



The State of Mercury in the Republic of Chad



The Minamata Convention on Mercury is the first global agreement specifically designed to address contamination from a heavy metal. Opened for signature on October 10, 2013 and entered into force on August 16, 2017, the Convention seeks to address issues related to the use and release of mercury in trade and in industrial processes.

The treaty also addresses major sources of atmospheric emissions and releases of mercury into the environment, as well as long-term storage and disposal of mercury and mercury compounds.

Under the Minamata Convention, individual countries are charged with protecting human health and the environment from the risks of mercury exposure, which involves systematically controlling mercury emissions and releases, including phasing out the use of mercury in certain products and processes.

In order to assist with preparations for the ratification and implementation of the Convention, the government of Chad conducted a Minamata Initial Assessment (MIA). The primary activities of the MIA included:

- A review of institutional and capacity needs for implementation of the Convention;
- An assessment of national regulations, policies, and legislation to assist with preparations for compliance with the obligations of the Convention; and
- An identification of the primary sources of mercury emissions and releases as part of a detailed National Mercury Profile.

The MIA was conducted with financial assistance from the Global Environment Facility and was implemented by UNIDO. This brochure summarizes the primary mercury sources and risks identified through the MIA project in Chad.



Findings from the Minamata Initial Assessment

What Are the Sources of Mercury?

The origin of mercury (Hg) can be natural (e.g., volcanoes) or anthropogenic (human-caused releases). The major sources of mercury in Chad based on the mercury inventory conducted for the MIA, include the following:

- Fossil Fuel and Biomass Combustion 1,436 kg Hg/yr (26%)
- Gold extraction with mercury amalgamation 2,000 kg Hg/yr (36%)
- Use and disposal of mercury-added products 746 kg Hg/yr (13%)
- Mercury waste into landfills and wastewater 673 kg Hg/yr (12%)
- Mercury release from dental amalgam 34 kg Hg/yr (<1%)
- Waste incineration 169 kg Hg/yr (3%)
- Crematoria and cemeteries 493 kg Hg/yr (9%)



As a result of the MIA process, the approximate magnitude and source distribution of these anthropogenic releases into the air, water, and land are now quantified for Chad. Based on the MIA findings, the total calculated mercury input to society in Chad is 5,600 kg/year.

How Are People Exposed to Mercury?

Elemental mercury, which is found in some manufactured products, is not necessarily toxic to humans. Exceptions may include dental amalgam and cosmetics, but these products are still under scientific investigation, so their potential harm is not yet fully characterized.

Methylmercury, the organic form of mercury, biomagnifies in food webs and bioaccumulates over time in organisms that may be frequently consumed. Once ingested, this neurotoxin can cause physiological harm and behavioral disorders in humans. Mercury exposure is particularly concerning for children and women of childbearing age as it can damage the nervous system, kidneys, and cardiovascular system. Developing organ systems, such as the fetal nervous system, are the most sensitive to the toxic effects of mercury, although nearly all organs are vulnerable.

Fish from the sea or freshwater systems can be a major source of methylmercury exposure to humans. In general, fish species that are small, short-lived, and forage low in the food web contain less

methylmercury, while predatory species that are long-lived and grow larger can contain higher levels of methylmercury.

Published mercury concentrations (measured in methylmercury) from tissues in fish in Chad and the region indicate some exceedance of various thresholds used by American and International entities (e.g., 0.22 parts per million (ppm), wet weight (ww) by the Great Lakes Consortium for the U.S. and Canada; 0.30 ppm, ww by the U.S. Environmental Protection Agency; 0.50 ppm, ww by the European Commission and World Health Organization which includes an exemption for large predatory fish species of 1.0 ppm, ww). See the list of healthier and riskier seafood choices below:

Seafood with lower mercury levels (<0.22 ppm, ww; healthier choices):

- Nile perch

Seafood with higher mercury levels (>0.22 ppm, ww; riskier choices):

- Many tuna species



Nile Perch

How Does Mercury Affect Ecological Health?

Studies have shown that high mercury concentrations in fish (measured as methylmercury) can have negative impacts on fish growth, behavior, and reproduction. Consequently, fish-eating wildlife are shown to have decreased reproductive success when methylmercury concentrations in fish are high. As a neurotoxin, methylmercury can also have negative effects on behavior such as foraging or nest protection.

The process of methylation, the conversion of elemental mercury to organic methylmercury, varies widely on the landscape and within the waterscape. Areas that are particularly sensitive to mercury deposition—where methylation rates are highest and biomagnification in the food web is greatest, and where animals experience significant reproductive harm—are called biological mercury hotspots. These areas generally represent aquatic ecosystems or have an aquatic connection within the food web and often include invertivorous birds and mammals.

Aquatic freshwater ecosystems, such as lakes and rivers, are often prime areas for high methylation rates. Fish and wildlife predators that forage in these habitats and

associated floodplain and emergent wetlands often contain elevated mercury levels. The combination of high methylation rates and longer-lived animals higher in the food web creates the greatest risk of adverse effects.

Ramsar Wetlands of International Importance include six sites in Chad and cover 124,050.68 square kilometres (47,896.24 sq mi). The sites include Lac Fitri, Partie tchadienne du lac Tchad, Plaine de Massenya, Plaines d'inondation des Bahr Aouk et Salamat, and Réserve de faune de Binder-Léré.

Habitats at Greatest Risk:

- Lakes, rivers and associated wetlands

Wildlife at Greatest Risk:

- White Pelican; Yellow-billed, Marabou and Saddle-billed Stork; Black-crowned Crane; Great White and Cattle Egret; Grey, Purple and Black-headed Heron; Glossy and Sacred Ibis; Collared Pratincole and African Fish Eagles



White Pelican



Lakes



Rivers



Wetlands

What Is the Status of Mercury in Chad?

The Minamata Convention addresses the management of mercury and the risks this toxin poses to human health and the environment. Provisions in the Convention assist countries in developing strategies to reduce mercury contamination.

Findings from the Minamata Initial Assessment in Chad indicate that the input of mercury into local ecosystems may be elevated in some areas, but with effort by the government, key stakeholders, and the general public, those inputs can be further identified and reduced.

Lifecycle management of mercury-added products also presents a challenge for Chad. The adoption of national legislation that limits and restricts the importation of such products will be an important first step towards the successful implementation of

the Minamata Convention, which will help to reduce overall mercury releases in the country. With greater collaboration and cooperation across the region, the potential risks associated with mercury in the environment can be reduced.

STEPS CONSUMERS CAN TAKE TO PROTECT AGAINST MERCURY CONTAMINATION

- Choose healthier dietary fish options (those with lower mercury levels).
- Purchase no- or low-mercury product replacements when possible (See Useful Links on back page for more information).
- Support legislation that helps reduce the impacts of mercury on the environment.

Recommendations from the Chad Mercury Team

- Ratify the Minamata Convention on Mercury.
- Create legislation that can help facilitate a framework to comply with the Minamata Convention.
- Promote mercury-free alternative consumer products and medical equipment (which are already widespread on the market):
 - Replace compact and linear fluorescent lights with Light Emitting Diodes (LED) bulbs;
 - Choose brands of batteries that do not contain mercury;
 - Replace outdated medical/measuring devices containing mercury with digital alternatives; and
 - Generate greater awareness and education through existing outreach programs; oversee the development distribution of information on mercury to the public, including importers of manufactured products.
- Develop proper separation methods for the disposal of mercury-added products both at the household consumer level and in the landfill management procedures.
- Improve public access to environmentally sound facilities/ locations that could aid in the disposal process, as well as provide information and guidelines on safe disposal of mercury-added products.
- Implement safety measures for capture and release of mercury emissions during the process of artisanal small-scale gold mining.
- Participate in global mercury database and monitoring programs involving global and regional sampling efforts organized by UN agencies, including:
 - Hair samples for people;
 - Muscle samples for fish;
 - Blood, feather, and egg samples for birds;
 - Sampling of cosmetic skin lightening creams; and
 - Air sampling with passive devices.

BRI's Mercury Work in Chad

Biodiversity Research Institute (BRI) collaborates with its partners in Chad to help identify and estimate any major mercury sources in the region. An international advisor on mercury, BRI serves as co-lead of the UN Environment's Mercury Air Transport and Fate Research partnership area to assist with the development of a global mercury monitoring and observation system. In addition, BRI serves as International Technical Expert with the United Nations Development Programme (UNDP) and with UN Environment and as an Executing Agency for the UNIDO.

Useful Links

Minamata Convention: www.mercuryconvention.org

United Nations Environment: www.unep.org

United Nations Industrial Development Organization: www.unido.org

BRI publications on mercury: www.briloon.org/hgpubs

Stakeholders:

- Ministry in Charge of Environment and Fisheries;
- Ministry in Charge of Livestock;
- Ministry in Charge of Trade;
- Ministry in Charge of Finance;
- Ministry in Charge of Public Works and Transport;
- Ministry in Charge of Land-use Planning, Urban Planning and Housing;
- Ministry in Charge of Mines and Energy;
- Ministry in Charge of Oil;
- Ministry in Charge of Public Service and Labour;
- Ministry in Charge of Higher Education;
- Union of Chadian Journalists;
- Collective of Nongovernmental Organizations;
- Association of Chadian Consumers;
- Centre of Study and Research for the Valorization of Waste;
- Control Centre, Qualities and Foodstuffs



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