulations for Protection of the Environment in the

Petroleum Industry (Amendment) 2005, Civil Transactions Act 1984 National Agricultural Fertilizers Act 2010, Labor Act 1997, Drugs and Poisons Act 2009, Traffic Act 2010, Electricity Act 2001 and Forests and Renewable Natural Resources Act 2002, Local Government Act 2003.

The Sudanese institutional assessment reviewed 19 institutions from the public sector, civil society and parastatal and private industry organizations for their year of establishment, vision, mission, mandate / function, structure, institutional capacities, policies and publications in addition to institutional gender aspects and institutional challenges. The institutions assessed are The Higher Council of Environment and Natural Resources, The Ministry of Minerals, Sudanese Mineral Resources Company, The Ministry of Oil and Gas , Federal Ministry of Health, National Chemical Laboratories, National Drugs and Poisons Board, Occupational Health Department, Environmental Health and Food Control Administration, The Federal Ministry of Industry and Trade, Central Bureau of Statistics, Sudanese Standard and Metrology Organization, Federal Ministry of Agriculture/ The National Pesticide Council, General Customs Administration, Ministry of Higher Education and Scientific Research, Sudamin Company Limited, The Sudanese Environment Conservation Society and Sudanese Consumer Protection Society.

The assessment revealed that:

- There are in existence scattered general national regulatory and institutional measures that address some aspects of the Minamata Convention;
- The principal legislative gap in the existing legal framework is the lack of regulatory and institutional measures on mercury-added products;
- absence of specific guidelines, strategies and regulations related to manufacturing processes in which mercury or mercury compound are used;
- There is a need to sensitize policy makers and the law enforcement agencies about the important issues related to the Minamata Convention and the role of each stakeholder.

# Identification of population at risk and gender dimension

The inventory results indicated that five types of population may be risk of exposure to mercury due to anthropogenic sources. These are;

- population involved directly or indirectly in artisanal gold mining;
- population in the licensed gold mining companies (using tailings of ASGM as raw materials),
- population exposed to mercury-containing beauty care products;
- population exposed to mercury in the waste stream; and
- population exposed to mercury from dental amalgam and medical laboratories,

In the ASGM sector the mining activities consist of detection of ore containing gold, digging and collection of suspected soil and transporting the soil to specific places called mining markets where processing takes place. The main ASGM processes in which Hg use and exposure takes place are related to artisanal gold extraction with mercury. There are 73 artisanal gold mining markets distributed in 14 states of Sudan. The populations at these markets were estimated as two million people doing more than 33 different jobs. These populations' degrees of exposure vary according to the job performed; the most highly exposed are amalgam-burning workers, followed by washing and milling workers.

The majority of washing workers are children (aged 10-15 years) while the milling and burning workers are in a broader age range (15-60 years). The ASGM workers found at the northern, central and eastern states are almost all males, with the exception of the western states and Blue Nile State markets where the mining activity is done within the family holdings, implying the risk of exposure in other populations, notably females, pregnant women, infants and older persons.

The population exposed to mercury in the waste stream can be classified into subcategories according to Hg sources as: workers of informal dumping of solid waste, open burning of waste (on landfills and informally) and waste scavengers; communities living around the waste dump sites; and population exposed to mercury in dental amalgam and medical sector.

For the population at risk from the use of mercury-containing soap and creams (for skin-lightening purposes), the national statistical data of women in the range of 15-65 year age was used for estimation of their total number (assuming 50% of the population is women and 50 % of those in age category 15-65 year use such products). It is worth mentioning that these products are not used by men in most cases.

## Implementation Plan & Priorities for Action

Based on the outcome of the inventory of mercury releases in Sudan, the major priority areas for intervention were identified as: the national ratification of Minamata convention; capacity building and/or strengthening of the national legal and institutional framework to fulfil the requirements of Minamata Convention; reduction and, where feasible, elimination of the use, emissions and releases of mercury and mercury compounds in and from Artisanal and Small-scale Gold Mining; phasing-out the use and import of Mercury-added Products; a sound waste management system, particularly mercury-containing waste; and the phasing-down of the use of dental amalgams.

The total estimated budget for these intervention plans is US\$7,850,000 (Seven million, eight hundred and fifty thousand United States dollars).

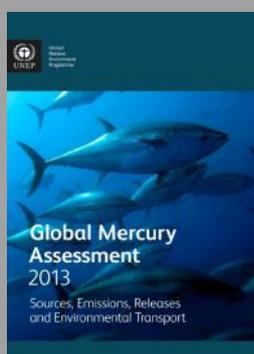
## 1. MERCURY: A PUBLIC HEALTH AND ENVIRONMENTAL CONCERN

Mercury, commonly known as quicksilver, is an element with symbol Hg and an atomic number of 80. It is a dense, silver-white metal that is liquid at ordinary temperatures. It has unique properties of expansion and contraction in response to temperature changes and maintaining its volume in response to pressure changes.

Mercury in the environment exists in three forms: elemental, inorganic and organic. mercury occurs in its elemental form in the earth's crust and is more commonly found in combination with other elements to form inorganic mercury compounds (e.g. mercuric chloride, mercuric nitrate, mercuric oxide, mercuric sulphide). Furthermore, it may be subject to biotransformation by aquatic microorganisms into the organic forms such as methyl mercury and ethyl mercury.

Mercury is a persistent pollutant in the environment. It is released through:

- Natural sources that include volcanic activity, weathering of rocks, water movements, biological and processes,
- anthropogenic sources such as human activities of combustion of fossil fuels (specially coal), electricity-generating power stations, gold and mercury mining, manufacture of cement, pesticides, chlorine, caustic soda, mirrors and medical equipment, industrial leaks, dentistry, waste and corpse incineration and
- Remobilization of historic sources: mercury in soil, sediment, water, landfill, waste (WHO 2007)



The Global Mercury Assessment (UN Environment, 2013a) estimates anthropogenic sources are responsible for 30% of annual emissions of mercury to air. Another 10% comes from natural geological sources and the rest (60%) is from re-emissions of previously released mercury that has built up over decades and centuries in surface soil and oceans

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

Mercury is known to be present in various environmental media and food (especially in fish and seafood) globally. It can bio accumulate in the food chain, at levels that adversely affect human health and wildlife. Furthermore, exposure to mercury may be magnified where current or past economic activities have resulted in landfills, mine tailings, factory sites, soils and sediments contaminated with mercury.

Mercury is considered by the World Health Organization (WHO) as one of the top ten chemicals or groups of chemicals of major public health concern. Elemental and methyl mercury are toxic to the central and peripheral nervous systems. According to WHO (2017), the inhalation of mercury vapour can have harmful effects on the nervous, digestive and immune systems, lungs and kidneys, and may be fatal. The inorganic salts of mercury are corrosive to the skin, eyes and gastrointestinal tract, and may induce kidney toxicity if ingested. Moreover, after exposure to mercury, neurological and behavioral disorders can occur, including tremors, insomnia, memory loss, neuromuscular effects, headaches and cognitive and motor dysfunction, as well as kidney failure. There is no conclusive evidence linking mercury exposure to cancer in humans (WHO 2017).

Neurotoxicity is the most significant health concern associated with mercury exposure. Methyl mercury easily reaches the bloodstream and is distributed to all tissues, and can cross the normally protective blood-brain barrier and enter the brain. It can also readily move through the placenta to developing fetuses and their developing brains, and is therefore a particular concern to pregnant women and women of childbearing age. Low-level exposure is linked to learning disabilities in children and interference with reproduction in fish-eating wildlife such as loons, eagles and otters are also at risk from mercury contamination. Reproductive problems are the primary concern for birds suffering from mercury poisoning. Other mercury effects in birds and mammals include liver damage, kidney damage, and neurobehavioral effects.

## 2. THE MINAMATA CONVENTION ON MERCURY

The Minamata Convention on Mercury is a global treaty to protect human health and the environment from the anthropogenic emissions and releases of mercury and mercury compounds (UNEP 2013c). The legally binding global instrument was agreed upon at the fifth session of the Intergovernmental Negotiating Committee in Geneva, Switzerland, 19 January 2013. The treaty was formally adopted and opened for signature at the Diplomatic Conference held from 9 to 11 October 2013 in Minamata and Kumamoto, Japan. The Convention entered into force on 16 August 2017, and the first conference of parties was held on the last week of September 2017. 128 countries have signed the treaty and 127 have ratified it.

Sudan became a signatory on 24 September 2014 and has taken significant steps towards the ratification of the convention.

Controlling the anthropogenic emissions and releases of mercury throughout its lifecycle has been a key factor in shaping the obligations under the Convention, which include a ban on new mercury mines and the phase-out of existing ones, the phase-out and phase down of mercury use in a number of products and processes, control measures on emissions to air and on releases to land and water, and the regulation of the informal sector of artisanal and small-scale gold mining. The Convention also addresses interim storage of mercury and its disposal once it becomes waste, sites contaminated by mercury as well as health issues. (UN Environment and Minamata Convention Secretariat, 2021)

## 3. SUMMARY OF KEY PROVISIONS OF THE MINAMATA CONVENTION

The convention articles related to mercury management	
Art.3 Mercury supply sources and trade	Art.12 Contaminated sites
Art.4 Mercury-added products	Art.13 Financial resources and mechanism
Art.5 Manufacturing processes in which mercury or mercury compounds are used	Art.14 Capacity-building, technical assistance and technology transfer
Art.6 Exemptions available to a Party upon request	Art.15 Implementation and Compliance Committee
Art.7 Artisanal and small-scale gold mining	Art.16 health aspects
Art.8 Emissions	Art.17 information exchange
Art.9 Releases	Art.18 public information, awareness and education.
Art.10 Environmentally sound interim storage of mercury	Art.19 research, development and monitoring.
Art.11 Mercury waste	Art.20 implementation plans

## 4. CORE OBLIGATIONS OF THE MINAMATA CONVENTION

The Minamata Convention imposes a set of core obligations on each State Party; which can be summarized as follows:

- a. Each Party shall not allow primary mining that was not being conducted within its territory at the date of entry into force of the Convention for it. (Article 3(3)) The ongoing primary mercury mining shall only be allowed for a period up to fifteen years after the date the Convention becomes legally binding for the particular Party. (Article 3(4)). During this period, mercury from such mining shall only be used in manufacturing of mercury-added products as prescribed in Article 4, in manufacturing processes in line with Article 5, or be disposed in accordance with Article 11, using operations that do not lead to recovery, recycling, reclamation, direct re-use or alternative uses.
- b. Manufacturing, import or export of mercury-added products listed in Part 1 of Annex A is prohibited after 2020 the phase-out date fixed for those products.
- c. Manufacturing processes in which mercury or mercury compounds are used shall not include processes using mercury-added products, processes for manufacturing mercury-added products or processes that process mercury-containing waste. (Article 5(1)).
- d. Each Party that has artisanal and small-scale gold mining and processing within its territory shall take steps to reduce, and where feasible eliminate, the use of mercury and mercury compounds in, and the emissions and releases to the environment of mercury from, such mining and processing. (Article 7).
- e. Each party with relevant sources shall take measures to control and where feasible reduce emissions from existing point sources through emissions limit values, BAT, BEP, or other alternative measures no later than 10 years after the date of entry into force of the Convention for that Party. For its new sources, each party shall require the use of BAT and BEP to control and, where feasible, reduce emissions, as soon as practicable but no later than five years after the date of entry into force of the Convention for that Party. (Article 8)
- f. Each Party shall endeavour to control, or at least reduce the releases of mercury and mercury compounds to land and water from the relevant point sources not addressed in the Convention. (Article 9).

g. The relevant definitions of the Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and Their Disposal shall apply to wastes covered under the Minamata Convention.

For the purposes of the latter Convention, mercury wastes means substances or objects:

- (i) Consisting of mercury or mercury compounds;
- (ii) Containing mercury or mercury compounds; or
- (iii) Contaminated with mercury or mercury compounds.

h. Each Party shall develop appropriate strategies for identifying and assessing sites contaminated by mercury or mercury compounds. (Article 12).

i. Each Party shall promote the development and implementation of strategies and programmes to identify and protect populations at risk, particularly vulnerable populations. (Article 16).

j. Each Party shall facilitate scientific, technical, economic and legal information concerning mercury and mercury compound, including toxicological, Eco toxicological and safety information. (Article 17).

k. Each Party shall, within its capabilities, promote and facilitate:

Provision to the public of available information on:

- (i) The health and environmental effects of mercury and mercury compounds;
- (ii) Alternatives to mercury and mercury compound;
- (iii) Scientific, technical, economic and legal information concerning mercury and mercury compound. (Topics listed in Paragraph 1 of Article 17); and
- (iv) The results of its research, development and monitoring activities stated in Article 19; and
- (v) Activities to meet its obligations under the Convention;

Education, training and public awareness related to the effects of exposure to mercury and mercury compounds on human health and the environment in collaboration with relevant intergovernmental and non-governmental organizations and vulnerable populations, as appropriate.

## 5. THE MINAMATA INITIAL ASSESSMENT (MIA) PROJECT

The Republic of the Sudan has signed the Minamata Convention and has undertaken meaningful steps to further the ratification of the Convention. In order to facilitate the ratification process, the Higher Council for the Environment and Natural Resources (HCENR) has executed a Global Environment Facility (GEF) funded project on the “Development of the Minamata Initial Assessment (MIA) in the Sudan”. The project is implemented by the United Nations Industrial Development Organization (UNIDO) with support of the United Nations Institute for Training and Research (UNITAR) for technical assistance to HCENR. The expected project outcome will lead to the national capacity improvement to ratify and prepare the country for implementation of the Minamata Convention. The project has four outputs

- a. Institutional gaps identified and national coordination on mercury established
- b. Review of existing mercury related regulations and identification of needed policy reforms to prepare for implementation of the Minamata Convention completed
- c. National mercury profile established based on the initial inventory and key sectors identified for intervention and investment to reduce, and where possible eliminate, mercury use, release, and emissions and
- d. Dissemination of information among relevant stakeholder groups (academia, public and private sectors, and civil society) conducted.

Finally, the results of the various assessment activities were compiled in this MIA report which is organized according to the model developed by UNDP in collaboration with UNITAR and with review provided by the Inter-Organization Programme for the Sound Management of Chemicals (IOMC) agencies.

## 1. COUNTRY PROFILE

Sudan is the third largest country in Africa. It is situated in northern Africa and is bordered by Egypt to the north, the Red Sea to the northeast, Eritrea and Ethiopia to the east, South Sudan to the south, the Central African Republic to the southwest, Chad to the west and Libya to the northwest (Fig 1).

Sudan covers a total area of 1.88 million square kilometers which lies between latitudes 10 degrees and 22 degrees N. and longitudes 22 to 38 degrees East and with a 750 kms (466 miles) coastline bordering the Red Sea.

Sudan has a federal system of government with 18 states. (Fig 1)

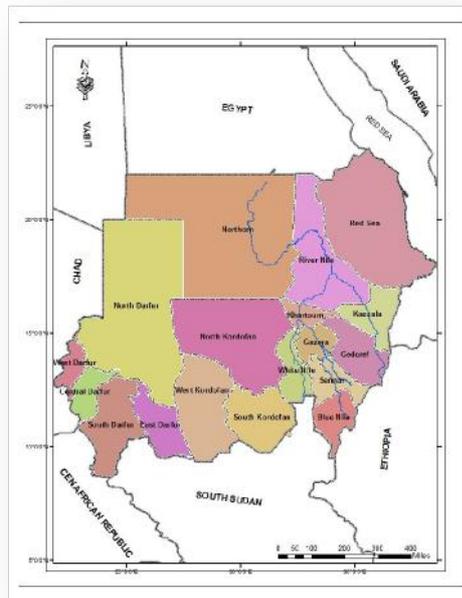


Fig 1 Sudan location and states map

### 1.1 GEOGRAPHY

Sudan’s landscape consists of gentle plains and few dotted hills that include Jebel Marra volcanic massif hill in West Darfur, Nuba hills in South Kordofan, Ingersana hills in Blue Nile State and the Red Sea Hills.

The world's longest river, the Nile, divides the country between east and west sides. The Blue and White Niles meet at Khartoum to form the River Nile, which flows northwards through Egypt to the Mediterranean Sea. The Blue Nile is joined by the Dinder and Rahad Rivers between Sennar and Khartoum. The White Nile within Sudan has no significant tributaries. Atbra River joins the Nile River at Atbra City in the Northern State.

## 1.2 CLIMATE

An exclusively tropical and a predominantly continental climate characterizes Sudan. Climatic zones range from the desert in the north to the wet monsoon in the extreme south. The average annual rainfall increases from north to south, ranging from almost zero mm in the arid north to over 800 mm in the tall grass savannah regions. The range of rainfall in the climatic zones of the country are; 0-75 mms for the desert, 75-300 mms for semi-desert, 300-900 mms for Low rainfall savanna and 500-2000mms for high rainfall savanna (Mohamed, 2020).

Sudan’s rainy season lasts for about three months (July to September) in the north, and up to six months (June to November) in the south.

The dry regions are plagued by sandstorms, known as haboob, which can completely block out the sight.

Temperature in summer ranges between 37 to 44oC. The mean maximum temperature in the coldest month ranges between 18oC to 21oC. The general climatic pattern is interrupted by the winter rainfall regime along the Red Sea coast and in its highlands.

## 1.3 GEOLOGY AND SOIL

The geology of the Sudan is dominated by the basement complex formations of the Pan-African terrains that cover more than 50% of its area. These terrains were found to host most of the economically valuable mineral deposits. (Fig (2))

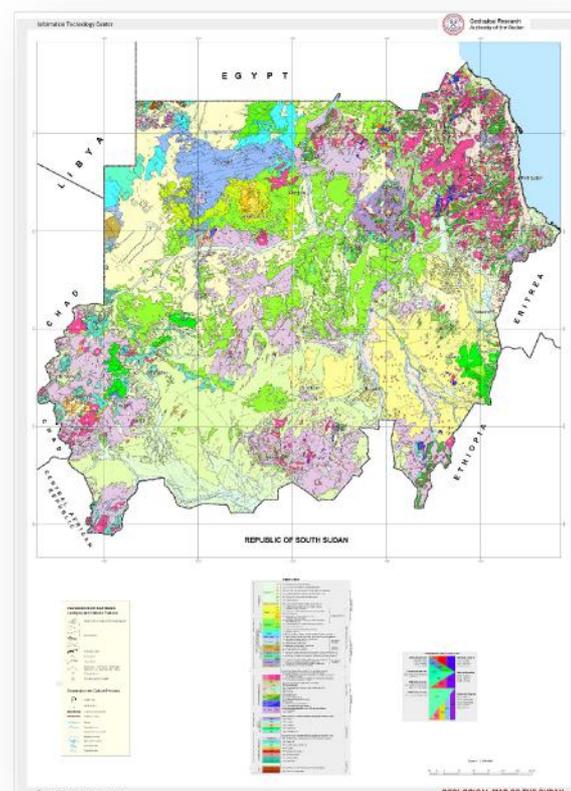


Fig 2 Sudan Geology map

## SOIL

The soil resources of the Sudan can be divided into seven broad regions as follows: (i) Xerosol soils of the hyper-arid area (about 78 million ha); (ii) Arenosols (about 28 million ha) towards the south; (iii) The 12 million ha of the more weathered Arenosols ; (iv) Vertisols (about 70 million ha) (v) Ferrasols (about 30 million ha) . (vi)The 18 million ha of rocky soils (Leptosols) of the Red Sea Hills and parts of Jebel Marra mountains and (vii) Cambisols (FAO, 1995)

## 1.4 POPULATION

According to the Central Bureau of Statistics 2008 census, the population of the northern states of Sudan (now constituting the Sudan) was 30.89 million people with a high annual growth rate of 2.8. In 2017, the population was estimated as 40,78 million and is expected to reach 57.28 million person by 2030 (CBS 2018),

The population of the Sudan is young, with children under 15 years age comprising 45.0% of the total population, including 30.1% in the age group of 5-14 years. Those in the age group 60 years and above represent 5.4% of the total population and reflects short life expectancies among the population.(CBS 2008 projections).

The most densely populated states are Khartoum, Gezira, and Southern Darfur, while the least densely populated states are the Northern, Red Sea, and the River Nile.

About 70.2 % of this population resides in rural areas. Agriculture is the mainstay of the national economy with about 80% of the people engaged in crop and animal production. Even in the northern and western semi-desert areas, people rely on the scant rainfall for basic agriculture, and many are nomadic, travelling with their herds of sheep and camels. Nearer the rivers, there are irrigated farms growing cash crops (Mohamad 2020).

Nearly 292 million feddans<sup>1</sup>, almost half Sudan's surface area is classified as suitable for agriculture. Many other data sources give about 200 million feddans as arable while the cultivated land is only 40 million feddans. From the cultivated land 29 million feddans are rainfed and 11 million feddans are irrigated

<sup>1</sup>feddan is equivalent to 0.42 hectares ([https://www.afdb.org/fileadmin/uploads/afdb/Documents/Boards-Documents/Approval\\_Sudan-Agricultural\\_Value\\_Chain\\_Development\\_Project\\_AVCDP.pdf](https://www.afdb.org/fileadmin/uploads/afdb/Documents/Boards-Documents/Approval_Sudan-Agricultural_Value_Chain_Development_Project_AVCDP.pdf))

Accordingly, millions of people in the country are directly dependent on natural resources (not including mineral extraction) for their livelihoods and employment. The States with productive lands of more than 20 million feddans are the Blue Nile, South Kordofan, West Kordofan, West Darfur , South Darfur and Central Darfur (Hamad 2010).

## 2. ECONOMIC AND POLITICAL PROFILE

### 2.1 LAND USE

Arable land: 33.02%, permanent crops: 3.14%; other: 63.84% (2005) Irrigated land 2,820 km<sup>2</sup> (2003) Agriculture is the leading sector in the national economy contributing to over 37.2 % of GDP, and the share of agriculture commodities from the total value of the export (8.5%). Agriculture sector provides the agriculture industry in the country with most of its needs of raw materials and gives means of living (Mohamed,2020).

### 2.2 SUDAN MINERAL RESOURCES

Rich mineral resources are available in Sudan including:

- Massive sulphide deposits [VMS & SEDEX] of Cu, Zn, Au, Ag, Fe, Mn, together with Cr, PGM, magnesite, talc, Ni, Ba, Mn, ± As, Bi, Cd, Te, Co and other trace elements.
- Precious metals: Au, Ag, Pt.
- Tin, tungsten, zirconium Aluminum.
- Sedimentary & Igneous iron formations.
- Rare Earth Elements. Radio-Active elements, black sands.
- Industrial minerals & rocks including: fluorite, white sands. pozzolana, limestone, marble, gypsum, mica, kaolin, feldspar, kyanite, bauxite, wollastonite, graphite, potassium salts and barite. Building materials and dimension stones(Elsamani, 2015);
- Agro minerals like phosphate, potash, gypsum, zeolite, vermiculite
- Gem stones.

Table (2) Major mineral resources of Sudan States

S/N	State	Mineral Resources
	Red Sea	Chrome, Manganese, gold, Polymetallic sulphide (Cu,Zn,Pb), lead, Nickel, Cobalt, Rare earth elements, Uranium
	Gezira	Gold
	Gedaref	Chrome, Manganese, gold
	Sinnar	Gold
	Blue Nile	Chrome, gold, Nickel
	River Nile	Manganese, gold, Polymetallic sulphide (Cu, Zn, Pb), Rare earth elements
	Northern	Manganese, gold, Polymetallic sulphide (Cu, Zn, Pb)
	West Darfur	Uranium
	Northern Darfur	Chrome, Polymetallic sulphide (Cu,Zn,Pb), Aluminum, Nickel, Uranium
	Central Darfur	Gold
	Eastern Darfur	Gold
	Southern Darfur	Gold, Aluminum, Uranium
	Kassala	Gold, Uranium
	Southern Kordofan	Chrome, gold, Polymetallic sulphide (Cu, Zn, Pb), Nickel, Uranium
	Northern Kurdufan	Gold, Polymetallic sulphide (Cu,Zn,Pb), Uranium
	West Kurdufan	Gold

Source: [www.Minerals.gov.sd](http://www.Minerals.gov.sd)

## 2.3 WATER RESOURCES

Sudan is a country with substantial water resources from annual precipitation in addition to rivers, seasonal streams, lakes and groundwater aquifers. The country also opens on the Red Sea with a 750-km coast.

The estimated total available water in Sudan is 28 Km<sup>3</sup>. This includes Sudan's share of water from the Nile according to the 1959 Nile Water Agreement (20.5 Km<sup>3</sup>), the average flow from non-Nile streams (5.5 Km<sup>3</sup>), and renewable groundwater (2.0 Km<sup>3</sup>)

Both surface and ground water resources are mostly shared with neighboring countries. (Hamad, 2020).

There are several dams on the Blue, White and Nile rivers. Among them are the Sennar and Roseires on the Blue Nile, and Jebel Aulia Dam and KhasmAlgirba on the White Nile Mereoi on Nile River and Upper Atbra complex on Atbra River. There is also Lake Nobia on the Sudanese-Egyptian border.

### 3. COUNTRY ENVIRONMENTAL OVERVIEW

Major environmental challenges facing the country are periodic droughts; flooding, soil degradation, rapid deforestation, desertification, urban air and water pollution, chemical and oil pollution (water, air, and soil; serious ecological damage from oil spills), loss of arable land and rapid urbanization accompanied by unsustainable waste management. Uncontrolled open burning of solid wastes is the rule rather than the exception which, although convenient, is environmentally unacceptable.

### 4. ENVIRONMENTAL GOVERNANCE

The Sudan is a federal nation divided into states according to the Interim Constitution of 2005. The Constitution of the Republic of Sudan adopted on July 6th of 2005 reflects the Comprehensive Peace Agreement (CPA) of January 2005 and defines a new set of rules for governance in general and land in particular. The two main elements of this new policy context are: a high degree of decentralization of powers and decision making to states". The states are sub-divided into localities, hence there are three levels of authority: national level, state level and locality level. The powers are divided among the various levels. The Interim Constitution has five schedules which specifically state the powers of the various levels of government on various issues (Abusin, 2020).

The Interim Constitution radically changed the relative powers of the different actors and stakeholders in the field of land by transferring large sections of the powers from the national to the state level (Abdalla, 2018). Most of the legislations on environment are based on the Environmental Act 2001, which provided controls and guidelines for the protection of environment and giving the States the right to establish environmental councils and to set policies and legislations guided by the Environmental Act 2001 and customary tenure.

Besides the 2001 Act, a number of sectoral acts are concerned with elements related to natural resources and their protection and implemented by different departments and line ministries. These include the Public Health Act 2008, the Environmental Health Act 2009, the Labour Act 1997 and the Pesticides and Pest Control Products Act 1994.

Sudan has signed and ratified most of the Multilateral Environmental Agreements (Table 2) and received support to set strategies and plans according to these agreements. The country established safeguard policies and abided by donor requirements of the World Bank and African Development Bank as well as requirements of bilateral agreements and major donors.

The main unit for environmental governance is the Higher Council for Environment and Natural Resources (HCENR) and a number of state level councils and departments or units in line ministries such as agriculture and forestry.

A key role of the HCENR has been in international liaison and agreements. To date, virtually all of the relevant international conventions and agreements have been ratified by the Sudan and managed by the HCENR (Table 3).

Table (3): List of International Agreements ratified by Sudan

Ref.	Title of Treaty or Convention	Ratification year
Marpol 1973	International Convention for Prevention of Pollution from Ships	1979
Vienna 1994	Vienna Convention on Nuclear Safety	1995
UNEP 1992	Kyoto Protocol to the United Nations Framework Convention on climate change Kyoto 1997	2005
Montreal	Montreal Protocol on Substance that deplete Ozone 1987	1998
Vienna 1985	Vienna Convention for the protection of Ozone Layer	1988
Montreal 1987 amendment	Amendment to the Montreal Protocol on Substance that deplete Ozone 1992	1994
Basil 1989	Basel Convention on the Control of the Trans- Boundary Movement of Hazardous Wastes, Basel, 1989	2006
London 1933	Convention Relative to the Preservation of Flora and Fauna in their Natural State	1935
Rome 1951	International Convention on the Conservation of plants	1971
Moscow 1963	Treaty Banning Nuclear Weapons Tests in the Atmosphere, in the Outer Space and Under Water	1966
Rome 1965	Agreement for the Establishment of a Commission for Controlling the Desert Locust in the Near East	1967
Algiers 1968	African Convention on the Conservation of Nature and Natural Resources	1973
Ramsar 1971 Amendment 1982	Ramsar Convention on Wetland of the International importance especially as waterfall Habitat	2005
Paris 1972	Convention concerning the Protection of World Culture and Natural Heritage	1973
Washington, 1973 amendments 1979 and 1983	Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES)	1982
Bonn 1979	Convention on the Conservation of Migratory Species of Wild Animals	2002
Jamaica 1982	United Nations Convention of the Law of the Sea	Ratified 1985
Jeddah 1982	Regional Convention for the Conservation of the Red Sea and Gulf of Eden	1985
Jeddah 1982	Protocol Concerning Regional Co-Operation in Combating Pollution by Oil and Other Harmful Substances in the Red Sea	1985

# NATIONAL BACKGROUND INFORMATION

Ref.	Title of Treaty or Convention	Ratification year
Bamako 1991	Bamako Convention on the Ban of the Import into Africa and the Control of Transboundary Movement and Management of Hazardous Wastes within Africa	1993
Tanzania 1999	Nile Basin Initiative	1999
Rio De Janeiro 1992	UN Framework Convention on Climate Change (UNFCCC)	1995
Rio De Janeiro 1992	International Convention on Biodiversity (CBD)	1995
Bonn 1994	International Convention to Combat Decertification in Countries Experiencing Serious Drought and or Desertification particularly in Africa (UNCCD)	1995
Rotterdam 1998	Convention on the Prior Informed Consent (PIC) Procedure for Certain Hazardous Chemicals and Pesticides in International Trade	2005
Montreal 2000	Cartagena Protocol on Biosafety to the Convention of Biodiversity	2005
Stockholm 2001	Stockholm Convention on Persistent Organic Pollutants (POPs)	2006
Dubai 2006	Strategic Approach to International Chemicals Management (SAICM)	2006
Vienna 1986	Convention on Early Notification of a Nuclear Accident	1986

Source: HCENR Environmental and Social Impact Assessment National Requirements and Guidelines 2018

## 1. INTRODUCTION

A major component of the MIA report is the inventory of mercury in Sudan using data for the year 2017 (where possible) in toolkit level version 2.1. The inventory results help to identify potential anthropogenic sources of mercury emissions and releases that need to be addressed for Sudan to become a Party in compliance with its obligations under the Minamata Convention.

## 2. METHODOLOGY

The inventory was carried out by a team headed by a national consultant (Professor Azhari Omer Abdelbagi, University of Khartoum) assisted by three national experts (Samir Badr, ministry of Energy and Mining; Handi Atta E. Mohamed, Ministry of Industry and Trade; Ahlam M. Abdelgalil, Ministry of Health) representing the main governmental sectors concerned with mercury use and management in the Sudan. Further a supporting team consisting of additional 15 persons from all relevant stakeholders helped in the process of data collection. A three days training work shop was carried out by the UNITAR Chemical and Waste Management programme between the 12th and 14th February 2019. The workshop was attended by 21 participants representing all relevant stakeholders in the country. The inventory team developed their work plan which was approved by the national focal point in May 2019. The inventory started in June 2019 and concluded by March 2020. Due to the COVID 19 pandemic, no further data collection was possible. The year 2017 was used as base year, whenever data were available. However, 2017 data were not available for all sources and in these circumstances the most recent available data were used. Average of 3 -5 years was used when available. The data year used for each source category is noted in the relevant sections of this report.

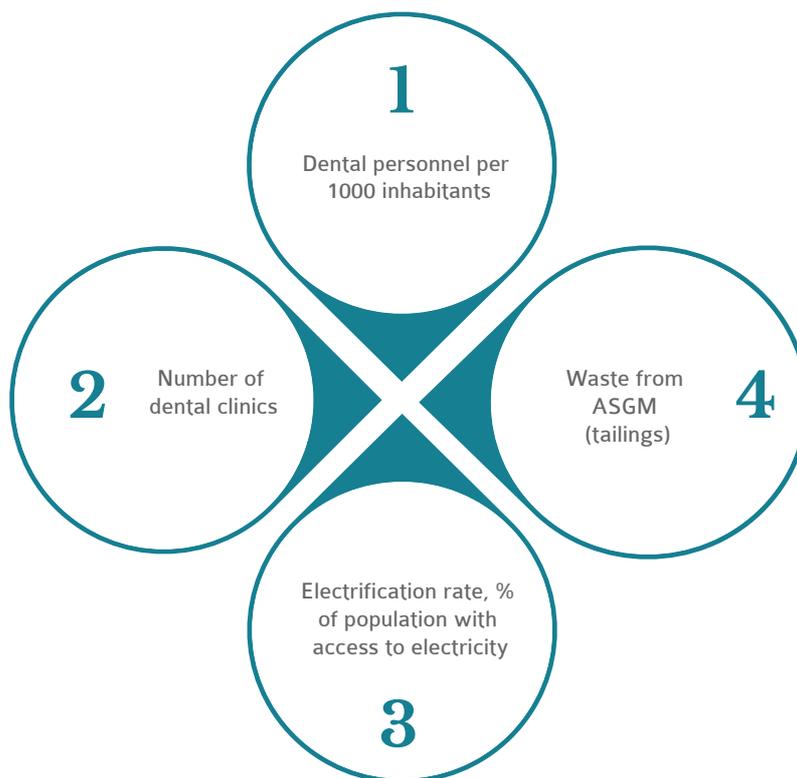
This mercury release inventory was made using the "Toolkit for identification and quantification of mercury releases- Level 1, Version 2.1, April 2015, of the Chemicals Branch of the United Nations Environment Programme (UNEP Chemicals) which is available at UNEP website:

Mercury Inventory Toolkit | UNEP - UN Environment Programme. This Toolkit is based on mass balances for each mercury release source type. Inventory Level 1 works with pre-determined factors used in the calculation of mercury inputs to society and releases, the so-called default input factors and default output distribution factors. These factors were derived from data on mercury inputs and releases from the relevant mercury source types from available literature and other relevant data sources.

# MERCURY INVENTORY AND IDENTIFICATION OF SOURCES, EMISSIONS AND RELEASES IN SUDAN

Care was taken to avoid double counting of the contribution of various sources of mercury.

For the following mercury source sub-categories, input and releases estimates were made based on the standard level 1 approach, with the exception of the following background calculations which data was based on the currently available estimates:



The data were collected through questionnaires, interviews, consultation of national government reports, relevant published literature and site visits to some places.

## 3. RESULTS

### 3.1 MERCURY RELEASE SOURCE TYPES PRESENT IN THE SUDAN

Table (4) shows the major mercury release sources identified as present or absent in the country. Only source types identified as present are included in the quantitative assessment. The results indicated about 28 source types present in the country in addition to 11 minor source types present (Table (5)). In addition, there are about three major and two minor sources considered as questionable sources. The minor sources were not subjected to identification and quantification work.

# MERCURY INVENTORY AND IDENTIFICATION OF SOURCES, EMISSIONS AND RELEASES IN SUDAN

Table (4) Identification of mercury release sources in the Sudan; sources present (Y) and possible but not positively identified (?)

Source category	Source present? Y/?
<b>Energy consumption</b>	
Coal combustion in large power plants	Y
Combustion/use of petroleum coke and heavy oil	Y
Combustion/use of diesel, gasoil, petroleum, kerosene, LPG and other light to medium distillates	Y
Biomass fired power and heat production	Y
Charcoal combustion	Y
<b>Fuel production</b>	
Oil extraction	Y
Oil refining	Y
<b>Primary metal production</b>	
Gold extraction by methods other than mercury amalgamation	Y
Primary ferrous metal production (pig iron production)	Y
Gold extraction with mercury amalgamation - from whole ore	Y
<b>Other materials production</b>	
Cement production	Y
<b>Production of products with mercury content</b>	
Paints with mercury	?
Skin lightening creams and soaps with mercury chemicals	?
<b>Use and disposal of products with mercury content</b>	
Dental amalgam fillings ("silver" fillings)	Y
Thermometers	Y
Electrical switches and relays with mercury	Y
Light sources with mercury	Y
Batteries with mercury	Y
Paints with mercury preservatives	?
Skin lightening creams and soaps with mercury chemicals	Y
Medical blood pressure gauges (mercury sphygmomanometers)	Y
Other manometers and gauges with mercury	Y
Laboratory chemicals	Y
Other laboratory and medical equipment with mercury	Y

# MERCURY INVENTORY AND IDENTIFICATION OF SOURCES, EMISSIONS AND RELEASES IN SUDAN

Table (4) Identification of mercury release sources in the Sudan; sources present (Y) and possible but not positively identified (?)

Source category	Source present? Y/?
<b>Production of recycled of metals</b>	
Production of recycled ferrous metals (iron and steel)	Y
<b>Waste incineration</b>	
Incineration / burning of medical waste	Y
Open fire waste burning (on landfills and informally)	Y
<b>Waste deposition/land filling and waste water treatment</b>	
Controlled landfills/deposits	Y
Informal dumping of general waste *1	Y
Waste water system/treatment	Y
<b>Crematoria and cemeteries</b>	
Cemeteries	Y

Table (5) Miscellaneous potential mercury sources not included in the quantitative inventory (Y); with preliminary indication of possible presence in Sudan (?)

Source category	Source present? Y/?
Production of other recycled metals	Y
Production of lime	Y
Production of light weight aggregates (burnt clay nuts for building purposes)	Y
Infra red detection semiconductors	Y
Educational uses	Y
Vacuum pumps with mercury	Y
Light houses (levelling bearings in marine navigation lights)	Y
Tanning	Y
Pigments	Y
Products for browning and etching steel	Y
Certain colour photograph paper types	Y
Fireworks	Y
Executive toys	Y

# MERCURY INVENTORY AND IDENTIFICATION OF SOURCES, EMISSIONS AND RELEASES IN SUDAN

## 3.2 SUMMARY OF MERCURY RELEASE FROM VARIOUS SOURCES IN THE SUDAN

The results of the inventory (Table 6) indicated that the following source groups contribute with the major mercury inputs: Gold extraction with mercury amalgamation - from whole ore which is the main contributor (contributing 81%), followed by primary metal production (excl. gold production by amalgamation) contributing 13%, use and disposal of other products contributing 3%, waste incineration and open waste burning contributing and cemeteries each contributing 1%

Table (6) Summary of mercury release from various sources in the Sudan

Source category	Source present? Y/?	Estimated Hg input, Kg Hg/y	Percent of Total releases *3 *4
Coal combustion and other coal use	Y	45.9	0%
Other fossil fuel and biomass combustion	Y	194.9	0%
Oil and gas production	Y	17.6	0%
Primary metal production (excl. gold production by amalgamation)	Y	45,005.8	13%
Gold extraction with mercury amalgamation	Y	276,030.3	81%
Other materials production*6	Y	752.4	0%
Application, use and disposal of dental amalgam fillings	Y	590.2	0%
Use and disposal of other products	Y	9,190.5	3%
Production of recycled metals	Y	7.8	0%
Waste incineration and open waste burning*2	Y	4,377.5	1%
Waste deposition*2	Y	1,533.0	0%
Informal dumping of general waste *2*3	Y	7,416.0	0%
Waste water system/treatment *4	Y	0.6	0%
Crematoria and cemeteries	Y	1,937.2	1%
<b>TOTALS (rounded) *1*2*3*4*5*6</b>		<b>335,090</b>	<b>100%</b>

### \* Notes

1. To avoid double counting of mercury in products produced domestically and sold on the domestic market (including oil and gas), only the part of mercury inputs released from production are included in the input total.
2. To avoid double counting of mercury inputs from waste and products in the input total, only 10% of the mercury input to waste incineration, waste deposition and informal dumping is included in the Total for mercury inputs. These 10% represent approximately the mercury input to waste from materials which were not quantified individually in Inventory Level 1 of the Toolkit.

# MERCURY INVENTORY AND IDENTIFICATION OF SOURCES, EMISSIONS AND RELEASES IN SUDAN

## \* Notes

3. The estimated quantities include mercury in products which has also been accounted for under each product category. To avoid double counting, the release to land from informal dumping of general waste has been subtracted automatically in the totals.

4. The estimated input and release to water include mercury amounts which have also been accounted for under each source category. To avoid double counting, input to, and release to water from, waste water system/treatment have been subtracted automatically in the totals.

5. Total inputs do not necessarily equal total outputs due to corrections for double counting (see notes\*1-3) and because some mercury follows products/metal mercury which are not sold in the same country or in the same year

6. To avoid double counting, fossil fuel mercury contributions to cement production was subtracted automatically in the totals.

The individual mercury release sub-categories contributing with the highest mercury inputs (Fig 3) includes gold extraction with mercury amalgamation - from whole ore which is the main contributor (contributing with 82.4%), followed by primary metal production (excl. gold production by amalgamation) contributing 13.4%, use and disposal of other products contributing 2.74%, informal dumping of general waste contributing 2.2% and open fire waste burning (on landfills and informally contributing 1.3%.

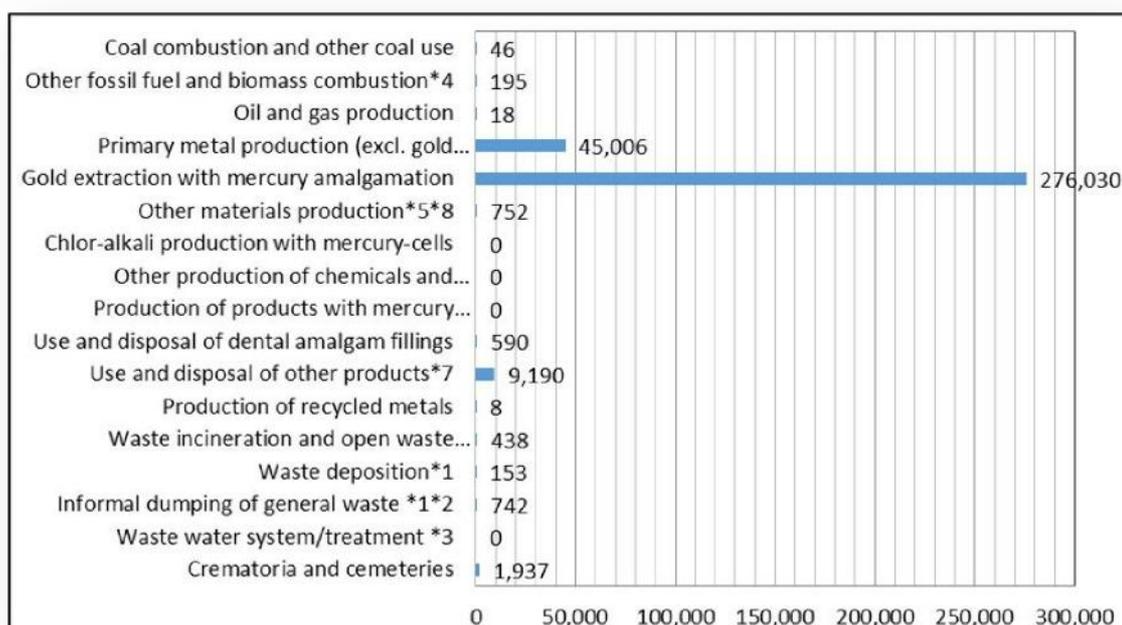


Fig 3 Estimated mercury inputs (kg Hg/y)

# MERCURY INVENTORY AND IDENTIFICATION OF SOURCES, EMISSIONS AND RELEASES IN SUDAN

## 4. MERCURY RELEASES

The key mercury releases are to air (the atmosphere), water (marine and freshwater bodies, including via waste water systems), land, general waste, and to sectors specific waste treatment. An additional output pathway is “by-products and impurities” which designate mercury flows back into the market with by-products and products where mercury does not play an intentional role.

### 4.1 RELEASE TO ATMOSPHERE, WATER AND LAND

The individual mercury release sub-categories contributing with the highest mercury releases to the atmosphere were; Gold extraction with mercury amalgamation contributing 88.1% followed by waste incineration and open waste burning contributing with 5.44%, use and disposal of other products contributing with 2.26% and primary metal production (excluding gold production by amalgamation) contributing with 2.24%. (Fig 4).

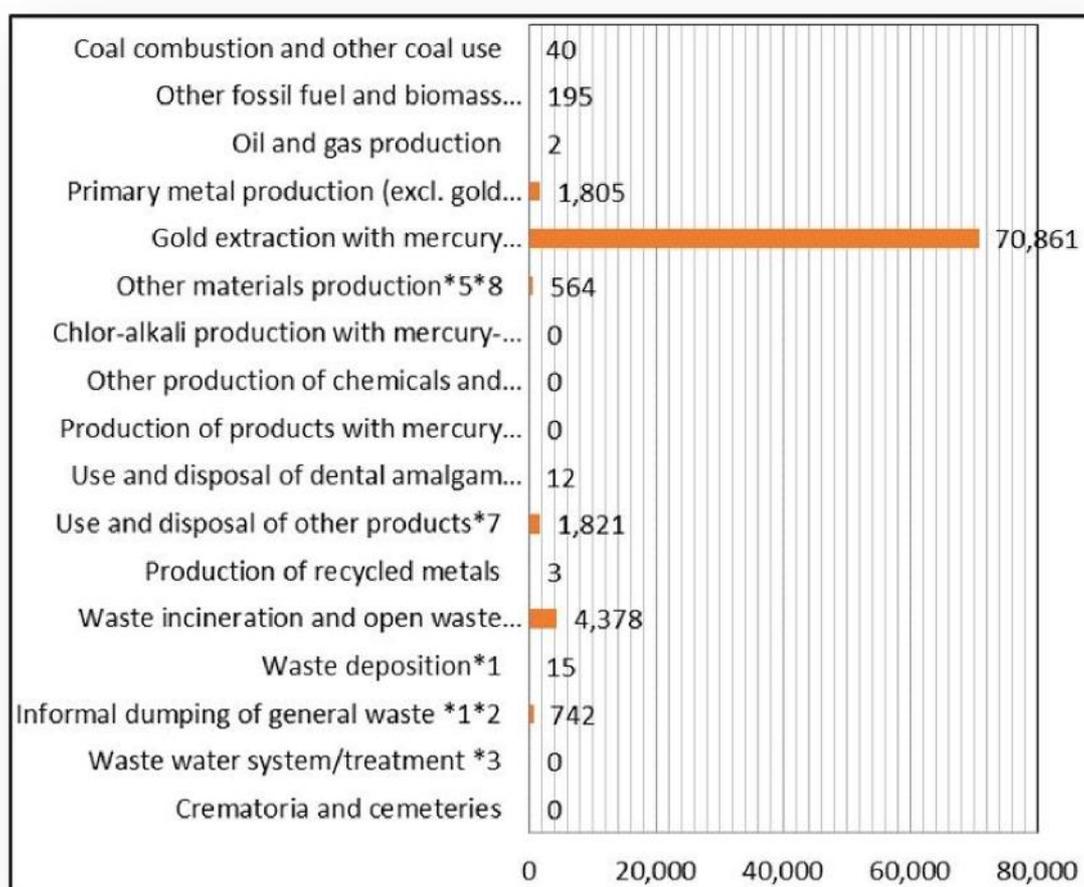


Fig 4 Estimated mercury releases to air (Kg Hg/y)

# MERCURY INVENTORY AND IDENTIFICATION OF SOURCES, EMISSIONS AND RELEASES IN SUDAN

On the other hand, major sources of release to water are; gold extraction with mercury amalgamation which contributes to 96.53% of releases followed by use and disposal of other products which contributes to 1.68% of releases and primary metal production (excl. gold production by amalgamation) contributing 0.85% of releases. (Fig 5).

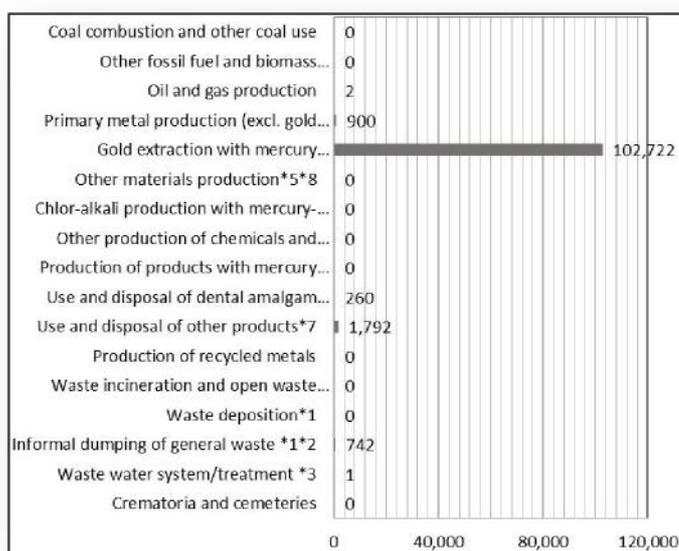


Fig 5 Estimated mercury releases to water (Kg Hg/y)

The major sources of release to land are; gold extraction with mercury amalgamation - from whole ore which is the main contributor (contributing 66.91%), followed by primary metal production (excluding gold production by amalgamation) contributing 26.45%, followed by informal dumping of general waste contributing 3.88% and use and disposal of other products contributing 1.44% and crematoria and cemeteries which contributes to 1.27%. (Fig 6).

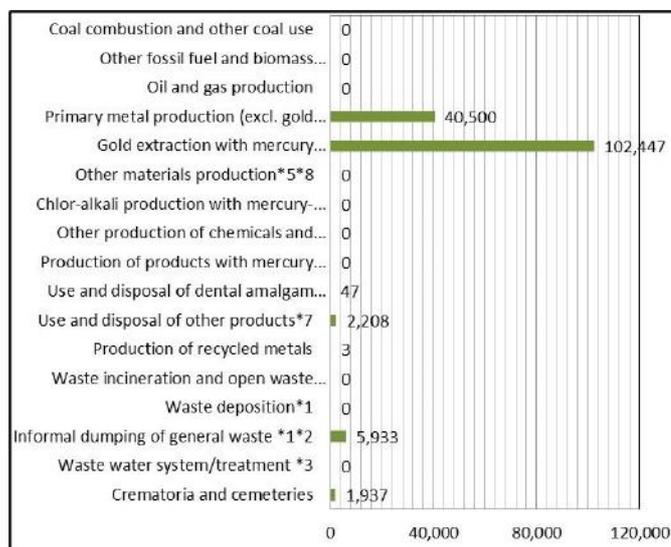


Fig 6 Estimated mercury releases to land (Kg Hg/y)

# MERCURY INVENTORY AND IDENTIFICATION OF SOURCES, EMISSIONS AND RELEASES IN SUDAN

## 4.2 RELEASE TO WATER AND WASTE WATER

The origin of mercury in waste and waste water produced in the country is mercury containing products and materials. Waste fractions and waste water do not present original mercury inputs to society (except imported waste). Waste and waste water may however represent substantial flows of mercury through society. The major flows of mercury with waste and waste water include use and disposal of other products contributing to 96.04% of the Total Hg flows to waste and waste water, followed by application, use and disposal of dental amalgam fillings contributing to 3.81% of the total (Fig 7). The same two categories were the highest among the sector specific sources contributing 76.89 % and 23.14% respectively (Fig 8).

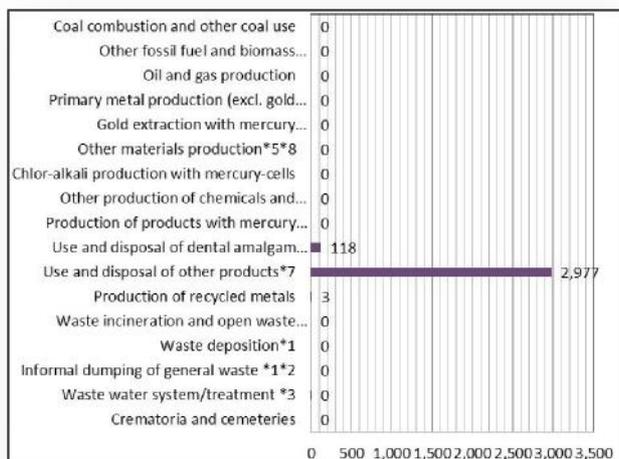


Fig 7 Estimated mercury releases to general waste (Kg Hg/y)

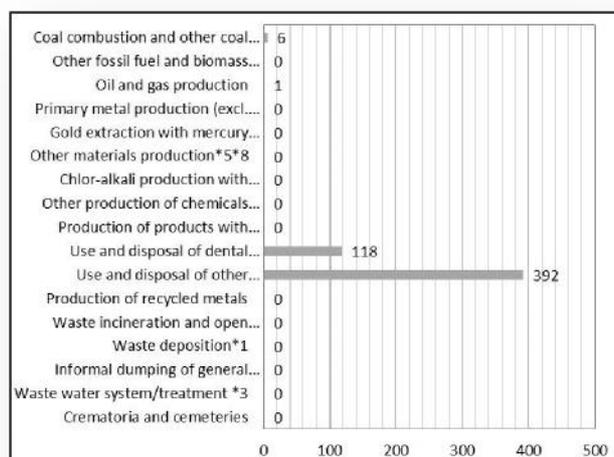


Fig 8 Estimated mercury releases sector spec. waste

### Note

Default input factors were used for the estimate of mercury releases from wastewater treatment. The default factors were based on available literature data of developed countries for mercury contents in waste and wastewater. The calculations made indicate that the default input factors for wastewater may over-estimate the mercury releases from these sources

# MERCURY INVENTORY AND IDENTIFICATION OF SOURCES, EMISSIONS AND RELEASES IN SUDAN

## 4.3 MERCURY OUTPUT TO BY-PRODUCTS AND IMPURITIES

The most important types of mercury output to by-products and impurities are primary metal production (excl. gold production by amalgamation) contributing to 89%, followed by other materials production contributing to 9.3% and use and disposal of dental amalgams contributing 1.7% (Fig 9).

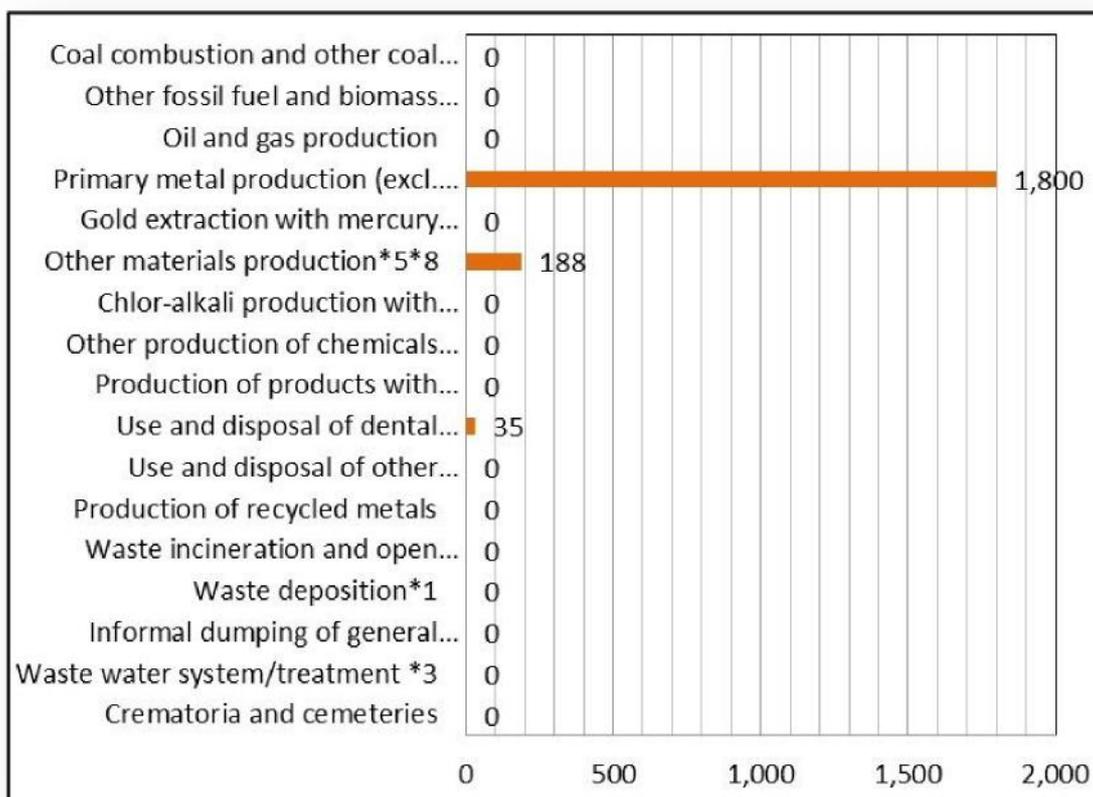


Fig 9 Estimated mercury outputs to by-products and impurities (Kg Hg/y)

## 4.4 MERCURY INPUT TO SOCIETY

Results indicated that the following source sub-categories made the largest contributions to mercury inputs to society: Gold extraction with mercury amalgamation - from whole ore contributing 71.59%, followed by gold extraction by methods other than mercury amalgamation contributing with 12.96%, gold extraction with mercury amalgamation - from concentrate contributing with 7.93%, informal dumping of general waste with 2.14%, open fire waste burning (on landfills and informally) contributing with 1.26% and electrical switches and relays with mercury contributing with 0.93%. (Table (7)).

# MERCURY INVENTORY AND IDENTIFICATION OF SOURCES, EMISSIONS AND RELEASES IN SUDAN

Table (7) Summary of mercury inputs to society

Source category	Source present?			Estimated Hg input, Kg Hg/v
	Y/?	Activity rate	Unit	Standard estimate
<b>Energy consumption</b>				
Coal combustion in large power plants	Y	306,000	Coal combusted, t/y	46
Combustion/use of petroleum coke and heavy oil	Y	1,394,300	Oil product combusted, t/y	77
Combustion/use of diesel, gasoil, petroleum, kerosene, LPG and other light to medium distillates	Y	6,980,400	Oil product combusted, t/y	38
Biomass fired power and heat production	Y	2,342,597	Biomass combusted, t/y	70
Charcoal combustion	Y	79,393	Charcoal combusted, t/y	10
<b>Fuel production</b>				
Oil extraction	Y	2,994,604	Crude oil produced, t/y	10
Oil refining	Y	2,179,366	Crude oil refined, t/y	7
<b>Primary metal production</b>				
Gold extraction by methods other than mercury amalgamation	Y	3,000,000	Gold ore used, t/y	45,000
Primary ferrous metal production (pig iron production)	Y	115,374	Pig iron produced, t/y	6
Gold extraction with mercury amalgamation - from whole ore	Y	49,700	Gold produced, kg/y	248,500
Gold extraction with mercury amalgamation - from concentrate	Y	21,300	Gold produced, kg/y	27,530
<b>Other materials production</b>				
Cement production*4	Y	5,500,000	Cement produced, t/y	752
<b>Production of products with mercury content</b>				
Paints with mercury	?	0	Mercury used for production, kg/y	?
Skin lightening creams and soaps with mercury chemicals	?	0	Mercury used for production, kg/y	?
<b>Use and disposal of products with mercury content</b>				
Dental amalgam fillings ("silver" fillings)	Y	40,782,742	Number of inhabitants	590
Thermometers	Y	24,359	Items sold/y	212
Electrical switches and relays with mercury	Y	40,782,742	Number of inhabitants	3,226
Light sources with mercury	Y	3,195,537	Items sold/y	56
Batteries with mercury	Y	9,976	t batteries sold/y	2,814
Paints with mercury preservatives	?	0	Paint sold, t/y	?
Skin lightening creams and soaps with mercury chemicals	Y	43	Cream or soap sold, t/y	1,276
Medical blood pressure gauges (mercury sphygmomanometers)	Y	4,244	Items sold/y	340
Other manometers and gauges with mercury	Y	40,782,742	Number of inhabitants	115
Laboratory chemicals	Y	40,782,742	Number of inhabitants	230
Other laboratory and medical equipment with mercury	Y	40,782,742	Number of inhabitants	922

# MERCURY INVENTORY AND IDENTIFICATION OF SOURCES, EMISSIONS AND RELEASES IN SUDAN

Source category	Source present?			Estimated Hg input, Kg Hg/y
	Y/?	Activity rate	Unit	Standard estimate
<b>Production of recycled of metals</b>				
Production of recycled ferrous metals (iron and steel)	Y	7,050	Number of vehicles recycled/y	8
<b>Waste incineration</b>				
Incineration / burning of medical waste	Y	730	Waste incinerated, t/y	18
Open fire waste burning (on landfills and informally)	Y	4,360,000	Waste burned, t/y	4,360
<b>Waste deposition/land filling and waste water treatment</b>				
Controlled landfills/deposits	Y	1,533,000	Waste landfilled, t/y	1,533
Informal dumping of general waste *1	Y	7,416,000	Waste dumped, t/y	7,416
Waste water system/treatment	Y	110,683	Waste water, m3/y	1
<b>Crematoria and cemeteries</b>				
Cemeteries	Y	774,872	Corpses buried/y	1,937
<b>TOTAL of quantified inputs*1*2*3*4</b>				<b>347,100</b>

## Notes

\*1: To avoid double counting of mercury inputs from waste and products in the input TOTAL, only 10% of the mercury input to waste incineration sources, waste deposition and informal dumping is included in the Total for mercury inputs. These 10% represent approximately the mercury input to waste from materials which were not quantified individually in Inventory Level 1 of this Toolkit. See Appendix 1 to the Inventory Level1 Guideline for more explanation.

\*2: The estimated quantities include mercury in products which has also been accounted for under each product category. To avoid double counting, the release to land from informal dumping of general waste has been subtracted automatically in the totals.

\*3: The estimated input and release to water include mercury amounts which have also been accounted for under each source category. To avoid double counting, input to, and release to water from, waste water system/treatment have been subtracted automatically in the totals.

\*4 To avoid double counting, fossil fuel mercury contributions to cement production was subtracted automatically in the totals.

# MERCURY INVENTORY AND IDENTIFICATION OF SOURCES, EMISSIONS AND RELEASES IN SUDAN

## 4.5 DATA AND INVENTORY ON ENERGY CONSUMPTION AND FUEL PRODUCTION

### 4.5.1. Energy consumption

This sector contributed with a total of 258 Kg Hg per year 92% of it goes to the air. The contribution of the various sub-sectors of energy consumption is as follows; Coal combustion in large power plants (18%), Combustion/use of petroleum coke and heavy oil (30%), Combustion/use of diesel, gasoil, petroleum, kerosene, LPG and other light to medium distillates (15%), Biomass fired power and heat production (27%) and Charcoal combustion (4%). The information on the first three sub-sectors came from Ministry of Energy report (2018) while the data the last two sub sectors came from the Ministry of industry and trade 2018 and Sudan Bureau of Statistics (2016). The Total “Biomass fired power and heat production” was estimated at 2,200,000 tons of Baggas used by six sugar factories, plus 140,392.635 tons of fire wood, plus 2,274.2 tons of Dukhan wood, equalling 2,342,597 tons of biomass (Table 7).

### 4.5.2. Fuel production

Fuel production in Sudan included oil extraction and oil refinery. Sudan produces about 2,994,604 tons of crude oil every year (Table (8)), releasing about 10 Kg of Hg per year while the oil facilities refine about 2,179,366 tons of crude oil every year contributing 7Kg of Hg per year (Table (8)).The source of the above information is the Ministry of Energy (2018).

Table (8) Summary of mercury releases from energy consumption and fuel production

Source category	Activity rate	Unit	Estimated Hg input, Kg Hg/y	Estimated Hg releases, standard estimates, Kg Hg/y					
	Annual consumption/production		Standard estimate	Air	Water	Land	By-products and impurities	General Waste	Sector specific waste treatment/disposal
<b>Energy consumption</b>		Coal combusted, t/y							
Coal combustion in large power plants	306,000	Coal used, t/y	46	40.4	0.0	0.0	0.0	0.0	5.5
Combustion/use of petroleum coke and heavy oil	1,394,300	Oil product combusted, t/y	77	76.7	0.0	0.0	0.0	0.0	0.0
Combustion/use of diesel, gasoil, petroleum, kerosene, LPG and other light to medium distillates	6,980,400	Oil product combusted, t/y	38	38.4	0.0	0.0	0.0	0.0	0.0

# MERCURY INVENTORY AND IDENTIFICATION OF SOURCES, EMISSIONS AND RELEASES IN SUDAN

Source category	Activity rate	Unit	Estimated Hg input, Kg Hg/y	Estimated Hg releases, standard estimates, Kg Hg/y					
	Annual consumption/production		Standard estimate	Air	Water	Land	By-products and impurities	General Waste	Sector specific waste treatment/disposal
Biomass fired power and heat production	2,342,596.66	Biomass combusted, t/y	70	70.3	0.0	0.0	0.0	0.0	0.0
Charcoal combustion	79,393	Charcoal combusted, t/y	10	9.5	0.0	0.0	0.0	0.0	0.0
<b>Fuel production</b>									
Oil extraction	2,994,604	Crude oil produced, t/y	10	0.0	2.0	0.0	0.0	0.0	0.0
Oil refining	2,179,366	Crude oil refined, t/y	7	1.9	0.1	0.0	0.0	0.0	1.1

## 4.6 DATA AND INVENTORY ON DOMESTIC PRODUCTION OF METALS AND RAW MATERIALS

This sector releases about 321,788 Kg of Hg every year. About 23% (73,230.6 Kg) is released to air annually and about 44.4% (142,947.1 Kg) is annually released to land and 32.6% released to water (Table (9)). Gold extraction with mercury amalgamation - without use of retort contributed 77.2% of releases from this sector followed by Gold extraction by methods other than mercury amalgamation which contributes 14% and Gold extraction with mercury amalgamation - with use of retorts which contributes 8.6% of releases. Cement production and Primary ferrous metal production (pig iron production) are minor sources of releases (Table 9). The source of information is Ministry of Mineral Resources annual report and Sudan Bureau of Statistics (2016).

Table (9) Domestic production of metals and raw materials

Source category	Estimated Hg input, Kg Hg/y	Estimated Hg releases, standard estimates, Kg Hg/y						
	Standard estimate	Air	Water	Land	By-products and impurities	General Waste	Sector specific waste treatment/disposal	
<b>Primary metal production</b>								
Gold extraction by methods other than mercury amalgamation	45,000	1,800.0	900.0	40,500.0	1,800.0	0.0	0.0	
Primary ferrous metal production (pig iron production)	6	5.5	0.0	0.0	0.0	0.0	0.3	

# MERCURY INVENTORY AND IDENTIFICATION OF SOURCES, EMISSIONS AND RELEASES IN SUDAN

Source category	Estimated Hg input, Kg Hg/y	Estimated Hg releases, standard estimates, Kg Hg/y					
	Standard estimate	Air	Water	Land	By-products and impurities	General Waste	Sector specific waste treatment/disposal
Gold extraction with mercury amalgamation - without use of retort	248,500	49,700.0	99,400.0	99,400.0	0.0	0.0	0.0
Gold extraction with mercury amalgamation - with use of retorts	27,530	21,160.8	3,322.4	3,047.1	0.0	0.0	0.0
<b>Other materials production</b>							
Cement production	752	564.3	0.0	0.0	188.1	0.0	0.0

According to the inventory results (Table (9)), artisanal gold mining represents the most significant source of Hg release in Sudan. A total of 321,030 Kg of Hg input is used annually in this sector, representing 99.7 of the Total Hg input in the mining sector.

## 4.7 HG RELEASES IN THE GOLD MINING SECTOR

There are two types of gold mining activities where exposure to Hg is expected:



### 4.7.1. The artisanal gold mining sector

A Total of 276,030 Kg of Hg input is used annually in this sector representing 85.8% of the Total Hg input in the mining sector. In this sector the mining activity consists of the following steps; detection of soil/rocks containing gold by various gold sectors, digging and collecting suspected soil and then transporting the soil to specific places where processing takes place. These places are called mining markets, with all uses of mercury confined to these markets.

# MERCURY INVENTORY AND IDENTIFICATION OF SOURCES, EMISSIONS AND RELEASES IN SUDAN

Three decades ago, before the expansion in artisanal gold mining activity, the whole process was done at or near the mining sites, but since then all processing activities are done within these markets according to the directions of the states' supervisory authorities. The artisanal gold mining markets are distributed in 14 states (excluding Gezira, White Nile, Sinnar and East Darfur which are free from artisanal gold mining activities) of the Sudan serving a Total 245 mining sites. The artisanal mining markets were initially created by the states' governments and developed by the artisanal miners themselves. The populations at these markets were estimated at two million people doing more than 33 different jobs. These populations are considered as the highest population at risk since they are mostly exposed directly to mercury whether as vapour and elemental or organic mercury (images 1-4). Most of the miners do not use retorts for recycling of Hg. Therefore, the amount of Hg input from these mining activities varies significantly; 27,530 Kg for those using retorts compared to 248,500 Kg by those not using retorts.

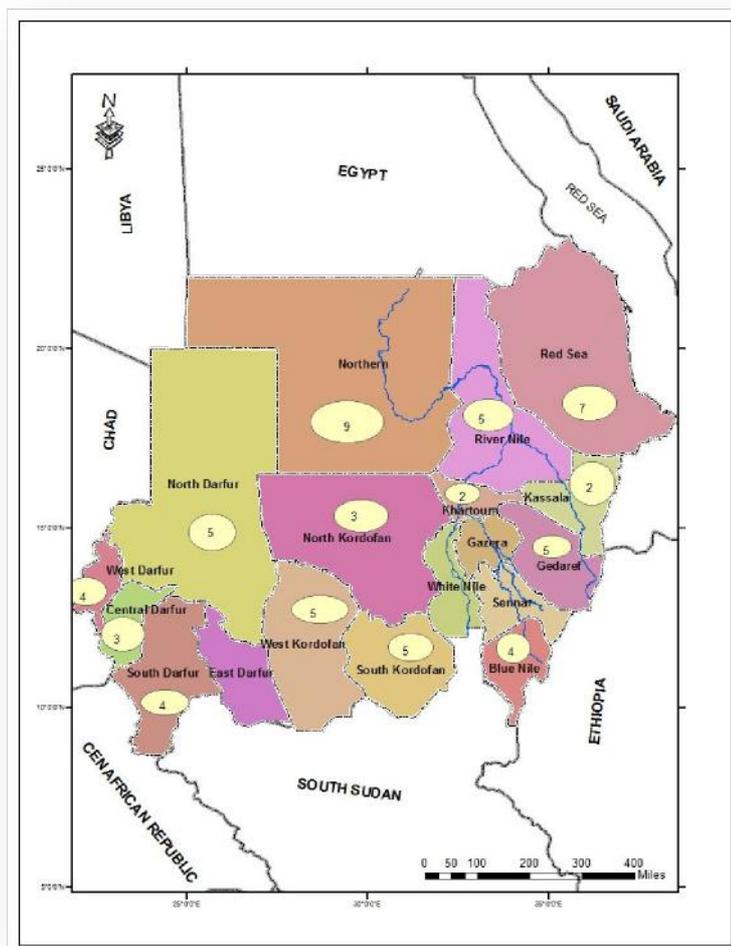
The expansion in artisanal gold mining started in 1992 and currently covers 14 states of the Sudan out of the 18 states (no activity found in Gezira, Sinnar, White Nile and East Darfur), with over two million peoples working in the sector. There are about 44,296 mining wells spread over 244 sites in 55 localities in 14 states, with about 5668 mills, 5398 washing bonds and 77 markets. Details are given in table 9, figure 10 and images1-4.

Table (10) Distribution of artisanal mining activity in various states of Sudan

States	Localities	Places	Mining sites	Markets	Mining wells	Mills	Washing bonds
Northern	4	14	42	9	6140	392	480
Nile valley	2	32	32	4	223	2543	776
Red Sea	4	13	24	6	441	619	329
Kassala	3	17	8	3	285	10	180
Gedarif	2	8	18	6	2247	653	669
North Kordofan	2	4	19	3	7562	259	282
West Kordofan	3	3	13	4	6393	298	510
South Kordofan	9	18	39	9	6021	685	1070
North Darfur	8	12	9	9	13000	60	1000
South Darfur	3	7	6	7	1378	51	32
Blue Nile	4	4	11	6	200	65	52
Central Darfur	6	6	16	6	221	11	9
West Darfur	4	4	4	4	180	7	0
Khartoum	1	2	2	1	5	15	9
<b>Total</b>	<b>55</b>	<b>144</b>	<b>244</b>	<b>77</b>	<b>44296</b>	<b>5668</b>	<b>5398</b>

# MERCURY INVENTORY AND IDENTIFICATION OF SOURCES, EMISSIONS AND RELEASES IN SUDAN

Figure 10 .Distribution of artisanal mining sites in the Sudan



Code	State	Sites	Code	State	Sites
NS	Northern State	42	NK	North Kordofan State	19
RS	Red Sea State	24	WK	West Kordofan State	13
RNS	River Nile State	32	SK	South Kordofan State	39
Ks	Kassala State	8	ND	North Darfur State	9
GS	Gedarif State	18	SD	South Darfur State	6
BNS	Blue Nile State	11	WD	West Darfur State	6
KHS	Khartoum State	2	CD	Central Darfur State	18
<b>Total*</b>	<b>245 sites</b>				

\*Four states are free of artisanal mining activities; Gezira, Sinnar, White Nile and East Darfur

# MERCURY INVENTORY AND IDENTIFICATION OF SOURCES, EMISSIONS AND RELEASES IN SUDAN



Image 1: Living environment in the artisanal gold mining sector



Image 2: Milling the ore



Image 3: Washing the ore with mercury



Image 4: Burning the gold mercury amalgam

# MERCURY INVENTORY AND IDENTIFICATION OF SOURCES, EMISSIONS AND RELEASES IN SUDAN

## 4.7.2. The large scale gold mining companies not using Hg in gold extraction

A total annual input of 45,000 Kg of Hg is from this sector, representing 8.6% of the total Hg input from the mining sector. This includes the organized, licensed gold mining industries which extract gold from the tailings (locally called Karta) of artisanal gold mining ore which contains a residual amount of mercury. These companies extract gold by methods other than Hg amalgamation. There are 70 of these companies distributed in 12 states mostly located in the northern part of Sudan.

## 4.8 CEMENT PRODUCTION

A Total of 752 Kg of Hg input is estimated to be unintentionally produced annually in this sector, representing less than 0.23% of the Total Hg input in the mining sector. About 75% of this amount is released to the air and 25% goes to byproducts and impurities. There are six cement producing factories, five of them in the Nile valley state and only one in the White Nile state. Their Total production capacity of 6.7 million tons is all consumed locally (Table 8). All clinker used is produced domestically and none is imported.

Table (11) Cement factories and their estimated annual production\*

States	Factory	Annual production in tons
Nile Valley	Attbra	1,710,000
Nile valley	Asalam	600,000
White Nile	Nile-Rabak	300,000
Nile Valley	Barbar	1,500,000
Nile Valley	Altakamo	1,350,000
Nile Valley	Alshamal	1,260,000
Total		6,720,000

\*Based on estimated daily production values, extrapolated to an estimate of 300 working days

## 4.9 DATA AND INVENTORY ON THE GENERAL CONSUMPTION OF MERCURY IN PRODUCTS

Mercury-added products are a source-category present in most countries. These sources are explicitly addressed in the Minamata Convention. According to Article 4, those mercury-added products listed in Annex A of the convention are to be phased-out by 2020, unless the Party notifies the secretariat of time exemptions as per article 6.

### 4.9.1. Local production of products containing mercury

There is generally no domestic production of products with mercury content, however there is local production of paints, at 80.000 tons annually, produced by 10 factories all located in Khartoum state. In addition, there is 109 tons of annual paint imports. Local production does not use Hg, while the Hg content of imported paints is unknown.

Furthermore, there are many factories of soap production which do not use Hg. However, there is one new licensed factory for skin lightening creams, which has not started production yet. The Sudanese Standards and Metrology Organization has set specification on skin lightening creams and soaps that prohibits the use of Hg in their production.

Other than that, there is no local production of any other expected sources of Hg-i.e. there is no production of mercury containing thermometers (medical, air, lab, industrial etc.); electrical switches and relays with mercury; light sources with mercury (fluorescent, compact, others: batteries with mercury; manometers and gauges with mercury; biocides and pesticides with mercury). Furthermore, there is no production of chemicals mixture with mercury intentionally included.

### 4.9.2. Use of products containing mercury

National data for some mercury-containing medical equipment. such as thermometers, and laboratory chemicals with mercury are available and have been used in the inventory. There are no national data on light sources and batteries and so UN comtrade data were used. This calls for collection of national data on batteries and light sources with mercury. According to the calculations, this sector contributes about 12,863 Kg of Hg every year (Table 12).

# MERCURY INVENTORY AND IDENTIFICATION OF SOURCES, EMISSIONS AND RELEASES IN SUDAN

Table (12) Use of products containing Hg

Source category	Estimated Hg input, Kg Hg/y	Estimated Hg releases, standard estimates, Kg Hg/y					
	Standard estimate	Air	Water	Land	By-products and impurities	General Waste	Sector specific waste treatment/disposal
<b>Use and disposal of products with mercury content</b>							
Dental amalgam fillings ("silver" fillings)	590	11.8	259.7	47.2	35.4	118.0	118.0
Preparations of fillings at dentist clinics		11.8	82.6	0.0	0.0	70.8	70.8
Use - from fillings already in the mouth		0.0	11.8	0.0	0.0	0.0	0.0
Disposal (excavations, lost and extracted teeth)		0.0	165.3	47.2	35.4	47.2	47.2
Thermometers	212	42.5	63.7	42.5	0.0	63.7	0.0
Medical Hg thermometers	7						
Other glass Hg thermometers (air, laboratory, dairy, etc.)	205						
Engine control Hg thermometers and other large industrial/specialty Hg thermometers	N						
Electrical switches and relays with mercury	3,226	967.8	0.0	1,290.4	0.0	967.8	0.0
Light sources with mercury	56	16.8	0.0	16.8	0.0	22.4	0.0
Fluorescent tubes (double end)	40						
Compact fluorescent lamp (CFL single end)	16						
Other Hg containing light sources (see guideline)	0						
Batteries with mercury	2,814	703.4	0.0	703.4	0.0	1,406.9	0.0
Mercury oxide (button cells and other sizes); also called mercury-zinc cells	320						
Other button cells (zinc-air, alkaline button cells, silver-oxide)	0						
Other batteries with mercury (plain cylindrical alkaline, permanganate, etc., see guideline)	2,494						

# MERCURY INVENTORY AND IDENTIFICATION OF SOURCES, EMISSIONS AND RELEASES IN SUDAN

Source category	Estimated Hg input, Kg Hg/y	Estimated Hg releases, standard estimates, Kg Hg/y					
	Standard estimate	Air	Water	Land	By-products and impurities	General Waste	Sector specific waste treatment/ disposal
Polyurethane (PU, PUR) produced with mercury catalyst	N						
Paints with mercury preservatives	?						
Skin lightening creams and soaps with mercury chemicals	1,276	0.0	1,211.9	63.8	0.0	0.0	0.0
Medical blood pressure gauges (mercury sphygmomanometers)	340	67.9	101.9	67.9	0.0	101.9	0.0
Other manometers and gauges with mercury	115	23.0	34.6	23.0	0.0	34.6	0.0
Laboratory chemicals	230	0.0	76.0	0.0	0.0	76.0	78.3
Other laboratory and medical equipment with mercury	922	0.0	304.2	0.0	0.0	304.2	313.4

Electrical switches and relays with mercury contributes about 3226 Kg of Hg every year representing 25% of the Total Hg input from this sector, followed by batteries with mercury which contributes about 2814 Kg of Hg every year, representing 22% of Total input from this sector. It is followed by skin-lightening creams and soaps with mercury which contribute 1,276 Kg of Hg every year representing 10% of the Total Hg input from this sector. The releases from these sectors to various environmental media is given in the table above. Further details of each product type is given in following sub-titles.

#### 4.9.3. Mercury in Dental Amalgams

The use and disposal of dental amalgams account for 590 kg Hg/year (according to the General Customs Administration dental amalgam imports reports of 2017, 2018 and first 8 months of 2020) almost half (259.7 Kg) of it goes to water and 236 Kg goes to waste (Table 11).

# MERCURY INVENTORY AND IDENTIFICATION OF SOURCES, EMISSIONS AND RELEASES IN SUDAN

There is an average of about 12 Kg of dental fillings with Hg amalgam used in 494 dental clinics in Khartoum (349) and other states (145) in 2017, utilized in about 1,2151 fillings in 2017. The number of Dentists per 100,000 population was 0.6 in 2017. Mercury is released to the environment during preparation of the amalgam, from the process of wear and tear in the mouth, and by disposal of wastewater (from the preparation and removal stages) from dental clinics. It is also released from the burial of dead bodies with amalgam fillings (if teeth with fillings remain). About 40 % of all the amalgam prepared for a restoration is incorporated into the new filling in the mouth: the remainder is discarded into the drainage or smaller amalgam particles disposed in the trash. The information about dental clinics, dentist and their activities came from Annual Health Statistics Reports 2017 and the Sudanese Medical Board and Sudanese Medical Clinic Institutions.

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#### 4.9.4. Mercury in Thermometers

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The use and disposal of thermometers account for 212kg Hg/year. The types of thermometers identified in Sudan include;

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##### 4.9.4.1. Medical Thermometers containing mercury

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General Customs Administration report of 2016-2018 there is an average of 7268.6 mercury-filled thermometers sold in Sudan contributing 7Kg of Hg every year and;

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##### 4.9.4.2. Other glass Thermometers containing mercury (air, laboratory, dairy, etc.)

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with an average number for the years 2016-2018 of contributing 205 Kg of Hg every year according to General Customs Administration report of 2016-2018. The engine control Hg thermometers and other large industrial/specialty Hg thermometers bare not used in Sudan.

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#### 4.9.5. Mercury in Electrical switches and relays

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The use and disposal of electrical switches and relays account for an estimated 3,226kg Hg/year. The estimate is based on the population of Sudan and adjusted according to the electrification rate of Sudan. There are no specific national data available in Sudan.

# MERCURY INVENTORY AND IDENTIFICATION OF SOURCES, EMISSIONS AND RELEASES IN SUDAN

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## 4.9.6. Mercury in light sources

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Light sources contribute an estimated 56 kg Hg/year from about 3,195,537 items sold in 2018. According to the UN Comtrade, 2018 the types of light sources with Hg sold in Sudan include Compact Fluorescent Lamps (bulbs) and fluorescent tubes lamps. There are no national data on the quantity of each types used.

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## 4.9.7. Batteries with mercury

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Batteries with mercury contribute 2,814 Kg of Hg every year. There are no national data on batteries with Hg used in Sudan. According to the UN Comtrade, 2018, two types were sold in Sudan; Mercury oxide (button cells and other sizes); called mercury-zinc cells contributing 320 Kg of Hg and other batteries with mercury (plain cylindrical alkaline, permanganate, etc.,) contributing 2,494 of Hg every year. It is not known how many of these batteries contain mercury but for simplicity it was assumed all contain mercury.

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## 4.9.8. Skin lightening creams and soaps with mercury

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Skin lightening creams and soaps with mercury chemicals contribute 1,276 Kg of Hg every year. The average used quantities of soaps and creams for the years 2016-2018 is 75,0819.7 and 425,220.9 Kg respectively according to the General Customs Administration imports reports of 2016-2018. In addition there is a Total of 49,262 smuggled cartons of Skin lightening creams.

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## 4.9.9. Medical blood pressure gauges and manometers

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Medical blood pressure gauges and manometers contribute 455 Kg of Hg every year. According to General Customs Administration report of 2016-2018 the gauges and manometers used in Sudan are; Medical blood pressure gauges (mercury sphygmomanometers) and other manometers and gauges with mercury contributing 340 and 115 Kg of Hg respectively.

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## 4.9.10. Laboratory chemicals and other laboratory and medical equipment with mercury

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This category contributes 1,152 Kg of Hg every year. The information used in the calculations came from National General Health Laboratories / Chemical Laboratory for 2018.

# MERCURY INVENTORY AND IDENTIFICATION OF SOURCES, EMISSIONS AND RELEASES IN SUDAN

## 4.9.11. Mercury in Polyurethane Catalyst

The investigation carried out did not indicate the presence of this activity in Sudan.

## 4.10 DATA AND INVENTORY ON WASTE AND RECYCLING

This section summarizes the inventory results waste and recycling (Table 13).

Table (13) Estimated mercury releases from waste and recycling

Source category	Estimated Hg input, Kg Hg/y	Estimated Hg releases, standard estimates, Kg Hg/y					
	Standard estimate	Air	Water	Land	By-products and impurities	General Waste	Sector specific waste treatment/ disposal
Production of recycled metals	7.8	2.6	0.0	2.6	0.0	2.6	0.0
Waste incineration and open waste burning	4,377.5	4,377.5	0.0	0.0	0.0	0.0	0.0
Waste deposition	1,533.0	15.3	0.2	0.0	-	-	-
Informal dumping of general waste	7,416.0	741.6	741.6	5,932.8	-	-	-
Waste water system/treatment	0.6	0.0	0.5	0.0	0.0	0.1	0.0

Details are given under the following sub headings;

### 4.10.1. Production of recycled metals

There is no production of recycled metals in the Sudan, other than recycled ferrous metal which is estimated at a total of 3,426,700 tons per year. However, according to interviews with the GIAD industrial group, the biggest group of ferrous recycling, vehicles recycled represent 3% of total scrap iron intended for recycling. A visit was paid to GIAD steel company on January 2020, the oldest and the biggest metal recycling company in Sudan, which was established in 2000. An interview took place with their officials (interview with director of planning and director metal melting units).

# MERCURY INVENTORY AND IDENTIFICATION OF SOURCES, EMISSIONS AND RELEASES IN SUDAN

They do not have a record of the number of recycled vehicles but they can estimate the number based on the Total iron brought to the factory for recycling; they estimated recycled vehicles to constitute 3% of the Total input of iron, which is estimated at 70,000 tons per year. Assuming an average weight of vehicles at one ton, the number of recycled vehicles therefore can be estimated at 2,100 vehicles per year. There are three other metal recycling factories; their production capacity is as follows; Alasad 60,000, Dubai 30,000 and Omega 50,000 tons per year. Comparing that with GAID production capacity of 70,000 tons, then one can estimate the Total number of recycled vehicles used by these factories to be equal to: 2100 vehicles (GIAD) + 1800 vehicles (Alasad) + 1500 Vehicles (Omega) + 1050 vehicles (Dubai) = 6150 vehicles per year. According to the tool kit level 1 calculations, this contributes 7.8 Kg of mercury input (Table 12).

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## 4.10.2. Waste incineration

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Incineration of medical waste and open waste burning are the only processes found in Sudan. The year 2017 is the only year with available data for both. There are no incinerators for municipal and hazardous wastes or sewage sludge in Sudan (former Ministry of Environment and Natural Resources, 2017).

The medical or health care waste is growing rapidly due to the increase in population and the spread and expansion of health care services in all States of the Sudan. Treatment processes for medical wastes comprise autoclaving, microwaving, chemical disinfection, irradiation, plasma system, and incineration (Wolper,1995). Incineration is a suitable treatment for most types of medical waste and has several advantages that include volume reduction of the waste, and destruction of pathogens and hazardous organic matter (Vesilind et al., 2002). Major sources of health-care waste in Sudan are mainly hospitals and clinics, laboratories and research facilities. Cosmetic ear-piercing and tattoo parlours, illicit drug users and needle exchanges, ambulance and funeral services and home treatment are also considered as sources of medical waste by the World Health Organization (WHO, 2013). According to the Higher Council for Environment and Urban Development report of 2017, the total medical waste generated is estimated at 7,300 tons per year, of which 730 tons are incinerated and 1,825 tons are autoclaved, while 4,745 tons is maintained as controlled deposits/landfills.

# MERCURY INVENTORY AND IDENTIFICATION OF SOURCES, EMISSIONS AND RELEASES IN SUDAN

The open burning of municipal and domestic waste (in landfills and informally) is estimated at 4,360,000 tons/year according to the National Environment council (formerly Ministry of Environment and Natural Resources) report of 2017 data.

One of the tobacco factories had set up an advanced incinerators for its hazardous waste treatment.

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## 4.10.3. Waste deposition/land filling and waste treatment

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The available waste infrastructure for treatment and disposal is generally highly limited in Sudan and the main disposal method for hazardous as well as non-hazardous waste is the (controlled) dumping of the waste on dumpsites (UNDP 2015).

The total amount of municipal solid waste, including clinical and hazardous waste, is estimated at  $7.88 \times 10^6$  tons/year according to the 2018 report of the Central Bureau of Statistics, of which 7,416,000 tons/year is general waste. Most of it is subject to informal dumping, and only 1,533,000 tons/year is subject to controlled landfills/deposits according to the National Environment council (formerly Ministry of Environment and Natural Resources) report of 2017.

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## 4.10.4. Waste water

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There are no exact estimates of total waste water and sludge available in Sudan as there only two water treatments plant in the country, both located in Khartoum.

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## 4.10.5. Waste water treatment facilities

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There are two sewage plants in Sudan; The Soba waste water treatment plant which is connected to a residential and small industrial area in Khartoum with a capacity to handle waste of 80,000 persons, with a waste water output of 33,500 cubic meters per day, and 483.8 tons of sludge per year

The Wad Dafiah Waste Water Treatment Plant has a water output of 14,500 cubic meters per day and 1581.6 tons of sludge per year.

Water treated in the two water treatment facilities was estimated at 48,000 m<sup>3</sup>/day with 2,065.4 tons / year of sludge (Tables 14 and 15).

# MERCURY INVENTORY AND IDENTIFICATION OF SOURCES, EMISSIONS AND RELEASES IN SUDAN

Therefore, for the purpose of this inventory, waste water and sludge were estimated by interpolation from the input and output of the two plants related to urban and rural populations, with the assumption that a person in rural areas utilizes 1/3 of the quantity utilized by urban persons. Based on this approach, the total of waste water and sludge was estimated at 3,880,376.28 cubic meters per day and 4,169,393.41 tons per year respectively. The waste water and sludge generated by the urban population was estimated at 2,454,840.69 cubic meters per day and 2,637,954.87 tons per year respectively, while that of rural population was estimated at 1,425,535.59 cubic meters per day and 1,531,438.45 tons of sludge per year respectively.

Table (14) Quality of Treated waste water at Soba Plant Stabilization ponds

Year	Volume (M <sup>3</sup> /day)	BOD (mg/l)		COD (mg/l)		Sludge (ton/year)
		Inlet	Outlet	Inlet	Outlet	
2012	32000	300	60	550	150	552.9
2013	32500	310	80	570	200	529.9
2014	33000	315	100	590	250	495.3
2015	33500	320	110	600	275	483.8

Source: Soba Stabilization Ponds Plant records 2016

Table (15) Quality of Treated waste water of Wad Dafiah Plant Stabilization Ponds

Year	Volume (M <sup>3</sup> /day)	BOD (mg/l)		COD (mg/l)		Sludge (ton/year)
		Inlet	Outlet	Inlet	Outlet	
2012	13000	950	149	2000	229	1124.6
2013	13500	1050	150	2050	233	1312.2
2014	14000	1150	155	2100	239	1504.4
2015	14500	1170	160	2150	242	1581.6

Source: Wad Dafiah Waste Water Treatment Plant records 2016

# MERCURY INVENTORY AND IDENTIFICATION OF SOURCES, EMISSIONS AND RELEASES IN SUDAN

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## 4.10.6. Waste management in Sudan

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Currently, Sudan faces a great challenge due to the lack of; integrated waste management systems, inadequate industrial and hazardous waste regulations to limit waste production, absence of a waste source sorting system, inadequate infrastructure to manage the waste and lack of documented data on waste quantities, types and characteristics. The high cost of waste collection, transportation and land filling is a further challenge for decision- and policy-makers, forcing them to overlook the long-term economic costs of waste management, including public health, and environmental and economic impacts. Municipal solid waste is a long-term problem in the country's urban centers, mainly due to low levels of environmental awareness, poor practices at the household and individual levels when dealing with solid waste, and institutional weaknesses in the enforcement of legislation related to solid waste.

Various pieces of legislation are in place for waste management in the country, including the 2001 Environmental Protection Act as the umbrella law. The Public Health Act as amended in 2008 promotes the general health of individuals while protecting them from catching diseases from an unclean environment. The Environmental Health Act, which was amended in 2009, seeks to ensure that the environment is kept in a manner that supports human, plant and animal life through the provision of basic necessities such as clean water, clean air and proper waste management. The Federal laws are supported by state level laws such as the 2008 Khartoum State Environmental Protection Law. Standards are also set with the aim to ensure that the environment is clean from waste and pollutants. For example, the Sudanese Standards and Metrology Organization Act sets minimum thresholds and standards for pollutants emitted by industry, as well as provide guidelines for the management of solid, hazardous and waste.

Waste management in Sudan is under the direct responsibilities of states and localities which act in coordination and integration with federal government. Waste management is not only carried out by government, municipalities and individuals, but also by the private sector. The private sector in some cases was contracted to collect waste, clean streets and transport solid waste. Some private companies, such as tobacco companies, incinerate their own hazardous waste.

# MERCURY INVENTORY AND IDENTIFICATION OF SOURCES, EMISSIONS AND RELEASES IN SUDAN

Various public campaigns and educational programs were carried out with the aim to reduce waste generation, and consequently the amount of waste that reaches landfills, by 25% by 2030. The campaign also seeks to increase the level of recycling to 40% by 2030. These campaigns also aim at promoting waste separation at source, and development of standards for packaging materials (EWTSCO 2016). Universities and research centers are engaged in developing waste treatment technologies such as waste-to-energy and composting.

The available waste infrastructure for treatment and disposal is generally highly limited in Sudan and the main disposal method for hazardous as well as non-hazardous waste is the (controlled) dumping of the waste on dumpsites (UNDP 2015). In conclusion management of all types of waste (solid municipal, plastic, medical, industrial and waste water) in the Sudan is closely related to Sudan's stage of development. The current existing waste management systems can hardly cope with the rate of waste generation. Solid waste management is a real challenge in Sudan, considering the increased rate of urbanization, population growth and globalization of trade with increased cheap imports of consumer goods and increase in waste volume. The average solid waste generation rate was estimated as 0.5 kg per capita per day. Solid waste management in most areas of Sudan is not yet considered as a priority service and suffers from irregular solid waste management services in terms of inefficient collection, transportation and final disposal. There is no system for proper waste water treatment and disposal except in limited district of the capital Khartoum.

There are no adopted procedures for quantity reduction, sorting, efficient collection, transport, recycling and standard final disposal sites. The integrated management of municipal solid wastes should be implemented to remove wastes accumulations, raise efficiency of collection and transport, and establish a system for waste recycling in addition to increasing work efficiency in dump sites and establishing sanitary landfills.

Investment in waste recycling is an opportunity that requires supporting legislation and regulatory mechanisms, such as the provision of concessional loans to encourage the private sector to expand into an advanced industry to recover the resources and protect them from unfair competition. It is also essential to raise the environmental awareness of the importance of rationalizing consumption, and the reuse practices, in addition to the necessity of waste sorting.

# MERCURY INVENTORY AND IDENTIFICATION OF SOURCES, EMISSIONS AND RELEASES IN SUDAN

In recent times, Sudan has witnessed prominent cases of industrial waste spilling into the environment. The cases include the accidental spill of 500 tonnes of molasses from North West Sennar Sugar factory into the Blue Nile in March 2006, which resulted in the death of fish (Abdel Magid and ElHassan 2006). Fuel spillage at Rabak Cement Factory is another case where 100,000 litres of chemical liquid waste leaked into the soil around the Rabak Cement Factory (Abdel Magid and ElHassan 2006).

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## 4.10.7. Management of mercury waste in Sudan

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Apart from reuse and re-extraction of gold from the tailings of artisanal gold mining and efforts made by the Ministry of Energy and Mining by distribution of retorts, there is no management system of mercury waste in the Sudan. All the mercury containing waste goes within the general waste stream

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## 4.10.8. Contaminated Sites

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There is no exact record of contaminated sites but from inventory results there are two types of highly contaminated sites;

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### 4.10.8.1. Artisanal gold mining markets

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As mentioned earlier, there are 73 artisanal gold mining markets serving 245 mining sites containing 44296 mining wells spread over 55 localities in 14 states with about 5668 mills, and 5398 washing bonds. According to an unpublished study by Ahmed (2018), all soil, water, vegetation and animal portion samples contain violative (higher than the US EPA tolerance limit) amounts of mercury. Details of this study is given in the chapter of identification of population at risk.

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### 4.10.8.2. Pesticides storage area in Hassahesa town

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Abdelrhman (1999) investigated the level and movement of mercury contaminants released from storage areas of obsolete stocks of phenyl mercury acetate **treated cotton seeds in Hassahesa town. No recent data is available.**

# MERCURY INVENTORY AND IDENTIFICATION OF SOURCES, EMISSIONS AND RELEASES IN SUDAN

Prior to the study, some of the stocks were sold to food processing factories to be used as fuel. Sampling sites included factories, storage soil within and around stores of phenyl mercury acetate treated seeds and soil in the surrounding residential areas. Her results indicated elevated mercury level in all samples analyzed. Levels detected far exceeded the background and normal range for mercury in soil. This may indicate a possible risk of high exposure to workers in these factories and stores, and residents, in the surrounding areas. At present, these stocks were not found and most probably were taken illegally.

## 4.10.8.3. Other expected mercury contaminated sites include:

- Waste recycling, dumping and land filling as the mercury added products are not segregated from the waste stream
- the areas of ferrous recycling companies
- Petroleum production fields from drill cuttings (the management of which is the responsibility of the companies' health, safety and environment (HSE) departments and the Ministry of Oil and Gas)

## 4.11 DATA AND INVENTORY OF CEMETERIES

There are no crematoria in Sudan. Cemeteries were estimated by the death rate reported by the Annual Health Statistics Reports for the year 2017 as given in Table (15). The estimated mercury input from cemeteries is 1937 Kg Hg per year

Table (16) Mercury releases from cemeteries

Source category	Source present?	Activity rate	Hg input (Kg/Year)	Year	Unit	Calculation Method and source
Cemeteries Death rate	Y	774,872	1937	2017	person	1. Annual Health Statistics Reports 2017

## Data Gaps

The inventory identified the following data gaps and proposes the following recommendations:

- Estimates of mercury content in the environment of artisanal gold mining markets including analysis of soil, water, food crops, animal products and human samples;
- Set up mitigation measure to reduce mercury contamination of soil and water in these sites and investigate possible remediation methods;
- There is a need to collect data for estimating total quantities of ASGM waste followed by analysis of the mercury content in waste as the waste is used as raw material by gold mining companies.
- Recycling mercury by using retorts in the gold mining sector. Some retorts were distributed by the Ministry of Minerals to artisanal miners and there is no tracking or follow up of the amount of mercury recycled and evaluation of the whole operation.
- Analysis of mercury content in waste stream and adoption of integrated mercury waste management system
- Analysis of mercury content in imported and locally produced soaps and skin lightening creams and imported and locally produced paints.
- Creation and build-up of national statistics and databases on light sources and batteries with mercury.
- Do level 2 of inventory after obtaining national data on various activity rates.

The inventory results indicated that five population groups may be risk due to anthropogenic sources of mercury;

1. Population at the markets of artisanal gold mining;
2. Population in the gold mining companies not using mercury in gold extraction
3. Population exposed to mercury-containing beauty care products;;
4. Population exposed to mercury in the waste stream;
5. Population exposed to mercury from dental amalgam and medical laboratories,



## 1. POPULATION AT THE MARKETS OF ARTISINAL GOLD MINING

The mining activities in which Hg is used and exposure takes place occurs in the mining markets. There are 73 artisanal gold mining markets distributed in 14 states. Therefore, all uses of mercury are confined to these markets. These markets serve a total of 244 mining sites. There are about 44296 mining wells (small mines dug by ASGM miners) spread over 244 sites in 55 localities in 14 states with about 5668 mills, 5398 washing bonds and 73 markets. Three decades ago before the expansion in artisanal gold mining activity the whole process was done near the mining wells, but since then all processing activities are done within these markets. The artisanal mining markets were initially created by the states' governments and developed by the artisanal miners themselves. The populations at these markets were estimated at two million people doing more than 33 different jobs of ore handling, grinding and crushing, washing, mercury handling, processing the raw crushed ore and soil with mercury, collection of the mercury extract, burning of the extract and production of gold and different living services. These populations are considered to be the most highly exposed group since they are exposed directly to mercury, whether as vapours, elemental or organic mercury (images 1-5).

## IDENTIFICATION OF POPULATIONS AT RISKS AND GENDER DIMENSIONS

Most of the miners do not use retorts for the recycling of mercury. However, the degree of exposure varies according to the profession with burning workers (who represent 6.8% of the market population) being the most highly exposed, followed by washing and milling workers who represent 43% and 48.9% of the market population respectively. This ranking was assumed because the former group is expected to be exposed via inhalation to mercury vapour emanating during the burring process. The washing worker (mostly between 10-15 years old) came in the second rank as they are in direct contact with mercury during mixing of the ore with mercury to extract gold and they collect the mercury gold amalgam. The milling workers came in the third rank as they are exposed to mercury from the nearby washing ponds. The whole market population may be exposed to mercury vapours from the burning process, either through direct inhalation of vapours and/or consumption of contaminated water or food. Persons performing other jobs such as food providers, shopkeepers, inspectors, other officials, custom officers, security officers, laundry workers, butchers, drivers, nomads and others are also exposed, but to a much lesser degree.

The majority of washing workers are children (aged between 10-15 years), while the milling and burning workers are between 15 and 60 years old. The vast majority of the mining workers at the northern, central and eastern states are males, however in the western states and Blue Nile State markets the mining activity is done within the family holdings and therefore the exposed population in these areas contains other vulnerable populations such as female workers, pregnant women, infants and older persons.

The Department of Environment and Safety, Ministry of Minerals (Nov. 2013) conducted a study on the mercury level in 100 blood and urine samples collected from artisanal miners in Abu Hamad area of the Nile River State of Northern Sudan. Seventeen additional samples of urine and blood were collected from residents outside the highly contaminated sites as a control. According to the study, no worker used any personal protective equipment and they carried out the gold extraction process with bare hands without face or eye protection. Further, they are also exposed to mercury fumes during the heating process of the amalgam to separate gold from the mercury. Results (Ministry of Minerals 2013) indicated very high levels of mercury in the blood and urine samples analyzed.

## 2. POPULATION IN LARGE SCALE GOLD MINING COMPANIES NOT USING MERCURY IN GOLD EXTRACTION

This includes workers in the licensed gold mining industries which extract gold from the tailings (locally called Karta) of artisanal gold mining ore which contains a residual amount of mercury. These companies extract gold by methods other than mercury amalgamation using heap leach or VAT closed system (carbon in leach or carbon in pulp) techniques. There are 70 of these companies distributed in 12 states, mostly located in the northern part of Sudan. A total of 10,000 workers were employed by these companies; however, only those handling the tailings are the group at risk of mercury exposure in this sector, while other employees and officials were not directly exposed to mercury. The age of this exposed group is ranges from 25 to 60 years and all workers are males.

## 3. POPULATION EXPOSED TO MERCURY-CONTAINING BEAUTY AND CARE PRODUCTS

The most significant category of population exposed to mercury-containing products is women using beauty-care products, especially skin lightening creams and soaps. Generally, mercury is a common ingredient in most of these products, especially the skin lightening creams (Drug and Poisons Board 2020).The mercury salts inhibit the formation of melanin and therefore give a lighter skin tone, which has made such soaps and creams attractive for the majority of women in the African continent. For the purpose of estimating the number of women using such creams and soaps in Sudan, it was assumed (according to occupational health officers, personal communication) 50% of the total number of women of age category ranging between 15 to 65 years use these products. Based on this assumption, and based on the most recently available prediction (2017) of the Sudanese population, about 5.5 million women will be exposed to mercury in such products. A significant fraction of this population may be in the childbearing age or breast-feeding children (Central Bureau of Statistics, 2020). Although the SSMO of the Sudan prohibits local production and import of such beauty/care products, the customs administration reported significant amounts of these products entering the country through smuggling.

## 4. POPULATION EXPOSED TO MERCURY IN THE WASTE STREAM

This sector of the population can be classified into subcategories according to mercury sources;

### 4.1 WASTE WORKERS OF INFORMAL DUMPLING OF SOLID WASTE, OPEN FIRE WASTE BURNING (ON LANDFILLS AND INFORMALLY) AND SCAVENGERS

The workers engaged in the waste management system in Sudan may be exposed to mercury in the waste stream as they handle unsorted wastes which may contain many types of hazardous, discarded mercury-containing waste products with bare hands and without any personal protective equipment (PPE). Sometimes the responsible authorities avail the PPEs, however workers do not use it because they are uncomfortable, especially in the Sudan climate. The waste stream in Sudan contains unsorted waste which may contain many types of hazardous waste including mercury disposed equipment or elemental spills of mercury or fumes from open burning of wastes at solid waste dump sites. Therefore, workers in the waste management system and scavengers may be at high risk from direct exposure to Hg containing wastes and/or Hg vapours emanating from open waste burning. Such sectors of the population may include significant numbers of women and children. According to the Annual Health Statistics reports of 2017 there are about 3730 workers involved in the handling of informal dumping of general waste and open waste burning in addition to an unknown number of scavengers. Other exposed groups in this sector include 762 sanitary supervisors, 908 assistant sanitary supervisors and 2060 environmental health workers.

### 4.2 COMMUNITIES LIVING AROUND THE WASTE DUMP SITES

Individuals in this community may directly inhale fumes and dust from dumpsites which may contain Hg vapour or Hg sorbed dust particles. This community may include infants, children, pregnant women, patients with chronic diseases and other vulnerable groups with health implications. Their exact numbers were not available.

## 5. POPULATION EXPOSED TO MERCURY IN DENTAL AMALGRAM AND MEDICAL SECTOR



### 5.1 POPULATION EXPOSED TO MERCURY IN DENTAL AMALGRAM

Dental workers may be exposed to mercury amalgam during the disposal of amalgam waste (remaining from preparation or removal of Hg contaminated teeth from patients). Such amalgam waste is mostly discarded into solid waste or enters waste water systems, potentially contaminating waste disposal streams and water treatment facilities, and thus posing hazards to downstream workers. Therefore, all workers in this sector are exposed. According to the Health Statistics reports of 2017 the total of dental staff in Sudan was 9565 working in 494 dental clinics (Sudanese Medical Clinic Institutions report data of 2020)



### 5.2 POPULATION IN OTHER MEDICAL CARE SECTOR

This group includes workers in the dental clinics, patients and other health care worker. In the healthcare sector, mercury is used in a variety of devices and measuring instruments. Healthcare workers may be exposed to mercury due to spills from broken Hg-containing devices and equipment. Improper containment and disposal of spill remains could contaminate the solid waste stream and the environment. Therefore, all workers in this sector in addition to medical waste management workers can be considered at risk. According to the Health Statistics reports of 2017 the total number of medical staff in Sudan in 2017 is 27,458 composing of 7,561 physicians, 6,233 assistant officers and 13,664 nurses.

## 6. DATA GAPS AND RECOMMENDATION

The study identified the following data gaps and proposes the following recommendations;

- Estimate of mercury exposure and impacts of artisanal gold mining markets including analysis of soil, water, food crops, animal products and human samples;
- Set up mitigation measures to reduce exposure to Hg in these sites and investigate possible remediation methods for the soil and water in these sites;
- Estimate exposed population during various activities of waste streams;

The review and assessment of national ,technical, administrative, infrastructure and regulatory capacities as well as policy and institutional frameworks was carried out in order to make a preliminary assessment of the current gaps and national needs for the ratification and early implementation of the Minamata Convention. It provides ministries with strong arguments for the prioritization of mercury management on the national agenda and highlights areas that are essential for compliance with the reporting obligations of the Convention and of monitoring its implementation.

The assessment identifies national institutions and stakeholders with mandates and capacities relevant to the control of mercury. It identifies institutional capacity gaps and barriers; analyses and reviews existing laws and regulations; identifies gaps in the policies, laws and regulations; sets out a list of needed mercury-related regulations; and provides a final legal and institutional capacity report. The assessment was based on a desk survey, followed by a situational analysis of the current relevant policies, regulatory and institutional structure in the light of the Minamata Convention and other relevant international instruments.

## 1. ENVIRONMENTAL POLICIES AND MANAGEMENT IN THE SUDAN

Since independence, Sudan's various governments have strived to achieve welfare for their people via development based on its natural resources. Sudanese policy in the realm of natural resources and environmental conservation has taken great strides in the last three decades. There was an oblique reference to environmental policy in the 1973 Constitution but no national body was entrusted with the responsibility for environmental and natural resources management. Key ministers dealt with natural resources as part of their administration such as the Ministry of Agriculture, Food and Natural Resources and the Ministry of Irrigation.

Within the last decade of the twentieth century prominent milestones were achieved. The State adopted a National Strategy for the Comprehensive Development (NSCD) for the decade 1992-2002, within which the environment had a committee to itself. The culmination of these governmental steps occurred in 1994 when the environment portfolio was promoted to ministerial level. A second strategy plan for the period 2007- 2032 is underway and is being implemented in 5-year phases. The overall strategic plan vision is summarized in building a unified, secured, developed, advanced and progressive Sudanese nation, a nation that aspires to both cohesive objectives and goals. The cultural, social, political and geographic diversities should propel the nation towards development and modernization based on conceptual and civilized behavior.

The interpretation of the Twenty-Five Year Strategy with its vision, mission and values into phases and predictable programs in terms of goals and priorities would hasten reaching qualitative and quantitative results in the framework of a national program for development. It would furthermore enrich institutions' capacities and make better use of human and natural resources (National Council for strategic Planning 2007).

The quarter century strategy (2007-2031) was reviewed in 2018 and a new government plan was developed for the period (2020-2025). All sectors were involved in the formation of this programme. The designed plan gave special attention to human rights; capacity building; youth involvement etc. Special consideration is given as well to the private sector and NGOs. This plan aims also to implement the SDGs.

([https://sustainabledevelopment.un.org/content/documents/19424Sudan\\_Voluntary\\_National\\_Review\\_2018\\_1.pdf](https://sustainabledevelopment.un.org/content/documents/19424Sudan_Voluntary_National_Review_2018_1.pdf))

## 2. CONSTITUTIONAL DIRECTIVES, GUIDELINES AND POLICIES

Article 10(1) of the Interim National Constitution (INC) obliges the State to, among others, attain the MDGs, which are superseded by the 2030 SDGs. The SDGs provide numerous goals of relevance to health, safety and the environment. Article 11 recognizes, as part of the overall aims of economic development, the importance of environment and natural resources. Specifically, it sets out that:

1. The people of the Sudan shall have the right to a clean and diverse environment; the State and the citizens have the duty to preserve and promote the country's biodiversity.
2. The State shall not pursue any policy, or take or permit any action, which may adversely affect the existence of any species of animal or vegetative life, their natural or adopted habitat.
3. The State shall promote, through legislation, sustainable utilization of natural resources and best practices with respect to their management.

In line with all the above stipulated directives and principles, Sudan has acceded to numerous relevant international and regional environmental agreements and followed the same with the promulgation of regulatory measures that address various aspects of environmental problems.

In relation to chemicals and hazardous wastes; including mercury and mercury-compounds; the country is a Party to the following international and regional instruments:

- Stockholm Convention on Persistent Organic Pollutants (2003),
- Vienna Convention for the Protection of the Ozone Layer (1985),
- Basel Convention on the Control of Trans-boundary Movements of Hazardous Wastes and Their Disposal (1989),
- Rotterdam Convention on the Prior Informed Consent Procedure for Certain Hazardous Chemicals and Pesticides in International Trade (1998) and
- Bamako Convention on the Ban of the Import into Africa and the Control of Transboundary Movement and Management of Hazardous Wastes within Africa (1991).

All the above-mentioned ratified environmental agreements, as well as the United Nations Framework Convention on climate change 1994, constitute an important supplement to realize the objectives of the Minamata Convention. However, this needs to be equally supported by adequate and appropriate national legal measures to secure the implementation of these ratified instruments.

## 3. RELEVANT NATIONAL REGULATORY MEASURES

Sudan has enacted numerous relevant environmental legislations and regulations with the aim to protect human health and the environment.

### ENVIRONMENT PROTECTION ACT 2021

The Environment Protection Act is the umbrella national framework law which includes various guidelines, directives and institutional measures for the protection of the environment. Section 5(1) of the Act established the HCENR to be formed by a decree from the Council of Ministers headed by the national Minister in charge of environmental affairs and with membership drawn from the concerned ministries, and the related organs and corporations to undertake specific duties, which include:

- a. Setup the general policy and a national long-term plan for sustainable exploitation of natural resources, including preparation of an inventory for these resources in coordination with the competent authorities;
- b. Periodic review of related legislations to ensure that they are compatible with the international standards relating to development of the environment and natural resources, and to submit recommendations on such reviews to the competent authorities;
- c. Draw the general policy for environmental protection and set a national plan for the sustainable exploitation of natural resources;
- d. Coordinate the efforts of the State with regard to accession to agreements relating to the environment; and
- e. To reinforce the role of the HCENR at the State level, Section 14 obliges each state to establish, in line with its State Constitution, a State Council for the Environment and Natural Resources to be constituted by the decision of the State Governor (Wali). This State Council is to be presided over by the concerned State Minister and with members selected from the relevant ministries, organs and corporations.

To date, no long-term plan, strategies or policies for the sustainable exploitation of mineral resources, including ASGM were formulated by the HCENR in accordance with Section 5(1) of the Environment Protection Act.

Among provisions worth highlighting are Sections 17(1) and 18 of the Act. The former requires, as a precondition for the approval of any projects with potential negative impacts, that a thorough environmental impact assessment should be submitted by the investor to the Evaluation and Follow-up Committee to be constituted by the Higher Council for this purpose. This requirement is considered as potentially important for implementation of Article 5 of the Minamata convention.

To ensure the involvement of all in environmental protection, Section 19(1) of the Act obliges any person, whether natural or corporate body to report on the risks that endanger the environment, as well as the violations stipulated in the Act and other environment health related laws and to render the needed assistance for the protection of the environment. In return, the Section entitles such persons to recover any expenditure which she/he had exerted in providing the required help from any of the competent authorities which perform the same task. To facilitate the process of reporting any environmental violation, Para (2) of Section 19 and subject to the rules provided in the laws governing rights and Civil Procedure, entitles any person to institute a civil suit against such contraventions without the need to prove any interest.

Lack of legal knowledge on environmental laws among many law enforcement personnel, including judges and lawyers constitutes a real challenge to effectively prosecute environmental violations. Added to this, lack of public awareness about environmental laws hinders the active participation of community members in monitoring the implementation of environmental laws in accordance with Section 19 referred to above.

Section 20 of the Act enumerates the acts that constitute environmental violations; which include contamination of air; water sources; soil, or the disposal of wastes and industrial materials; and the change of natural water courses; including rivers.

Whoever is convicted of any of the above indicated violations will be liable for imprisonment for a term not exceeding three years or with fine or with both. In addition, the Court may confiscate the materials related to the violations for the benefit of the concerned authority.

Lack of environmental awareness, as well as inadequacy of competent legal and technical expertise to entertain violations relating to ASGM are major factors hindering the enforcement of violations prescribed in the existing sectorial enactments, including those provided in Section 20 of the Environment Protection Act. Accordingly, there is no record on violations concerning observed unsustainable ASGM practices.

All the above cited provisions are meant to provide general guidance for various competent sectoral authorities to formulate further detailed regulations for the protection of the environment and human health in accordance with their delegated mandates.

In relation to mercury, mercury compounds, and gold activities in general, these provisions are of significant importance since they address some of the core issues included in the Minamata Convention, namely; the emissions and releases of mercury and contaminated sites (Articles 8, 9 and 12 of the Convention). Having in mind the absence of specific regulatory measures on these significant environmental concerns, it is advisable for the HCENR, in collaboration and consultation with the Ministry of Mining, Ministry of Health and other relevant competent authorities to propose the appropriate Regulations in compliance with the above cited Articles of the Minamata Convention.

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## ENVIRONMENT HEALTH ACT 2009

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The Environment Health Act provides considerable provisions related to pollution control. The Act stipulates the following conditions for the prevention, or at least, reduction of air pollution:

- a. Sources of pollution from the industrial should be established at an appropriate distance from schools and public utilities;
- b. The height of a chimney should be reasonable to allow the spread of vapours, fumes, gases, and prevent their concentration; and
- c. Factories of chemicals, oils, or textiles which discharge gases shall be equipped with air purifying devices, such as cyclones and filters, for the absorption of the gas or to decrease its concentration.

Non-compliance with any of the above stipulated provisions constitutes a violation under the Environment Health Act, as well as Section 20 of the Environment Protection Act. However, there is no reported case in the Sudan Law Journal and Reports where the provision of this section was invoked in environmental protection. Apparently, as noted earlier, due to want of coordination between the HCENR and the competent sartorial ministries and bodies, in addition to the weakness of the existing legal and technical resources.

The Act, in its preliminary provisions, defined the meaning of water pollution and goes on further and sets out the duties of the localities towards environmental health. It explicitly prohibits any person to throw any solid, liquid or gaseous materials into any water source which are likely to harm human health or negatively affect the use of water sources for other usages. In case of violations of any of its stipulated rules, the convicted person will be liable to imprisonment for a term not less than a year or with a fine or both.

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## PENAL CODE 1991

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The Penal Code dedicates a chapter on environmental crimes, including provisions on the ones related to water resources. For example, Section 70(1) considers any person who exposes the life or the safety of people to danger by putting poisonous material into a well, reservoir or any public water course to have committed a crime, and accordingly, be liable for imprisonment for a period not exceeding three years, and may also be subject to a fine. Furthermore, paragraph (2) of the same Section imposes on the convicted person who contaminates or pollutes a well or a reservoir or any public water course in a way that renders such water unsuitable for the intended purposes an imprisonment for a period not exceeding three months or with a fine or with both, which is significantly lighter than the penalty prescribed in paragraph (1) of the same Section. Section 71(2) prescribes a term of imprisonment not exceeding five years or a fine or with both for any person to be convicted for the contamination or pollution of the territorial water of Sudan, and the waters of the high seas adjacent to the Territorial Sudanese Water.

In relation to unsustainable ASGM activities, the implementation of all the above stipulated offences rests on the Ministry of Mining, the HCENR and other competent bodies which are expected to exercise authority in accordance with their mandates. In addition, individuals and NGOs are expected to file cases regarding relevant violations in line with Section 19(1) of the Environment Protection Act. Similarly, the observed drawbacks relating to environmental awareness and lack of the needed legal and technical resources are among the chief factors obstructing compliance, including enforcement.

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## PESTICIDES AND PESTS' CONTROL PRODUCTS ACT 1994

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The Pesticide and Pests' Products Control Act provides provisions designed to protect the environment. To this end, the National Council for Pesticides and Pests' Control was established in line with Section 4(1) headed by the Minister of Agriculture to supervise all activities relating to the inspection of pesticides and pest control products, registration of pesticides and restrictions of their use in accordance with the approved regulations.

- The Regulations so far passed, in accordance with Section 10 of the Act, include: Regulations for the Control of Trading;
- Circulation and Commercial Use of Pesticides and Pests' Control Products;
- Regulations for the Inspection of Pesticides and Pests' Control 2002;
- Regulations to Control Storage and Transport of Pesticides and Pests' Control Products 2002;
- Regulations for the Protection of Workers dealing with Pesticides and Pests' Control Products 2002;
- Importation of Pesticides and Pests' Control Products Regulations 2002;
- Registration of Pesticides and Pests' Control Products Regulations 2002; and the
- Formulation of Pesticides and Pests' Control Products Regulations 2002.

The above-mentioned Regulations provide complementary measures to implement the provisions of the Act relating to, among others, the method of inspection, supervision of pesticides and pests' control products and the classification of pesticides according to the degree of toxicity.

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## STANDARD AND METROLOGY ACT 2008

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The Standards and Metrology Act is the leading enactment relating to all specifications to be followed by the competent authorities. Section 8 of the Act requires all technical committees to observe, in the process of laying the technical specifications and rules, the following:

- a. Preservation of security and national economy, prevention of cheating, consumer protection, and the protection of human health and safety, and environmental protection; and
- b. The standards, if there are any, which are recommended by accredited international and regional organizations.

And in line with Section 9, the technical specifications and rules shall be reviewed periodically, or on the request of any concerned stake holder.

The SSMO, as per Section 12(1) shall declare the technical specifications and rules through:

- a. The media at an earlier stage of preparing any technical specifications;
- b. Notify the competent international organization at an earlier stage about the products covered by the technical specifications and rules; and
- c. Enable the concerned bodies, upon request, to be acquainted with the technical specifications.

By virtue of Section 31 of the Act, any of the following acts constitutes a violation that warrants an imprisonment or fine or both:

- a. Offering for sale in markets or commercial places any products not matching with the technical specifications and rules;
- b. Cheating with the information relating to packaging or using counterfeited ones; and
- c. Misleading or cheating the consumer through dishonest commercial promotion of products or materials.

The scope of the Standards and Metrology Act covers all industries that produce products and goods as well as imported products and goods intended for consumer consumption, including water bottling plant manufacturers and those specialized in the production of personal hygiene related products.

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## MINERALS RESOURCES DEVELOPMENT ACT 2015

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The Minerals Resources Development Act obliges, according to Section 26, any holder of a licence or contract for the development of minerals to observe the applicable environmental laws. In particular, the Section requires such person to protect the environment of the area covered in the license or contract from pollution and damage caused by the mining operations in accordance with rules of the Act and its Regulations. To ensure compliance with the conditions of the licence and observance of environmental laws, Section 27(1) of the Act authorizes the competent authority at the Ministry of Mining to enter the area covered by the licence or contract and to report to the concerned authority on any noted environmental, technical and administrative aspects related with the operations.

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## REGULATIONS FOR THE ORGANIZATION OF MERCURY IMPORTATION, USE AND CIRCULATION 2012

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These Regulations were passed in accordance with Section 26 of the repealed Minerals Resources Development Act 2007 and were reinforced, in accordance with Section 2(a) of the Minerals Resources Act 2015. As per Section 4(a), The Minister of Minerals is to establish a Mercury Unit and specifies its functions. The Ministry of Minerals is the lead body which is responsible for the implementation of the Regulations in cooperation and coordination with other governmental units, namely the Customs General Administration, SSMO, Ministry of Environment (replaced by the National Council for Environment and Natural Resources) and the Directorate of Economic Security.

The 2012 Regulations were adopted with the principal objective to control the import, use and circulation of mercury and its compounds for mining purposes by the registered companies which satisfy the conditions prescribed in the Regulations. The Regulations do not address mercury that might be imported and used in mercury-added products that are considered in the Minamata Convention.

In accordance with Section 5(a) of the Regulations, any company which imports mercury must:

- a. Be owned by Sudanese; and registered in accordance with the Companies Act 2015;
- b. Be specialized in mining and related materials; and technically competent and possesses the needed technical knowhow for the import, storage, transport and distribution of mercury in a safe and secure way;
- c. Abide by all the conditions and orders of the Ministry of Mining and related bodies;
- d. Import mercury that is with the quality set by the SSMO;
- e. Store mercury in a safe and secure way at all stages and in all times and in particular in the event of non-use (as out of the reach of children and kept in firmly closed containers with thin layer of water to prevent evaporation of mercury).
- f. Preserve the safety of employees dealing with mercury and secure the safe use of mercury by minimizing the risks of exposure to mercury vapour; and providing the control measures including personal protective equipment.

Furthermore, Section 6 requires the company within the definition of Section 5(a) of the above-mentioned Regulations to, among others, use mercury for the mining intended purpose. With regard to the circulation of mercury, Section 7 compels the company to:

- a. Keep mercury in well closed and sealed containers with its stamp for easy and safe transport;
- b. Open sale points for mercury with the approval of the Ministry of Mining and the Directorate of Economic Security;
- c. Prohibit sale of mercury to children under the age of 18 years;
- d. Prohibit circulation of any quantity of mercury exceeding 1 kg except with the written permission of the Ministry of Mining; and
- e. Print labels on the containers used for mercury circulation, in accordance with SSMO labeling requirements, that specify mercury quality and mercury hazards to health and the environment (in writing and symbols).

At present, the Sudamin Company Ltd is the only company licensed to import mercury for mining purposes. It was established in 2012 in accordance with the repealed Companies Act 1925. This Company constitutes the investment apparatus of the Ministry of Mining.

The Ministry of Mining shall, in accordance with Section 8, prepare a database for the import, use and circulation of mercury, in addition to registers which show the areas where such use and circulation take place. With respect to awareness, Section 9(1) of the Regulations obliges the Ministry of Mining to maintain an enduring coordination with other ministries and units, with the aim to raise the awareness of citizens on the risks of mercury, besides the provision of guidance on the use of mercury. In line with paragraph (3) of the same Section, the Ministry of Mining shall, in coordination with the States and Localities, define the areas where the use of mercury is authorized.

Finally, Section 10 lists the following activities as violations of the acts:

- a. Importation of mercury or any of its compounds without obtaining permission or approval therefore from the competent authority;
- b. Smuggling mercury or any of its compounds;
- c. Use of mercury near the Nile, water courses, or rivers;
- d. Circulation of mercury in violation of any of the rules stipulated in Sections 7,8,9 of the Regulations;
- e. Use of mercury for any unapproved purpose; other than gold extraction
- f. Circulation of mercury in the defined States or Localities without the permission from the competent authority; and
- g. Use of mercury inside the residence, or not less than 4 km near such residence. (there is no residence within the mining markets)

Section 11 specifies the punishment of whoever commits any of the above stated violations as the following:

- Cancellation of the granted authorization;
- Banning from any future dealing; and
- Accrual of the mercury quantity, which constitutes the subject of violation to the benefit of the Ministry of Mining.

It is worth noting that the violation stated in Section 10 regarding contamination of water resources by mercury is equally considered an offence under the Environment Protection Act 2001 and the Penal Code.

## REGULATIONS FOR PROTECTION OF THE ENVIRONMENT IN THE PETROLEUM INDUSTRY (AMENDMENT) 2005

Section 2 of these Regulations dictates on the competent authorities to consider having the following in any agreement related to petroleum operations:

- a. The measures and procedures necessary for the protection of the land layers which contain the petroleum, metals and water;
- b. The preliminary precautionary measures required to avoid environmental pollution during loading and unloading or transportation of petroleum by road, sea, river or air;
- c. The contingency plan to overcome and control any environmental pollution or damage;
- d. The follow up process of care and attention as well as the good measures during the exercise of the petroleum operations to avoid environmental pollution;
- e. An insurance certificate or financial guarantee to cover, restore and compensate the damage in the case of occurrence of environmental damage;
- f. A study containing overall evaluation of the environmental impacts likely or definitely may result from the petroleum operations;
- g. Adherence to any law or regulations that is in force; and
- h. An undertaking to be abided by any international environmental agreement to which the Republic of Sudan is a party.

To serve the above stipulated environmental considerations, Section 2 of the Regulations construes the term “petroleum operations” broadly to embrace “all the exploration, drilling, development, production, field development, refining, import, export and all operations accompanying the petroleum”. In other words, the Regulations cover all stages of oil industry, that is, upstream, midstream and downstream operations.

Moreover, Section 43 of the Regulations requires any company undertaking petroleum operations to establish an Environmental and Occupational Health Unit, with the aim to protect the employees and the environment surrounding and the establishment from the impact of occupational safety and health hazards taking into account the health and safety laws which are in force and lay down and implement training programs on the safety and occupational health.

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## CIVIL TRANSACTIONS ACT 1984

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The Civil Transactions Act equally provides important provisions aiming at the protection of human and animal health and the environment as clearly stated in Section 564(2) of the Act. In line with these legislative provisions, no industrial utility will be granted license without insurance that the hazardous wastes shall be disposed safely in accordance with the best practices. Para (3) of Section 565 of the same Act considers failure or permission to damage the environment or natural resources a tortuous act which makes the responsible body liable for damages reclamation in accordance with the rules of torts.

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## NATIONAL AGRICULTURE FERTILIZERS ACT 2010

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National Agricultural Fertilizers Act provides detailed provisions with the objectives to protect human health and the environment. Section 7 considers any fertilizer as not matching the required conditions and standards if its label does not indicate its contents, source, or if such ingredients has completely or partially been genetically modified to the extent that it becomes dangerous to human, animal health or the environment. Moreover, Section 17 authorizes the Minister of Agriculture, in coordination with the competent authorities to ban the production, exportation, importation or circulation of any fertilizer on a permanent or temporary basis whenever it is necessary.

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## LABOR ACT 1997

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The Labor Act includes considerable provisions relating to industrial safety. To illustrate, Section 78 of the Act prohibits any person to establish or make an extension for a factory without obtaining a license from the concerned authorities. In addition, Section 85 obliges any owner or holder of a license for establishing a factory to submit to the concerned agencies within a period of one year from the date of attainment of the license an adequate report showing the number of the factory employees, their term of employment, the work environment, the available safety measures and any other required information that may be requested by the responsible authorities. In addition, Sections 87 and 88 authorize the concerned authority to appoint industrial security inspectors to implement the prescribed regulations under this enactment.

To this end, the inspectors are empowered to enter the work places within the working hours, day or night, to inspect the equipment substances, work environment and to obtain any sample and investigate in any accident.

The owner of the industrial establishment, by virtue of Section 94 is under a duty to inform his employees about the risks associated with their work and the measures to be taken to avoid them. The owner must also take all needed precautions to protect his employees from industrial accidents and other related diseases. Besides, the owner must report any accident that occurs in the establishment within the working hours to the responsible authority. However, very few industries which provide their employees with the needed safety equipment and periodic training. In fact, the activities of most industries in the Sudan are not routinely monitored by the competent staff of the Ministry of Health and the Ministry of Labor in line with their mandates.

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## DRUG AND POISONS ACT 2009

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This enactment was passed to regulate and supervise the import, manufacture, storage transport, setting specifications and use of drugs and substances, including cosmetics and pesticides. By virtue of Section 6(1) of the Act, the National Council for Drugs and Poisons was established and designated as the national competent authority to undertake the stated responsibilities in accordance with the approved standards. And in line with section 27(1) of the same statute, the National Council is mandated to prepare a list of poisonous substances and to publish it in the official Gazette. The Section goes on to authorize the Council to update the list of poisonous in the time it considers necessary. At present, mercury and/or any mercury-added products were not explicitly included in this list; however, this could be done in the process of updating the list to comply with the relevant provisions of the Minamata Convention.

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## TRAFFIC ACT 2010

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The Traffic Act was adopted with the main objective to regulate the licensing of vehicles and to secure the safety of road users in accordance with international standards, bilateral, regional and international agreements. Pursuant to Section 4(1), the Traffic safety Coordination Council was established to, among others, act as a coordinating body and to lay the plans, policies and strategies relating to traffic safety . Notably, the Act provides sketchy provisions relating to pollution control, namely Section 43(1) which obliges users of roads to provide their vehicles with secure exhaust to prevent harmful emission of inflammable or any hazardous substances that may adversely affect human health.

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## FORESTS AND RENEWABLE NATURAL RESOURCES ACT 2002

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The Forests and Renewable Natural Resources Act dictates in its Section 34(1) on the competent authority to demarcate in the reserved area the public roads, channels and water resources meant for public use. And in line with Section 35 of the Act, the Director-General of Forests Corporation shall deposit in the National Lands Registration Office and the State Lands Registration a map showing the declared reserved area with all roads, channels and water resources intended for public use. Section 37(1) prohibits any person to set fire, bring any harmful materials or bury any waste in the reserved area.

## 4. THE ROLE OF THE STATES AND LOCALITIES

According to Section 6(1) of the Local Government Act 2003 and the exclusive executive and legislative powers stipulated in Schedule (C) of the INC 2005, the Locality within each State is empowered with extensive functions for implementation of the national legislations which include pollution control as well as town and rural planning. Towards this, each State is empowered to adopt the appropriate legal and institutional measures in line with the INC 2005. In this regard, each State, in line with Schedule (C) of the INC 2005 and the Local Government Act, is granted a wide range of powers which include management of protection of water sources from pollution and waste disposal.

It is significant to emphasize on the implementation of the review of regulatory measures within the endorsed decentralized system of governance; which empowers each State to adopt the appropriate legal and institutional measures. The division of national and state legislative and executive powers is enumerated in Schedules (A) and (B), whereas the concurrent powers are provided for in Schedule (D) of the INC. Notably, issues relating to HSE fall within the concurrent powers of the national government and State governments. These are enlisted in Schedule (D) and embrace the following aspects, which are of relevance to the Minamata Convention:

- Health policy;
- Urban development, planning and housing;
- Trade, commerce, Industry and industrial development;
- Manufacturing licenses;
- Disaster preparedness, management and relief and epidemics control;
- Traffic regulations;
- Electricity generation and water and waste management;
- Environmental management, conservation and protection;
- Consumer safety and protection; and
- Human and animal drug quality control.

With all the above in mind, the States and, in particular, those with mining activities should have in place the appropriate legal and institutional measures, in line with the INC 2005 and the Local Government Act, for the effective implementation of the Minamata Convention. In this context, it is worth mentioning that most states, including those with mining activities, had adopted regulatory and institutional measures of relevancy. For example, the Nile River State had passed the Environment Protection and Promotion Act 2008, and established, in accordance of its Section 5, a State Council for the Protection and Promotion of the Environment.

Besides the River Nile State, Red Sea State, Kassala State and South Kordufan State had adopted similar enactments for the protection of the environment and natural resources, and established States' Councils to be in charge of implementation.

With respect to the periodic review of laws, it is a time-consuming process which involves many stakeholders and embraces the lead Ministry or body in charge of implementing the particular legislation under review, the Legal Department of the concerned competent ministry or body, the Directorate of Legislation at the Ministry of Justice, the Council of Ministers and the National Legislature (composed of the National Assembly and the Council of States). Of course, the legislative process should also involve the public as represented by relevant NGOs in accordance with the Constitutional directives. In comparison, Regulations need far less time to be passed by the particular competent authority in accordance with the enabling provision and jurisdiction included in the enactment. However, such Regulations should be deposited in the National Legislature to be enforceable.

## 5. OVERALL ASSESSMENT OF THE REGULATORY MEASURES

It is clear from the above statutes reviewed that there are a considerable number of enactments which are appropriate to serve the objectives of the Minamata Convention. On the top of these legal measures is the Regulations for the Organization of Mercury Importation, Use and Circulation derived from the mineral Resources Development Act for the mining industry which embody considerable provisions related to some aspects included in the Minamata Convention, namely those concerning importation of mercury, provision of information to the public, training and awareness raising.

Neither the Regulations for the Organization of Mercury Importation nor any of the reviewed statutes address mercury-added products which are listed in Part I of Annex A of the Minamata Convention. This is a major gap in the reviewed statutes which, unless rectified by the adoption of appropriate legal measures, will hinder the implementation of the Minamata Convention provisions related to the manufacture and import of mercury-added-products. Arguably, the existing enactments provide general preventive measures which could be effectively implemented by the relevant competent bodies to eliminate, or at least reduce the import and use of mercury-added compounds. The competent entities that should undertake this task are the National Council for Environment and Natural Resource (HCENR) Sudanese Standard and Metrology Organization(SSMO), General Custom Administration (GCA), Ministry of Health and the Ministry of Water Resources, the National Council for Drugs and Poisonous, Irrigation and Electricity. However, this is only viable with the adoption of adequate and appropriate regulations, in line with the enabling provisions of the enactments that fall under the jurisdiction of each of these ministries and bodies. Added to this, it is important to involve the NGOs, Institutes of Higher Learning and Scientific Research Centers in this endeavor.

## 6. INSTITUTIONS RELVANT TO SOUND MANAGEMENT OF CHEMICALS AND MERCURY IN THE SUDAN

The institutions, organizations and societies identified as key players in addressing the problem of mercury directly or indirectly were assessed in terms of institutional aspects, including year of establishment, vision, mission, mandate, function, structure, capacities, policies and publications in addition to institutional gender aspects and institutional challenges:

### THE HIGHER COUNCIL OF ENVIRONMENT AND NATURAL RESOURCES (HCENR)

Higher Council of Environment and Natural Resources (HCENR) was established in year 1992 under the Cabinet of Ministers to oversee, co-ordinate and liaise on issues pertaining to, and linked with the environment.. It is the executive arm of the Cabinet for the implementation of environmental regulations and treaties. HCENR functions are stipulated in Environment Protection Act 2001 of the Interim National Constitution (INC) 2005 as

- to draw up the overall policy for natural resources and the protection of environment;
- to coordinate the activities of states' environment and natural resources councils;
- to review legislation for its conformity with international standards;
- to participate in the international arena and ensure that Sudan is party to international conventions and regional treaties on environment and that the Sudan is complying with conventions;
- to raise funds for the implementation of programmes, projects and national plans on natural resources;
- to promote scientific research on natural resources and environment and
- to promote environmental awareness and sustainable use of natural resources.

HCENR is the Designated National Focal Point (DNFP) for the implementation of chemical related Multilateral Environmental Agreements (MEAs) including the Minamata Convention on Mercury. It cooperates, collaborates or participates in all activities related to sound chemicals management with other the Federal Ministries, organizations and stakeholders.

At the National level, HCENR is headed by an appointed Secretary General with a state minister status. The HCENR is a Federal structure, with councils at state and district levels, in some states councils are supported by the environmental health committee. Currently two other councils were incorporated within HCENR which are the Biosafety Council and Drought and Desertification Council. The senior staff of the HCENR are responsible for day to day work as well as following the activities and responsibilities of the international conventions and related projects executed by contracted staff.

- i. HCENR policy is to achieve major objectives of sustainable development through the followings; Development of projects is based on their continuous productivity and renewal by making use of best available technology suitable for local environment and life-style of the people.
- ii. The environment and social impacts for each project are to be assessed and compiled in the environmental and social impact assessment (EIA) report and this should be evaluated by the authority approving the project.
- iii. Evaluation of present practices negatively affecting environment and the existing projects with the intention of rectifying them and fending against future negative side-effects.
- iv. Promulgation the necessary legislation, embodying strong punishment, to guarantee environmental protection.
- v. A shift towards more sustainable production is needed in order to promote social and economic development. This is closely linked to the appropriate selection and use of chemicals and a move to Green/ Sustainable chemistry. The substitution of mercury can be one important element form this shift.

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## THE MINISTRY OF MINERALS

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The Ministry of Minerals was established in the year 2010 with the vision of exploiting Sudan's land resources with the highest efficiency and minimal cost through the deployment of human and natural resources, knowledge and high technology. This has been based on a well developed infrastructure within a clean and hygienic environment.

Exploration and development of mineral resources production is through the latest scientific and knowledge technologies while maintaining international standards for specifications, quality and environment. This has been coupled with national capacity building to be in line with the international experience level.

The mission of the Ministry is the deployment of the State capacity within the various related institutions for utilizing the mineral resources and application of high technology to achieve high quality and continuously growing production, encourage investment through developing an attractive environment, development of infrastructure and basic services as one of the pillars for balanced development and minimize environmental pollution levels associated with production in the field of mining. The Ministry Headquarters is in Khartoum.

### **The Mandate of the ministry includes:**

- The development of policies and national plans in the field of mineral resources,
- promoting investment in the mining sector and develop policies to attract investors while protecting the rights of the country,
- signing contracts on behalf of the Country with investors and issue appropriate licenses,
- controlling and supervising the activities of licensed companies in the fields of mineral resources exploration and development.
- Supervising exploring operations in the Sudan, its territorial water and the continental shelf.
- Developing technical specifications for facilities and products to ensure safety and protection of the environment in relation to the mineral industry and making plans to mitigate the impacts and protect the environment in coordination with relevant entities.
- Supervising research and studies in the fields of mineral resources to alleviate negative impacts of operations of exploration and development of minerals.

- Promoting and training human resources in the fields of mineral resource management
- Controlling operations of licensed companies in survey and geological exploration and mining within permit and contracts granted.
- Representing the Sudan on all its rights in the field of minerals according to ratified agreements.
- Promoting and developing national connections with regional and international related facilities.

The Ministry cooperates and coordinates with related regional and international Organizations which include Greater Lakes Council; African Geological Survey Organization and East and South African Mining Center.

The Ministry has units guided by the Ministry policies include Aryab Mining Company; Sudamin Company; Sudanese Gold Refinery Company and Sudanese Mineral Resources Company.

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## **SUDANESE MINERALS RESOURCES COMPANY**

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The Sudanese Mineral Resources Company is one of arms of the Ministry of Mining and is located in Khartoum. The company mandate, after acquiring the approval of concerned authorities, includes:

- Carrying out all exploration, production and development of all minerals and fields on the ground or sea.
- Performing services in the realm of mining including excavations, extraction, transport and provision of equipment and tools .
- The company organizes treatment of mining tailings and carry out site restoration of artisanal mining.
- The company invests in all areas related to mining and works at promoting and developing the mining sector on all minerals.
- The company contracts activities related to mining including excavation, earthmoving, quarry and mines preparations and rock breaking, grinding, crushing and sieving of soils components in conformity with the basic principles of protection of the environment, wild and marine life as well as historical heritage and geological integrity.

- The company is responsible for the standard chemical and geophysical investigations to determine the suitability of soils and geological catena for all construction and civil constructions.
- Act as an agent to international mining companies in all mining related fields and activities.
- Endeavour to provide transport facilities to mining areas over land, air and sea.

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## SUDAMIN COMPANY LIMITED

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Sudamin Company Limited is another arm of the Ministry of Minerals, located in Khartoum. Sudamin is the only body entrusted for issuing importation licenses as well as handling and management of mercury and keeping records within the Ministry. The company has the mandate to launch mineral markets and create reference accredited laboratories specialized in precious and semiprecious stones analysis.

However, the implementation of the Organization of Mercury Importation, Use and Circulation requires an effective cooperation and coordination between the Ministry of Mining and other governmental and non-governmental bodies, in particular, the SSMO, the National Council for Environment and Natural Resources, HCENR, Ministry of Water Resources, Irrigation and Electricity, Ministry of Health, General Administration of the Ministry of Interior and the NGOs working in the field of environmental and consumer protection. Indeed, the needed cooperation is to be pursued through the effective implementation of the relevant regulatory measures that fall under the jurisdiction of each governmental body.

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## THE MINISTRY OF OIL AND GAS

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The Ministry of Oil and Gas was established in 2019. The Ministry Headquarters is in Khartoum. The ministry mandate is to:

- Develop policies and plans investments in the fields of oil and gas and supervise their implementation,
- Supervise exploring operations in the Sudan territorial water and the continental shelf,
- License, control and supervise the activities of companies working in the fields of oil and gas exploration and development,

- Represent the Sudan on its royalties in the fields of oil and gas resources.
- Develop technical specifications for facilities and products ensuring safety and protection of the environment in relation to the oil and gas industry.
- Supervise the activities of private companies as well as those in which the Government holds shares.
- Develop and supervise oil fields, transport, refine, distribution and sell of oil derivatives in the local market as well as exporting crude oil and its derivatives.
- Supervise research and studies in the fields of oil and gas to alleviate negative impacts of operations of exploration and development of oil, gas and minerals and make plans to mitigate the above and protect the environment in coordination with relevant entities.
- Promote and train human resources in the fields of oil and gas and their derivatives.
- Promote and develop national connections with regional and international related facilities.

**Related Regional and international Organizations:** International Energy Forum; African Countries Oil Producing Association and Greater Lakes Council.

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## FEDERAL MINISTRY OF HEALTH (FMOH)

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The first Ministry of Health was established in 1949 and the federal and states ministries were established in 1998. The administrative structure of the FMOH is composed of five main general directorates which are the General Directorate of Primary Health Care, the General Directorate of Preventive Medicine, the Planning and International Relations, the General Administration of Financial and Administrative Affairs and the General Directorate for Quality, Development and Planning.

The Ministry, through its directorates and centers, is involved in the area of chemicals management, the FMOH has the power of registering and controlling the administration of food additives, pharmaceuticals, medical appliances, and pesticides for public health in the country.

The General Directorate of Environmental Health of the Ministry has an Occupational Health Department which has a unit for chemical safety . The “Chemical Safety Unit” supports the sound management of chemicals throughout the whole process (importation, transportation, storage, use and waste management).

The Administration of Food Control sets limits for food additives and food contaminants, inspects, analyses imported and locally produced foods and those on the market for safety and investigate food poisoning outbreaks. It also rules over the issue of disease vector control like malaria and other vector borne diseases. The Department of Environmental Health through its sanitation unit supervises municipal waste and hazardous materials and wastes and license hazardous waste disposal.

The FMOH Public Health Laboratories analyses water, food and biological fluids to help implement various legislations of the ministry and other institutions. Moreover, the Ministry regulates matters related to control of poisonous and deleterious substances, matters related to regulations of production, import, use or handling of chemical substances which may damage human health and also, matters related to regulations of household pesticides containing hazardous substances.

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#### **FMOH, PUBLIC HEALTH LABORATORIES, NATIONAL CHEMICALS LABORATORIES**

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**Institutional Aspect:** The National Chemical Laboratories was established as far back as 1903. The laboratories are currently under the auspices of the Federal Ministry of Health. The National Chemical Laboratories provide approved and trusted chemical analysis of food and water and environmental contaminants for regulatory and quality control purposes.

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#### **NATIONAL DRUGS AND POISONS BOARD**

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**Institutional Aspect:** The control of pharmaceuticals in Sudan began after the independence in the 1960s when the first law, the Pharmacy and Toxicology Act, was enacted in 1963. The Act authorized its implementation and licensing of pharmaceutical establishments by the Federal Ministry of Health represented by the General Administration of Pharmacy and the departments of state authority. In 2001 the law was amended, and the supervisory role continued within the direct responsibilities and powers of the Ministry of Health.

The National Drugs and Poisons Board was established in 2001 for the control of drugs and preparations of pharmaceuticals, medical devices and supplies of cosmetics regionally and globally. The NDPB goal is to protect the public health by building a system for drugs and medical products to ensure safety, effectiveness and quality. The Board members include representatives of institutions and entities related to the control of drugs as well as other medical products. In 2009, the law was amended to become the Drugs and Poisons Act of 2009 which is currently in force.

According to the Drugs and Poisons Act of 2009, Article 6, the National Drugs and Poisons Board is the national authority responsible for the drug policy formulation, setting standards, registration of, controls and conditions for import, export, storage, use, pricing, distribution and the circulation and reception of medicines, drugs, all medical supplies, cosmetics, toxins and narcotics according to the approved standards in cooperation with the relevant authorities. Also it is responsible for approving the reference laboratories and establishing the necessary rules, regulations and conditions for the registration and licensing of drug stores, pharmaceutical factories, vaccines and veterinary laboratories and pharmaceutical information offices and permission of drug experiments and trials on humans and animals.

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## FMOH / OCCUPATIONAL HEALTH DEPARTMENT

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The Occupational Health Department was established in 1969 and its terms of reference were determined under the Public Health Act 1975. The occupational health services nature is protective through the control of workers' exposure to occupational hazards and eliminating or minimizing safety and health risks and the adverse effects resulting from the various developmental activities (agricultural - industrial - services). Occupational health service is a multidisciplinary work of a team of specialists from its units which include:

- Medical examinations section for worker placement, early detection and cure of occupational diseases,
- Occupational hygiene and physiology section is concerned with providing a healthy and safe working environment and control of the occupational health hazards exposure risks,
- public and environmental health section for inspection of workplace sanitary conditions,
- Occupational Health and Safety Training Institute for the workers on safe work performance and safe personal protection
- Assistant administration services for statistics and records keeping.

Specialized occupational health services are provided by competent professionals, including physicians and nurses, industrial hygienists, specialists in the safety of the work environment (chemists for assessment of work environment and toxicological analysis - engineers for environmental reform - physiologists for environmental measurements), inspectors specialized in public and environmental health and specialists in occupational psychology and social wellbeing, in addition to statisticians.

The services are shared between the federal, state and institutional levels. The federal occupational health administration is responsible of setting the general policies and standards for occupational health services at all levels, coordination with other relevant national and international organizations and institutions and participate in certification of industrial, agricultural and service projects. At the state level the occupational health departments are responsible for implementing the policy set by the federal administration and providing the specialized occupational health services for institutions in the states.

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## FMOH / ENVIRONMENTAL HEALTH AND FOOD CONTROL ADMINISTRATION

Environmental Health and Food Control Administration is one of the Primary Health Directorate of the Federal Ministry of Health. The administration is composed of five departments which are Food Control, Health and Safety of Water, sanitation, Vector Control and Occupational Health departments.

The administration vision is protecting the health of individuals and society and preventing the incidence of diseases related to the environment and sanitation by implementing a set of efficient and effective programs to protect the health and safety of individuals and community and to achieve sustainable development in Sudan. Its role is the promotion of environmental health programs and to assure the quality of performance and continuity of the services, development of the capacities and capabilities of the administration departments at the federal and state levels, reduction of the incidence of food poisoning outbreaks. supervision of health institutions in industrial areas with regard to workplace sanitation conditions. development of health and environmental awareness raising programs and involve the community in preventive programs and activities continuous communication with relevant national and international organizations on environmental health issues.

**The Directorate responsibilities include:**

Develop and update laws, regulations and guidelines related to all environmental health activities,

- Develop plans and programs, and set standards and specifications for environmental health services, supervise and follow-up implementation of all environmental health services in Sudan to ensure the quality of performance and continuity of activities and programs,
- supervise and control of imported and locally produced food and implement the Food control regulations issued pursuant thereto
- Support the development of health and environmental awareness and involve the community in preventive programs and activities.
- Strengthen capacity of states and localities to address urban health and environmental problems through the use of participatory and collaborative approaches among all members of society.

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## THE FEDERAL MINISTRY OF INDUSTRY AND TRADE

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The Federal Ministry of Industry and Trade is responsible for formulating and implementing policies, programs and incentives for industrial development of the country including chemical industries. The Ministry carries out its mandate through its relevant directorates while individual administrative departments look after the production, distribution, development and planning aspects of specific industries allocated to them, Trade plays a key role in economic development through promoting exports in different sectors, creating real export opportunities for exporters in foreign markets and raising local production in order to meet global competition. It is a federal ministry and each state has its own ministry

The General Directorate of Industrial Development (GDID, the former Ministry of Industry) was established in the year 1966, and in the year 2018 the Ministry of Trade was merged with it to become the Ministry of Industry and Trade. The Ministry 's relevant responsibilities are to initiate, develop and enforce the policy, laws and regulations related to the control and development of industrial activities. It is the main institution in charge of developing and implementing government policy in the areas of domestic and foreign trade, competition, pricing and enforcement (This can include prohibition of trade of mercury added products)

The main goal of this ministry is to formulate and implement promotional and developmental measures for the industrial sector growth and to increase the contribution of industrial products as well as the micro, small and medium enterprises sector to Gross Domestic Product, the annual growth rate of exports and providing targeted number of job opportunities while keeping in view the national priorities and socio-economic objectives and is responsible for the overall industrial policy.

The mandate of the Ministry is to promote industrial development, foreign investment and guarantees the rights of citizens to participate in the economy of Sudan, set standards to regulate fair competitive practices , in coordination with relevant institutions promote and enforce labour and employment relations, foreign employee employment and occupational safety and health standards, environment protection, manage and enforce the statutory obligations of the license and registries of companies and other legal entities and protect the rights of intellectual property hold.

The ministry general and sectoral policy is to provide foreign currency and the required inputs for production, encourage new investments, maintain quality and price for national products to compete with imported ones, benefits of bilateral and multilateral agreements in invested fields, technology transfer and training, provide long term loans for funding industries. prioritize fund for industrial sector exports, attract local and foreign investors for special projects (e.g. energy projects) by providing incentives according to government policies and continue importing fuel supplies (such as furnace fuel) by giving complete exemptions from customs fees and give required technical assistance for industrial sector.

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## CENTRAL BUREAU OF STATISTICS (CBS)

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Central Bureau for Statistics is located in Khartoum State with a branch in each of the Sudan's 18 States.

- The CBS mandate is the provision of timely and accurate statistics needed for socio-economic development purposes and for promotion of good governance and democracy, using modern and appropriate technology for data collection, analysis, storage, retrieval and dissemination. The CBS prepares surveys programmes and carries out census and surveys in collaboration with government bodies and continuously monitoring of statistical data. It provides high quality statistics by adopting international standards and norms and gives advice to the Government and participates in public awareness-raising. It represents the Sudan in international and multinational relevant for and sign international relevant treaties.
- The Central Bureau of Statistics (CBS) is the government body directly affiliated to the presidency and the Council of Ministers. It is responsible for the overall development of statistics in the Sudan and has responsibility for guiding, giving technical back-stopping, monitoring and supervising the production of official statistics across the National Statistical System.

**Policy Aspects:** The Bureau recognizes the importance of investment in human resources development and creation of a working environment that promotes quality. The CBS in the analysis and interpretation of produced data remains impartial in the release of statistics. The Bureau involves users and introduces their priorities in all its activities. Through a demand-driven process. CBS works in partnership with most of the data users to respond to their data needs. The Bureau is committed to produce best quality products conforming to key principles. The CBS focus on key strategic goals namely organizational and institutional development; infrastructure development; data development and management and promote statistical advocacy, co-ordination, human resources and statistical capacity building.

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## **SUDANESE STANDARD AND METROLOGY ORGANIZATION (SSMO)**

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- Sudanese Standard and Metrology Organization was established in 1992 as an independent organization under the Presidency. It succeeded to the Department of Standards of the Ministry of Industry and Trade, which existed since 1969. Subsequently, a decision was made to add, to the newly established Organization, the Weights and Measures Department, of the Ministry of Trade and Industry to form the SSMO.
- SSMO is active in the fields of development and publication of Sudanese Standards, scientific and legal metrology including assay of precious metals and stones as well as control and assurance of quality, research and development. The headquarters of SSMO is in the capital city of the Sudan. The SSMO has branches in all states. SSMO has 15 laboratories in the headquarters and branches and in particular the states where import entry points exist. The best equipped ones are those in Khartoum and Port Sudan; both of which are capable of determining the total mercury.
- The SSMO Mandate is to ensure the health and safety of the consumer and protection of the environment and national economy by making sure that goods, products and services are in compliance with the technical regulations adopted by the Organization for the purpose, preparation of standard specifications for goods and services, control of export and import, enhancing the competitiveness of national products, introduction of quality systems in the production and service institutions. And raise awareness of standards, quality and measurement among segments of the society.

- A wide range of products are continuously inspected and tested to ensure conformity with national and international standards, including detergents, paints, textiles, foods, feeds, lubricants, cosmetics, and fertilizers.

## FEDERAL MINISTRY OF AGRICULTURE / THE NATIONAL PESTICIDE CONTROL

- The National Pesticide Council (NPC) was established in the year 1974. It is a multidisciplinary inter-ministerial council which has representatives from all stakeholders within the country including; Ministries of Agriculture, Health and Animal Resources, Research Institutions, Customs General Directorate, Universities, Economical Security, Sudanese Agrochemicals Association, Higher Council for Environment, Sudanese Metrological & Standardization Organization. The council is chaired by the undersecretary of the Ministry of Agriculture and Irrigation. The registrar of the council is the Director General of Plant Protection Directorate (PPD) who is responsible of all administrative and executive functions of the council.
- NPC manages all aspects of pesticides and pest control products from importation or production up to disposal. The council derives its power from the pesticides and Pest Control Materials Act 1974, amended 1994.
- NPC has the following functions and powers of:
  - establishing the register for pesticides and pests' control products;
  - examining and evaluating pesticides and pests control products,
  - approval of the recommendations of the technical committees concerning the results of the agricultural and health tests of pesticides and pests' control products;
  - registering pesticides and pests control products, re-register or strike the same off, in accordance with the regulations, made under the provisions of this Act;
  - licensing the manufacture, processing and trade in pesticides and pests control products, or revoke the license in accordance with the regulations, made under the provisions of this Act;
  - licensing the import and export of pesticides and pests control products, thereof;
  - monitor the disposal of the surplus of pesticides and pests control products in accordance with the regulations, made under the provisions of this Act, or any other law;

- Prohibit and restrict the use of pesticides and pests control products; and
- Establish an organ for, control, assessment and inspection.
- Most of the NPC activities are carried out by Technical Committees formed from its member institutions:
  - NPC Technical Committee that studies all the provided information about any pesticide and raises its recommendation on its provisional registration;
  - NPC has recognized institutions (Agricultural Research Corporation, Plant Protection Directorate, Medical Entomology Department and Veterinary Research Laboratories) for testing of the product granted provisional registration for quality, efficacy, residues in crops and/or environmental media for compliance with acceptable limits.
  - The final testing results is subjected to evaluation and approval by scientific committees (the Pests and Diseases Committee for agricultural pesticides, the Ministry of Health Scientific Committee for public health pesticides and Veterinary Technical Committee for veterinary pesticides) whose recommendations are endorsed and finally approved by NPC for pesticide commercial registration;
  - Also, the NPC can form emergency committees to discuss urgent issues arising in the period between its regular meetings which are held every two months.
  - Importation of pesticides is in coordination with the Customs Directorate and SSMO
  - Supervision of the use of pesticides is the responsibility of Plant Protection Directorate, the Ministry of Health or Veterinary, and/or Agricultural Schemes.
  - The NPC has a central inspection committee and there are committees in all states responsible for the inspection and follow up of all pesticides' matters related to pesticides storage, transport, trade, use.
  - Also, the NPC has a technical committee for licensing and inspection of pesticides formulation factories.

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## GENERAL CUSTOMS ADMINISTRATION (GCA)

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The General Customs Administration is one of the Ministry of Interior Administrations. The strategy of the GCA is to facilitate movement of goods, trade and people in a series of developments and implementation of comprehensive regulations and laws towards the goals of sustainable development. Transportation in the supply chain achieves the development and implementation of integrated policies and procedures to ensure safety, security and integrity of the trade through the tools and information provided by the supplier. The supervisory role of the Customs is one of the strategic objectives of the World Customs Organization (WCO) and achieves a number of objectives as protecting the community and public welfare and combating corruption, enhancing security and facilitating international trade, strengthening capacities across national customs interests to adopt modern customs standards and encouraging the parties concerned in customs matters to exchange information, experiences and practices.

- Activities of the Directorate include:
  - Setting international standards for facilitating cross-border trade.
  - Securing the supply of goods in international trade.
  - Coordination and simplification of security and resistance to smuggling.
  - Partnerships and cooperation - modernization and capacity building - research and knowledge dissemination.
  - Coverage of all country borders area and customs ports including dry ports, airports, crossings and any locations
- The Customs Law of 1986 (Amended) 2010 is the legal reference of GCA.
- The General Customs Administration includes the following administrative and technical units:

**A. Ports:** Four Marine Ports (Port Sudan, Suakin, and Oseif); international airports( Khartoum - Port Sudan - Genina - Nyala -Marwoe); Border Crossings Ports with neighboring countries(South Sudan - Egypt - Chad - Central Africa - Libya - Ethiopia -Eritrea), (in the North (Halfa-Arqin/ Ashkeet), North East (Shalatin); and the western crossing (El Geneina); Dry Ports spread in eight non-border states in Atbara - Dongola - Hamfa - El Abyad and Kosti.

B. Managing and combating smuggling Department is concerned with controlling of all goods that enter the country through non-customs and illegal points. Its activities includes the routinely patrolling identified border areas and specific locations in accordance with past experience and the department estimates as to the management and scale of illegal activities in the region.

C. The GCA also has technical support departments including a legal reference department concerned with amendment of articles or proposing by-laws in compliance with the International conventions, Department of Information Technology concerned with compilation and dissemination of information, X-ray detectors and Risk Management departments for controlling borders in coordination with other relevant departments like security and borders control units, and Statistics Department responsible of indexing and recording of imports and exports

**D. Customs Laboratories are responsible of** sampling, testing and analysis of items for the purpose of compliance with the desired use according to specifications and documents. The release of any shipment is permitted only after completion of the documents and matching the results of the laboratory standards. Customs labs are currently installed in three states of Khartoum (Khartoum, Qari), Red Sea (Port Sudan, Suakin, Ousef) and Northern State (Halfa) and currently there is ongoing preparations for opening other laboratories in Wad Medani, Atbara and Dongola. Future plans include further coverage in other states. All of the officers are university graduates specialized in various academic disciplines; having practical and technical skills and are capable of performing the supervisory role in terms of mercury and its products

**E. Risk Management system** is a branch of the Environment and Safety Specialized department which coordinates with the related departments to verify the enforcement of national and international agreements and laws. This department is concerned with supervision and safe handling of hazardous materials and scrutinizing illegal trade. It is also concerned with legal traffic and the prevention of illegal trade in environmentally sensitive approach.

**F. Training unit:** There is a number of training programs for upgrading the skills of the GCA officers, on their role efficiency and effectiveness according to needs in national and international developments in the field of customs and international trade, including:

- Basic training courses for new recruits to the service on subjects including police laws, general law and Customs law and national laws with regard to control, transport, trade and customs procedures.
- Regular training sessions by any competent department that prepares programs according to GCA recommendations
- Periodic training sessions by specialized departments; courses on the request of various departments like Environment and Safety. Programmes include awareness raising and handling materials including mercury as well as legal and administrative issues to assure safe handling and control.
- **Issues of Engagement, Coordination, Collaboration and Partnership:**
  - At the international level in the field of environmental protection, there is coordination through the Customs Organization with the United Nations Agencies and the Green Customs Initiative. There is also organized agreements and protocols on coordination and partnerships with a number of relevant national authorities concerned with hazardous substances management on interrelated and relevant issues such as those related to mercury control.
  - The Custom Directorate is represented in the MIA steering committee and can play an active role in preparing the annual statistics of the entities concerned with mercury imported or impregnated by the competent authorities and control of entry of mercury and mercury-added products into the country.

## MINISTRY OF HIGHER EDUCATION AND SCIENTIFIC RESEARCH (MHESR)

The Ministry of Higher Education was established in 1971 as the quality and excellence in higher education and scientific research leads to the development of the nation.

- The Ministry mission is the dissemination of knowledge, human capacity building, application of scientific research to serve development and consolidation of spiritual and humanitarian values of the community.
- National Council for Higher Education Act of 1972, was the first law to regulate higher education in Sudan. The Higher Education Regulatory Act was developed in 1975. The Higher Education and Scientific Research Act was proposed in 1990. The Act was amended in 1993, 1995, 2013 and currently is under revision.

The Ministry of Higher Education and Scientific Research is composed of directorates, units of research and centers and corporations. The National Council for Higher Education operates through the specialized scientific committees and standing committees. The Ministry acts as secretariat and executing agency for the National Council committees.

- Scientific research is an important pillar for the advance and prosperity of the societies. The Public Administration for Scientific Research was established in 2003 which and was upgraded to the Authority of Scientific Research , Technology and Innovation in 2015. It prioritize scientific research projects according to the developmental needs in the country, seeks funding, specifies the executing agent and research teams, monitors and evaluates the progress of the projects.
- Student welfare fund was established to support students by creating a healthy environment for students, promoting extra-curricular activities by organizing cultural and sports championships locally, regionally and globally, combating negative phenomena and promoting positive values and exchanging cultures and scientific knowledge with students from other countries.

- The Ministry possesses two networks of information technology, Sudanese Universities and Higher Education Institutions Network (SUN) and Sudan Research and Education Network. The Ministry also possesses Higher Education Data Center (H E Cloud), Higher Education Management Information System (HEMIS), E-Learning Project, Sudan Research Hub (SRH) and Higher Education Institutions E-admission.
- Community Colleges: In Sudan there are thirty community colleges affiliated to different universities covering all states of Sudan. Their objectives include strengthening the role of women and their participation in public affairs, combating poverty and linking universities to society. Admission to these colleges does not require any previous qualification nor experience.
- Peace studies centers: The Ministry has thirteen centers distributed all over Sudan with the objectives of spreading culture of peace and peace fulco-existence among different entities affected by war and within society at large, carrying out and developing scientific research on culture of peace, conflict resolution and developmental issues, field training of human resources in areas of peace culture, coexistence and conflict resolution and providing advice and services to all actors in the such areas.
- Other services provided by the Ministry include:
  - Scientific and consultation services to investors in various fields;
  - Convoys of students and professors to serve rural communities;
  - Therapeutic and health services associated with the faculties of health sciences;
  - Counseling services associated with the faculties of agricultural sciences;
  - Counseling services related to other colleges.

### **The MHESR duties and responsibilities:**

- Develop policies, plans and programs of higher education and scientific research advancement and development and determine the role of each of its institutions and universities.
- Setting the admission policies and regulations for the institutions of higher education levels and numbers
- Supervising the governmental, private and foreign institutions of higher education

- Caring for students of higher education in all cultural and social aspects.
- Training and upgrading the higher education workforce skills academically and administratively.
- To make benefit of the results of scientific research in development applications by promoting the scientific and economic feasibility of research results and urging the public and private sectors to implement these results and improve services.
- Supervise technical education and care of its institutions and develop its institutional and human capacities to meet the labor market needs.
- Setting the regulations and criteria for improving the outputs of higher education and scientific research and adopting them academically and administratively.

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## THE SUDANESE ENVIRONMENT CONSERVATION SOCIETY (SECS)

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- The Sudanese Environment Conservation Society (SECS) is a national non- governmental organization (NGO) concerned with environmental conservation and achievement of sustainable development through popular participation. The Society was established in 1975. Since early 1980s, when drought and desertification started raking the country, the membership of the Society increased tremendously. Now SEC has about 113 branches in 17 states. The Society build its capacity through grants from donors (e.g. DANIDA, Fredrick Ebert, Ford Foundation and the Netherlands Embassy). The Society established an office with permanent staff in 1975 and started launching a national environmental program to address the fundamental environmental issues and problems in Sudan. Through the mobilization of effective popular participation, SECS has been working diligently towards this end. Since its official registration in 1975 as a national NGO, SECS has been able to attract more than 10000 female and male members of different disciplines and skills and different age groups. SECS membership spreads all over Sudan, and women have actively been engaged in its activities. SECS is a pioneer Society that addresses environmental and sustainable development issues with a lot of accumulated experiences and acknowledged credibility for its genuine and dedicated efforts.

- SECS endeavors to target all population segments with focus on decision-makers, affected groups of the poor, children, displaced, homeless and victims of war and conflicts. SECS main purpose is working for peace, environmental rehabilitation and sustainable development, poverty eradication and achieving the sustainable development goals.
- The Society aims at protecting and sanitizing environment for sustainable development and positive support, spreading environmental awareness and activating participation in maintaining and developing environment, encouraging and patronizing positive environmental initiatives, realizing peace and ending wars and conflicts particularly those related to natural resources and treatment of its impacts, disseminating and consolidating the comprehensive concept of sustainable development and realizing it.
- The Society has partnerships with a number of international NGOs and UN agencies. Examples: Oxfam Canada (one project), Oxfam the Netherlands (5 projects), Government of the Netherlands (Horn of Africa Network project), the Ford Foundation (one project) and the EU Sudan.

In relation to the Minamata convention SECS is fully aware of the damage inflicted through the use of mercury in the artisanal and small gold mining both to the environment and human health. Memorandum of understanding was signed with the Sudanese Company of Mineral Resources of the Ministry of Minerals regarding the economic, social and environment impact of ASGM, revision rules and regulation that organize ASGM in the country, information dissemination and awareness raising, exchange of experience and expanding the area of partnership to include the local communities

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## **SUDANESE CONSUMER PROTECTION SOCIETY (SCPS)**

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The Sudanese Consumer Protection Society was established mid-February 1997, it has a federal structure. Its main role is to protect consumer and consumers' rights including needs, and responsibilities. The mandate of the society is to take all the necessary measures for protecting the consumers; organizing channels and groups for awareness raising and education; encouraging the related government institutions to issue laws and standards related to consumers rights and protection; develop media programs and studies related to consumer protection; and promote the cooperation with the concerned stakeholders.

## 7. INSTITUTIONAL GENDER ASPECTS

In Sudan, almost all institutions are gender-sensitive tallying with the policies of the Sudan, dating back to the 1970s; employment depends only on qualifications and experience. Women have equal chances in employment with equal salaries.

According to the Central Bureau of Statistics records of employment of university, college and higher institutes graduates for the years 2014, 2015 and 2016, the percentage of employed females are 57%, 58% and 52.7% respectively. Also, as examples, 48% of the staff of HCENR and 50% of the Federal Occupational health Department staff are females. Over 60% of the members of the Sudanese Environment Conservation Society are women who have significant participation in the different committees of SECS projects (workshop trainings, campaigns and Environmental Strategic Planning Committee). Also, SECS has a specialized Women and Child Committee which advocates adoption and implementation of women and child rights.

## 8. INSTITUTIONAL CHALLENGES

Table (17) Institutional Challenges and gaps

Sr. No.	Institution	Challenges / Gaps
1	Higher Council for the Environment and Natural Resources	<ul style="list-style-type: none"> <li>Limited number of permanent personnel</li> <li>Most of the activities/ projects are conducted in coordination and, collaboration with other institutions or national experts</li> </ul>
2	Public Health Laboratories, National Chemical Laboratories	<ul style="list-style-type: none"> <li>Financial resources are limited;</li> <li>the skills of technical personnel need continuous upgrading</li> <li>Unavailability of some chemical reagents required for determination of some important environmental contaminants and their health impact (e.g. mercury in human hair)</li> </ul>
3	National Drugs and Poisons Board	<ul style="list-style-type: none"> <li>Management of smuggled drugs and cosmetics</li> <li>Control of drugs and cosmetics that enter the Sudan for personal use. (qualities and quantities and their impact on health and the environment)</li> </ul>
4	Federal Ministry of Health / Occupational Health Department	<ul style="list-style-type: none"> <li>Weak allocated budget for the services specially at the States levels</li> <li>limited number of human resources at the Federal level and of specialized infrastructure for the services at the state levels.</li> <li>Not all states have occupational health departments</li> <li>Services could not cope with the country requirements due to shortage in infrastructures (personnel and equipment)</li> <li>Overlap of responsibilities with other institutions</li> </ul>

# POLICY, REGULATORY AND INSTITUTIONAL FRAMEWORK ASSESSMENT

Sr. No.	Institution	Challenges / Gaps
5	Federal Ministry of Health, Environmental Health and Food Control Administration	<ul style="list-style-type: none"> <li>Weak allocated budget for the services specially at the state and localities levels</li> <li>Absence of clear and stable vision for systematic services</li> <li>Shortage in human resources at the Federal level and of specialized infrastructure for the services at the state levels.</li> <li>Services could not cope with the country requirements due to shortage in infrastructures (personnel and equipment)</li> <li>Overlap of responsibilities with other institutions (e.g. states council for the environment).</li> </ul>
6	The Federal Ministry of Industry and Trade	<ul style="list-style-type: none"> <li>Shortage in infrastructures (personnel and capacity)</li> <li>Challenges (the high rate of inflation, availability of the required raw materials (quantity and in time), shortage of foreign currency and economic sanctions on Sudan) facing the industrial sector affect Ministry role</li> <li>Overlap of responsibilities with other institutions</li> </ul>
7	Central Bureau of Statistics (CBS)	<p>Lack of permanent statistical coordination mechanisms or bodies with the data users and producers in the country which results in costly duplication of efforts</p> <ul style="list-style-type: none"> <li>weak sectoral statistics and the use of different definitions, concepts in the collection and dissemination of statistics</li> <li>Infrastructure is inadequate; (inadequate budget, personnel number and shortage in transportation vehicles specially for state offices)</li> </ul>
8	Sudanese Standard and Metrology Organization	<ul style="list-style-type: none"> <li>Not all the states branches have capacities to determine items quality conformity with standards</li> </ul>
9	Federal Ministry of Agriculture/ The National Pesticide Council	<ul style="list-style-type: none"> <li>Weak financial resources/ capacities for regular inspection follow-up activities of pesticides throughout the country</li> <li>The NPC lacks its own laboratories</li> <li>The NPC has no capacity for management of the unwanted obsolete pesticides, empty containers and contaminated soil in the country.</li> </ul>
10	The General Customs Directorate	<ul style="list-style-type: none"> <li>Insufficient/ineffective control of items smuggling (including mercury) throughout the large unguarded boundaries of the country</li> <li>Insufficient/ineffective control of items entering the Sudan as for personal use (e.g. cosmetics)</li> </ul>
11	Ministry of Higher Education and Scientific Research	<ul style="list-style-type: none"> <li>Weak research allocated fund</li> <li>Lack of sponsored research on specific topics (e.g. mercury exposure/ environmental contamination)</li> <li>Capacity building for analytic laboratories.</li> </ul>
12	The Sudanese Environment Conservation Society	<ul style="list-style-type: none"> <li>Shortage in financial resources</li> <li>dependence on external funding and mobilization of internal revenue sources</li> <li>weak links of central office with its state branches membership,</li> <li>Self-funding for research</li> </ul>
13	Sudanese Consumer Protection Society	<ul style="list-style-type: none"> <li>Lack of funding</li> <li>Lack of communication tools</li> </ul>

## 9. POLICY, REGULATORY AND INSTITUTIONAL FRAMEWORKS IN RELATION TO THE ARTICLES OF THE MINAMATA CONVENTION

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

Table (18) Analysis of the legal and institutional frameworks of Sudan with regards to Article 3 of the Minamata Convention

Article 3: Mercury Supply Sources and Trade		
Description of the Article and applicability in the context of Sudan		
Article No.	Succint summary of provisions of the Article	Applicability
3.3	Not allow new primary mercury mining	Applicable
3.4	Phase out existing primary mercury mining within 15 years	Not applicable
3.5(a)	Obtain information on stocks of mercury or mercury compounds exceeding 50 metric tons (MT), and mercury supply generating stocks exceeding 10 MT/year	Not applicable
3.5(b)	Restrict the use of excess mercury from decommissioning Chlor-alkali plants, and require environmentally sound disposal	Not applicable
3.6	Not allow the export of mercury unless the importing country provides written Consent and the mercury is for an allowed use under the convention or environmentally sound storage, and all other conditions of Article 3.6 are met	Applicable (for preventive measures)
Policy and regulatory measures in place that enable Sudan to comply with the above listed provisions:		
Article No.	Title, ref. no. and date of relevant Policy and Regulatory Measure	What aspects of the above provisions are being addressed by policy/regulatory measure
3.3 and 3.4	Minerals Resources Development Act 2015	Relevant provisions of the Minerals Resources Development Act 2015 relating to the grant of licenses and concessions for minerals mining operation. <ul style="list-style-type: none"> <li>Section 5(a) of the Regulations for the Organizations of Mercury Importation, Use and Circulation 2012 regarding restrictions therefore.</li> </ul>
3.5 (a) -	Regulations for the Organization of Mercury Importation, Use and Circulation 2012	Sections 8 and 9 of the Regulations for the Organization of Mercury Importation, Use and Circulation; which oblige the preparation of data base for all these dealings.

# POLICY, REGULATORY AND INSTITUTIONAL FRAMEWORK ASSESSMENT

Policy and regulatory measures in place that enable Sudan to comply with the above listed provisions:

Article No.	Title, ref. no. and date of relevant Policy and Regulatory Measure	What aspects of the above provisions are being addressed by policy/regulatory measure
3.5 (b) -	Environment Protection Act 2001	<ul style="list-style-type: none"> <li>• Conditions stated in Section 5(a) of the Regulations for the Organization of Mercury Importation, Use and Circulation, in addition to those listed in Section 10 which prevents use of mercury near the Nile, water courses, rivers and inside residential areas.</li> <li>• Section 20 of the Environment Protection Act 2001 which prevents any activities that may endanger human health or the environment.</li> </ul>
3.6	Minerals Resources Development Act 2015- Pesticides and Pests Products Control Act 1994.	Regulatory measures are needed to fill in the gap. Such measures may be passed in accordance with the Minerals Resources Development Act, as well as, the Pesticides and Pests Products Control Act 1994.

## Outstanding regulatory or policy aspects that would need to be addressed/developed to ensure compliance with the Convention's provisions

Comprehensive provisions, in line with the ratified Convention of Rotterdam are needed to comply with this article (In practice Sudan does not export any hazardous substances; including mercury.)

Name of the Institution/stakeholder and its role with respect to the above-listed provisions	Relevant institutional capacity in place to comply with the above listed provisions
Ministry of Mineral Resources	Ministry of Mineral Resources has good infrastructure capacities for prohibition of primary mercury mining, control of imports, distribution and use of mercury
National Council for Environment and Natural Resources	Higher Council for Environment and Natural Resources has good capacity for environmental and social impact assessment (ESIA) and permission of activities involving mercury use
Customs Directorate	Customs Directorate has good capacity for controlling import of mercury
SSMO	The Sudanese Standard and Metrology Organization has good capacity for quality control of imported mercury

## Remaining Capacity Gaps at National Level that need to be addressed before provisions can be met

Other related institutions role such as Ministry of Industry and Trade and Trade and Ministry of Health as well as the states councils for the environment is weak and lack control capacities

Table (19) Analysis of the legal and institutional frameworks of Sudan with regards to Article 4 of the Minamata Convention

Article 4: Mercury-Added Products		
Description of the Article and applicability in the context of Sudan		
Article No.	Succint summary of provisions of the Article	Applicability
4.1	Not allow the manufacture, import, and export of products listed in Part I of Annex A not otherwise excluded following the phase out date listed in the Annex	Applicable
4.3	Phase down the use of dental amalgam through two or more measures listed in Part II of Annex A	Applicable
4.5	Take measures to prevent the incorporation of products listed in Part I of Annex A (i.e., switches and relays, batteries) into larger, assembled products	Applicable
4.6	Discourage the manufacture and distribution of new mercury product types	Applicable
Policy and regulatory measures in place that enable Sudan to comply with the above listed provisions:		
Article No.	Title, ref. no. and date of relevant Policy and Regulatory Measure	What aspects of the above provisions are being addressed by policy/regulatory measure
4.1	Drugs and Poisons Act 2009, Standards and Metrology Act 2008 and Electricity Act 2001	<ul style="list-style-type: none"> <li>Sections 6(1) and 27(1) of the Drugs and Poisons Act 2009 which empower the National Board for Drugs and Poisons to control the manufacture, import and use of drugs and cosmetics, in addition to the preparation and maintenance of an updated list for such substances. In this respect, cosmetics with mercury should be added to the list to ensure the implementation of the relevant provision of the Convention. However, this viable through cooperation with the SSMO in accordance with Section 12(1); referred to in the below comment.</li> <li>Section 12(1) of the Standards and Metrology Act 2008 which dictates on the SSMO to provide the concerned authorities with the needed technical specifications.</li> <li>Section 31 of the Drugs and Poisons Act which incriminates offering for sale any product not matching with the technical specifications.</li> <li>There are no explicit provisions in the Electricity Act 2001 which prevent the import or use of electric equipment; including lamps with mercury. Para (2) of Section 9 of this Act provides a general obligation on the distributors to ensure the safety of electrical materials and their correspondence with the approved specifications. Hence, specific Regulations should be adopted, in accordance with the Act to prevent the import of lamps and electric equipment that contain mercury.</li> </ul>
4.3	Drugs and Poisons Act 2009	Section 6(1) and 27(1) of the Drugs and Poisons Act 2009 which empower the National Board for drugs and Poisons to control the manufacture, import and use of drugs, in addition to the preparation and maintenance of an updated list for such substances. Besides inclusion of dental amalgam in the list, particular directives aimed at phasing out the use of dental amalgam are needed. Such directives should be adopted in line with the enabling provision of the Act.

# POLICY, REGULATORY AND INSTITUTIONAL FRAMEWORK ASSESSMENT

Policy and regulatory measures in place that enable Sudan to comply with the above listed provisions:

Article No.	Title, ref. no. and date of relevant Policy and Regulatory Measure	What aspects of the above provisions are being addressed by policy/regulatory measure
4.5	Regulations for the Organization of Mercury Importation, Use and Circulation 2012; Environment Protection Act 2001; Standards and Metrology Act 2008 and; the Electricity Act 2001	Specific Regulations on management of mercury, mercury compounds and products containing mercury should be adopted and implemented, in cooperation and coordination with the SSMO, HCENR, Ministry of Irrigation, Water Resources and Electricity, Directorate of Custom, and the Directorate of Economic Security to control the listed materials.
4.6	Labour Act 1997, Pesticide and Pests' Control act 1994, Environment Protection Act 2001 and the Drugs and Poisons Act.2009	<ul style="list-style-type: none"> <li>Section 78 of the Labour Act 1997 prohibits the establishment of a factory or any extension for such a factory without obtaining a license from the competent authorities.</li> <li>Section 4(1) of the Pesticide and Pests' Control act 1994 with regard to the control of all dealings related to pesticides, chemicals and related products.</li> <li>Section 17(1) of the Environment Protection Act stipulates, as a precondition for the approval of any projects or industrial establishments with potential negative impacts the submission of an environmental impact assessment.</li> <li>The above relevant Sections of the Drugs and Poisons Act.</li> </ul>

## Outstanding regulatory or policy aspects that would need to be addressed/developed to ensure compliance with the Convention's provisions

Comprehensive provisions, in line with the ratified Convention of Rotterdam are needed to comply with this article (In practice Sudan does not export any hazardous substances; including mercury.)

Name of the Institution/stakeholder and its role with respect to the above-listed provisions	Relevant institutional capacity in place to comply with the above listed provisions
National Drugs and Poisons Board	Drugs and Poisons Board is quite capable to restrict, and control hazardous chemicals, drugs and cosmetics use for health purposes including those containing mercury
SSMO	The Sudanese Standard and Metrology Organization capacity is efficient for the control of the quality of imported items
Ministry of Irrigation, Water Resources and Electricity	The Ministry of Irrigation, Water Resources and Electricity has good capacity for control of the type and use of electric items
HCENR	HCENR capacity for approval or rejection of projects or industrial establishments which have potential negative impacts on environment or health is good
Ministry of Industry and Trade	Ministry of Industry and Trade licenses manufacturing processes and control row materials Capacity needs improvement
National Pesticides Council	The National Pesticides Council control and restricts the registration, import and use of mercury containing pesticides and pest control materials
Directorate of Custom	Customs Directorate has good infrastructure for control of imports and exports of items

**Remaining Capacity Gaps at National Level that need to be addressed before provisions can be met**  
Occupational Health services at the Federal and state level for control of workplace conditions and workers exposure and health

# POLICY, REGULATORY AND INSTITUTIONAL FRAMEWORK ASSESSMENT

Table (20) Analysis of the legal and institutional frameworks of Sudan with regards to Article 5 of the Minamata Convention

Article 5: Manufacturing processes in which mercury or mercury compounds are used		
Description of the Article and applicability in the context of Sudan		
Article No.	Succint summary of provisions of the Article	Applicability
5.2	Not allow the use of mercury or mercury compounds in the manufacturing processes listed in Part I of Annex B	Applicable (for preventive measures in future)
5.3	Restrict (as specified in the Annex) the use of mercury in the processes listed in Part II of Annex B	
5.4	Not allow new facilities from using mercury in the processes listed in Annex B, except facilities using mercury catalysts to produce polyurethane	
5.5	For facilities with processes listed in Annex B, identify and obtain information on mercury or mercury compound use; and control mercury emissions to air, and releases to land and water	
5.7	Discourage new uses of mercury in industrial processes	
Policy and regulatory measures in place that enable Sudan to comply with the above listed provisions:		
Article No.	Title, ref. no. and date of relevant Policy and Regulatory Measure	What aspects of the above provisions are being addressed by policy/regulatory measure
5.2 and 5.3	none	Specific Industrial Chemicals Management Regulations are needed. These Regulations should be drafted by the Ministry of Industry and Trade in cooperation with the HCENR, Ministry of Health and the SSMO.
5.4	<ul style="list-style-type: none"> <li>Minerals Resources Development Act 2015</li> <li>Regulations for the Organizations of Mercury Importation, Use and Circulation 2012</li> <li>Environment Protection Act 2001 Regulations for Protection of the Environment in the Petroleum industry (Amendment) 2005</li> <li>Labour Act 1997</li> </ul>	<ul style="list-style-type: none"> <li>(Section 17(1) of the Environment Protection Act and Section 78 of the Labour Act and its accompanying Regulations should be endorsed as part of the requirements for the grant of license for activities.</li> <li>Section 27(1) of the Minerals Resources Development 2015 authorizes the competent authority at the Ministry of Mineral Resources to monitor mining activities and their compliance with the best environmental practices.</li> <li>Section 2 of the Regulations for Protection of the Environment in the Petroleum industry (Amendment) 2005 requires the competent authorities to abide by any ratified international environmental agreements. Therefore, on ratification, Sudan will be bound to adhere to the terms of this provision of the Minamata Convention.</li> </ul>
5.5	<ul style="list-style-type: none"> <li>Environment Protection Act 2001</li> <li>Standards and Metrology Act 2008-The Environment Health Act 2009</li> </ul>	<ul style="list-style-type: none"> <li>Section 20 of the Environment Protection Act prevents, among others, release and emissions of harmful substances to air land and water. However, these are of general application. Specific Regulations should be passed, in accordance with the Minerals Resources Development Act, in consultation with the HCENR and the SSMO to fill in the existing gap.</li> <li>Section 20 of the Standards and Metrology Act 2008 obliges the SSMO to abide by the prescribed technical specifications.</li> <li>The Environment Health Act prescribes preventive measures on factories to eliminate, or at least reduce air pollution.</li> </ul>

# POLICY, REGULATORY AND INSTITUTIONAL FRAMEWORK ASSESSMENT

Policy and regulatory measures in place that enable Sudan to comply with the above listed provisions:

Article No.	Title, ref. no. and date of relevant Policy and Regulatory Measure	What aspects of the above provisions are being addressed by policy/regulatory measure
5.7	<ul style="list-style-type: none"> <li>• Environment Protection Act 2001</li> <li>• Labour Act 1997</li> <li>• Standards and Metrology Act 2008-The Environment Health Act 2009</li> <li>• Drugs and Poisons Act 2009</li> </ul>	The stated Sections in the Drugs and Poisons Act, Labour Act, Environment Protection Act, Standards and Metrology Act, and the Environment Health Act.

## Outstanding regulatory or policy aspects that would need to be addressed/developed to ensure compliance with the Convention's provisions

Complementary Regulations should be passed in accordance with the enabling provisions of the above cited enactments to fill in the noted gaps

Name of the Institution/stakeholder and its role with respect to the above-listed provisions	Relevant institutional capacity in place to comply with the above listed provisions
Ministry of Industry and Trade	Ministry of Industry and Trade capacity for licensing of manufacturing processes that use mercury or mercury compounds and restricting the use of raw materials containing mercury or mercury compounds within the set exemption/ phase-out dates, needs improvement
Ministry of Mineral Resources/ Sudamin Company Ltd	The Ministry of Mineral Resources Sudamin Company has good capacity to control the use and distribution of mercury and monitor mining activities and their compliance with the best environmental practices
Ministry of Oil and Gas	Efficiently control the use of hazardous chemicals and activities involving their use in the petroleum sector
SSMO	The Sudanese Standard and Metrology Organization capacity is efficient for the control of the quality of imported items.
Federal Ministry of Health	The Federal Ministry of Health through the Environmental Health Administration and Occupational health Administration role for monitoring and supervising activities related to processes containing mercury or mercury compounds is important but the two administration capacities could not cope with the services required.
HCENR	HCENR is responsible for approval or rejection of any projects or industrial establishment which use mercury or mercury compounds and has potential negative impacts on environment or health

**Remaining Capacity Gaps at National Level that need to be addressed before provisions can be met**  
 the involvement of the relevant bodies at the States level for implementation of the articles is needed  
 provision of technical and financial support to the relevant stakeholders is necessary for securing an effective implementation

# POLICY, REGULATORY AND INSTITUTIONAL FRAMEWORK ASSESSMENT

Table (21) Analysis of the legal and institutional frameworks of Sudan with regards to Article 6 of the Minamata Convention

Article 6: Exemptions available to a Party upon request		
Description of the Article and applicability in the context of Sudan		
Article No.	Succint summary of provisions of the Article	Applicability
6.1	Any State or regional economic integration may register for one or more exemptions from the phase-out dates listed in Annex A and Annex B	Applicable
Policy and regulatory measures in place that enable Sudan to comply with the above listed provisions:		
Article No.	Title, ref. no. and date of relevant Policy and Regulatory Measure	What aspects of the above provisions are being addressed by policy/regulatory measure
Currently there is no policy/ regulatory measures in place for the mining, industrial and health sectors but there are efforts for finding alternatives in progress		
<b>Outstanding regulatory or policy aspects that would need to be addressed/developed to ensure compliance with the Convention's provisions</b> No existing Directives or Regulations on the exemption and phase-out. This should be promptly considered after ratification of the Minamata Convention.		
Name of the Institution/stakeholder and its role with respect to the above-listed provisions	Relevant institutional capacity in place to comply with the above listed provisions	
HCENR	HCENR role as the convention focal point is major for requesting/registering for exemptions from the phase-out dates capacity for approval or rejection of any projects or industrial establishments which has potential negative impacts on environment or health is good	
Ministry of Industry and Trade	Ministry of Industry and Trade capacity, through licensing of manufacturing processes and controlling of raw materials within the set exemption/ phase-out dates, needs improvement	
Ministry of Mineral Resources	The Ministry of Mineral Resources has good capacity to identify the exemption cases and phase-out dates of the use and distribution of mercury.	
Ministry of Oil and Gas	Ministry of Oil and Gas efficiently control the use of hazardous chemicals and activities involving their use in the petroleum sector	
National Drugs and Poisons Board	Drugs and Poisons Board is of good capacity to identify exemption cases, restriction dates and control hazardous chemicals, drugs and cosmetics use for health purposes	
Federal Ministry of Health	Federal Ministry of Health / Environmental Health Administration and Occupational health Administration have insufficient capacities for monitoring and supervising and inspection of activities involving restrict use of mercury.	
SSMO	The Sudanese Standard and Metrology Organization capacity is efficient for the control of the quality of imported items	
<b>Remaining Capacity Gaps at National Level that need to be addressed before provisions can be met</b>		

# POLICY, REGULATORY AND INSTITUTIONAL FRAMEWORK ASSESSMENT

Table (22) Analysis of the legal and institutional frameworks of Sudan with regards to Article 7 of the Minamata Convention

Article 7: Artisanal and Small-scale Gold Mining (ASGM)		
Description of the Article and applicability in the context of Sudan		
Article No.	Succint summary of provisions of the Article	Applicability
7.1 to 7.4 and Annex C	Take measures to reduce, and where feasible, eliminate mercury and mercury compound use, emissions (to air), and releases (to land and water) associated with ASGM	Applicable
	<ul style="list-style-type: none"> <li>Establish coordinating mechanism and delineate agency roles for development/implementation of an ASGM National Action Plan (NAP)</li> <li>Define and formalize or regulate ASGM consistent with the Convention</li> </ul>	Applicable
	Eliminate whole ore amalgamation, open burning of amalgam or processed amalgam, burning of amalgam in residential areas, and cyanide leaching of mercury-laden sediment, ore or tailings (the “worst practices”)	Applicable
	Set mercury use reduction goals or targets consistent with the timely elimination of the worst practices and other use reduction efforts	Applicable
	Develop steps to facilitate the formalization or regulation of the artisanal and small-scale gold mining sector	Applicable
	Develop strategies to prevent the exposure of vulnerable populations, particularly children and women of child-bearing age, especially pregnant women, to mercury used in artisanal and small-scale gold mining	Applicable
	Reduce mercury emissions, releases, and exposures associated with ASGM, and prevent mercury exposures of vulnerable populations (particularly women of child-bearing age and children)	Applicable
	Strategies for managing trade and preventing the diversion of mercury and mercury compounds from other sectors to ASGM, and manage mercury trade consistent with the NAP	Applicable
	Implement a public health strategy to address mercury exposures to ASGM miners and communities	Applicable
Policy and regulatory measures in place that enable Sudan to comply with the above listed provisions:		
Article No.	Title, ref. no. and date of relevant Policy and Regulatory Measure	What aspects of the above provisions are being addressed by policy/regulatory measure
7.1 to 7.4 and Annex C	<ul style="list-style-type: none"> <li>Minerals Resources Development Act 2015</li> <li>Environment Protection Act 2001</li> <li>The Environment Health Act 2009</li> </ul>	<p>Section 2 of the Minerals Resources Development Act 2015 compels any holder of a licence or contract for the exploitation of minerals; including gold to observe the applicable environmental laws; in particular to protect the area of the concession from pollution and damage caused by the mining activities.</p> <ul style="list-style-type: none"> <li>- Para (1) of Section 27 of the above cited Act authorizes the competent authority at the Ministry of Mineral Resources to enter the area of the concession and to report to the concerned body any environmental, technical, and administrative remarks relating to the mining operations.</li> <li>- Duty incumbent on the HCENR, in accordance with Section 5(1) of the Environment Protection Act 2001 to set, in cooperation and coordination with competent authorities, a national plan for the sustainable exploitation of natural resources.</li> <li>- The relevant provisions of the Environment Health Act 2009 relating to pollution control.</li> <li>- Further specific Regulations are needed to enforce the obligations arising out of Article 7 of the Convention.</li> </ul>

# POLICY, REGULATORY AND INSTITUTIONAL FRAMEWORK ASSESSMENT

## Outstanding regulatory or policy aspects that would need to be addressed/developed to ensure compliance with the Convention's provisions

There is no national policy on the sustainable development of minerals Resources; including Artisanal and small-scale Gold Mining. Such policy should be adopted by the HCENR, in collaboration with the Ministry of Mineral Resources and relevant, SSMO and the Ministry of Health, in line with Section Para (1) of Section 5 of the Environment Protection Act 2001

Name of the Institution/stakeholder and its role with respect to the above-listed provisions	Relevant institutional capacity in place to comply with the above listed provisions
Ministry of Mineral Resources	Ministry of Mineral Resources has good infrastructure capacities for control of mercury imports, distribution and use and can develop and update regulations of artisanal mining sector
HCENR	HCENR has good cooperation and coordination with competent authorities for the sustainable exploitation of natural resources and can facilitate the formalization or regulation of the artisanal and small-scale gold mining sector
SSMO	The Sudanese Standard and Metrology Organization capacity is efficient for the control of the quality of imported items
Federal Ministry of Health	Ministry of Health / Environmental Health Administration and Occupational health Administration for monitoring and supervising activities related to emission, releases and workers (or miners) exposure in the ASGM

## Remaining Capacity Gaps at National Level that need to be addressed before provisions can be met

- More specific Regulations to further the implementation and monitoring process are needed. Such Regulations should be drafted in accordance with the enabling provision of the Minerals Resources Act, in collaboration and coordination with the HCENR, SSMO and the Ministry of Health.
- Involvement of responsible authorities at the States; especially those with artisanal and small-scale gold mining (River Nile State, Red Sea State, South Kordufan State, and the Blue Nile State) is of great importance.

# POLICY, REGULATORY AND INSTITUTIONAL FRAMEWORK ASSESSMENT

Table (23) Analysis of the legal and institutional frameworks of Sudan with regards to Article 8 of the Minamata Convention

Article 8: Emissions		
Description of the Article and applicability in the context of Sudan		
Article No.	Succint summary of provisions of the Article	Applicability
8.3	Take measures to reduce, and where feasible, eliminate mercury and mercury compound use, emissions (to air), and releases (to land and water) associated with ASGM	Applicable
8.4	Require best available techniques/best environmental practices (BAT/BEP) or associated emission limit values (ELVs) for new (as defined in Article 8.2(c)) sources listed in Annex D (coal-fired power plants, coal-fired industrial boilers, non-ferrous metal smelting and roasting processes, waste incineration, newly proposed mining operations and cement production)	Applicable in terms of waste incineration
8.5	Require one or more measures identified in Article 8.5 to control/reduce mercury emissions from existing sources listed in Annex D, which shall be operational at the source within 10 years	Applicable in terms of waste incineration
8.7	Require monitoring/reporting and other wise establish a mercury emissions inventory for sources listed in Annex D	Applicable in terms of waste incineration
Policy and regulatory measures in place that enable Sudan to comply with the above listed provisions:		
Article No.	Title, ref. no. and date of relevant Policy and Regulatory Measure	What aspects of the above provisions are being addressed by policy/regulatory measure
8.4 to 8.7-	<ul style="list-style-type: none"> <li>Minerals Resources Development Act 2015</li> <li>Environment Protection Act 2001 Standards and Metrology Act 2008</li> <li>The Environment Health Act 2009</li> </ul>	Apart from the cited national provisions in relation to Para (1) and (2) of Article 7, no specific Regulations are in place.
Outstanding regulatory or policy aspects that would need to be addressed/developed to ensure compliance with the Convention's provisions		
Specific Regulations on standards and control of mercury releases and emissions at source are needed on this aspect of the Convention.		
Name of the Institution/stakeholder and its role with respect to the above-listed provisions	Relevant institutional capacity in place to comply with the above listed provisions	
Ministry of Mineral Resources	the Ministry of Mineral Resources has good capacity to supervise the use of mercury and monitor mining activities and their compliance with the best environmental practices	
HCENR	HCENR has good collaboration capacity for approval or rejection of any projects or industrial establishments which has potential negative impacts on environment or health	
Federal Ministry of Health	Federal Ministry of Health / Environmental Health Administration and Occupational health Administration for monitoring of the level of pollutants and supervising their compliance with standards	
SSMO	The Sudanese Standard and Metrology Organization collaborating capacity is efficient for setting standards and guidelines for safe levels of pollutants and pest environment practice	

# POLICY, REGULATORY AND INSTITUTIONAL FRAMEWORK ASSESSMENT

Name of the Institution/stakeholder and its role with respect to the above-listed provisions	Relevant institutional capacity in place to comply with the above listed provisions
Ministry of Industry and Trade	Setting standards and guidelines for Ministry of Industry and Trade to license manufacturing processes and control raw materials capacity needs improvement
<b>Remaining Capacity Gaps at National Level that need to be addressed before provisions can be met</b> <ul style="list-style-type: none"> <li>• Draft the appropriate regulations, in cooperation and coordination with the relevant authorities at the States level</li> <li>• Development of waste management system</li> <li>• A national Plan on the sustainable exploitation of natural resources; including Artisanal and Small-scale Gold Mining, as well as, cement industry is needed.</li> </ul>	

Table (24) Analysis of the legal and institutional frameworks of Sudan with regards to Article 9 of the Minamata Convention

Article 9: Releases to Land and Water		
Description of the Article and applicability in the context of Sudan		
Article No.	Succint summary of provisions of the Article	Applicability
9.3, 9.4	Require reporting or otherwise obtain information as needed to identify significant sources of mercury/mercury compound releases to land or water, and to maintain an inventory of releases from the sources identified	Applicable
9.5	Take one or more measures specified in Article 9.5 to control/reduce mercury and mercury compound releases to land and water from significant sources it identifies	Applicable
Policy and regulatory measures in place that enable Sudan to comply with the above listed provisions:		
Article No.	Title, ref. no. and date of relevant Policy and Regulatory Measure	What aspects of the above provisions are being addressed by policy/regulatory measure
9.3, 9.4 and 9.5	<ul style="list-style-type: none"> <li>• Minerals Resources Development Act 2015</li> <li>• Environment Protection Act 2001- Environment Health Act 2009</li> <li>• Regulations for Protection of the Environment in the Petroleum industry (Amendment) 2005</li> </ul>	Apart from the general provisions provided for by the Environment Protection Act, Environment Health Act, Minerals Resources Development Act, and the Regulations for Protection of the Environment in Petroleum Operations, there are no specific regulations on this aspect.
<b>Outstanding regulatory or policy aspects that would need to be addressed/developed to ensure compliance with the Convention's provisions</b> There is no national policy or a strategy addressing the issues that authorized institutions on obtaining or reporting information or management (including control measures) of the sources of mercury releases to land and water or emissions to air		
Name of the Institution/stakeholder and its role with respect to the above-listed provisions	Relevant institutional capacity in place to comply with the above listed provisions	
Ministry of Mineral Resources	the Ministry of Mineral Resources has good capacity to report or obtain information on the used and distributed mercury and identify mining activities and their releases to the environment	
HCENR	HCENR has good collaborative capacity for conducting inventories on the sources and releases of mercury /mercury compounds to the environment	

# POLICY, REGULATORY AND INSTITUTIONAL FRAMEWORK ASSESSMENT

Name of the Institution/stakeholder and its role with respect to the above-listed provisions	Relevant institutional capacity in place to comply with the above listed provisions
SSMO	The Sudanese Standard and Metrology Organization capacity is efficient for setting standards on the releases to the environment from industrial activities and guidelines for pest practice which reduces the releases.
Ministry of Health	Ministry of Health / Environmental Health Administration and Occupational health Administration capacity for identifying mercury/mercury compounds sources and releases to the environment is relatively weak
Ministry of Oil and Gas	Ministry of Oil and gas can identify and obtain information of mercury/mercury compounds sources and releases in the petroleum sector
Ministry of Industry and Trade	Ministry of Industry and Trade capacity for identifying sources of mercury/mercury compounds and releases is relatively good

**Remaining Capacity Gaps at National Level that need to be addressed before provisions can be met**

Table (25) Analysis of the legal and institutional frameworks of Sudan with regards to Article 10 of the Minamata Convention

Article 10: Environmentally sound interim storage of mercury, other than waste mercury		
Description of the Article and applicability in the context of Sudan		
Article No.	Succint summary of provisions of the Article	Applicability
10.2	Take measures to ensure interim mercury storage is conducted in an environmentally sound manner, taking into account guidelines to be developed by the Conference of the Parties (COP)	Applicable
Policy and regulatory measures in place that enable Sudan to comply with the above listed provisions:		
Article No.	Title, ref. no. and date of relevant Policy and Regulatory Measure	What aspects of the above provisions are being addressed by policy/regulatory measure
10.2	<ul style="list-style-type: none"> <li>Regulations for the Organizations of Mercury Importation, Use and Circulation 2012                             <ul style="list-style-type: none"> <li>Environment Protection Act 2001</li> </ul> </li> <li>Pesticides and Pests Products Control Act 1994</li> <li>Regulations for Protection of the Environment in the Petroleum industry (Amendment) 2005</li> </ul>	<ul style="list-style-type: none"> <li>Section 5(1) of the Regulations for the Organization of Mercury Importation, Use and Circulation 2012 requires any importing company to be technically competent and possesses the needed know how for the import, storage, transport and distribution of mercury in a safe and secure way. The same Section obliges such company to store mercury in a secure way at all stages and in all times and in accordance with the prescribed conditions.</li> <li>Section 43 of the Regulations for Protection of the Environment in the Petroleum Industry obliges any company to observe the standards limits for liquid wastes resulting from transportation and storage vessels to be discharged in the marine environment, in addition to compliance with the applicable health and safety laws.</li> </ul>

# POLICY, REGULATORY AND INSTITUTIONAL FRAMEWORK ASSESSMENT

## Outstanding regulatory or policy aspects that would need to be addressed/developed to ensure compliance with the Convention's provisions

- A national Policy is needed on this aspect of the Convention.
- Further regulations; based on the guidelines to be developed by the COP of the Minamata Convention are needed to meet the requirement of Article 10.2
- The relevant Regulations of the Pesticide and Pests' Products Control Act 1994 should be updated to cover this aspect of the Convention.

Name of the Institution/stakeholder and its role with respect to the above-listed provisions	Relevant institutional capacity in place to comply with the above listed provisions
Ministry of Mineral Resources/ Sudamin Company	The Ministry of Mineral Resources Sudamin Company has good capacity to control and inspect the storage of mercury in the mining sector
HCENR	HCENR's capacity for approval or rejection of any projects or industrial establishments which has potential negative impacts from the storage of mercury on environment or health is good
National Council for Pesticide	National Pesticides Council has good capacity for approving and inspecting the pesticides stores and storage conditions
Ministry of Oil and Gas	Ministry of Oil and Gas control the storage of hazardous chemicals in the petroleum sector

**Remaining Capacity Gaps at National Level that need to be addressed before provisions can be met**  
The Ministry of Mineral Resources should take the initiative to propose the needed regulations

Table (26) Analysis of the legal and institutional frameworks of Sudan with regards to the Article 11 of the Minamata Convention

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

# POLICY, REGULATORY AND INSTITUTIONAL FRAMEWORK ASSESSMENT

Policy and regulatory measures in place that enable Sudan to comply with the above listed provisions:		
Article No.	Title, ref. no. and date of relevant Policy and Regulatory Measure	What aspects of the above provisions are being addressed by policy/regulatory measure
11.3 (a)	<ul style="list-style-type: none"> <li>Environment Protection Act 2001</li> <li>Pesticides and Pests Products Control Act 1994.</li> <li>Regulations for Protection of the Environment in the Petroleum industry (Amendment) 2005</li> <li>Environmental Health Act Penal Code 1991                             <ul style="list-style-type: none"> <li>Mineral Resource Act 2015</li> <li>Local Government Act 2003</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>Apart from the general provisions included in the Environment Protection Act 2001, Regulations for Protection of the Environment in the Petroleum Industry, Pesticides and Pests' Products Control Act, there are no Regulations addressing this aspect.</li> <li>Sudan is a Party to Basel Convention; and accordingly, it is bound to implement the obligations arising out of this Convention.</li> </ul>
11.3(b)	<ul style="list-style-type: none"> <li>Minerals Resources Development Act 2015</li> <li>Regulations for the Organizations of Mercury Importation, Use and Circulation 2012                             <ul style="list-style-type: none"> <li>Environment Protection Act 2001</li> </ul> </li> <li>Regulations for Protection of the Environment in the Petroleum industry (Amendment) 2005                             <ul style="list-style-type: none"> <li>Standards and Metrology Act 2008</li> <li>The Environment Health Act 2009</li> </ul> </li> </ul>	No Regulations are in place to cater for this issue. Existing regulatory measures in the Minerals Resources Development and its accompanying Regulations, and the Environment Protection Act are of general nature.
11.3 (c)	<ul style="list-style-type: none"> <li>Minerals Resources Development Act 2015</li> <li>Regulations for the Organizations of Mercury Importation, Use and Circulation 2012                             <ul style="list-style-type: none"> <li>Environment Protection Act 2001</li> </ul> </li> <li>Regulations for Protection of the Environment in the Petroleum industry (Amendment) 2005                             <ul style="list-style-type: none"> <li>Standards and Metrology Act 2008</li> <li>The Environment Health Act 2009</li> </ul> </li> </ul>	Requires Regulations to implement this obligation in line with the requisites of the Basel Convention

## Outstanding regulatory or policy aspects that would need to be addressed/developed to ensure compliance with the Convention's provisions

- A National Policy and a strategy on the above aspects of the Convention are needed.
- Detailed Regulations; based on the guidelines to be developed by the COP of the Minamata Convention, as well as, the directives of the Basel Convention should be adopted.

Name of the Institution/stakeholder and its role with respect to the above-listed provisions	Relevant institutional capacity in place to comply with the above listed provisions
Ministry of Mineral Resources	Ministry of Mineral Resources/Sudamin Company Ltd and Sudanese Mineral Resources Company can efficiently take measures to manage mercury wastes in an environmentally sound manner and restrict use of mercury derived from the treatment or re-use of mercury waste
HCENR	HCENR as the focal point of the conventions able to play its role in mercury waste management and restriction of reuse of it and control the cross-boundary movement according to Basel Convention requirements.
Ministry of Health	Ministry of Health / Environmental Health Administration capacity for management of mercury waste needs improvement
SSMO	The Sudanese Standard and Metrology Organization capacity is efficient for setting standards and guidelines for sound management of hazardous waste
Ministry of Oil and Gas	Ministry of Oil and Gas efficiently manage hazardous chemicals wastes from activities involving their use in the petroleum sector
Ministry of Interior	The Ministry of Interior can enforce the implementation of the national acts and regulations in coordination with relevant institutions

## Remaining Capacity Gaps at National Level that need to be addressed before provisions can be met Conduct stakeholders' engagements

# POLICY, REGULATORY AND INSTITUTIONAL FRAMEWORK ASSESSMENT

Table (27) Analysis of the legal and institutional frameworks of Sudan with regards to the Article 12 of the Minamata Convention

Article 12: Contaminated Sites		
Description of the Article and applicability in the context of Sudan		
Article No.	Succint summary of provisions of the Article	Applicability
12.1	Develop strategies for identifying and assessing mercury/mercury compound contaminated sites	Applicable
12.2	If risk reduction activities are taken at contaminated sites, they are taken in an environmentally sound manner, incorporating risk assessment where appropriate	Applicable
Policy and regulatory measures in place that enable Sudan to comply with the above listed provisions:		
Article No.	Title, ref. no. and date of relevant Policy and Regulatory Measure	What aspects of the above provisions are being addressed by policy/regulatory measure
12.1 and 12.2	<ul style="list-style-type: none"> <li>Minerals Resources Development Act 2015                             <ul style="list-style-type: none"> <li>Environment Protection Act 2001</li> </ul> </li> <li>Regulations for Protection of the Environment in the Petroleum industry (Amendment) 2005                             <ul style="list-style-type: none"> <li>The Environment Health Act 2009</li> </ul> </li> </ul>	No such strategies are in place. These should be adopted by the Ministry of Mineral Resources, in collaboration and consultation with the HCENR, Ministry of Health, and the Ministry of Oil and Gas
Outstanding regulatory or policy aspects that would need to be addressed/developed to ensure compliance with the Convention's provisions		
Develop a strategy for identifying and assessing mercury and mercury compounds contaminated sites		
Name of the Institution/stakeholder and its role with respect to the above-listed provisions	Relevant institutional capacity in place to comply with the above listed provisions	
Ministry of Mineral Resources	the Ministry of Mineral Resources can efficiently identify and assess mercury/mercury compound contaminated sites and take measures to reduce the risks of activities that are taken at contaminated sites	
HCENR	HCENR capacity for approval or rejection of any projects or industrial establishments which has potential negative impacts on environment or health is good	
Federal Ministry of Health	Federal Ministry of Health / Environmental Health Administration and Occupational health Administration for monitoring and supervising activities related to environmental and occupational health	
SSMO	Efficiently control the use of hazardous chemicals and activities involving their use in the petroleum sector	
Remaining Capacity Gaps at National Level that need to be addressed before provisions can be met		
<ul style="list-style-type: none"> <li>Provide technical and legal support to the Ministries and national bodies involved in issues related to contaminated sites</li> <li>Develop the needed strategies and action plans in light of the guidelines to be developed by the COP.</li> </ul>		

# POLICY, REGULATORY AND INSTITUTIONAL FRAMEWORK ASSESSMENT

Table (28) Analysis of the legal and institutional frameworks of Sudan with regards to Article 13 of the Minamata Convention

Article 13: Financial Resources and Mechanism		
Description of the Article and applicability in the context of Sudan		
Article No.	Succint summary of provisions of the Article	Applicability
13.1	Access domestic resources as may be needed to implement Convention obligations	Applicable
13.2	Access financial resources available under the Convention financial mechanism and other resources available from multilateral, regional, and bilateral funding sources	Applicable
Policy and regulatory measures in place that enable Sudan to comply with the above listed provisions:		
Article No.	Title, ref. no. and date of relevant Policy and Regulatory Measure	What aspects of the above provisions are being addressed by policy/regulatory measure
13.1	Environment Protection Act 2001	<ul style="list-style-type: none"> <li>The HCENR as the lead body responsible for setting out general policies, among others, for the sustainable utilization of natural resources and coordinating the efforts of competent authorities has this mandate in line with section 5(1) of the Environment Protection Act 2001.</li> <li>The relevant authorities at the States level, namely the States Environment Councils should be part of the process.</li> </ul>
13.2	Environment Protection Act 2001	There is a need to develop appropriate financial regulations; with an enforcement mechanism. Other available and obtainable financial and technical support under the relevant ratified Conventions should be accessed.
Outstanding regulatory or policy aspects that would need to be addressed/developed to ensure compliance with the Convention's provisions		
<ul style="list-style-type: none"> <li>There is a need to develop appropriate financial regulations; with an enforcement mechanism.</li> <li>Other available and obtainable financial and technical support under the relevant ratified Conventions should be accessed.</li> </ul>		
Name of the Institution/stakeholder and its role with respect to the above-listed provisions	Relevant institutional capacity in place to comply with the above listed provisions	
HCENR	Responsible for, inter alia, setting a national long-term plan for the optimum and sustainable use of natural resources. No such plan is in place at the time	
Remaining Capacity Gaps at National Level that need to be addressed before provisions can be met		
Inadequacy of financial and technical resources is a major challenge; which could be surmounted by the commitment of the top responsible national authorities to provide the needed budget and resources. This is in addition to the support from the allocated fund and technical support available under the Minamata Convention and other relevant ratified Instruments		

# POLICY, REGULATORY AND INSTITUTIONAL FRAMEWORK ASSESSMENT

Table (29) Analysis of the legal and institutional frameworks of Sudan with regards to Article 16 of the Minamata Convention

Article 16: Health Aspects		
Description of the Article and applicability in the context of Sudan		
Article No.	Succint summary of provisions of the Article	Applicability
16.1(a)	Promote the development and implementation of strategies to identify and protect populations at risk, such as developing fish consumption guidelines	Applicable
16.1(b)	Promote occupational exposure educational and prevention programs	Applicable
16.1(c)	Promote prevention, treatment, and care services for affected populations	Applicable
Policy and regulatory measures in place that enable Sudan to comply with the above listed provisions:		
Article No.	Title, ref. no. and date of relevant Policy and Regulatory Measure	What aspects of the above provisions are being addressed by policy/regulatory measure
16.1 (a)	Public Health Act 2008- Environment Health Act 2009	There are no strategies or policies in existence on this aspect.
16.1 (b)-	<ul style="list-style-type: none"> <li>Minerals Resources Development Act 2015</li> <li>Regulations for the Organizations of Mercury Importation, Use and Circulation 2012</li> <li>Environment Protection Act 2001- Labour Act 1997                             <ul style="list-style-type: none"> <li>Standards and Metrology Act 2008</li> <li>The Environment Health Act 2009</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>5(a) of the Regulations for the Organization of Mercury Import, Use and Circulation requires any company to, among others, protect the safety of employees dealing with mercury by protecting them from exposure to mercury vapour.</li> <li>Section 94 of the Labour Act 1997 obligates any owner of an industrial establishment to acquaint his employees with the potential associated risks and the measures to be taken to avert them.</li> <li>Specific Safety Regulations relating to mercury are needed to meet the requirement of Article 16.1(b) at the national and the States level.</li> </ul>
16.1(c)	<ul style="list-style-type: none"> <li>Minerals Resources Development Act 2015</li> <li>Regulations for the Organizations of Mercury Importation, Use and Circulation 2012                             <ul style="list-style-type: none"> <li>Environment Protection Act 2001</li> </ul> </li> <li>Regulations for Protection of the Environment in the Petroleum industry (Amendment) 2005                             <ul style="list-style-type: none"> <li>Standards and Metrology Act 2008</li> <li>The Environment Health Act 2009</li> </ul> </li> </ul>	No regulations or comprehensive preventive measures on this issue. There are scattered efforts which had been initiated by the Ministry of Mineral Resources
Outstanding regulatory or policy aspects that would need to be addressed/developed to ensure compliance with the Convention's provisions		
<ul style="list-style-type: none"> <li>Comprehensive strategies and action plans are needed to meet the obligations of Article 16.</li> <li>Strategies and action plans are needed to address this requirement of Article 16.1. Such strategies and plans should be adopted by the HCNR, in collaboration and consultation with the Ministry of Health, SSMO, Ministry of Health, the relevant authorities at the States, and the relevant NGOS; such as the Sudanese Environment conservation Society and the Sudanese Consumer Protection Society.</li> </ul>		

# POLICY, REGULATORY AND INSTITUTIONAL FRAMEWORK ASSESSMENT

Name of the Institution/stakeholder and its role with respect to the above-listed provisions	Relevant institutional capacity in place to comply with the above listed provisions
Ministry of Mineral Resources	the Ministry of Mineral Resources/Sudamin Company Ltd has good capacity to identify population and gold miners' exposure and reduce the risks of mining activities on their health
HCENR	HCENR has good collaborative capacity for identifying population and workers at risks from any projects or industrial establishments which has potential negative impacts on their
SSMO	The Sudanese Standard and Metrology Organization collaborative capacity is efficient for the setting standards and guidelines which control of the exposure conditions of population and workers at risks from any activity
Federal Ministry of Health	Federal Ministry of Health / Environmental Health Administration and Occupational health Administration have fair capacities for identifying population and workers at exposure risks from any source, monitoring and controlling their adverse health effects
Ministry of Oil and Gas	Efficiently identify and control the exposure of workers and surrounding population from activities of the petroleum sector
Ministry of Industry and Trade	Ministry of Industry and Trade can collaborate with other institutions in identifying and controlling the exposure risks of population and workers at risks from any manufacturing processes

**Remaining Capacity Gaps at National Level that need to be addressed before provisions can be met**  
 Relevant institutions at the state and localities levels needs capacity building for providing the required services

Table (30) Analysis of the legal and institutional frameworks of Sudan with regards to Article 17 of the Minamata Convention

Article 17: Information Exchange		
Description of the Article and applicability in the context of Sudan		
Article No.	Succint summary of provisions of the Article	Applicability
17.1, 17.3 and 17.5	Each party shall facilitate the exchange of information referred to in paragraph 17.1. Each Party shall designate a national focal point for the exchange of information under this Convention. Share information on the health and safety of humans and the environment as non-confidential, in accordance with Article 17.5	Applicable
Policy and regulatory measures in place that enable Sudan to comply with the above listed provisions:		
Article No.	Title, ref. no. and date of relevant Policy and Regulatory Measure	What aspects of the above provisions are being addressed by policy/regulatory measure
17.1, 17.3 and 17.5	<ul style="list-style-type: none"> <li>Minerals Resources Development Act 2015               <ul style="list-style-type: none"> <li>Environment Protection Act 2001</li> </ul> </li> <li>Regulations for Protection of the Environment in the Petroleum industry (Amendment) 2005               <ul style="list-style-type: none"> <li>Standards and Metrology Act 2008</li> <li>The Environment Health Act 2009                   <ul style="list-style-type: none"> <li>Public Health Act 2008</li> </ul> </li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>The Minerals Resources' development Act 2015 mandates the Ministry of Mineral Resources to implement the Act and its accompanying Regulations in cooperation and coordination with the General Directorate for Custom, SSMO, HCENR, and the Directorate of Economic Security. Exchange of information among these bodies is essential for the implementation.</li> <li>In relation to information sharing on human health and environmental safety, the Ministry of Mineral Resources should be designated as the national focal point to supervise and monitor the implementation, in cooperation with the HCENR, Ministry of Oil and Gas, and the Ministry of Health.</li> </ul>

# POLICY, REGULATORY AND INSTITUTIONAL FRAMEWORK ASSESSMENT

## Outstanding regulatory or policy aspects that would need to be addressed/developed to ensure compliance with the Convention's provisions

Name of the Institution/stakeholder and its role with respect to the above-listed provisions	Relevant institutional capacity in place to comply with the above listed provisions
Ministry of Mineral Resources	The Ministry of Mineral Resources has good official capacity to disseminate information on the use of mercury and the mining sector
HCENR	HCENR can facilitate and exchange information on issues related to activities that have potential negative impacts on environment or health
SSMO	The Sudanese Standard and Metrology Organization can efficiently collaborate in facilitating and dissemination of information regarding the implementation of the convention
Ministry of Oil and Gas	Efficiently facilitate, disseminate and exchange information regarding the convention in the petroleum sector
Federal Ministry of Health	Federal Ministry of Health directorates can facilitate and disseminate information regarding the convention provisions related to environmental and occupational health

## Remaining Capacity Gaps at National Level that need to be addressed before provisions can be met

- Easy access and exchange of information among the above-mentioned competent bodies should be facilitated by the provision of reliable and up-to-date data.
- Provision of easy and accessible information should be available at all levels of governance (National and the State levels).

Table (31) Analysis of the legal and institutional frameworks of Sudan with regards to Article 18 of the Minamata Convention

Article 18: Public information, awareness, and education		
Description of the Article and applicability in the context of Sudan		
Article No.	Succint summary of provisions of the Article	Applicability
18.1	Each Party shall promote and facilitate provision to the public of available information referred to in paragraph 18.1 and education, training and public awareness related to the effects of exposure to mercury and mercury compounds on human health and the environment	Applicable
18.2	Each Party shall use existing mechanisms or give consideration to the development of mechanisms, such as pollutant release and transfer registers where applicable, for the collection and dissemination of information on estimates of its annual quantities of mercury and mercury compounds that are emitted, released or disposed of through human activities.	Applicable

# POLICY, REGULATORY AND INSTITUTIONAL FRAMEWORK ASSESSMENT

Policy and regulatory measures in place that enable Sudan to comply with the above listed provisions:

Article No.	Title, ref. no. and date of relevant Policy and Regulatory Measure	What aspects of the above provisions are being addressed by policy/regulatory measure
18.1-	<ul style="list-style-type: none"> <li>Minerals Resources Development Act 2015</li> <li>Regulations for the Organizations of Mercury Importation, Use and Circulation 2012                             <ul style="list-style-type: none"> <li>Environment Protection Act 2001</li> </ul> </li> <li>Regulations for Protection of the Environment in the Petroleum industry (Amendment) 2005                             <ul style="list-style-type: none"> <li>Standards and Metrology Act 2008</li> <li>Environmental Health Act 2009                                     <ul style="list-style-type: none"> <li>Public Health Act 2008</li> <li>Labour Act 1997</li> </ul> </li> <li>Local Government Act 2003</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>Section 9(1) of the Regulations for the Organization, Use and Circulation 2012 obliges the Ministry of Mineral Resources, in coordination with other Ministries and Units to undertake awareness programmes to the citizens on the risks associated with mercury. However, as noted in the text, these Regulations do not address mercury-added products.</li> <li>The HCENR is mandated, pursuant to Section 5(1) of the Environment Protection Act 2001, to set a national plan for the promotion of environmental awareness and the sustainable utilization of natural resources.</li> <li>Involvement of the relevant authorities at the States level, as well as, the NGOs working in the field of environmental and consumer protection is highly needed in the activities relating to awareness raising on the adverse impacts of mercury and mercury-added products.</li> </ul>
18.2-	<ul style="list-style-type: none"> <li>Minerals Resources Development Act 2015</li> <li>Regulations for the Organizations of Mercury Importation, Use and Circulation 2012                             <ul style="list-style-type: none"> <li>Environment Protection Act 2001</li> </ul> </li> <li>Regulations for Protection of the Environment in the Petroleum industry (Amendment) 2005 Standards and Metrology Act 2008                             <ul style="list-style-type: none"> <li>Environmental Health Act 2009                                     <ul style="list-style-type: none"> <li>Public Health Act 2008</li> <li>Labour Act 1997</li> </ul> </li> </ul> </li> </ul>	<p>The existing mechanisms to perform this task embrace, the Mercury Unit at the Ministry of Mineral Resources, Ministry of Health, HSE Unit at the Ministry of Oil and Gas, Ministry of Industry and Trade, Ministry of Labour, and the SSMO.</p>

## Outstanding regulatory or policy aspects that would need to be addressed/developed to ensure compliance with the Convention's provisions

- A national policy and plan for the promotion of environmental awareness on the risks associated with mercury and mercury-added products should be adopted by the HCENR, in cooperation and coordination with the Ministry of Mineral Resources, National Board for drugs and Poisonous, Ministry of Health, SSMO, competent authorities at the States, Universities and Scientific Research Centres, and the relevant NGOs.

Name of the Institution/stakeholder and its role with respect to the above-listed provisions	Relevant institutional capacity in place to comply with the above listed provisions
Ministry of Mineral Resources	the Ministry of Mineral Resources and its specialized companies/Sudamin Company Ltd and Sudanese Mineral Resources Company have good capacity to disseminate information to the public and raise their awareness regarding mercury and mining activities
Federal Ministry of Health	Federal Ministry of Health directorates have activities and programs on training and awareness raising regarding environmental and occupational health
Ministry of Oil and Gas	Efficiently facilitate, disseminate and exchange information regarding related activities to the convention in the petroleum sector
SSMO	The Sudanese Standard and Metrology Organization can efficiently collaborate in facilitating and dissemination of information regarding the implementation of the convention

# POLICY, REGULATORY AND INSTITUTIONAL FRAMEWORK ASSESSMENT

Name of the Institution/stakeholder and its role with respect to the above-listed provisions	Relevant institutional capacity in place to comply with the above listed provisions
Ministry of Higher Education and Scientific Research	The Ministry of Higher Education and Scientific Research through its centers and experts can collaborate and provide materials and facilitate training and awareness raising activities
NGOs (Sudanese Environment Conservation Society, Sudanese Consumer Protection Society and Sudanese Women Association)	NGOs committees and unions according to their mandates organize and collaborate in training and awareness raising to the public in the field of environment and health

**Remaining Capacity Gaps at National Level that need to be addressed before provisions can be met**

- Complementary awareness campaigns are needed in relation to mercury-added products; which is not covered by the Regulations for the Organization of Mercury Import, Use and Circulation.
- The awareness campaigns on the risks associated with mercury and mercury-added products should be inclusive, i.e. involvement of all relevant national and States governmental bodies, Universities and Institutes of High Learning, Scientific Research Centers, the Judicial and Legal Studies Institutes affiliated to the Presidency, and the NGOs

Table (32) Analysis of the legal and institutional frameworks of Sudan with regards to Article 19 of the Minamata Convention

Article 19: Research, Development and Monitoring		
Description of the Article and applicability in the context of Sudan		
Article No.	Succint summary of provisions of the Article	Applicability
19.1	shall Endeavour to cooperate to develop and improve, (a) Inventories of use, consumption, and anthropogenic emissions to air and releases to water and land of mercury and mercury compounds; (b) Modeling and geographically representative monitoring of levels of mercury and mercury compounds in vulnerable populations and ecosystems, (c) Assessments of the impact of mercury and mercury compounds on human health and the environment; (d) Harmonized methodologies for the activities undertaken under subparagraphs (a), (b) and (c);(e) Information on the environmental cycle, transport, transformation and fate of mercury and mercury compounds in a range of ecosystems	Applicable
19.2	build on existing monitoring networks and research programmes in undertaking the activities identified in paragraph 19.1	Applicable
Policy and regulatory measures in place that enable Sudan to comply with the above listed provisions:		
Article No.	Title, ref. no. and date of relevant Policy and Regulatory Measure	What aspects of the above provisions are being addressed by policy/regulatory measure
19.1-	<ul style="list-style-type: none"> <li>• Minerals Resources Development Act 2015</li> <li>• Environment Protection Act 2001</li> <li>• Regulations for Protection of the Environment in the Petroleum industry (Amendment) 2005</li> <li>• Standards and Metrology Act 2008</li> <li>• The Environment Health Act 2009</li> </ul>	<ul style="list-style-type: none"> <li>• Pending preparation by the relevant stakeholders, in cooperation with the HCENR; the lead national environmental body and the focal point responsible for monitoring the implementation of the Convention.</li> <li>• Adoption of participatory approach in the implementation process is important (Involvement of relevant authorities at the States level, Universities and Research Centers, in addition to the relevant NGOs.</li> </ul>

# POLICY, REGULATORY AND INSTITUTIONAL FRAMEWORK ASSESSMENT

Policy and regulatory measures in place that enable Sudan to comply with the above listed provisions:

Article No.	Title, ref. no. and date of relevant Policy and Regulatory Measure	What aspects of the above provisions are being addressed by policy/regulatory measure
19.2	<ul style="list-style-type: none"> <li>Minerals Resources Development Act 2015                             <ul style="list-style-type: none"> <li>Environment Protection Act 2001</li> </ul> </li> <li>Regulations for Protection of the Environment in the Petroleum industry (Amendment) 2005 Standards and Metrology Act 2008                             <ul style="list-style-type: none"> <li>The Environment Health Act 2009</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>Empowerment of the existing relevant mechanisms; technically financially to meet the obligation of Article 19(1) of the Convention.</li> <li>There is a need to form new innovative networks and research programmes to undertake the outlined activities in the above-mentioned Article efficiently.</li> </ul>

**Outstanding regulatory or policy aspects that would need to be addressed/developed to ensure compliance with the Convention's provisions**

Name of the Institution / stakeholder and its role with respect to the above-listed provisions	Relevant institutional capacity in place to comply with the above listed provisions
HCENR	HCENR in cooperation with other stakeholders is capable of conducting inventories on mercury and mercury compounds issues related to the implementation of the Convention
Ministry of Mineral Resources	The Ministry of Mineral Resources has good capacity to carry inventories on the use and distribution of mercury and mining activities and determine their relation to the convention requirements
Federal Ministry of Health	Federal Ministry of Health /Poison and Drugs Board, Environmental Health Administration and Occupational health Administration can collaborate and provide information related to the convention issues in the environment and health field.
SSMO	The Sudanese Standard and Metrology Organization capacity is efficient for the control of the quality of imported items
Ministry of Oil and Gas	Ministry of Oil and Gas has good records on the use of hazardous chemicals and activities involving their use in the petroleum sector
Customs General Directorate	Customs General Directorates can collaborate through the records of imported and exported items in conducting inventories of mercury and mercury compounds in the country

**Remaining Capacity Gaps at National Level that need to be addressed before provisions can be met**

- Inadequacy of finance; especially to Universities and Institutes of High Learning, and Research Centers is a major obstacle hindering implementation of the required activities.
- Universities and Institutes of High Learning, and Research Centre should encourage research on the various aspects of the Convention; including the development of environmentally alternatives.

# POLICY, REGULATORY AND INSTITUTIONAL FRAMEWORK ASSESSMENT

Table (33) Analysis of the legal and institutional frameworks of Sudan with regards to Article 21 of the Minamata Convention

Article 21: Reporting		
Description of the Article and applicability in the context of Sudan		
Article No.	Succint summary of provisions of the Article	Applicability
21.1	shall report to the Conference of the Parties, through the Secretariat, on the measures it has taken to implement the provisions of this Convention and on the effectiveness of such measures and the possible challenges in meeting the objectives of the Convention	Applicable
21.2	shall include in its reporting the information as called for in Articles 3, 5, 7, 8 and 9 of this Convention	Applicable
Policy and regulatory measures in place that enable Sudan to comply with the above listed provisions:		
Article No.	Title, ref. no. and date of relevant Policy and Regulatory Measure	What aspects of the above provisions are being addressed by policy/regulatory measure
21.1	Environment Protection Act 2001	The HCENR; the national focal point will undertake this activity, in collaboration with other competent authorities; which include the Ministry of Mineral Resources, Ministry of Health, Ministry Oil and Gas, SSMO, Ministry of Irrigation, Water resources and Electricity, Ministry of Foreign Affairs, and the relevant NGOSs.
21.2	Environment protection Act 2001	Shall be performed by the HCENR; the designated national focal point, in cooperation with the relevant stakeholders
Outstanding regulatory or policy aspects that would need to be addressed/developed to ensure compliance with the Convention's provisions		
Name of the Institution/stakeholder and its role with respect to the above-listed provisions		Relevant institutional capacity in place to comply with the above listed provisions
HCENR		HCENR has good capacity and collaborate with other institutions/experts for reporting on activities related to any project or industrial establishment so as to ensure compliance with the convention provisions
Remaining Capacity Gaps at National Level that need to be addressed before provisions can be met		
<ul style="list-style-type: none"> <li>• This task is to be undertaken through the collaborative efforts of all relevant competent authorities at the national and state levels, besides the involvement of the relevant NGOs.</li> <li>• Existence of reliable and up-to-date data base; with easy-accessible network to facilitate sharing of the required information among the competent authorities is indispensable for reporting purposes.</li> </ul>		

## A. KHARTOUM STATE WORKSHOP

Venue: Sudan academy for banking and financing sciences

Date: 22 January 2021

Total No of Participants: 56

Male: 42

Female: 14

Ministries and other Gov. Institutions:

- M. of Mining
- M. of Health
- M. of Industry
- M. of Agriculture
- HCENR
- HCE and rural development Khartoum state

UN agencies: UNIDO

Academic and Research institutions:

- University of Khartoum
- Khartoum North University
- Agriculture Research Corporation

NGOs:

- Mining Union
- Sudanese Environment Conservation Society
- Environmentalist association



# AWARENESS AND UNDERSTANDING OF WORKERS AND THE PUBLIC

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## PROCEEDINGS OF THE WORKSHOP

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The workshop was opened by the secretary general of the higher council for environment and natural resources. He expressed his appreciation to the GEF for availing the fund and to UNIDO, the implementing agency. He extended appreciation to the National consultants who undertook the assignments of the project components. He finally wished successful deliberation and confirmed that the recommendations of the workshop will be highly considered.

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## PRESENTATIONS

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1. A description of Minamata initial assessment project was delivered by Ms. Sitnour Hassan, the National project coordinator. She highlighted the objective of the project and the expected outcomes.
2. The 2nd presentation: This presentation was delivered by Ms. Namarig, she briefly described how the convention was developed. She elaborated on the important articles of the convention. A detailed explanation was given of how, Sudan will benefit of being a party as well as the obligations that the country to comply with.
3. The 3rd presentation was about the inventory which was one of the major activities of the MIA project. Professor Azhari Abdelbagi, the National consultant who undertook this activity presented the outcome of the inventory and its related activities.
4. Professor Altayeb Murkaz of the faculty of Law, University of Khartoum gave an elaborated presentation of the capacities in Sudan that related to Minamata Convention management.

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## COMMENTS AND RECOMMENDATIONS

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The interventions of the participants focused on the health impact of mercury not only on the miners but it was observed that the nearby villages were affected. Some of the participants from mining areas noted that tailing was drifted during rainy season to main seasonal water courses.

- It was strongly recommended that Sudan should ratify Minamata convention in order to receive technical and financial support to find alternatives of mercury.
- Some of the participants were very sharp as they recommended that mercury use in ASGM should immediately be prohibited.
- Research centers and academic institution were urged to initiate research programs in support of finding other methods of gold extraction.

# AWARENESS AND UNDERSTANDING OF WORKERS AND THE PUBLIC

## B. RIVER NILE STATE WORKSHOP (RNS)

Venue: Ministry of agriculture

Date: 26 January 2021

Total No of Participants: 50

Male: 35

Female: 15

Ministries and other Gov. Institutions:

- M. of mining in RNS
- M. of Health in RNS
- RNS Council for environment
- Local government

Academic and Research institutions:

- RNS University
- Agricultural Research Corporation in RNS

NGOs:

- Mining union
- Sudanese Environment Conservation Society



# AWARENESS AND UNDERSTANDING OF WORKERS AND THE PUBLIC

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## PROCEEDINGS OF THE WORKSHOP

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River Nile state is considered as the top state in ASGM this is why the awareness racing is held in Atbara the capital of the state. The deputy governor in the opening speech stated that although the ASGM boosted the economy of the state but one cannot overlook adverse impact of mercury on the health of the miners and the people living around the mining areas.

He expressed his appreciation for the HCENR to hold this awareness racing workshop in Atbara. The government of RN will support research program that investigate alternative of mercury. He urged the central government to ratify Minamata convention so as to receive technical and financial support.

Like Khartoum workshop, 4 presentations were delivered and participant reacted during the discussion session.

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## THE FOLLOWING ARE THE MOST IMPORTANT INTERVENTIONS AND RECOMMENDATIONS

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It is of vital importance that awareness raising program must continue as this will reduce the negative health impact.

It was recommended that monitoring of mercury in the environment in all mining are should be regularly measured so as to assess the progress the reduction of mercury releases.

Strong recommendation that Sudan should immediately ratify the Minamata convention. It is recommended that miners who are not using mercury must be given incentive e.g. exempted from taxes.

Academic and research institution in RNS must be encouraged to launch research programmes to find alternatives i.e. other than mercury for gold extraction.

# AWARENESS AND UNDERSTANDING OF WORKERS AND THE PUBLIC

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## RADIO AND TV INTERVIEW

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River Nile state FM radio hosted the national consultants for 30 minutes so as to elaborate more on the adverse effect of mercury on human health and the necessary precautionary measures to be taken in mining areas and nearby villages. People from different part of the state were allowed to ask questions through telephone.

A TV program was organized by the blue Nile channel. A group of experts were invited. The objectives and the importance of the Minamata convention were firstly explained and the benefit that Sudan will gain by being a Party to this convention. The experts discussed the importance of investigating alternatives to replace mercury.

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## DISSEMINATION INFORMATION REPORT

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Brochures were produced and widely disseminated to the participants and stakeholders, including:

- Brief description of the project and the outcomes.
- Brief description of the project activities and the results
- The Minamata Convention on Mercury:

How the convention was developed.

Important articles of the convention.

The benefit of being a Party.

## 1. INTRODUCTION

Based on the outcome of the inventory of mercury releases and other areas of research in Sudan, the following major priority areas were identified;

1. Completing the national procedures of ratification of Minamata convention;
2. Capacity building and/or strengthening of the national legal and institutional frame work to fulfill the requirements of the Minamata Convention;
3. Reduction and, where feasible, elimination of the use, emissions and releases of mercury and mercury compounds in and from Artisanal and Small-scale Gold Mining.
4. Phasing-out the use and import of mercury-added products;
5. Environmentally sound waste management system, particularly for mercury-containing waste;
6. The phasing-down of the use of dental amalgams;
7. Encouraging and provision of technical and financial support for research in areas related to the implementation of the Convention articles including use, emissions and releases, health effects, environmental impacts, non-mercury-containing alternatives and mercury waste management.

## 2. SUMMARY OF PROPOSED BUDGET

Below is an estimated indicative budget proposed, subject to economic assessment before implementation

Table (34) Preliminary budget estimates for the proposed Intervention Plans

Intervention Plan	Proposed budget (US Dollars)	Proposed funding source
Completing the national procedures of ratification of Minamata convention	50,000	Local funding
Capacity building and/or strengthening of the national legal and institutional framework to fulfill the requirements of the Minamata Convention	1,800,000	GEF, Minamata Secretariat (Specific International Programme), other relevant funding agencies/institutions/programmes, private companies
Reduction and, where feasible, elimination of the use, emissions and releases of mercury and mercury compounds in and from Artisanal and Small-scale Gold Mining	2,500,000	GEF, UNEP, UNDP, UNIDO, WHO, other relevant funding agencies/institutions/programmes, private companies

# IMPLEMENTATION PLAN & PRIORITIES FOR ACTION

Intervention Plan	Proposed budget (US Dollars)	Proposed funding source
Completing the national procedures of ratification of Minamata convention	50,000	Local funding
Capacity building and/or strengthening of the national legal and institutional framework to fulfill the requirements of the Minamata Convention	1,800,000	GEF, Minamata Secretariat (Specific International Programme), other relevant funding agencies/institutions/programmes, private companies
Reduction and, where feasible, elimination of the use, emissions and releases of mercury and mercury compounds in and from Artisanal and Small-scale Gold Mining	2,500,000	GEF, UNEP, UNDP, UNIDO, WHO, other relevant funding agencies/institutions/programmes, private companies
Phasing-out the import and use of Mercury-added Products	1,700,000	GEF, WHO, Minamata Secretariat (Specific International Programme), World Bank, UN Habitat, UNOPs, other relevant funding agencies/institutions/programmes, private companies
Environmentally sound management of waste system, particularly mercury-containing waste	2,000,000	GEF, WHO, Minamata Secretariat (Specific International Programme), World Bank, UN Habitat, UNOPs, other relevant funding agencies/institutions/programmes, private companies
Phasing-down of the use of dental amalgam	800,000	GEF, WHO, other relevant funding agencies/institutions/programmes, private companies
<b>Total</b>	<b>8,850,000</b>	

## 3. PRIORITIES AND ACTION PLANS

### 3.1 PRIORITY AREA 1: RATIFICATION AND DOMESTICATION OF THE MINAMANTA CONVENTION ON MERURY

Sudan had undertaken significant steps towards completion of ratification of the convention. The council of ministers approved the ratification on 6 April 2021 awaiting the final endorsement by joint meeting of the Council of Ministers and the Sovereign Council.

# IMPLEMENTATION PLAN & PRIORITIES FOR ACTION

Objective of ratification of the convention is to protect human health and the environment from anthropogenic emissions and releases of mercury and mercury compounds through the legally-binding global instrument of the Minamata Convention. Once the Minamata Convention on Mercury is ratified, the focal points to perform administrative responsibilities relevant to the implementation of the convention will be appointed together with capacity building and allocation of funds for the focal points to perform the administrative responsibilities and an initial system for reporting will best abolished.

## INTERVENTION PLAN 1: RATIFICATION OF MINAMATA CONVENTION ON MERCURY

Relevant SDGs: #1, # 3, #5, #6, #7, # 8, # 9, # 12, # 14, # 15 # 16

Relevant Articles of the Minamata Convention: Articles that have provisions identified as relevant during the national inventory and legal and institutional evaluations are relevant for this implementation plan (Namely Articles 3, 4 (Mercury-added products), 5, 7 (Artisanal and Small-scale Gold Mining), 8 (Emissions), 9 (Releases), 10 (Environmentally sound interim storage of mercury, other than waste mercury), 11 (Mercury Waste), 12 (Contaminated sites), 16 (Health aspects), 17 (Information exchange), 18 (Public information, awareness and education), 19 (Research, development and monitoring));

Key institutions: HCENR, Ministry of energy and Mining, Ministry of Justice, Council of Ministers and Sovereign Council;

Time frame: 2020-2021

Priority: High

Budget: 50,000 USD

Potential risks:

- Delay in protecting human health and the environment from the potential risk from the anthropogenic emissions and releases of mercury and mercury compounds
- Loss of other benefits of the convention



# IMPLEMENTATION PLAN & PRIORITIES FOR ACTION

Table (35) Details of priority area 1: Ratification of Minamata Convention on Mercury

Proposed activities	Description	Relevant stakeholders	Time Frame	Estimated budget (USD)
Follow up the deliberations of the memo at the various governmental levels	HCENR which is the focal point of all international conventions related to the environment is following up the deliberation of the ratification memo at the various governmental levels. During the deliberations national experts will be involved	HCENR, Ministry of Justice, Ministry of energy and mining, other relevant ministries, the technical committee at the cabinet, the governance and administration sector in the cabinet, the council of ministers, the joint meeting of the council of ministers and the Sovereign Council. Appointing personnel at the national focal point to perform administrative responsibilities relevant to the implementation of the convention	2020-2021	1,000
Appointing personnel at the national focal point to perform administrative responsibilities relevant to the implementation of the convention	Qualified personnel appointed to perform the duties of the focal point	HCENR	2021	8,000
Capacity building and allocation of funds for the focal point to perform the administrative responsibilities and reporting.	Capacity building, training, offices, furniture, computer, internet, telephone etc	HCENR	2021	41,000
			Total	50,000

## 3.2 PRIORITY AREA 2: CAPACITY BUILDING AND/OR STRENGTHENING OF THE NATIONAL LEGAL AND INSTITUTIONAL FRAMEWORK TO FULFILL THE REQUIREMENTS OF THE MINAMATA CONVENTION

### ANALYSIS OF THE NATIONAL SITUATION

The review of the legal and institutional framework for mercury management in Sudan revealed that there are scattered national regulatory and institutional measures which address some aspects of the Minamata Convention. However, most of these measures are of general nature and they are entrusted to various competent bodies.

# IMPLEMENTATION PLAN & PRIORITIES FOR ACTION

The summary of the analysis of the legal and institutional framework for mercury management in Sudan was concluded with following recommendations:

- a. On the top of the enactments which are appropriate to serve the objectives of the Minamata Convention is the Regulations for the Organization of Mercury Importation, Use and Circulation which embody considerable provisions related to importation of mercury, provision of information to the public, training and awareness raising included in the Minamata Convention. However, the implementation of such regulations requires effective cooperation and coordination between the Ministry of Mining and other governmental and non-governmental bodies working in the field of environmental and consumer protection.
- b. The principal legislative gap in the existing legal framework is the lack of regulatory and institutional measures on mercury-added products. These products were not covered by the Regulations for the Organization of Mercury Import, Use and Circulation 2012; which was mainly passed to control the cited activities, in cooperation and coordination with the SSMO and the Directorate of Economic Security. Therefore, the HCENR should, in accordance with its mandate under the Environment Protection Act 2001, propose comprehensive regulations to control the import and use of mercury-added products. This should be pursued through an inclusive legislative process which involves all the relevant competent authorities at the National and the States' level, in addition to the relevant NGOS.
- c. A further drawback is the absence of specific guidelines, strategies and regulations to implement the Convention provisions relating to manufacturing processes in which mercury or mercury compounds are used, emissions, releases to land and water, environmentally sound storage of mercury, mercury wastes, and contaminated sites. All these aspects require appropriate and adequate policies, guidelines, and regulatory measures to be equally endorsed through a participatory approach.
- d. It is also crucial to establish the Mercury Unit at the Ministry of Mining, in line with Section 4(a) of the Regulations for the Organization of Mercury Importation, Use and Circulation, to monitor the implementation of these regulations and any related measures in consistency with the Minamata Convention. This Unit could be formed as a Unit within the institutional framework of the Directorate of Environment and Safety at the Ministry of Mining.

# IMPLEMENTATION PLAN & PRIORITIES FOR ACTION

e. There is a need to sensitize policy makers and the law enforcement agencies, including judges, advocates, prosecutors and the security personnel at the Directorate of Economic Security about the important issues related to the Minamata Convention and the role expected from each stakeholder. In this context, the Institute of Judicial and Legal Studies which is affiliated to the Presidency can play a cardinal role with the assistance of other partners, including UN agencies (e.g. UNIDO and UNITAR) in the process of sensitization.

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## INTERVENTION PLAN OBJECTIVES

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The main objective of this intervention plan is to prescribe the appropriate legal and institutional measures to remedy the existing loopholes and drawbacks in the existing legal and institutional frameworks in line with the requisites of the Minamata Convention.

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## PROPOSED ACTIVITIES

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1. Formation of a multi sectoral team of experts to review the existing legal, regulatory and institutional framework;
2. Brainstorming and training sessions on the key obligations of the Minamata convention together with a review of the relevant national legal and regulatory mechanisms and the institutional evaluation;
3. Deliberation among the team of experts of the gaps in the national regulation and the institutional capacity;
4. Proposal of national policy to cater for the identified gaps;
5. Amendments and/or proposal of new legal instruments;
6. Capacity building of the relevant institution to carry out the obligations under the Minamata convention;
7. Setting up a sustainable coordination mechanism between various stakeholders;
8. Setting up a sustainable system of monitoring of mercury and reporting.

# IMPLEMENTATION PLAN & PRIORITIES FOR ACTION

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## INTERVENTION PLAN 2: CAPACITY BUILDING AND/OR STRENGTHENING OF THE NATIONAL LEGAL AND INSTITUTIONAL FRAMEWORK TO FULFILL THE REQUIREMENTS OF MINAMATA CONVENTION

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Relevant SDGs: #1, # 3, #5, #6, #7, # 8, # 9, # 12, # 14, # 15 # 16

Relevant Articles of the Minamata Convention: Articles that have provisions identified as relevant during the national inventory and legal and institutional evaluations are relevant for this implementation plan (Namely Articles 3, 4 (Mercury-added products), 5, 7 (Artisanal and Small-scale Gold Mining), 8 (Emissions), 9 (Releases), 10 (Environmentally sound interim storage of mercury, other than waste mercury), 11 (Mercury Waste), 12 (Contaminated sites), 16 (Health aspects), 17 (Information exchange), 18 (Public information, awareness and education), 19 (Research, development and monitoring));

Key institutions: HCENR, Ministry of energy and mining, Ministry of Justice, council of ministers and Sovereign Council

Time frame: 2020-2023

Priority level: Medium-High

Budget: 1,800,000 USD

Potential risks:

1. Delay in protecting human health and the environment from the potential risk from the anthropogenic emissions and releases of mercury and mercury compounds
2. Inability to comply with national obligation under the convention
3. Economic losses due to contamination of products with mercury



# IMPLEMENTATION PLAN & PRIORITIES FOR ACTION

Table (36) Details of priority area 2 plan, relevant stakeholders time frame and proposed budget

Proposed activities	Description	Relevant stakeholders	Time Frame	Estimated budget (USD)
Formation of a multi sectoral team of experts to review the existing legal, regulatory and institutional framework	The multi sectoral team of experts should include persons with have enough experience on (a) national legal and institutional aspect of the various relevant institution in Sudan and (b) enough experience with various articles of Minamata Convention and other relevant MEAs	HCENR (leader), ministry energy and mining, ministry of Justice, ministry of health, ministry of industry and trade, ministry of higher education and scientific research, ministry of agriculture, SSMO, Custom, Economic security and forestry, relevant NGOs such as SECS, CPS	2020	10,000
Brainstorming and training session about the key obligations of Minamata convention together with a review of the relevant national legal and regulatory mechanisms as well as the institutional evaluation	Conduct a series of seminars and workshops about; (a) key obligations of Minamata convention; (b) Other relevant MEAs to which Sudan is a party or will be a party; (c) Review of the relevant national legal and regulatory mechanisms; and (4) evaluation of institutional capacity of relevant stake holders, including mandates, policies, relevant decisions and personnel capacity and required resources	HCENR (leader), ministry energy and mining, ministry of Justice, ministry of health, ministry of industry and trade, ministry of higher education and scientific research, ministry of agriculture and forestry, relevant NGOs such as SECS, CPS	2020	40,000
Deliberation among the team of experts about the gaps in the national regulation and the institutional capacity	Deliberations among the team about gaps in the legal and institutional framework and how they can be bridged to comply with the requirements of Minamata convention	HCENR (leader), ministry energy and mining, ministry of Justice, ministry of health, ministry of industry and trade, ministry of higher education and scientific research, ministry of agriculture and forestry, relevant NGOs such as SECS, CPS	2020-2021	150,000
Proposal of national policy to cater for the identified gabs	Proposal of an up dated policies to enable the full implementation of the articles and obligations of the convention taking into consideration; (a) obligations of the convention and other relevant MEAs to which Sudan is a party; (b) capacity of national institutions; (c) national developmental plans policies in various sectors and integrating mercury management within the broader context of the sound management of chemicals and wastes; and (d) to consider mainstreaming sound management of chemicals and wastes into national development policies and initiatives in order to address sustainable development targets.	HCENR (leader), ministry energy and mining, ministry of Justice, ministry of health, ministry of industry and trade, ministry of higher education and scientific research, ministry of agriculture and forestry, relevant NGOs such as SECS, CPS	2021	200,000

# IMPLEMENTATION PLAN & PRIORITIES FOR ACTION

Proposed activities	Description	Relevant stakeholders	Time Frame	Estimated budget (USD)
Amendments and/or proposal of new legal instruments	<p>Since the provisions relating to the implementation of environmental laws are scattered in various sectoral laws which fall under the jurisdiction of numerous ministries and governmental bodies therefore it is crucial to mend and/or propose new legal instruments including but not limited to the followings: (a) propose comprehensive regulations to control the import and use of mercury-added products; (b) update relevant laws or bylaws controlling the manufacturing processes in which mercury or mercury compound are used, minimize/ eliminate emissions, releases to land and water, allow environmentally sound storage of mercury, mercury wastes, and remediate the contaminated sites; (c) review and/or update the following legal instruments; Environment Protection Act 2001, Environment Health Act 2009, Penal Code 1991, Pesticide and Pests' Products Control Act 1994, Standards and Metrology Act 2008, Minerals Resources Development Act 2015, Regulations for the Organization of Mercury Importation, Use and Circulation 2012, Regulations for Protection of the Environment in the Petroleum Industry (Amendment) 2005, Civil Transactions Act 1984, National Agricultural Fertilizers Act 2010, Labor Act 1997, Drugs and Poisons Act 2009, Traffic Act 2010, Electricity Act 2001, Forests and Renewable Natural Resources Act 2002, Local Government Act 2003; and (d) The review of the above legal instruments should, among others, cater for the followings;</p> <p>a. reduce and, where feasible, eliminate the use, emissions and releases of mercury and mercury compounds in and from artisanal and small-scale gold mining</p> <p>b. to prohibit import, trade and use of mercury-added products in accordance with articles 4 and 6;</p> <p>c. phase-down of the use of dental amalgam accordance with article 4 (along with annex a, part ii) as well as articles 16 and 18</p> <p>d. to prohibit manufacturing processes in which mercury compounds are used in accordance with article 5 (preventive);</p> <p>e. to control emissions and releases of mercury and mercury compounds in accordance with article 8;</p> <p>f. to ensure that mercury wastes are managed in an environmentally sound manner in accordance with article 11;</p> <p>g. to revise existing legal text store move in consistencies or overlapping mandates and responsibilities amongst regulatory authorities to remove confusion that results in ineffective implementation;</p> <p>h. to domesticate and enact other related MEAs which complement the implementation of the Minamata Convention, including the Basel Convention on the control of transboundary movement of hazardous wastes and their disposal, and the Stockholm Convention on persistent organic pollutants; the Rotterdam convention;</p> <p>i. to set a sustainable Coordination mechanism for managements of chemical trough establishment a supreme council for chemical management;</p> <p>j. to assist states to develop compatible regulations and administrative rules to implement the Minamata Convention at state and local levels</p>	HCENR (leader), ministry energy and mining, ministry of Justice, ministry of health, ministry of industry and trade, ministry of higher education and scientific research, ministry of agriculture and forestry, relevant NGOs such as SECS, CPS	2021-2022	100,000

# IMPLEMENTATION PLAN & PRIORITIES FOR ACTION

Proposed activities	Description	Relevant stakeholders	Time Frame	Estimated budget (USD)
Capacity building of the relevant institution to fulfill the obligation under Minamata convention	Establishment of administrative units at HCENR and ministry of energy and mining followed by training to all relevant stake holders	HCENR (lead), ministry of energy and mining and other relevant ministries and governmental units	2022	1,000,000
	(a) establish a focal point at HCENR to follow implementation of Minamata	HCENR		
	(b) establish a Mercury Unit within the Directorate of Environment and Safety, Ministry of Ministry of Energy and Mining, in line with Section 4(a) of the Regulations for the Organization of Mercury Importation, Use and Circulation, to monitor the implementation of these regulations and any related measures in consistency with the Minamata Convention	Department of Environment and Safety, Ministry of Energy and Mining		
	(c) conduct many training sessions to all stakeholders in various ministries and governmental units of relevance to mercury management;	HCENR (lead) and other relevant stake holders with the assistance of partners and UN agencies (e.g. UNIDO and UNITAR)		
	(d) conduct a focused training for the staff of the focal point at HCENR, Department of Environment and safety, Ministry of energy and mining, occupational health department, environmental health departments at the federal and states, ministries of health, custom and economic security departments about Minamata convention and the updated policies and regulations; and	HCENR, Department of Environment and safety, Ministry of energy and mining, occupational health department, environmental health departments at the federal and states, ministries of health, custom and economic security departments with the assistance of partners and UN agencies (e.g. UNIDO and UNITAR)		
	(e) sensitize policy makers and the law enforcement agencies, including judges, advocates, prosecutors and the security personnel at the Directorate of Economic Security about Minamata convention and the updated policies	Institute of Judicial and Legal Studies, the ministry of Presidency with the assistance of partners and UN agencies (e.g. UNIDO and UNITAR)		

# IMPLEMENTATION PLAN & PRIORITIES FOR ACTION

Proposed activities	Description	Relevant stakeholders	Time Frame	Estimated budget (USD)
Setting a sustainable coordination mechanism between various stake holders	A multi stakeholder coordination mechanism will established from all relevant departments through the proposed supreme council for chemical management will be established to coordinate and integrate all the activities related to the implementation of the Minamata convention and other relevant MEAs	HCENR (lead) and relevant stakeholders	2022	150,000
Setting up a sustainable system of monitoring of mercury and reporting	Sustainable and comprehensive systems for monitoring based on the updated national policies and regulations are in place to implement the provisions of the convention and regularly report to national stakeholders, government, and the secretariat of the convention.	HCENR	2022	150,000
			Total	1,800,000

## 3.3 PRIORITY AREA 3: REDUCTION AND, WHERE FEASIBLE, ELIMINATION OF THE USE, EMISSIONS AND RELEASES OF MERCURY AND MERCURY COMPOUNDS IN AND FROM ARTISINAL AND SMALL-SCALE GOLD MINING

### ANALYSIS OF THE NATIONAL SITUATION

Sudan annually produces about 71,000 Kg of gold through artisanal gold mining using the mercury amalgamation method, of which 70 % is without the use of retort and 30 % with the use of retort. The tailings of artisanal gold mines which contain residual amounts of mercury (Karta) are used by certified companies for further extraction of gold using the cyanide method. There are 70 of these companies distributed in 12 states mostly located in the northern part of Sudan. Artisanal gold mining sector currently covers 14 of the Sudan states (with the exception of Gezira, Sinnar, White Nile and East Darfur states). Over two million peoples work in 33 different jobs in this sector. There are about 44,296 mining wells spread over 244 sites in 55 localities in 14 states with about 5,668 mills, 5398 washing bonds and 77 markets. About 40% of the mining sites were located in the northern and eastern region of Sudan. The populations in these sites are considered to have the highest exposure risks, directly to mercury whether as vapour and elemental or organic mercury. The legal and institutional framework controlling this sector needs to be revised and amended to enable sustainable use of natural resources, environmental protection, safety to humans and the ecosystem, to comply with the requirements of the Minamata convention.

# IMPLEMENTATION PLAN & PRIORITIES FOR ACTION

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## OBJECTIVES

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The main objective of this national action plan as per the requirement of the Convention is to reduce use of mercury amalgamation and where feasible, eliminate the use, emissions and releases of mercury and mercury compounds in and from Artisanal and Small-scale Gold Mining.

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## EXPECTED OUTPUTS

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

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## ACTIVITIES

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1. Develop strategy based on the updated legal framework and policies for the reduction and/or elimination of the use of mercury and mercury compounds in the ASGM according to Plan 2;
2. Put in place mechanism for implementation of the updated laws and policies and promote coordination amongst relevant regulatory agencies at national, state and local levels to implement the action plan;
3. Develop baseline estimates of quantities of mercury used, recovered and the techniques employed as well as determination of mercury level in the ASGM sites;
4. Promote (e.g. giving incentives) the use and research for low cost, simple mercury capture techniques that allow miners to meet emission standards by re-using mercury and preventing releases and promote the use of best available techniques and best environmental protection practice in accordance with Article 7.4(f) of the Minamata Convention;
5. Promote increased awareness of the negative health and environmental impacts of the use of mercury amalgamation;
6. Gradual prohibition of washing of the ore with mercury and open burning or amalgam within residential areas;
7. Promote the use of mercury alternatives in gold processing and support relevant research programs;

# IMPLEMENTATION PLAN & PRIORITIES FOR ACTION

8. Strengthen national monitoring and enforcement programmes to ensure efficient emission controls;
9. Develop national safety guidelines to protect at-risk groups from the cumulative long-term health impacts of mercury exposure.

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## INTERVENTION PLAN 3: REDUCTION AND, WHERE FEASIBLE, ELIMINATE THE USE, EMISSIONS AND RELEASES OF MERCURY AND MERCURY COMPOUNDS IN AND FROM ARTISANAL AND SMALL-SCALE GOLD MINING

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Relevant SDGs: #3, #9, #12, #14, #15 #16

Relevant Articles of the Minamata Convention: Articles that have provisions identified as relevant during the national inventory and legal and institutional evaluations are relevant for this implementation plan (Namely Articles 3, 4 (Mercury-added products), 5, 7 (Artisanal and Small-scale Gold Mining), 8 (Emissions), 9 (Releases), 10 (Environmentally sound interim storage of mercury, other than waste mercury), 11 (Mercury Waste), 12 (Contaminated sites), 16 (Health aspects), 17 (Information exchange), 18 (Public information, awareness and education), 19 (Research, development and monitoring));

Key institutions: Ministry of Energy and Mining, HCENR, Ministry of Health, Economic Security and the ASGM Miners Association

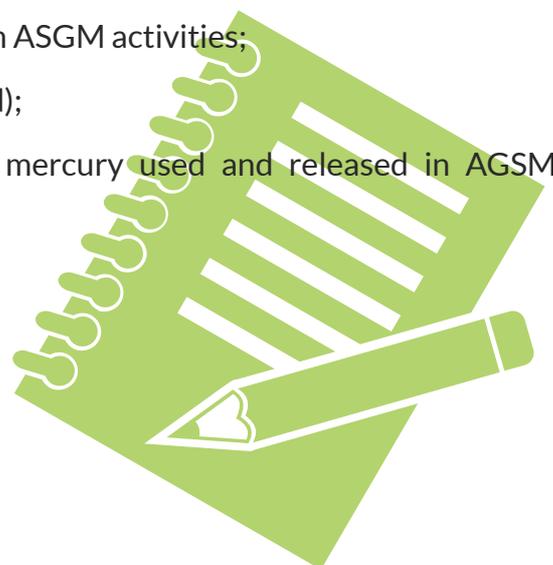
Time frame: 2021-2025

Priority: Medium-High

Budget: 2,500,000 USD

Potential risks:

1. Risk to human health from mercury used and released from ASGM activities;
2. Contamination of the environment (air, water, soil and food);
3. Risk to humans, animal and beneficial organisms from mercury used and released in ASGM activities.



# IMPLEMENTATION PLAN & PRIORITIES FOR ACTION

Table (37) Details of priority area 3 plan, relevant stakeholders time frame and proposed budget

Proposed activities	Description	Relevant stakeholders	Time Frame	Estimated budget (USD)
Develop strategy based on the updated legal framework and policies for the reduction and/or elimination of the use of mercury and mercury compounds in the ASGM (Plan 2);	Establish a group of experts from relevant stake holders to develop the strategy	Ministry of energy and mining (lead), HCENR, Ministry of health, states, universities and research center	2021	0
Put in place mechanism for implementation of the updated laws and policies and promote coordination amongst relevant regulatory agencies at national, state and local levels to implement the action plan;	Establish a multi-stake holder coordination committee from relevant stakeholders for coordination and enforcement of laws	Ministry of energy and mining (lead), HCENR, police department, economic security, states and ASGM Miners Association	2021	100,000
Develop baseline estimates of quantities of mercury used and the techniques employed as well as mercury level in the ASGM sites	Establish a team of team of expert to conduct the base line survey	Ministry of energy and mining (lead), HCENR, Universities and research centers	2021	400,000
Promote (e.g. giving incentives) the use and research for low cost simple tech mercury capture techniques that allow miners to meet emission standards by re-using mercury and preventing releases and promote the use of best available techniques and best environmental protection in accordance with Article 7.4(f) of the Minamata Convention;	Take decisions of giving incentive to those who use such safe technology and avail resources and funding for research of developing these technologies. A set of workshops and seminars to promote the use of safe technologies	Ministry of energy and mining (lead), HCENR, Universities and research centers and ASGM Miners Association	2021	200,000
Promote increased awareness of the negative health impacts of the use of mercury amalgamation	A series of workshops to raise the awareness of the workers in ASGM sector about health hazards of mercury will be conducted	Ministry of energy and mining (lead), HCENR, Ministry of health, Universities, states and ASGM Miners Association	2022	400,000
Gradual prohibition of washing of the ore with mercury and open burning of amalgam within residential areas specially in western states and Blue Nile State together with awareness raising campaigns about health hazards of mercury	workshops to raise the awareness of the workers in ASGM sector about health hazards of mercury will be conducted in these states followed by gradual prevention of washing of the ore with mercury and open burning of amalgam within residential areas	Ministry of energy and mining (lead), HCENR, Ministry of health, Universities, western states and Blue Nile State	2022	100,000

# IMPLEMENTATION PLAN & PRIORITIES FOR ACTION

Proposed activities	Description	Relevant stakeholders	Time Frame	Estimated budget (USD)
Promote the use of non-mercury alternative in gold processing and support relevant research programs;	workshops to promote the use of non-mercury alternatives in ASGM sector and support relevant research programs	Ministry of energy and mining (lead), HCENR, States, Universities and ASGM Miners Association	2022	500,000
Strengthen national monitoring and enforcement programmes to ensure that emission controls are in place and enforced;	Capacity building for HCENR focal point and the mercury unit, Ministry of energy and mining and the coordination committee to oversee monitoring of mercury use, import and level in the environment	Ministry of energy and mining (lead), HCENR, Economic security, Police department and coordination committee	2022	500,000
Develop national safety guidelines to protect the populace from the cumulative long-term health impacts of mercury exposure	Establish a team of expert to develop the safety guidelines	Ministry of energy and mining (lead), HCENR, Ministry of health, Universities, states	2022	300,000
			Total	2,500,000

## 3.4 PRIORITY AREA 4: PHASING-OUT THE USE AND IMPORT OF MERCURY-ADDED PRODUCTS

### ANALYSIS OF THE NATIONAL SITUATION

Products containing mercury or mercury compounds represent one of the most important sources of mercury in Sudan with total mercury input of 9,190.5 Kg mercury per year representing 3% of the total mercury input. Skin lightening creams and soaps represent a significant fraction of these products and pose serious risk to women who directly apply these products on their skin. Although there are many national factories of soap production that do not use mercury according to SSMO specifications of skin lightening creams and soaps, but there is uncertainty about one new factory for skin lightening creams which has not started commercial production yet. Although there are national specifications issued by SSMO that prevent import of mercury-containing creams and soap, these products enter Sudan through smuggling.

# IMPLEMENTATION PLAN & PRIORITIES FOR ACTION

Further, the analysis of the legal framework revealed the absence of a regulation prohibiting the import of mercury-added products and such products are not included in the list of poisonous substances issued according to the Drugs and Poisons Act 2009. As indicated before, about 5,438,699 women are expected to be at risk from using such products. A significant fraction of this population may be in the childbearing and breast-feeding age (Central Bureau of Statistics, 2020), with the subsequent impact on their children.

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## OBJECTIVES

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The main objective of this plan is to phase-out the use and import of mercury-added products.

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## EXPECTED OUTPUTS

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1. Import and use of mercury containing product will be eliminated;
2. The use of safe alternatives will be encouraged;
3. Population specially women will be protected from exposure to mercury containing products;
4. Mercury emissions and releases to the environment eliminated or minimized

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## ACTIVITIES

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1. Develop strategy based on the updated legal framework and policies which prohibit import and use of mercury-containing products (plan 2);
2. Conduct a national inventory of the types and quantities of mercury-containing products present in the country;
3. Conduct awareness raising workshops and seminars about the health hazards associated with use of mercury-added products;
4. Identify safe alternatives to each type of mercury-added product and promote their use in the government and different relative sectors;
5. Promote coordination amongst relevant regulatory agencies to implement the action plan;
6. Put in place mechanisms for monitoring and implementation of the updated laws and policies which ban the import and use of mercury added products

# IMPLEMENTATION PLAN & PRIORITIES FOR ACTION

## INTERVENTION PLAN 4: PHASING-OUT THE USE AND IMPORT OF MERCURY-ADDED PRODUCTS

Relevant SDGs: #3, #9, #12, #14, #15 #16

Relevant Articles of the Minamata Convention: Articles identified during national inventory and legal and institutional evaluations as relevant for this implementation plan (Namely Articles 3, 4 (Mercury-added products), 8 (Emissions), 9 (Releases), 10 (Environmentally sound interim storage of mercury, other than waste mercury), 11 (Mercury Waste), 12 (Contaminated sites), 16 (Health aspects), 17 (Information exchange), 18 (Public information, awareness and education), 19 (Research, development and monitoring);

Key institutions: Ministry of Energy and Mining, HCENR, Customs Administration; Ministry of Health, Economic Security; relevant departments identified during the national inventory and legal and institutional evaluations.

Time frame: 2021-2024

Priority: Medium-High

Budget: 1,700,000 USD

Potential risks:

1. Risk to human health specially women from the use mercury added products;
2. Contamination of the environment (air, water, soil and food)



# IMPLEMENTATION PLAN & PRIORITIES FOR ACTION

Table (38) Details of priority area 4 plan, relevant stakeholders time frame and proposed budget

Proposed activities	Description	Relevant stakeholders	Time Frame	Estimated budget (USD)
Develop strategy based on the updated legal framework and policies which prohibit import and use of mercury containing products (Plan 2);	Establish a group of experts from relevant stake holders to develop the strategy	Ministry of energy and mining (lead), HCENR, Ministry of health, states, custom department, economic security, universities and research center	2021	0
Conduct a national inventory of the types and quantities of mercury containing products present in the country;	Establish a team of team of expert to conduct the base line survey	Ministry of energy and mining (lead), HCENR, Ministry of health Universities and research centers	2021	400,000
Conduct awareness raising workshops and seminars about the health hazards associated with use of mercury added products;	A series of workshops to raise the awareness of the population specially women about health hazards of the use of mercury added products will be conducted	Ministry of energy and mining (lead), HCENR, Ministry of health, Universities, states	2022	500,000
Identify safe alternative to each type of mercury added products and promote their use in the different sector;	workshops to promote the use of alternatives of mercury added products in government and public sectors and support relevant research programs	Ministry of energy and mining (lead), HCENR, Ministry of health, States, Universities	2022	500,000
Promote coordination amongst relevant regulatory agencies to implement the action plan	Establish a multi-stake holder coordination committee from relevant stake holders	Ministry of energy and mining (lead), HCENR, customs department, economic security, states	2021	100,000
Put in place mechanism for monitoring and implementation of the updated laws and policies which ban the import and use of mercury added products;	Capacity building for HCENR focal point and the mercury unit, Ministry of energy and mining and the coordination committee to oversee monitoring import and use mercury added products	Ministry of energy and mining (lead), HCENR, Economic security. custom department and coordination committee	2022	200,000
			Total	1,700,000

## 3.5 PRIORITY AREA 5: ENVIRONMENTALLY SOUND MANAGEMENT SYSTEM FOR WASTE, PARTICULARLY MERCURY-CONTAINING WASTE

### ANALYSIS OF THE NATIONAL SITUATION

The lack of an integrated waste management system, inadequate industrial and hazardous waste regulations that limit waste production, inadequate infrastructure to manage the waste, and the lack of documented data on waste quantities, types and characteristics poses a challenge to the sound waste management in Sudan. The high cost of waste collection, transportation and final disposal is another challenge for decision- and policy-makers, forcing them to overlook the long-term economic costs of waste management, including impacts on public health, the environmental and economic costs. Municipal solid waste is a persistent problem in the country's urban centers mainly due to low levels of environmental awareness, poor practices at the household and individual levels when dealing with municipal solid waste, and institutional weaknesses in the enforcement of legislation related to solid waste. Various pieces of legislation are in place for waste management in the country, including the 2001 Environmental Protection Act as the umbrella law. The Public Health Act as amended in 2008 promotes the general health of individuals while protecting them from encountering diseases from an unclean environment. The Environmental Health Act 1976 (amended in 2009) seeks to ensure that the environment is kept in a state that supports human, plant and animal life through the provision of basic necessities such as clean water, clean air and proper waste management. The Federal laws are supported by state level laws such as the 2008 Khartoum State Environmental Protection Law. SSMO developed various standards to ensure safe environment clean of waste and pollutants. For example, SSMO sets minimum thresholds and standards for pollutants emitted by industry, as well as provide guidelines for the management of solid, hazardous, medical, electronic and radioactive wastes.

The medical or health care waste is growing rapidly due to the increase in population and the spread and expansion of health care services in all States of the Sudan. Treatment processes for medical wastes includes autoclaving, microwaving, chemical disinfection, irradiation, plasma system, and incineration. Major sources of health-care waste in Sudan are mainly hospitals and clinics, laboratories and research facilities.

# IMPLEMENTATION PLAN & PRIORITIES FOR ACTION

Waste management in Sudan is practised by the government, municipalities and individuals, and the private sector. Various public campaigns and educational programs were rolled out with the aim to reduce waste generation, and consequently the amount of waste that reaches landfills by 25% by 2030 and increase the level of recycling to 40% by 2030. The available waste infrastructure for treatment and disposal is very limited in Sudan and the current waste management systems can hardly cope with the rate of waste generation. Solid waste management is a real challenge in Sudan, considering the increased rate of urbanization, population growth and globalization of trade with increased cheap imports of consumer goods and increase in waste volume. The average solid waste generation rate was estimated at 0.5 kg per capita per day. Solid waste management in most areas of Sudan is not yet considered as a priority service and suffers from irregular solid waste management services in terms of inefficient collection, transportation and final disposal. There is no system for proper waste water treatment and disposal, except in limited districts of the capital Khartoum. Further there are no adopted procedures for quantity reduction, sorting, efficient collection, transport, recycling and standard final disposal sites. Investment in waste recycling is an opportunity that requires supporting legislation and regulatory mechanisms, such as the provision of concessional loans to encourage the private sector to expand into an advanced industry to recover the resources and protect them from unfair competition.

Apart from reuse and re-extraction of gold from the tailings of artisanal gold mining and efforts made by the Ministry of Mining by distribution of retorts there is no management system of mercury waste in the Sudan.

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## OBJECTIVES

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To provide an environmentally sound management system of waste, particularly for mercury-containing waste.

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## EXPECTED OUTPUTS

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1. Protection of human health and the environment from exposure to hazardous waste;
2. Development of sound management of wastestreams;
3. Reduction of exposure to mercury in the wastestreams.

# IMPLEMENTATION PLAN & PRIORITIES FOR ACTION

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## ACTIVITIES

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1. The establishment of a committee of experts specialized in waste management to develop plans for the establishment of integrated waste management system and to develop plan to separate mercury containing waste from the general waste stream (Plan 2);
2. Conduct inventory of types of waste, disposal sites and existing capacities and infrastructure;
3. Establishment of integrated waste management system
4. Conduct training sessions on the implementation of the developed plan for separation of mercury containing waste from the general waste stream;
5. Develop environmentally sound interim storage for mercury waste prior to disposal according to the provisions of the Minamata Convention

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## INTERVENTION PLAN 5: ENVIRONMENTALLY SOUND WASTE MANAGEMENT SYSTEM, PARTICULARLY MERCURY-CONTAINING WASTE

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Relevant SDGs: #3, #9, #12, #14, #15 #16

Relevant Articles of the Minamata Convention:

Articles identified during national inventory, legal and institutional evaluations as relevant for this implementation plan, (Art.8 Emissions), (Art. 9 Releases), (Art.10 Environmentally sound interim storage of mercury, other than waste mercury), (Art.11 Mercury Waste), (Art.12 Contaminated sites), (Art.16 Health aspects), (Art.17 Information exchange), (Art.18 Public information, awareness and education) and (19 Research, development and monitoring);

Key institutions: HCENR, Ministry of Health, Sates, Ministry of Energy and Mining, other relevant ministries

Time frame: 2021-2023

Priority: Medium-High

Budget: 1,000,000 USD

Potential risks:

1. Risk to human health, especially environmental health workers and residents around the waste dump sites;
2. Contamination of the environment (air, water, soil and food);



# IMPLEMENTATION PLAN & PRIORITIES FOR ACTION

Table (39) Details of priority area 5 plan, relevant stakeholders time frame and proposed budget

Proposed activities	Description	Relevant stakeholders	Time Frame	Estimated budget (USD)
The establishment of a committee of experts with the necessary skills in waste management to plan for sound waste management system development	Establish a group of experts from relevant stake holders to develop the strategy	HCENR, Federal and States Ministries of Health, universities and research center	2021	0
Conduct inventory of types of waste, disposal sites and existing infrastructure	Establish a team of team of expert to conduct the inventory	Ministry of health (lead), HCENR, States, Ministry of energy and mining, other relevant ministries, universities and research centers	2021	400,000
Development of integrated waste management system	Establishment of the system, capacity building and provision of if restructure	HCENR, Ministry of health, states, universities and research centers, relevant funding agencies/in-situations/programmes (GEF, UNDP, UNEP, UNIDO World Bank, and other private companies	2021-2025	1,000,000
The establishment of a committee of experts with the necessary skills in waste management to develop plan to separate mercury containing waste from the waste stream (Plan 2),	Establish a group of experts from relevant stake holders to develop the strategy	Ministry of energy and mining (lead), HCENR, Ministry of health, states, universities and research centers	2021	0
Conduct training sessions on the implementation of developed plan for separation of mercury containing waste from the waste stream	A series of training workshops about the developed plan for separation of mercury-containing waste from the waste stream will be conducted	Ministry of health (lead), HCENR, States, Ministry of energy and mining, other relevant ministries, universities and research centers	2022	400,000
Develop environmentally sound interim storage for mercury waste prior to disposal according to the provisions of the Basel Convention.	Establish a group of experts from relevant stake holders to develop the strategy	Ministry of health (lead), HCENR, States, Ministry of energy and mining, other relevant ministries, Universities and research centers	2022	200,000
			<b>Total</b>	<b>2,000,000</b>



## 3.6 PRIORITY AREA 6: THE PHASING-DOWN OF THE USE OF DENTAL AMALGAMS

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### ANALYSIS OF THE NATIONAL SITUATION

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The national inventory conducted in the current MIA indicates that 590.2 kg of mercury input per year is from dental amalgam. This is not a significant quantity however the exposure to it is direct and high by certain group of the Sudanese population. Mercury is widely used in dental amalgam and therefore dentists may become exposed during preparation of dental amalgam and disposal of amalgam waste (remaining from preparation or removed of Hg contaminated teeth from patients). Such amalgam waste is mostly discarded into solid waste or may enter waste water systems, potentially contaminating waste disposal stream and water treatment facilities and thus posing risks to workers there as well. Therefore, all workers in this sector and treated persons can be considered at risk. According to the Health Statistics reports of 2017 the Total number of dental staff in Sudan was 9565 working in 494 dental clinics. At present the use of mercury in dental amalgam is not prohibited under the Drug and Poisons Act therefore measures should be taken to phase down the use of dental amalgam.

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### OBJECTIVES

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To phase-down the use of dental amalgams

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### EXPECTED OUTPUTS

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1. Protection of dental staff and their patients from the risks of exposure to the hazards of mercury used in dental amalgam;
2. Prevent contamination of waste stream from mercury used in dental amalgam;

# IMPLEMENTATION PLAN & PRIORITIES FOR ACTION

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## ACTIVITIES

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1. Establish a committee of experts to develop strategy based on the updated regulations to phase down the use of mercury in dental amalgam (Plan 2);
2. Identify affordable alternative mercury-free dental amalgam and promote their use through establishment of dental health insurance system favouring the use of mercury-free products and other incentives;
3. Organize training workshops for dental professionals to introduce mercury-free alternatives and best management practices;
4. Promoting the use of Best Available Techniques (BAT) and Best Environmental Practices (BEP) preventing the leaching of mercury to the waste stream;
5. Reduce and gradually eliminate the use of mercury-containing amalgams and setting up of sustainable monitoring system.
6. Conduct workshops and public campaigns about the health hazards of using mercury containing dental amalgam;

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## INTERVENTION PLAN 6: PHASE-DOWN THE USE OF DENTAL AMALGAMS

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Relevant SDGs: #3, #9, #12, #14, #15 #16

Relevant Articles of the Minamata Convention:

Articles identified during national inventory and legal and institutional evaluations relevant for the implementation of this plan: Art. 4 and Annex A Part IIP has Down the use of Dental Amalgam, Art.10 Environmentally sound interim storage of mercury, other than waste mercury, Art.11 Mercury Waste, Art.16 Health aspects, Art.17 Information exchange, Art.18 Public information, awareness and education and Art 19 Research, development and monitoring;

Key institutions: Ministry of Health, HCENR, states. Universities and Research Centers

Time frame: 2021-2025

Priority: Low-Medium

Budget: 400,000 USD

Potential risks:

1. Risk to human health, especially dental staff and patients;
2. Contamination of the waste stream by mercury released from dental amalgam;



# IMPLEMENTATION PLAN & PRIORITIES FOR ACTION

Table (40) Details of priority area 6 plan, relevant stakeholders time frame and proposed budget

Proposed activities	Description	Relevant stakeholders	Time Frame	Estimated budget (USD)
Establish a committee of experts to develop strategy based on the updated regulations to phase down the use of mercury in dental amalgam (Plan 2);	Establish a group of experts from relevant stake holders to develop the strategy	Ministry of health (lead), HCENR, States, universities and research center	2022	0
Identify affordable alternative mercury-free dental amalgam and promote their use through establishment of dental health insurance system favouring the use of mercury-free products and other incentives	Identify affordable alternative mercury-free dental amalgam through research and giving incentives to use of mercury free dental amalgam	Ministry of health (lead), HCENR, States, Universities and research centers	2022	400,000
Organize training workshops for dental professionals to introduce mercury-free alternatives and best management practices	Training workshops for dental professionals to introduce mercury-free alternatives and best management practices will be conduct	Ministry of health (lead), HCENR, States, Universities and research centers	2022	100,000
Promoting the use of Best Available Techniques (BAT) and Best Environmental Practices (BEP) preventing the leaching of mercury to the waste stream	Workshops to promote the use of BAT and BEP to prevent the leaching of mercury to the waste stream	Ministry of health (lead), HCENR, States	2022	100,000
Reduce and gradually eliminate the use of mercury-containing amalgams and setting up of sustainable monitoring system.	Applying the above strategy and set of activities will help to reduce and gradually eliminate the use of mercury-containing amalgams and sustainable monitoring program will be in place	Ministry of health (lead), HCENR, States	2022	100,000
Conduct workshops and public campaigns about the health hazards of using mercury containing dental amalgam	Raise awareness about health hazards of using mercury containing dental amalgam	Ministry of Health (lead), HCENR, States, universities and research center	2022	100,000
			<b>Total</b>	<b>800,000</b>

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5	Hanadi Atta Elfadiel	Ministry of Industry
6	Ihlam Hassan Ahmed	National Pesticide Council
7	Maysara Mohamed Salih	United Nation Industrial Development Organization
8	Mohamed Bashir Hassan	Drug and Poisons Board
9	Mubarak Abbas	National Mining Association
10	Nadia Abdel Gadir Mohamed	General Customs Administration
11	Noureldin Gubasha Abdalla Adam	Dental Physicians Union
12	Sara Mohamed Rahma Hussien	Economic Security
13	Salma Masaad Elsiddig Elrayah	Sudanese Standards and Metrology Organization
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18	Wafaa Badawi Abdalla Ahmed	Sudanese Women General Union
19	Zeinab Mohamed Ali Sala	Central Bureau of Statistics

# ANNEXES

## 1

### Annex

#### Relevant Stakeholders

##### b. Contributors

Name	Function	Affiliation
Eng. Sitnour Hassan Mohamed hassan	National Project Coordinator	HCENR
Dr Ali Mohamed Ali Mahmoud	Project Technical Advisor	HCENR
Prof. Asim Ibrahim Al-Moghrabi for	Review of existing mercury related policies and institutions and identify the gaps	
Dr. Eltaiyb Ali Murkaz	Review of existing mercury related regulations and identification gaps and the needed regulations	Faculty of Law / University of Khartoum
Professor Azhari Omar Abdel-Baqi (team leader)	mercury inventory, population at risk and priority areas	University of Khartoum/ Faculty of Agriculture
Geologist/ Samer Abdullah Badr (Mining and Energy Sector)	mercury inventory and population at risk	Ministry of Mineral Resources/ SMRC
Hanadi Atta Al-Fadil Muhammad - Industrial Sector	mercury inventory	Ministry of Industry and Trade
Ahlam Mukhtar Abdel Galil (Health Sector)	mercury inventory and population at risk	National Public Health Laboratories /Occupational Health Department
Dr Ahmed Mhamed Ail Hamad Researcher	population at risk	University of Khartoum/ Faculty of Agriculture

# ANNEXES

2

## Annex

Sudan Inventory  
Toolkit Level 1 Calculation  
Excel Spreadsheet

For more information on the calculation spreadsheet, please contact HCENR at <https://hcenr.gov.sd>

