

Global Mercury Inventory Synthesis



An Initial Examination of the MIA Mercury Inventories



Globally, more than two-thirds of the mercury currently released to the environment originates, directly or indirectly, from human activities. This translates to an increase of global atmospheric mercury concentrations of between 300 and 500 percent since the early 1800s. In addition to atmospheric emissions, mercury is directly released into water and land.

Under specific ecological conditions, mercury can be converted to methylmercury, which can accumulate to high concentrations in the tissues of fish, wildlife, and humans with adverse health effects. Despite its known harmful impacts, mercury continues to be used in many products and processes (e.g., battery production), and is a byproduct of other processes (e.g., burning coal).

National Mercury Inventories

The Minamata Convention on Mercury addresses the use of mercury by the signatory countries, which are charged with protecting human health and the environment from the risks of mercury exposure. This is accomplished by controlling mercury emissions and releases, including phasing out the use of mercury in certain products and processes.

Minamata Initial Assessments (MIAs) help guide countries through ratification and implementation of the Convention. Using the *Toolkit for Identification and Quantification of Mercury Releases*, countries complete a national mercury inventory by sector. These inventories provide valuable baseline data and an important metric to evaluate the effectiveness of the Convention.

This publication highlights the results of a pilot study that Biodiversity Research Institute (BRI), in collaboration with UN Environment, developed to examine and summarize the national mercury inventories of 43 countries that have completed the MIA process.

This pilot study quantifies the relative contributions of sectors (ten primary source categories in the Toolkit) to mercury emissions and releases, within a set of countries representing varied global regions and socio-economic backgrounds. This baseline knowledge will help inform governments and international regulators proceeding with implementation and adoption of the Minamata Convention in countries worldwide.



Summary of Preliminary Findings

► Overarching findings:

- The Toolkit Hg inventories generally aligned with the GMA results.
- The use of Hg-added products remain prevalent in countries, which means serious efforts are needed to phase these products out by the end of 2020.
- Half of the Small Island Developing States (n=14) had over 100 kg Hg per 100,000 people.

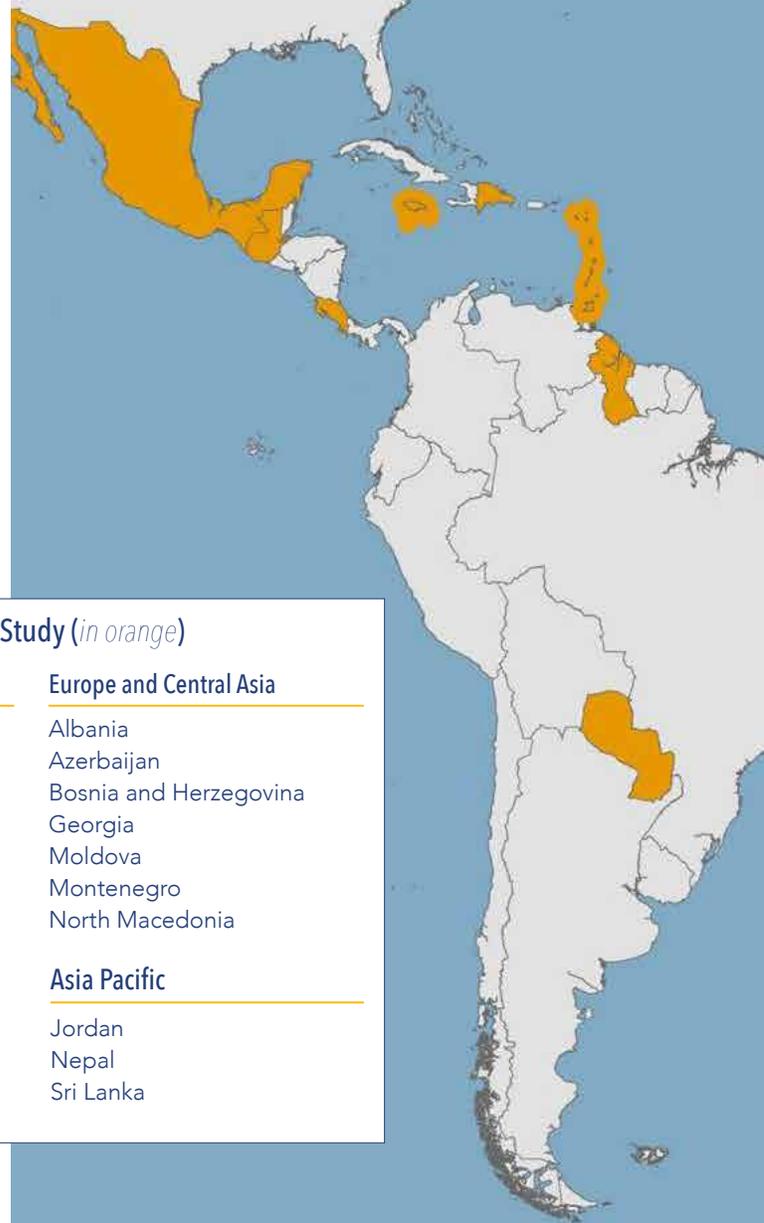
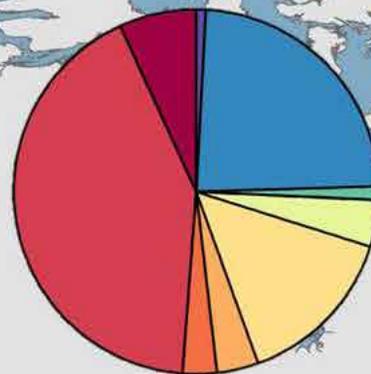
► Major findings of Hg in countries:

- Annual estimated mercury inputs to the environment by country ranged from a low of 9 kg Hg to a high of 353,590 kg Hg. (Countries with over 1,000 kg Hg per year had a strong influence by ASGM activities.)
- Annual estimated mercury inputs to the environment per capita (100,000 people) by country ranged from 8 to 3,723 kg Hg per year. (Countries with over 1,000 kg Hg per year per 100,000 people had large ASGM activities.)

► Major findings of Hg by sector:

- Cumulatively, the primary (virgin) metal production sector contributed the most total mercury input, with 24% of total atmospheric emissions attributable to artisanal and small-scale gold mining (ASGM) and a further 8% from industrial gold sources.
 - The second highest contributing sector was consumer products with intentional use of mercury (13% of total Hg inputs to the environment), particularly from battery use and disposal.
 - Third highest, waste deposition/landfilling and waste water treatment contributed roughly 7% of global mercury inputs including to air, water, and land, primarily from informal dumping of general waste.
- Mercury inputs to the environment from extraction and use of fuel/energy sources were clustered by region, as coal burning was most common in Eastern European countries, and charcoal combustion was reported primarily in Sub-Saharan Africa.

Latin America and Caribbean



Countries Included in the Mercury Inventory Pilot Study *(in orange)*

Latin America and Caribbean

Antigua and Barbuda
Costa Rica
Dominica
Dominican Republic
Grenada
Guatemala
Guyana
Jamaica
Mexico
Paraguay
St. Kitts and Nevis
St. Lucia
St. Vincent and the Grenadines
Trinidad and Tobago

Sub-Saharan Africa

Benin
Burkina Faso
Cabo Verde
Chad
Comoros
Ethiopia
Guinea
Madagascar
Mali
Mauritius
Niger
Sao Tome and Principe
Senegal
Seychelles
Tanzania
The Gambia
Togo
Uganda
Zambia

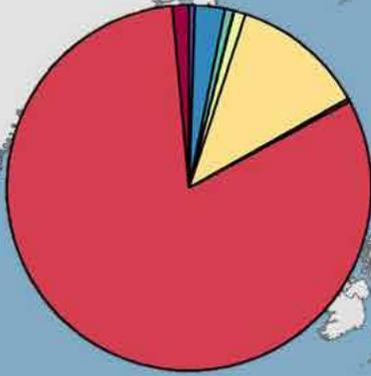
Europe and Central Asia

Albania
Azerbaijan
Bosnia and Herzegovina
Georgia
Moldova
Montenegro
North Macedonia

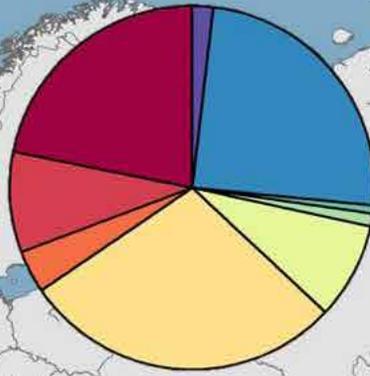
Asia Pacific

Jordan
Nepal
Sri Lanka

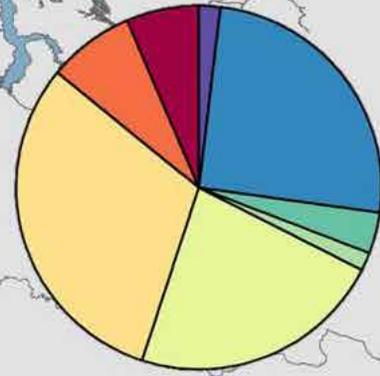
Sub-Saharan Africa



Europe and Central Asia

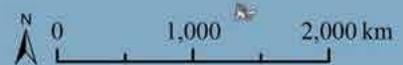


Asia Pacific



Mercury Source by Category (Global Percentage to Date)

- | | |
|---|---|
| <ul style="list-style-type: none"> Extraction and use of fuels/energy sources (3%) Primary (virgin) metal production (72%) Production of other minerals and materials with mercury impurities (1%) Intentional use of mercury in industrial processes (1%) Consumer products with intentional use of mercury—whole life cycle (13%) | <ul style="list-style-type: none"> Other intentional product/process use (2%) Production of recycled metals (0%) Waste incineration and burning (1%) Waste deposition/landfilling and waste water treatment (7%) Crematoria and cemeteries (1%) |
|---|---|



Potential Next Steps

This initial synthesis analyzes national mercury inventories from 43 countries. The substantial observed variability highlights the importance of obtaining additional inventories to help establish a global baseline across signatory countries.

Building on the current compilation will shed additional light on sectors playing a disproportionate role in the mercury cycle and help elucidate global patterns and processes, especially in areas with limited data. Subsequently tracking the data as inventories are added

and updated through time will provide vital insight for evaluating the effectiveness of the Minamata Convention.

Additionally, overlaying future inventory compilations with other mercury models would allow for further identification of patterns at country, regional, and global scales, helping to target the most effective future interventions. The identification of these spatial and temporal trends informs the prioritization of steps to protect human health and the environment as stated in Article 1 of the Minamata Convention.

Steps	Where We Are	What We Need
Incorporation of all Minamata Initial Assessment (MIA) Hg Inventories	<input checked="" type="checkbox"/> 43 countries summarized	<input type="checkbox"/> Compile inventories for remaining countries (~ 80)
Comparison of MIA Hg inventory results with emission models (by AMAP/UN Environment)	<input checked="" type="checkbox"/> MIA inventories compiled for 43 countries <input checked="" type="checkbox"/> Regional MIA trends compared to Global Mercury Assessment (GMA; UN Environment 2018)	<input type="checkbox"/> Compare global and regional MIA trends to GMA <input type="checkbox"/> Conduct global statistical analysis
Comparison of MIA Hg inventory results with release models	<input checked="" type="checkbox"/> MIA Hg releases compiled for 43 countries	<input type="checkbox"/> Compare release models to GMA models <input type="checkbox"/> Conduct global statistical analysis
Identification of data gaps		<input type="checkbox"/> Compare Hg inventories across countries and regions
Use MIA Hg inventory for needs by the Minamata Convention on Mercury		<input type="checkbox"/> Assess the use of MIA Hg inventories to serve as regional and global baselines <input type="checkbox"/> Identify trends by country and region for source types and environmental input processes

BRI's Contributions to the Minamata Convention

Biodiversity Research Institute has collaborated with its partners around the globe to help identify and estimate major mercury sources. As an Executing Agency and International Technical Expert, BRI provided training on the *Toolkit for Identification and Quantification of Mercury Releases* and assisted with the development and review of reports and products as part of 35 MIAs.

www.briloon.org/hgcenter

United Nations Environment Programme

The United Nations Environment Programme is the leading global environmental authority that sets the global environmental agenda, promotes the coherent implementation of the environmental dimension of sustainable development within the United Nations system, and serves as an authoritative advocate for the global environment.

www.unenvironment.org



*Technical Report
on Global Mercury
Inventory
Synthesis*

Download a copy (with a complete list of scientific references) at:

www.briloon.org/hgpubs

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