The Status of Mercury in Trinidad and Tobago

The Minamata Initial Assessment

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 Trinidad and Tobago 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 in collaboration with UN Environment and the Basel Convention Regional Centre for the Caribbean. This brochure summarizes the primary mercury sources and risks identifed through the MIA project in Trinidad and Tobago.

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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 the environment in Trinidad and Tobago, based on the mercury inventory conducted for the MIA using 2016 data, include the following:

- Extraction, refining, and use of natural gas (~3,653 kg Hg/yr)
- Use and disposal of mercury-added products such as thermometers, compact fluorescent lamps, batteries, and dental amalgam fillings (~429 kg Hg/yr)
- Waste management, including waste incineration and landfilling (~192 kg Hg/yr)

As a result of the MIA process, the approximate magnitude and distribution of these anthropogenic releases into air, water, and land are now quantified for Trinidad and Tobago. Based on the MIA findings, the extraction, refining, and use of natural gas is a major source of mercury emissions in the country. Additionally, the disposal of mercury-added products primarily through incineration produces significant releases into the environment. The total calculated mercury input to society in Trinidad and Tobago is ~4,433 kg Hg/yr.

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 behavioural 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 foetal 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 and marine mammals in the Caribbean Sea indicate regular 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):

- Small grouper, snapper, shrimp, tilapia, oysters, mahi mahi, salmon

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

- Atlantic blue marlin, barracuda, large grouper, king mackerel, swordfish, many tuna species, wahoo (peto)

Red Snapper

How Does Mercury Affect Ecological Health?

Studies have shown that high mercury concentrations in fish (measured in 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 affects 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.

Aquatic ecosystems, either marine (e.g., beaches and coral reefs) or freshwater (e.g., lakes and rivers), are often prime areas for high methylation rates. Fish and wildlife predators that live in rivers and lakes, or that forage in a food web associated with these habitats (e.g., mangroves), 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.

Habitats at Greatest Risk:

- Wetlands, mangroves, aquatic habitats near contaminated sites

Wildlife at Greatest Risk:

- Brown Pelican, Magnificent Frigatebird, Masked and Red-footed Booby, White-tailed Tropicbird, Black-capped Petrel, Audubon's Shearwater, Bridled Tern, Sooty Tern

Brown Pelican

Beaches and Coral Reefs

Lakes and Rivers

Mangroves

What is the Status of Mercury in Trinidad and Tobago?

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 Trinidad and Tobago 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 Trinidad and Tobago. 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 on the islands.

As with many Small Island Developing States, regional atmospheric mercury loads may be impacting local marine fisheries. However, 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.

The Way Forward for Consideration in the Implementation of the Minamata Convention in Trinidad and Tobago

- 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;
  - Check the ingredients in skin lightening creams and lotions to avoid products that 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 and 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 disposing of mercury-added products.
- Improve management of mercury releases from industrial processes through the implementation of best available techniques/best environmental practices to ensure maximum control and reduction of mercury emissions and releases. The efficiencies of these measures should be continuously monitored and evaluated. It is also recommended that the locations for development of future industries/processes/disposal sites should be considered with respect to environmentally sensitive areas.
- 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.

For More Information:

Basel Convention Regional Centre
for Training and Technology Transfer
for the Caribbean (BCRC-Caribbean)
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Basel Convention Regional Centre - Caribbean

The primary mechanism for assisting in the implementation of the Basel Convention and its obligations is a series of Basel Convention Regional Centres for Training and Technology Transfer (BCRC). Established across the world under Article 14 of the Convention, these Centres are meant to provide for the effective implementation of the Convention at the national to regional levels. The Basel Convention Regional Centre for Training and Technology for the Caribbean (BCRC-Caribbean) serves the Contracting Parties to the Basel Conventions within the Caribbean region and any other country consenting to be served by the Centre. Additionally, given the synergies of the Basel Convention to the Stockholm, Rotterdam, and Minamata Conventions, the BCRC-Caribbean also provides support to Caribbean Governments on the implementation of these other Conventions upon requests by the Governments.

BRI's Mercury Work in Trinidad and Tobago

Biodiversity Research Institute (BRI) has collaborated with its partners in Trinidad and Tobago to help identify and estimate major mercury sources in the region. As an International Technical Expert, BRI provided training on the UN Environment's *Toolkit for Identification and Quantification of Mercury Releases* and assisted with the review of primary reports and products developed as part of the MIA.

Useful Links

BCRC-Caribbean: www.bcrc-caribbean.org

Minamata Convention: www.mercuryconvention.org

United Nations Environment: www.unep.org

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

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