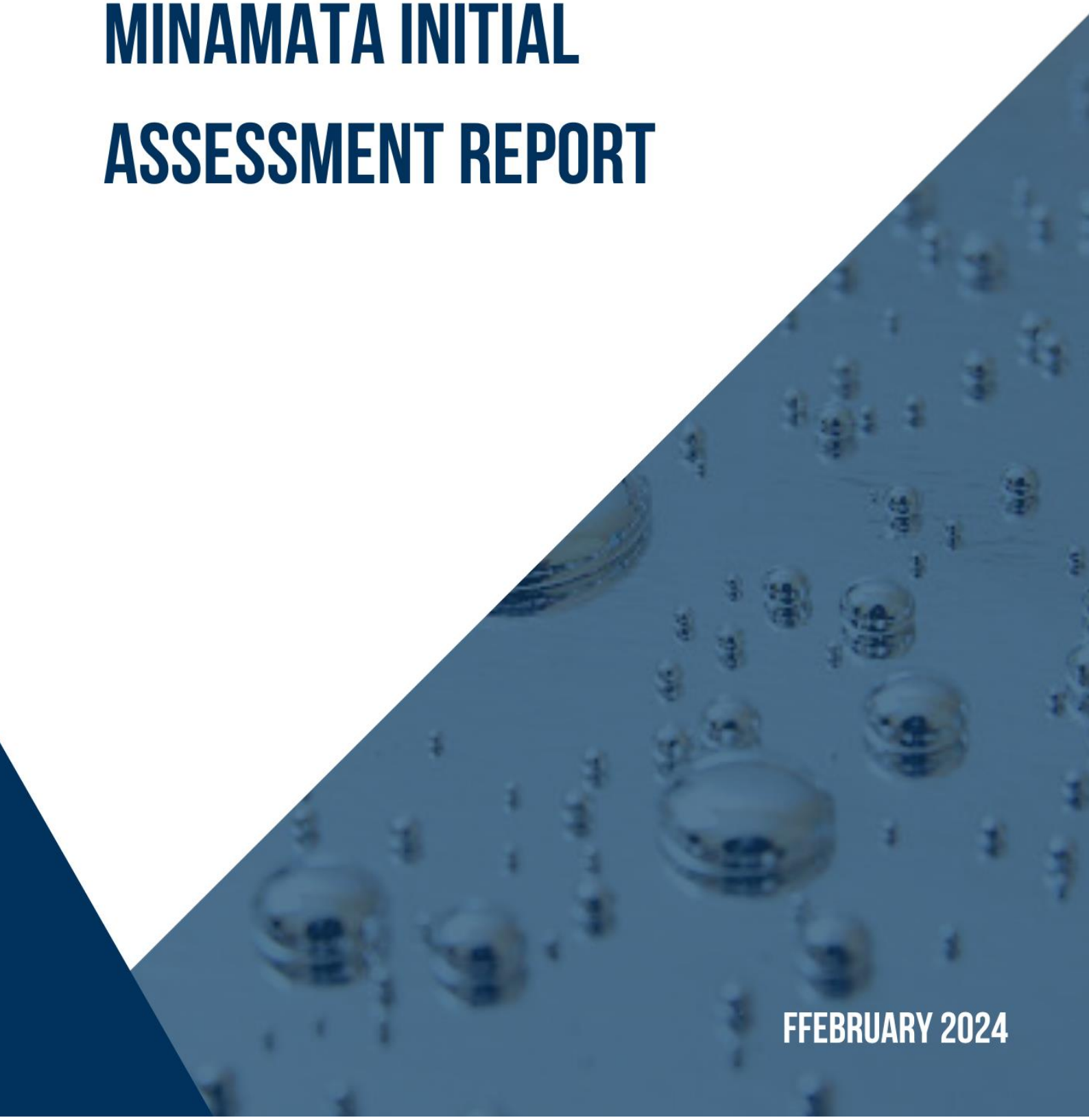
THE COOK ISLANDS MINAMATA INITIAL ASSESSMENT REPORT



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THE COOK ISLANDS MINAMATA INITIAL ASSESSMENT REPORT

PUBLISHED FEBRUARY 2024
Prepared by the Biodiversity Research Institute under the GEF Project (GEF ID: 9187): "Development of the Minamata Initial Assessment in the Pacific Region (MIA Pacific)".

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The sole responsibility for the content of this report lies with the co-authors. The views reflected in this report are solely those of the co-authors and are not necessarily those of the other institutions that supported the report.

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ABOUT THIS DOCUMENT

The Cook Islands Minamata Initial Assessment Report was developed under the project, "Development of Minamata Initial Assessment in the Pacific".

The project is an enabling activity for the ratification and/or implementation of the Minamata Convention on Mercury. Funding was received from the Global Environment Facility (GEF) with the United Nations Environment Programme (UNEP) acting as the Implementing Agency and the Secretariat of the Pacific Regional Environment Programme (SPREP) functioning as the Executing Agency. The Biodiversity Research Institute (BRI) was the lead technical consultancy on the project.

The report consists of:

- *an inventory of mercury releases primarily based on 2021 data, performed in accordance with UN Environment's "Toolkit for identification and quantification of mercury releases", Inventory Level 2 (version November 2019);*
- *an assessment of the policy, legislative and institutional framework in relation to the implementation of the Minamata Convention on Mercury;*
- *assessments relating to populations at risk, education and awareness-raising strategies and;*
- *recommendations and priorities for action to ensure the effective implementation of the Minamata Convention on Mercury.*

Data collection was coordinated by Ms. Hayley Weeks and Mr. Muraai Herman, NES, Ms. Tahlia Ali Shah, International Environmental Specialist, BRI and Mr. Mark Burton, Senior Ecological Analyst and Geospatial Scientist, BRI, via stakeholder consultations and background research. The legal and institutional assessment was conducted by Ms. Talissa Koteka, local consultant.

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Contents

List of Abbreviations vii
List of Tables ix
List of Figures x
Acknowledgements xi
Executive Summary 1
INTRODUCTION 7
Chapter 1: National Background Information 10
1.1 Geography and Population 10
1.2 Political, Economic and Legal Profile 11
1.3 Environmental Overview 11
Chapter 2: Mercury Inventory and Identification of Emissions and Releases 14
2.1 Summary of Mercury Releases, Stockpiles, and Supply and Trade 14
2.1.1 Mercury Release Source Types Present 14
2.1.2 Summary of Estimated Mercury Inputs to Society 16
2.1.3 Summary of Mercury Releases 17
2.1.4 Summary of Mercury Stockpiles, Supply and Trade 22
2.2 Data and Inventory on Extraction and Use of Fuels/Energy Sources 22
2.2.1 Use of Mineral Oils 22
2.2.2 Biomass fired power and heat production. 23
2.3 Data and Inventory on Consumer Products with Intentional Use of Mercury 24
2.3.1 Use and Disposal of Electrical Switches and Relays 24
2.3.2 Use and Disposal of Light Sources 25
2.3.3 Use and Disposal of Batteries 28
2.4 Data and Inventory on Other Intentional Product/Process Use 29
2.4.1 Dental mercury-amalgam Fillings 29
2.5 Data and Inventory on Waste Incineration 31
2.5.1 Incineration of General Waste 31
2.5.2 Incineration of Medical Waste 32
2.5.3 Open Waste Burning on Landfills and Informally 33
2.6 Data and Inventory on Waste Deposition/Landfilling and Wastewater Treatment 34
2.6.1 Controlled Landfills 34
2.6.2 Informal Dumping of General Waste 35
2.6.3 Wastewater System/Treatment 36
2.7 Data and Inventory on Crematoria and Cemeteries 37

2.7.1 Cemeteries 37
2.8 Stocks of Mercury and/or Mercury Compounds and Storage Conditions 38
2.9 Supply and Trade of Mercury and Mercury Containing Compounds Including Sources, Recycling Activities and Quantities 38
2.10 Identification of Hot Spots of Mercury Contamination (Contaminated Sites) 38
2.11 Impact of Mercury on Human Health and the Environment 40
Chapter 3 Policy, Regulatory and Institutional Framework Assessment 42
Chapter 4: Identification of Populations at Risk and Gender Dimensions 74
4.1 Preliminary Review of Potential Populations at Risk and Potential Health Risks 74
4.2 Assessment of Potential Gender Dimensions related to the Management of Mercury 76
Chapter 5: Awareness/Understanding of the Workers and Public; and Existing Training and Educating Opportunities of Target Groups and Professionals 78
Chapter 6: Implementation Plan and Priorities for Action 80
References 84
Annex 1: UNEP TOOLKIT Calculation Spreadsheet 86

List of Abbreviations

Abbreviation	Full Name
BAT	Best Available Techniques
BEP	Best Environmental Practices
BRI	Biodiversity Research Institute
CBD	United Nations Convention on Biological Diversity
CCFLs	Cold Cathode Fluorescent Lamps
CCKM	Coordination, Communication and Knowledge Management
CFLs	Compact Fluorescent Lamps
CIGT	Cook Islands General Transport
CIREC	Cook Islands Research Ethics Committee
CITC	Cook Islands Trading Corporation
CKI	The Cook Islands
CLO	Crown Law Office
COP	Conference of the Parties
COVID-19	Coronavirus Disease of 2019
CSOs	Civil Society Organisations
ECOSOC	Economic and Social Council
EEFLs	External Electrode Fluorescent Lamps
ESM	Environmentally Sound Management
g	Gram
GDP	Gross Domestic Product
GEF	Global Environment Facility
GIC	Glass ionomer cement (dental fillings)
GIS	Geographic Information Systems
GLC	Great Lakes Commission
HDI	Human Development Index
Hg	Mercury
$HgCl_2$	Mercury Chloride
HgO	Mercury Oxide
HgS	Mercury Sulphide
$HgSO_4$	Mercury Sulfate
HIDLs	High Intensity Discharge Lamps
HPMV	High-Pressure Mercury Vapour
HS Code	Harmonised System Codes
ICI	Infrastructure Cook Islands
ICM	Integrated Chemicals Management
INTAFF	Ministry of Internal Affairs
ISLANDS	Implementing Sustainable Low and Non-Chemical Development in SIDS
Kg	Kilogram
Kg Hg/y	kilograms per year
km^2	Squared kilometres
lbs	Pounds
LCD	Liquid Crystal Display
LDC	Lesser Developed Countries
LEDs	Light-Emitting Diodes

LFLs	Linear Fluorescent Lamps
LPG	Liquid Petroleum Gas
M&E	Monitoring and Evaluation
MAPs	Mercury-Added Products
MEAs	Multilateral Environmental Agreements
MFAI	Ministry of Foreign Affairs and Immigration
MFEM	Ministry of Finance and Economic Management
Mg	Milligrams
MIA	Minamata Initial Assessment
mm	Millimetres
MMR	Ministry of Marine Resources
MOT	Ministry of Transport
MOU	Memorandum of understanding
MW	Megawatts
NES	National Environment Service
NGOs	Non-Governmental Organisation
NIIP	National Infrastructure Investment Plan
NPTEL	National Programme on Technology Enhanced Learning
ODS	Ozone Depleting Substances
PIC	Prior Informed Consent
POPs	Persistent Organic Pollutants
PPE	Personal protective equipment
Ppm	Parts Per Million
SDG	Sustainable Development Goals
SHW	Solid and Hazardous Waste
SIDS	Small Island Developing States
SPC	Secretariat of Pacific Communities
SPREP	The Secretariat of the Pacific Regional Environment Programme
sq. km	Square Kilometres
SWM	Solid Waste Management
T	Tonne
THg	Total Mercury
TMO	Te Marae Ora (Ministry of Health)
UN	United Nations
UNEP	United Nations Environment Programme
UNFCCC	United Nations Framework Convention on Climate Change
USA	United States of America
US EPA	United States Environmental Protection Agency
WEEE	Waste Electrical and Electronic Equipment
WHO	World Health Organisation
WTO	World Trade Organization
Ww	Wet Weight
µg/L	Microgram per litre

List of Tables

Table 1: Outline of project components and expected outputs as stated in the MIA Project document. 9
Table 2. Key habitats in the Cook Islands and their make-up 12
Table 3: Multilateral environmental agreements to which the Cook Islands is a Party 12
Table 4: Identification of mercury release sources in CKI; sources present (Y), absent (N), and possible but not positively identified (?) 14
Table 5: Summary of mercury inputs to CKI 16
Table 6: Descriptions of the types of output pathways for mercury releases 17
Table 7: Summary of mercury releases in CKI for 2021 21
Table 8: Summary of Estimated Imports of Fuels in 2020/2021 Converted to tonnes/year. 23
Table 9: Analysis of mercury inputs and outputs from the use of mineral oils 23
Table 10: Mercury-added Electrical Switches and Relays and their Alternatives 24
Table 11: Analysis of mercury inputs and outputs from the historical use and disposal of mercury-added electrical switches and relays 25
Table 12: Assumptions made in Data used for Input in Toolkit to Estimate Mercury Releases for Lighting Products 27
Table 13: Analysis of mercury inputs and outputs from the use and disposal of lighting devices 27
Table 14: Analysis of mercury inputs and outputs from the use and disposal of batteries with mercury 29
Table 15: Analysis of mercury inputs and outputs from the preparation, use and disposal of dental amalgam 31
Table 16: Analysis of mercury inputs and outputs from controlled incineration of general waste 32
Table 17: Analysis of mercury inputs and outputs from medical waste incineration 33
Table 18: Analysis of mercury inputs and outputs from informal burning of waste 34
Table 19: Analysis of mercury inputs and outputs from controlled landfills/ deposits 35
Table 20: Analysis of mercury inputs and outputs from informal dumping of waste 36
Table 21: Analysis of mercury inputs and outputs from cemeteries 37
Table 22: Potentially contaminated sites for further analysis 39
Table 23: Relevant Articles of the Minamata Convention on Mercury for CKI. 42
Table 24: Existing Policy and Regulatory Measures, Gaps and Recommendations for Implementation of the Minamata Convention 43
Table 25: Existing Institutional Capacity for Mercury Management, Gaps and Recommendations for Capacity Building 52
Table 26: Summarised List of Key Mercury-added Products and their Mercury-free Alternatives 81

List of Figures

Figure 1: Pie Chart showing the main sources of estimated mercury releases in CKI. 2
..... 3
Figure 2: Bar Chart showing the mercury releases estimated according to output pathway in CKI. 3
Figure 3: Map of Rarotonga, CKI showing potentially mercury contaminated sites. 5
Figure 4: Map of CKI (Mapsland, 2023) 10
Figure 5: Mercury Emissions to Air Output Pathway from Present Mercury Source Categories 19
Figure 6: Mercury Releases to Water Output Pathway from Present Mercury Source Categories 19
Figure 7: Mercury Releases to Land Output Pathway from Present Mercury Source Categories 19
Figure 8: Mercury Releases to By-products and Impurities Output Pathway from Present Mercury Source Categories 20
Figure 9: Mercury Releases to General Waste Output Pathway from Present Mercury Source Categories 20
Figure 10: Mercury Releases to Sector Specific Treatment/Disposal Output Pathway from Present Mercury Source Categories 20
Figure 11: Map indicating potentially mercury contaminated sites in Rarotonga, CKI. 40
Figure 12: Human exposure to mercury and its compounds (WHO, 2021b). 74
Figure 13: Example of Fish Consumption Guidelines developed for the Pacific Region (BRI, 2022). 75
Figure 14: Scene in the awareness raising video developed under the project. 79

Acknowledgements

Kia Orana,

I am pleased to present to you the Minamata Initial Assessment Report for the Cook Islands, which aims to facilitate the ratification and implementation of the Minamata Convention on Mercury.

This Report provides a summary of:

• an inventory of mercury releases in the Cook Islands
•a legislative gaps analysis
•an institutional gaps analysis

I take full responsibility for this Report and provide my reassurance with respect to the accuracy and
reliability of the information contained within this Report.

Kia manuia,

Hon. Albert Nicholas
Minister for National Environment Service
Cook Islands

Executive Summary

The Minamata Convention on Mercury is a global multilateral environmental agreement that aims to protect human health and the environment from anthropogenic emissions and releases of mercury and mercury compounds through a number of obligations. The Minamata Convention on Mercury entered into effect on August 16, 2017, and has 147 Parties as of November 2023. In the Pacific region, 6 countries are Party to the Convention with others like t he Cook Islands (CKI) actively taking steps to become a Party.

To better inform needs for implementation of the Minamata Convention, CKI participated in the Minamata Initial Assessment (MIA) Project which aims to facilitate the ratification and implementation of the Convention using scientific and technical knowledge. The project is funded by the Global Environment Facility (GEF), implemented by the United Nations Environment Programme (UNEP) and executed regionally by the Secretariat of the Pacific Regional Environment Programme (SPREP). National Environment Service (NES) acts as the National Project Focal Point for its implementation nationally.

Under the MIA Project, an inventory of mercury releases was developed using the "Toolkit for Identification and Quantification of Mercury Releases" (Toolkit) Level 2, made available by the Chemicals Branch of UNEP. Other aspects of the MIA Project included an assessment of the regulatory and institutional capacity needs for effective mercury management; identification of strategies to identify potential contaminated sites and risks to human health and the development of an awareness raising strategy for mercury management.

Results of the Inventory of Mercury Releases

It is important to note that in calculating estimations of mercury releases using the Toolkit, there were various uncertainties and complexities involved. Due to the limited available data for certain categories and the assumptions made, the estimations of mercury releases for CKI using this inventory should not be considered as definitive but rather as a guide for the identification of priorities and further assessments.

6.24 kilograms (Kg) of mercury (Hg) were determined to be released in CKI in 2021. The estimated mercury releases by source and by output through various release pathways identified are illustrated in Figures 1 and 2. The most significant source of mercury releases was found to be the consumption of products with intentional use of mercury throughout their use and disposal. This category accounted for 70% of estimated national mercury releases mainly due to the use and disposal of mercury containing ‘electrical switches and relays’ and ‘batteries’, which accounted for inputs of approximately 2.08 Kg of mercury per year (Kg Hg/y) and 2.07 Kg Hg/y respectively.

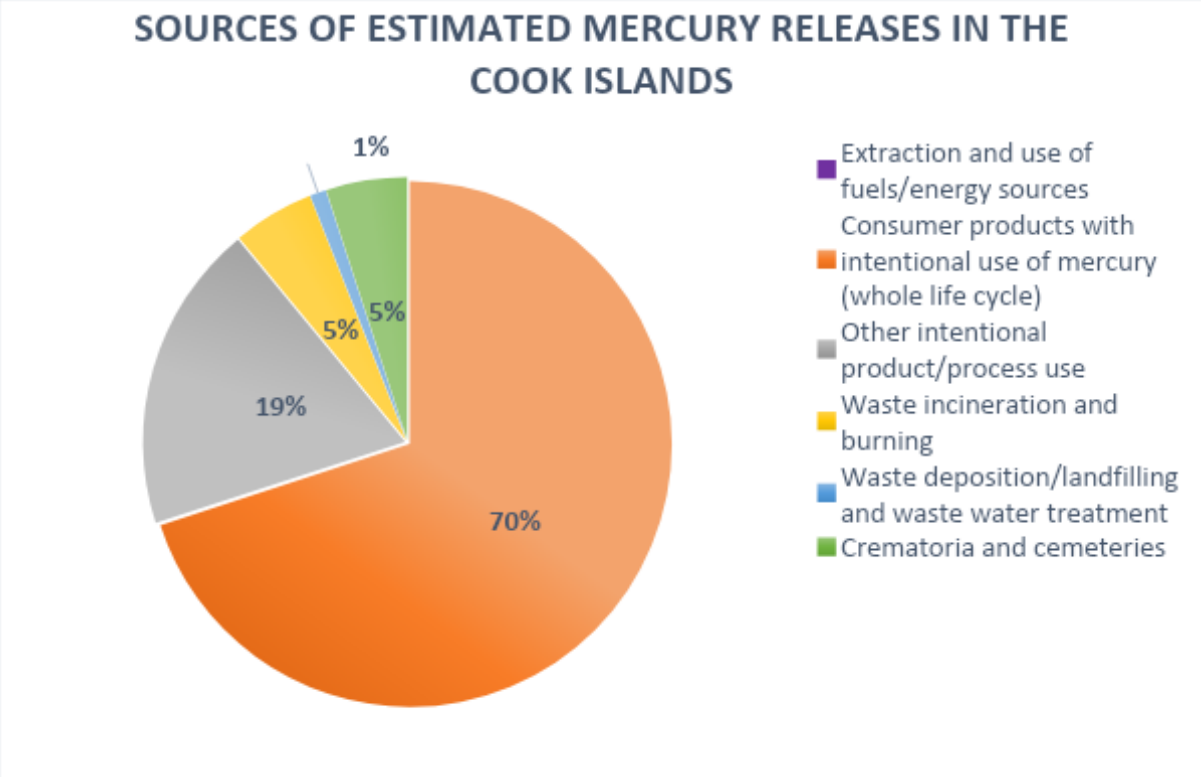


Figure 1: Pie Chart showing the main sources of estimated mercury releases in CKI.

The second highest category source of mercury releases at 19% was "Other Intentional Products/Process Uses" referring to the use and disposal of dental mercury-amalgam fillings (1.20 Kg Hg/y).

For the source categories, the output pathways for mercury releases were also assessed. Mercury releases to general waste was found to be the highest in comparison to other pathways at 4.00 Kg Hg/y. This was found to be mainly due to the use and disposal of consumer products with mercury. Releases to land, air and water accounted for mercury releases of 0.70 Kg Hg/y, 0.63 Kg Hg/y and 0.62 Kg Hg/y respectively.

CKI was found to have no major sources of mercury stockpiles, supply or trade.

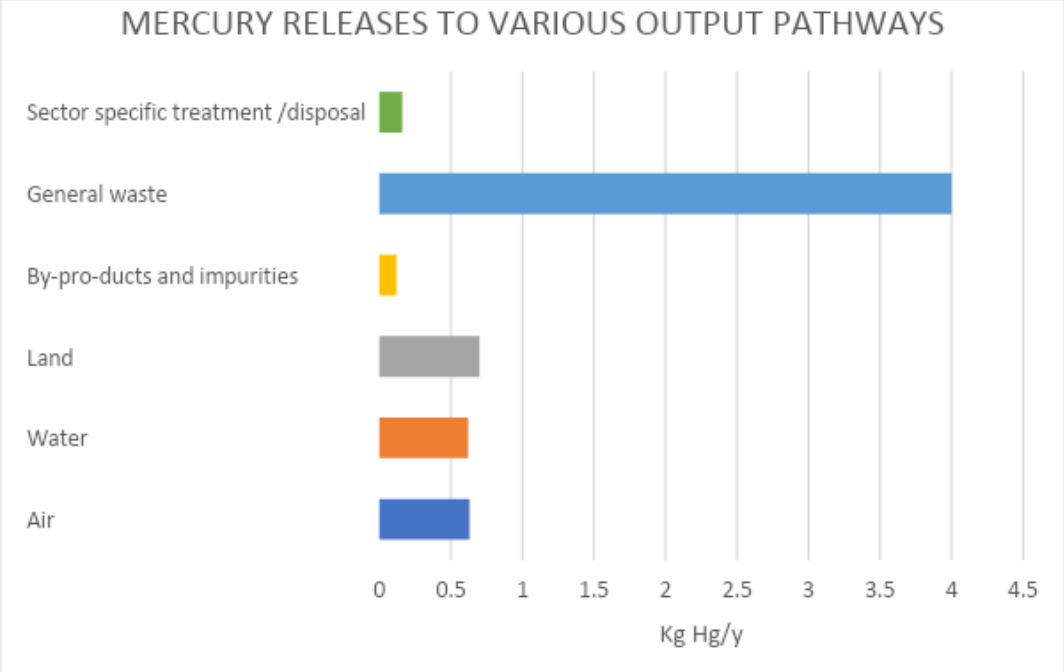


Figure 2: Bar Chart showing the mercury releases estimated according to output pathway in CKI.

Major Findings of the Policy, Regulatory and Institutional Framework Assessment

For the overall implementation of the Minamata Convention on Mercury, responsibility falls under the remit of the NES in coordination with several relevant stakeholders across the government sector, public and private sector as well as, non-governmental organisations and civil society organisations.

To formally recognise the obligations for CKI as a Party to the Minamata Convention on Mercury, a regulation under the Environment Act 2003 should be developed by the NES (in coordination with relevant stakeholders) for approval by the government. This should include the prohibition of the import of mercury, mercury compounds and mercury added products as outlined under Annex A (Part II) of the Minamata Convention and for Annex A (Part II), mercury in bulk form for dental amalgam.

Coordination with the Customs Department and private sector retailers to ensure the implementation of the prohibition of mercury products and the promotion of safe mercury-free alternatives should also be carried out. Coordination with the Te Marae Ora (Ministry of Health) to meet the obligations for phase down of dental amalgam and phase out of mercury added medical devices is recommended.

Other regulatory recommendations include the development of regulations under the Environment Act 2003 to include environmental standards for management of mercury releases to the air, water, land and for waste management. The NES should coordinate with relevant stakeholders for development of these standards with reference to guidance provided under the Minamata Convention. Coordination with the other national authorities and the health sector,

where needed, to ensure management of potential mercury releases through proper health and sanitation practices should be conducted.

New or updated national plans and policies related to environmental management and strategic planning should also include the provisions of the Minamata Convention and any related agreements.

Challenges in implementation include the limited human resource capacity and technical capacity to carry out continuous activities related to mercury management. To address this, it is important to recognise the linkages between mercury issues and issues related to other hazardous or potentially harmful chemicals and how approaches can be harmonised. It is recommended that mercury management coordination be formally established. Furthermore, it is important to recognise regional linkages that can be made to further opportunities for information exchange and capacity building, which is ongoing through agencies such as SPREP, among others.

Strategies for Identification of Contaminated Sites and Assessment of Risks to Human Health

Hot spots of mercury contamination exist as the direct result of the use and release of mercury in processes leading to on-site deposition, as well as the inadequate disposal of mercury-contaminated materials. Previous deposits of mercury may still have the potential to release significant amounts of mercury and pose a risk to human health and the environment. 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.

A map of Rarotonga (Figure 3), CKI was developed to identify the locations of potentially mercury contaminated sites. Further geospatial data on the other islands of CKI is recommended to provide a clearer indication of potential sites of interest for the country as a whole. Additionally, further research on the spatial distribution of potentially contaminated sites in relation to ecosystem characteristics that increase the methylation potential of mercury inputs should be conducted to inform locations prioritized for further study on the threat from mercury on human health and the environment and for future use in evaluating the effectiveness of the Minamata Convention. These, and any additional, potentially contaminated sites should be verified by the relevant national authorities.

Methylmercury, the organic form of mercury, is the most toxic form of mercury to humans as it is a neurotoxin that can cause physiological harm and behavioural disorders in people. Humans are most exposed to methylmercury through dietary consumption. Fish from the sea or freshwater systems can be a major source of methylmercury. 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. Many of the fish available in the Pacific are safe to eat, although more information is needed about

the mercury concentrations to better characterize how mercury is distributed in different species of fish in the waterscape of Pacific nations.

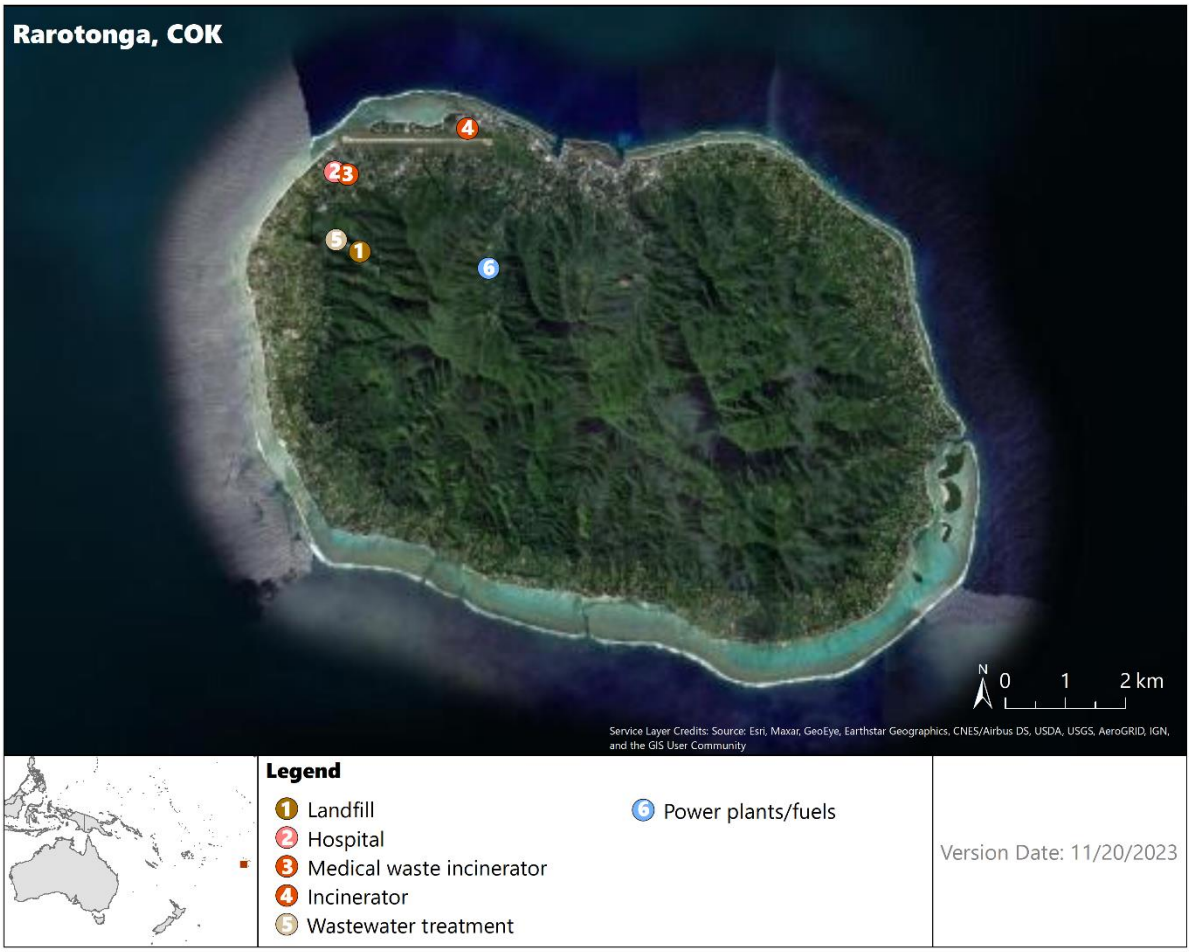


Figure 3: Map of Rarotonga, CKI showing potentially mercury contaminated sites.

Monitoring mercury exposure to humans will help the global community to meet the requirements of the Minamata Convention on Mercury and will also help identify global biological hotspots that represent elevated levels of mercury exposure that may pose serious threats to both ecosystem and human health. Gender and occupational considerations in terms of identifying vulnerable groups for monitoring should be made.

Awareness-raising Strategies for Mercury Management

The current level of awareness on the risks associated with mercury amongst workers (such as dental professionals and waste disposal workers) and the general public is not considered to be high and measures should be adapted to educate these groups on the issue. Under the MIA Project, a brief animated awareness raising video was developed for dissemination in CKI. The video aims to educate the general public on the potentially mercury-added household products that may be present, the need for safe disposal and the promotion of mercury-free alternatives that are already popular on the local market. It is recommended that the video be shared widely via social media by NES and other national stakeholder organizations.

To educate key stakeholders on the estimated sources of mercury releases and recommendations for mercury management developed under the project, a technical briefing document that summarizes the main findings of the MIA Project was developed by BRI.

Additionally, through CKI's participation in the GEF-funded programme, Implementing Sustainable Low and Non-Chemical Development in Small Island Developing States (ISLANDS), further mercury-related activities for information dissemination, inclusive of gender considerations, will be carried out. The materials developed under this project and the ongoing GEF ISLANDS Programme, can be utilized in future public education campaigns on environmental awareness.

In terms of mercury's potential impact on human health and possible exposure through diets, fish consumption guidelines that are based on scientific research are recommended to assist vulnerable populations in determining the recommended frequency in consuming fish that considers their health benefits versus potential mercury risks.

Coordination with other relevant governmental, private and non-governmental organizations such as the relevant fisheries authorities and the Te Marae Ora (Ministry of Health) is recommended to further promote mercury management awareness.

Priority Areas for Consideration in the Implementation of the Minamata Convention

Recommendations for consideration in the implementation of the Minamata Convention may include actions to:

1. Become a Party to the Minamata Convention on Mercury.
2. Develop an Act or Regulation to formally recognise the obligations of the Minamata Convention and facilitate its implementation.
3. Establish a Coordinating Mechanism for mercury management.
4. Implement measures to address identified sources of mercury release through:
    a. Promotion of the continued phase-out and phase down of mercury-added products and;
    b. Ensuring Best Available Techniques/Best Environmental Practices (BAT/BEP) implementation for monitoring and preventing mercury releases from sources such as landfills and waste incinerators.
5. Public awareness and sensitisation of relevant stakeholders on mercury issues
6. Strengthen understanding of mercury issues in CKI through monitoring programmes.

Under the ongoing GEF ISLANDS Programme, CKI will also benefit from the development of draft model legislation to control mercury-added products for use by Pacific SIDS that can be tailored for adoption, and the provision of support for the sound repackaging, shipping, collection, and disposal of mercury waste. However, in order to execute mercury-related activities under the project, CKI must be a Party to the Minamata Convention prior to execution of these activities.

INTRODUCTION

Mercury and the Minamata Convention on Mercury

Mercury (symbol: Hg), also known as quicksilver, is a natural element that exists in the earth's crust. Emissions of mercury to the environment may occur due to volcanic eruptions and other natural occurrences, but the majority of mercury releases have been found to be due to anthropogenic activities such as primary mercury mining, and re-emissions of mercury already in the environment, mainly as a result of previous human activity (UNEP, 2019a).

The release of mercury to the environment is of serious concern due its highly toxic and persistent nature, which can negatively affect human health and the environment. Mercury has been listed by the World Health Organisation (WHO) as one (1) of the top ten (10) chemicals or groups of chemicals of major health concern (WHO, 2017).

Mercury exists in three (3) main forms:

1. *Elemental or metallic mercury* which is a silvery-coloured liquid at room temperature and standard pressure. This form has been used in a variety of activities such as artisanal and small-scale gold mining (ASGM) in which mercury is used for its ability to form an amalgam with gold particles. It has also been used in the manufacture of some consumer products such as thermometers , dental amalgam, fluorescent light bulbs, and some electrical switches.
2. *Inorganic mercury compounds* which are formed when mercury bonds with other chemicals to form compounds or salts. This may occur naturally or due to man-made activities for use in several industrial processes and in the manufacture of products.
3. *Organic mercury compounds* which are formed when mercury combines with carbon to form compounds. The most toxic organic mercury compound is methylmercury (MeHg) which typically forms in water or sediment when anaerobic bacteria convert elemental or inorganic mercury to MeHg. This form tends to bioaccumulate in the food chain and humans are typically exposed to MeHg consumption of certain contaminated fish or shellfish over a period of time (UNEP, 2019b).

Exposure to mercury can range from short-term effects such as headache, dizziness, skin and eye irritations to more serious and long-term impacts on the nervous, digestive, respiratory, renal and immune systems, and may be fatal depending on the level and length of exposure (WHO, 2017). The most vulnerable populations to the harmful impacts of mercury include children and pregnant or breastfeeding women as mercury can cross into the placenta and breastmilk.

The effects of mercury on ecosystem health can also be detrimental as studies have shown that the growth, behaviour and reproduction of fish with high concentrations of mercury can be negatively impacted. This can in turn impact the food web as wildlife who then regularly consume mercury-contaminated fish have been shown to have decreased reproductive success

(BRI, 2019). Aquatic ecosystems such as beaches, lakes, mangroves among others, are particularly sensitive to mercury accumulation.

In recognising the need to address the issues posed by mercury, the global multilateral environmental agreement, the Minamata Convention on Mercury, was developed. The Convention aims to protect human health and the environment from anthropogenic emissions and releases of mercury and mercury compounds through a number of obligations that, among other things, regulate:

- mercury supply, sources and trade;
- mercury added products;
- manufacturing processes;
- artisanal and small scale gold mining;
- interim storage and disposal of mercury and mercury compounds;
- mercury waste management;
- mercury emissions and releases management, among other activities.

The Minamata Convention on Mercury entered into effect on August 16, 2017, and has 147 Parties as of November 2023. In the Pacific region, six (6) countries are Party to the Convention with several others actively taking measures to become a Party.

Project Background

The MIA Project aims to facilitate the ratification and implementation of the Minamata Convention on Mercury using scientific and technical knowledge in conducting an inventory of mercury releases (and emissions[1]). The development of an inventory of mercury releases will inform countries of their national mercury sources and subsequently assist in identifying actions to increase their capacity in mercury management.

The inventory was conducted with the use of the "Toolkit for Identification and Quantification of Mercury Releases" (Toolkit), made available by the Chemicals Branch of UNEP. The Toolkit is designed to produce a simple and standardised methodology and database to inform the national mercury inventory. It outlines a UNEP-recommended procedure to facilitate the development of consistent and comparable source inventories. The steps involved include:

1. The identification of the main mercury source categories present in the country;
2. The refining of the identified mercury source categories into further sub-categories in order to determine the individual activities that potentially release mercury, and gathering of qualitative information on the activities;

[1] Under the Minamata Convention, the term “releases” is typically related to mercury released to land and water while the term “emissions” refers to mercury released to air. Under the UN Environment Toolkit, “releases” is used to describe mercury released to all media, including air. For this report, the term “mercury releases” will be used predominantly as described under the UN Environment Toolkit.

3. The development of a quantitative inventory; the Inventory Level 2 version of the Toolkit was utilised in this MIA Project as it provided a more comprehensive look at the releases of mercury. Estimations are calculated via equations and procedures specific to the source types identified; and
4. The compilation of the standardised mercury inventory and identification of data gaps which will build on the country's knowledge base on mercury.

It is important to note that in calculating estimations of mercury releases using the Toolkit, there may be various uncertainties and complexities involved. As such, for each mercury source sub-category present, there will be an estimate of releases to all media where data is sufficient and an indication of the likely magnitude if full data is unavailable. Major data gaps will also be identified. These considerations will assist in the interpretation of results and prioritisation of future actions.

Further details on the project outputs are detailed in Table 1.

Table 1: Outline of project components and expected outputs as stated in the MIA Project document.

Project Component	Project Output
Global technical support and capacity building for MIA development	1.1 Technical assistance provided to the CKI to develop the MIA while building sustainable foundations for its future implementation
Development and validation of the Minamata Initial Assessment	2.1 Identified and strengthened national coordination mechanism dealing with mercury management that will guide the project implementation
	2.2 National institutional and regulatory framework and national capacities on mercury management assessed
	2.3 National inventories of mercury sources and releases developed using the UN Environment Mercury Toolkit Level II and strategy for the identification of mercury contaminated sites developed
	2.4 Challenges, needs and opportunities to implement the Minamata Convention assessed and recommendations to ratify and implement the Minamata Convention developed
	2.5 MIA validated by national stakeholders
Monitoring and Evaluation	3.1 Status of project implementation and probity of use of funds accessed on a regular basis and communicated to the GEF
	3.2 Independent terminal evaluation developed and made publicly available

Chapter 1: National Background Information

1.1 Geography and Population

The Cook Islands (CKI), located in the southwest Pacific, are a group of 15 volcanic islands and atolls spread within a 2 million square kilometers (km^2) exclusive economic zone (EEZ). With only 240 km^2 of total land area, the country is classified as a Small Island Developing State (SIDS) (UN, 2023). The climate is tropical and rainy, so the volcanic islands are mostly fertile and rainforests, while the atolls are flat with sandy soils. Typical of the south Pacific region, there is a distinct hot and wet 'cyclone season' through November to April and a cool and dry season from May to October (The World Bank, 2015).



Figure 4: Map of CKI (Mapsland, 2023)

The 15 islands are divided into the Northern Group and the Southern Group (as seen in Figure 4) with the former group being relatively isolated from the other (CISO, 2022). Of the 15 islands, 12 are inhabited and 3 (Manuae, Takutea and Suwarrow) are uninhabited. The total population of CKI is estimated to be 20,200 (inclusive of permanent and temporary residents) as of June 2023 with the largest and most populated island being Rarotonga with about 14,000 residents on 70 km^2 of land. The remaining residents are distributed across the 'Pa Enua' or sister islands (CISO, 2023).

The official languages spoken are Cook Islands Maori and English. The majority of the population are indigenous to CKI while there has been a steady increase in expatriates mainly from New Zealand, the Philippines and other Pacific islands (SPC, 2015). While there are individual cultural differences amongst the islands of CKI, the population typically follows the social structures of the traditional patrilineal and chief or clan system, with women having

status in their roles as ‘wives and mothers’ (SPC, 2015). Amongst the Pacific Islands region, CKI has been noted to have one of the highest female labour force participation rates and the percentage of women working in higher-level occupations has been increasing over the years, though men still outnumber women at this level (SPC, 2015).

Over the years, the population of CKI has been on a slow but steady decline mainly due to the search for employment opportunities in countries such as New Zealand and Australia (SPREP, 2018). This has impacted living conditions and resources across the country and as such, the government has implemented an incentive-based resettlement program to encourage the return of families (SPC, 2015).

1.2 Political, Economic and Legal Profile

The Cook Islands is a sovereign parliamentary democracy in free association with New Zealand.
The bi-cameral legislature is made up of the House of Ariki (Chiefs) and the Parliament, which is composed of the Head of State, King Charles III, represented in country by the Cook Islands King’s Representative and a unicameral parliament of 24 members elected in a 4-year cycle.

The free association with New Zealand indicates that all nationals of Cook Islands are citizens of New Zealand and can migrate to New Zealand or Australia (SPC, 2015). New Zealand also provides functions for defense, and to an extent, foreign affairs.

Economically, tourism accounts for approximately 60% of the Gross Domestic Product (GDP), which was greatly impacted by the COVID-19 pandemic and is slowly recovering (CISO, 2022). Other sources of revenue include the offshore banking industry and market-oriented agricultural production and fisheries (SPC, 2015). The high service-based tourism industry has driven more urban-centric activities and led to an increased use of technology and waste production in Rarotonga.

While diesel-powered generators have typically provided the main source of energy in CKI, solar energy production has increased over the years and all of Pa Enua except Aitutaki are powered by solar energy.

1.3 Environmental Overview

In CKI, there are several key habitats that make up the natural environment (Table 2). Environmental change in CKI is driven by population demographics and geographical isolation, economic development, traditional & contemporary values, governance and climate change. The main pressures on these habitats include land development, resource extraction/consumption and waste (SPREP, 2018).

Table 2. Key habitats in the Cook Islands and their make-up (SPREP, 2018)

Key habitats	Make up
Upland	Upland, mountains, and cloud forests
Lowland	Cultivated areas, wetlands, and lowland forests
Coastal	Foreshore, wetlands, marshlands, makatea
Inshore & offshore	Corals, seagrass, seamounts, benthic and pelagic organisms
Freshwater bodies, rivers and streams	Rivers, waterfalls, waterholes, caves, riparian, estuaries, groundwater, intakes
Rural and urban built environment	Dwellings, infrastructure, energy consumption
Protected areas	Conservation areas, protected areas, key biodiversity areas and marine protected areas
Atmosphere, weather and climate	ODS and greenhouse gas emissions, climate trends, climate adaptations

The habitats present in CKI are vulnerable to the diverse impacts of natural disasters, pollution and climate change. Tropical cyclones, floods, droughts and sudden sea surges are some examples of the natural hazards that put the local environment, infrastructure and communities at risk. The most vulnerable areas include the foreshore, low lying areas, slopes and inland water systems on the islands. On the main island of Rarotonga, most population dwellings are situated in low-lying coastal areas and are vulnerable seas surges, tropical cyclones and earthquakes (Herman, A. 2016).

To enhance national capacities to address environmental challenges and protect the environment, CKI is a Party to several Multilateral Environment Agreements (MEAs). A list of some relevant MEAs that CKI is a Party to is provided in Table 3. While CKI is not currently a Party to the Minamata Convention on Mercury, it is currently taking steps to understand the mercury risks posed in-country to inform accession.

Table 3: Multilateral environmental agreements to which the Cook Islands is a Party

Treaty		Year of Becoming a Party
	Basel Convention on the Control of the Transboundary Movement of Hazardous Waste and their Disposal	2004
	Stockholm Convention on Persistent Organic Pollutants	2004
	Convention on Biological Diversity	1993
	Paris Agreement (as part of United Nations Framework Convention on Climate Change)	2016

Treaty		Year of Becoming a Party
	Waigani Convention (The Convention to Ban the Importation into Forum Island Countries of Hazardous and Radioactive Wastes and to Control the Transboundary Movement and Management of Hazardous Wastes within the South Pacific Region)	2000

Chapter 2: Mercury Inventory and Identification of Emissions and Releases

2.1 Summary of Mercury Releases, Stockpiles, and Supply and Trade

2.1.1 Mercury Release Source Types Present

Mercury released into the environment can come from a variety of sources. For the Toolkit, focus was placed on anthropogenic sources of mercury. In the Cook Islands (CKI), the presence of these sources was identified through consultations with national stakeholders (Table 4). Stakeholders were engaged through questionnaires, email correspondence, interviews, and project meetings. The categories identified as not being present will not be discussed further in the report.

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

Toolkit Category #	Source category	Source presence (Y/N/?)
5.1	**Extraction and use of fuels/energy sources**	
5.1.1	Coal combustion in large power plants	N
5.1.2	Other coal combustion	N
5.1.3	Extraction, refining and use of mineral oil	**Y**
5.1.4	Extraction, refining and use of natural gas	N
5.1.5	Extraction and use of other fossil fuels	N
5.1.6	Biomass fired power and heat production	**Y**
5.1.7	Geothermal power production	N
5.2	**Primary (virgin) metal production**	
5.2.1	Primary extraction and processing of mercury	N
5.2.2	Gold and silver extraction with the mercury-amalgamation process	N
5.2.3	Zinc extraction and initial processing	N
5.2.4	Copper extraction and initial processing	N
5.2.5	Lead extraction and initial processing	N
5.2.6	Gold extraction and initial processing by other processes than mercury amalgamation	N
5.2.7	Aluminium extraction and initial processing	N
5.2.8	Extraction and processing of other non-ferrous metals	N
5.2.9	Primary ferrous metal production	N
5.3	**Production of other minerals and materials with mercury impurities**	
5.3.1	Cement production	N
5.3.2	Pulp and paper production	N
5.3.3	Lime production and light weight aggregate kilns	N

Toolkit Category #	Source category	Source presence (Y/N/?)
5.3.4	Other minerals and materials	N
5.4	**Intentional use of mercury as an auxiliary material in industrial processes**	
5.4.1	Chlor-alkali production with mercury-technology	N
5.4.2	VCM (vinyl-chloride-monomer) production with mercury-dichloride ($HgCl_2$) as catalyst	N
5.4.3	Acetaldehyde production with mercury-sulphate ($HgSO_4$) as catalyst	N
5.4.4	Other production of chemicals and polymers with mercury compounds as catalysts	N
5.5	**Consumer products with intentional use of mercury**	
5.5.1	Thermometers with mercury	N
5.5.2	Electrical and electronic switches, contacts and relays with mercury	**Y**
5.5.3	Light sources with mercury	**Y**
5.5.4	Batteries containing mercury	**Y**
5.5.5	Polyurethane with mercury catalysts	N
5.5.6	Biocides and pesticides	N
5.5.7	Paints	N
5.5.8	Pharmaceuticals for human and veterinary uses	N
5.5.8	Cosmetics and related products	**?**
5.6	**Other intentional products/process uses**	
5.6.1	Dental mercury-amalgam fillings	**Y**
5.6.2	Manometers and gauges	N
5.6.3	Laboratory chemicals and equipment	N
5.6.4	Mercury metal use in religious rituals and folklore medicine	N
5.6.5	Miscellaneous product uses, mercury metal uses and other sources	N
5.7	**Production of recycled metals**	
5.7.1	Production of recycled mercury ("secondary production)	N
5.7.2	Production of recycled ferrous metals (iron and steel)	N
5.7.3	Production of other recycled metals	N
5.8	**Waste incineration**	
5.8.1	Incineration of municipal/ general waste	**Y**
5.8.2	Incineration of hazardous waste	N
5.8.3	Incineration of medical waste	**Y**
5.8.4	Sewage sludge incineration	N
5.8.5	Informal waste burning	**Y**
5.9	**Waste deposition/landfilling and wastewater treatment**	
5.9.1	Controlled landfills/deposits	**Y**
5.9.2	Diffuse deposition under some control	N

Toolkit Category #	Source category	Source presence (Y/N/?)
5.9.3	Informal local deposition of industrial production waste	N
5.9.4	Informal dumping of general waste	**Y**
5.9.5	Wastewater system/treatment	**Y**
5.10	**Cremation and cemeteries**	
5.10.1	Crematoria	N
5.10.2	Cemeteries	**Y**

2.1.2 Summary of Estimated Mercury Inputs to Society

Mercury inputs to society should be understood here as the mercury made available for potential releases through economic activity in CKI. This includes mercury intentionally used in products such as blood pressure gauges and fluorescent light bulbs as well as mercury that can become available through the disposal of these products. It also includes mercury mobilized via extraction and use of raw materials which contain mercury in trace concentrations.

Mercury inputs to CKI for the source categories identified as being present in Table 4 are shown below in Table 5.

Table 5: Summary of mercury inputs to CKI

Source category	Estimated Hg Input (Kg Hg/y)
Extraction and use of fuels/energy sources	
Mineral Oil- Extraction, refining and use	**0.01**
Biomass fired power and heat production	**No data available**
Consumer products with intentional use of mercury	
Electrical and electronic switches, contacts and relays with mercury	**2.08**
Light sources with mercury	**0.23**
Batteries containing mercury	**2.07**
Other intentional products/process uses	
Dental mercury-amalgam fillings	**1.20**
Waste incineration	
Incineration of general waste	**0.10**
Incineration of medical waste	**0.10**
Informal waste burning	**0.14**
Waste deposition/landfilling and wastewater treatment	
Controlled landfills/deposits	**0.04**
Informal dumping of general waste	**0.20**

Source category	Estimated Hg Input (Kg Hg/y)
Wastewater system/treatment	**No data available**
Cremation and cemeteries	
Cemeteries	**0.33**

2.1.3 Summary of Mercury Releases

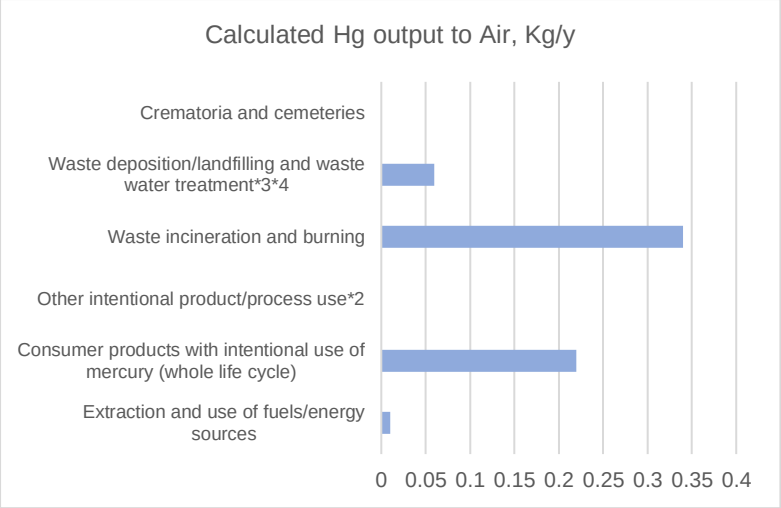
Mercury releases are to air (the atmosphere), water (marine and freshwater bodies, including via wastewater systems), land, general waste, and sector specific waste treatment/disposal. An additional output pathway is "by-products and impurities" which designates mercury flows back into the market in by-products and products where mercury does not play an intentional role. Table 6 describes these output pathways.

Table 6: Descriptions of the types of output pathways for mercury releases

Calculation Result Type	Description *(NOTE: Not all examples provided are relevant to CKI but are included for general reference)*
Estimated Hg input, Kg Hg/y	The standard estimate of the amount of mercury entering this source category with input materials, for example calculated mercury amount in coal used annually in the country for combustion in large power plants.
Air	Mercury emissions to the atmosphere from point sources and diffuse sources from which mercury may be spread locally or over long distances with air masses, for example, from: ● Point sources such as coal fired power plants, metal smelters, waste incineration. ● Diffuse sources such as small-scale gold mining, informal burning of waste with fluorescent lamps, batteries, thermometers.
Water	Mercury releases to aquatic environments and to wastewater systems; point sources and diffuse sources from which mercury will be spread to marine environments (oceans), and freshwaters (rivers, lakes, etc.). For example, releases from: ● Wet flue gas cleaning systems on coal fired power plants, ● Industry, households, etc. to aquatic environments, ● Surface run-off and leachate from mercury contaminated soil and waste dumps.
Land	Mercury releases to the terrestrial environment: General soil and groundwater . For example, releases from: ● Solid residues from flue gas cleaning on coal fired power plants used for gravel road construction, ● Uncollected waste products dumped or buried informally, ● Local un-confined releases from industry such as on-site hazardous waste storage/burial, ● Spreading of sewage sludge with mercury content on agricultural land (sludge used as fertilizer), ● Application on land, seeds or seedlings of pesticides with mercury compounds.

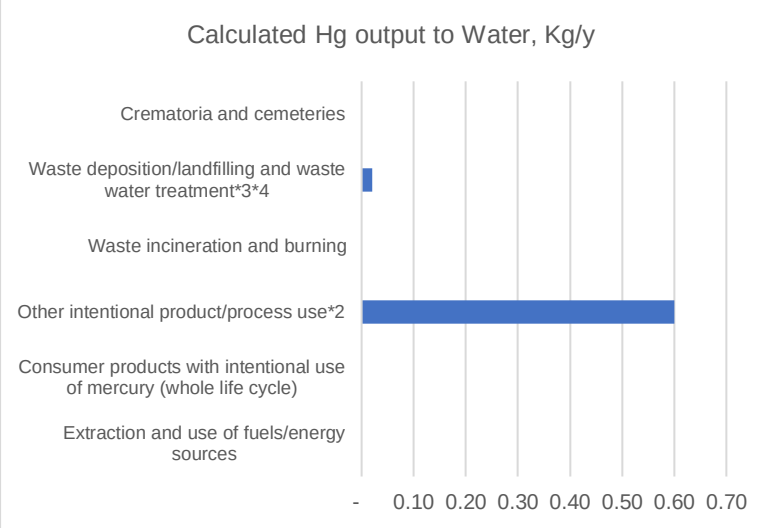
Calculation Result Type	Description *(NOTE: Not all examples provided are relevant to CKI but are included for general reference)*
By-products and impurities	By-products that contain mercury, which are sent back into the market and cannot be directly allocated to environmental releases, for example: ● Gypsum wallboard produced from solid residues from flue gas cleaning on coal fired power plants, ● Sulphuric acid produced from desulphurization of flue gas (flue gas cleaning) in non-ferrous metal plants with mercury trace concentrations, ● Chlorine and sodium hydroxide produced with mercury-based chlor-alkali technology; with mercury trace concentrations, ● Metal mercury or calomel as by-product from non-ferrous metal mining (high mercury concentrations).
General waste	General waste: Also called municipal waste in some countries. Typically, household and institution waste where the waste undergoes a general treatment, such as incineration, landfilling or informal dumping. The mercury sources to waste are consumer products with intentional mercury content (batteries, thermometers, fluorescent tubes, etc.) as well as high volume waste like printed paper, plastic, etc., with small trace concentrations of mercury.
Sector specific waste treatment /disposal	Waste from industry and consumers which is collected and treated in separate systems, and in some cases recycled, for example: ● Confined deposition of solid residues from flue gas cleaning on coal fired power plants on dedicated sites, ● Hazardous industrial waste with high mercury content, which is deposited in dedicated, safe sites, ● Hazardous consumer waste with mercury content, mainly separately collected and safely treated batteries, thermometers, mercury switches, lost teeth with amalgam fillings, etc., ● Confined deposition of tailings and high-volume rock/waste from extraction of non-ferrous metals.

Table 7 summarises mercury releases to the various output pathways in CKI based on Toolkit calculations using mainly 2021 data and default values or extrapolations where data was not available. Details on how the release values were obtained are included in the respective subsections of this report. Source categories that were not identified as being present in CKI are not included in the table.



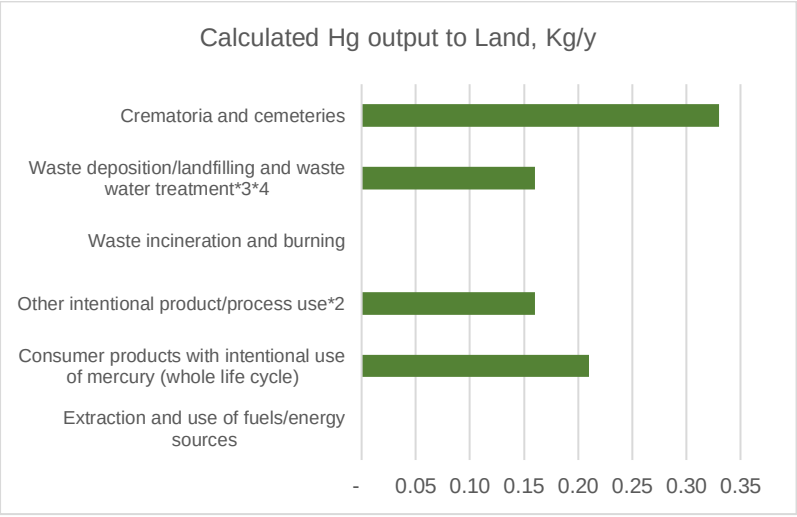
Waste incineration and burning contributed the most to air emissions at 0.34 Kg Hg/y, followed by the use and disposal of consumer products with mercury at 0.22 Kg Hg/y.

Figure 5: Mercury Emissions to Air Output Pathway from Present Mercury Source Categories



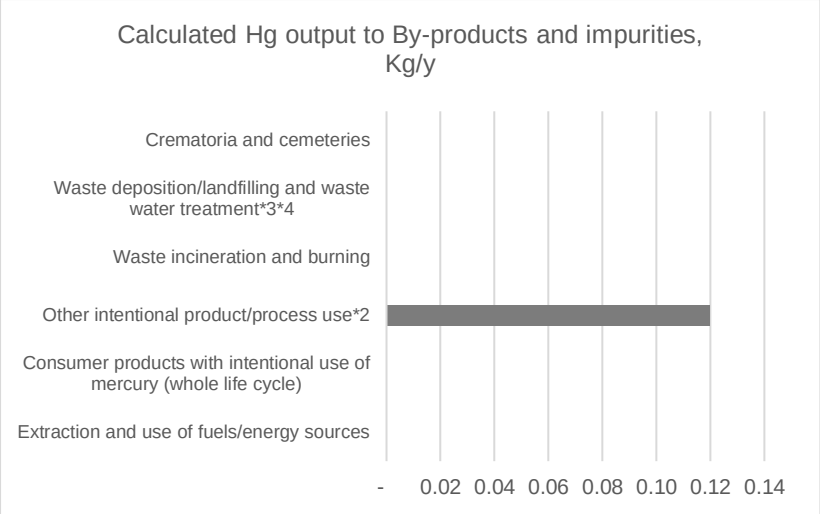
Other intentional product/process use which refers to the preparation, use and disposal of dental amalgam fillings resulted in 0.60 Kg Hg/y of releases to water. The potential mercury releases from the wastewater treatment category could not be quantified at the time of the inventory development but waste deposition/landfilling contributed to 0.02 Kg Hg/y.

Figure 6: Mercury Releases to Water Output Pathway from Present Mercury Source Categories



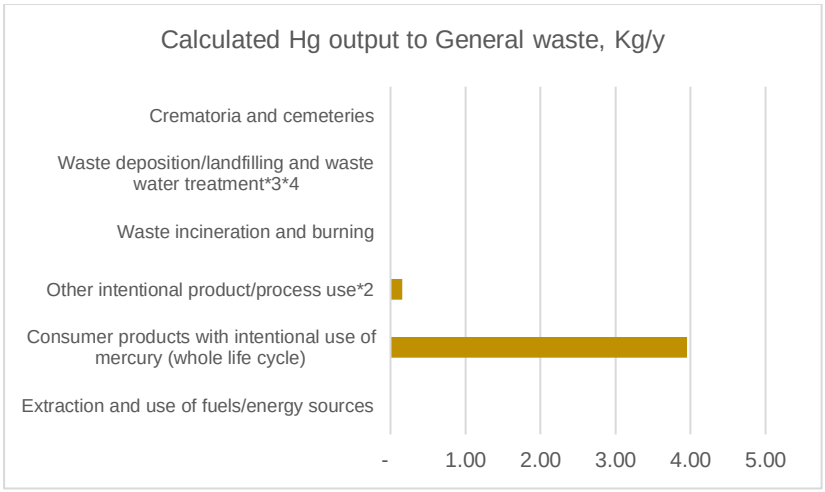
Mercury releases from cemeteries was estimated to be 0.33 Kg Hg/y, followed by releases from the disposal of consumer products at 0.21 Kg Hg/y. Other intentional product/process use and disposal of waste accounted for 0.16 Kg Hg/y being released per category.

Figure 7: Mercury Releases to Land Output Pathway from Present Mercury Source Categories



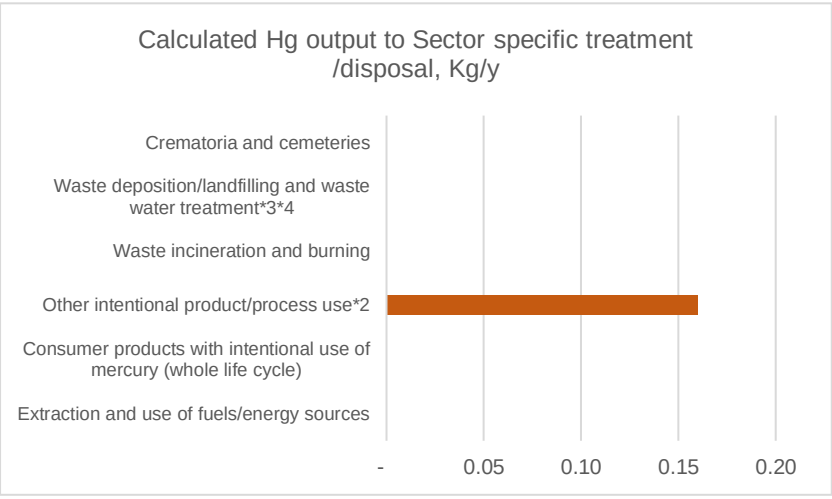
0.12 Kg Hg/y were estimated to be released to by-products and impurities due to the use and disposal of dental amalgam under the Other intentional product/process use category.

Figure 8: Mercury Releases to By-products and Impurities Output Pathway from Present Mercury Source Categories



Consumer Products with mercury was found to contribute the most to general waste releases at 3.95 Kg Hg/y followed by 0.16 Kg Hg/y from Other intentional products/process use.

Figure 9: Mercury Releases to General Waste Output Pathway from Present Mercury Source Categories



Other intentional product/process uses was found to be responsible for 0.16 Kg Hg/y of releases to sector-specific treatment/disposal pathways.

Figure 10: Mercury Releases to Sector Specific Treatment/Disposal Output Pathway from Present Mercury Source Categories

Table 7: Summary of mercury releases in CKI for 2021

Source category	Calculated Hg output, Kg/y					
	Air	Water	Land	By-products and impurities	General waste	Sector specific treatment/ disposal
Extraction and use of fuels/energy sources						
Mineral oils - extraction, refining and use	0.01	0.00	0.00	0.00	0.00	0.00
Biomass fired power and heat production	-	-	-	-	-	-
Consumer products with intentional use of mercury						
Electrical switches and relays with mercury	0.21	0.00	0.21	0.00	1.66	0.00
Light sources with mercury	0.01	0.00	0.00	0.00	0.22	0.00
Batteries with mercury	0.00	0.00	0.00	0.00	2.07	0.00
Other intentional product/process use						
Dental mercury-amalgam fillings	0.00	0.60	0.16	0.12	0.16	0.16
Waste incineration*3						
Incineration of general waste	0.10	0.00	0.00	0.00	0.00	0.00
Incineration of medical waste	0.10	0.00	0.00	0.00	0.00	0.00
Informal waste burning	0.14	0.00	0.00	0.00	0.00	0.00
Waste deposition/landfilling and wastewater treatment						
Controlled landfills/deposits*3	0.04	0.00	0.00	0.00	0.00	0.00
Informal dumping of general waste*1*3	0.02	0.02	0.16	0.00	0.00	0.00
Waste water system/treatment*2	-	-	-	-	-	-
Crematoria and cemeteries						
Cemeteries	0.00	0.00	0.00	0.33	0.00	0.00
SUM OF QUANTIFIED INPUTS AND RELEASES *1*2*3*4	**0.63**	**0.62**	**0.70**	**0.12**	**4.00**	**0.16**

***Notes**:*

**1: 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.*

**2: The estimated release to water include mercury amounts which have also been accounted for under each source category. To avoid double counting release to water from wastewater system/treatment have been subtracted automatically in the TOTALS.*

**3: 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.*

**4 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.*

Total mercury releases in CKI in 2021 were estimated to be 6.24 Kg Hg/y.

The following sub-categories were estimated to be the top sources of mercury releases:

1. Electrical switches and relays with mercury (2.08 Kg Hg/y)
2. Batteries with mercury (2.07 Kg Hg/y)
3. Dental Amalgam Fillings (1.20 Kg Hg/y)

2.1.4 Summary of Mercury Stockpiles, Supply and Trade

The Minamata Convention on Mercury outlines the obligations of Parties in terms of managing mercury supply sources and trade in Article 3. The provisions of the article refer to restrictions for the Party's territory regarding:

- Primary mercury mining;
- Individual stocks of mercury or mercury compounds exceeding 50 metric tons;
- Sources of mercury supply generating stocks exceeding 10 metric tons per year; and
- The import and export of mercury under circumstances described within the article.

If any such stockpiles are identified, Article 10 of the Convention regarding environmentally sound interim storage of mercury, other than waste mercury, would also apply.

There are no industries in CKI, which generate or use mercury as described by the Convention. Therefore, there are no such stockpiles in the country and no supply and trade in this regard.

2.2 Data and Inventory on Extraction and Use of Fuels/Energy Sources

2.2.1 Use of Mineral Oils

Through the extraction, refining and use of various fuels, small amounts of mercury impurities which may be naturally present, can be released into the environment. In CKI, no extraction or refining of fuel sources occurs but fuels such as diesel, gasoline and aviation fuel are imported for electricity generation and transportation purposes.

When oil products are combusted, mercury is primarily emitted to the air. Mercury concentrations in oils vary widely based on their source geology and in order to estimate potential releases in the Toolkit, globally available data on mercury concentrations in oils assessed over the years was analysed.

Data Collection and Assessment

For collection of data for use of mineral oils, Te Aponga Uira (Rarotonga Electricity Authority), the main supplier of electricity, was engaged. It was indicated that the total diesel consumption for the 2020/21 fiscal year was approximately 6,100,00 litres. For input into the Toolkit, these values were converted to tonnes per year (t/y) using the Unit Conversion tab in the UNEP Toolkit (summarised in Table 8).

Table 8: Summary of Estimated Imports of Fuels in 2020/2021 Converted to tonnes/year.

Type of Fuel	Estimated Use of Fuels 2020/2021 (litres/year)	Estimated Use of Fuels (tonnes/year)
Diesel	6,100,000	5,143

The amount of fuel used for transportation and other uses was not available at the time of the inventory development. Specific mercury content data was not available for any of the fuel sources. The recommended input factor provided in the Toolkit was used for calculations.

Table 9 summarises the mercury inputs and releases to CKI from the extraction and use of mineral oils. The input factors and output distribution factors used to estimate mercury releases were obtained from the Toolkit.

Table 9: Analysis of mercury inputs and outputs from the use of mineral oils

Use of Mineral Oils	Unit	Other Oil Combustion Facilities (Powerplant)
Activity rate	t/y	5,143
Input factor for phase	mg Hg/t	2.00
Calculated input to phase	**Kg Hg/y**	**0.01**
Output distribution factors for phase:		
- Air	N/A	1.00
- Water	N/A	-
- Land	N/A	-
- Products	N/A	-
- General waste treatment	N/A	-
- Sector specific waste treatment	N/A	-
Calculated outputs/releases to:		
- Air	Kg Hg/y	0.01
- Water	Kg Hg/y	-
- Land	Kg Hg/y	-
- Products	Kg Hg/y	-
- General waste treatment	Kg Hg/y	-
- Sector specific waste treatment	Kg Hg/y	-

2.2.2 Biomass fired power and heat production.

Biomass may naturally contain mercury as an impurity which can be released during burning as a fuel source (UNEP, 2019a). Vegetation also absorbs atmospheric mercury overtime which is readily re-released to the air upon combustion (UNEP, 2019a).

Data Collection and Assessment

Quantifiable data on the amount of biomass that may be used for cooking purposes was not available at the time of the inventory. Based on population size, it was assumed that mercury releases from this source would be negligible.

2.3 Data and Inventory on Consumer Products with Intentional Use of Mercury

Mercury has been added intentionally in several consumer products over the years due to its useful properties such as its high density and low vapour pressure. At each stage of the lifecycle of a product, mercury may be released due to the type of manufacturing processes used, handling procedures and disposal methods (UNEP, 2019a). In recent years, global trends have indicated that production and use of mercury-added products has greatly reduced due to more awareness of the dangers posed by mercury and technological advancements that have made mercury-free alternatives more accessible. While mercury releases from production and use are expected to be reduced, releases from the disposal of products over the years is also a factor considered in the Toolkit. Disposal of the products after use may occur directly to soil through landfills and informal dumping sites, to the air via waste incineration and informal burning, and to water through wastewater treatment, landfill leachate and runoff, according to the types and efficiency of waste collection and handling procedures implemented (UNEP, 2019a).

In CKI, no production of products containing mercury occurs. However, items may be imported, used and disposed of locally.

2.3.1 Use and Disposal of Electrical Switches and Relays

Mercury has been used in some switches and relays, generally found in various electronic equipment due to its high density, conductivity and sensitivity to temperature (UNEP, 2019a). Over the past twenty (20) years, mercury-free alternatives have become more common on the market (examples shown in Table 10). However, due to the long service life of mercury switches and relays (ranging from 10-50 years, primarily based on the life span of the equipment in which the switch or relay is contained), mercury from these items is expected to be present in wastes for many years despite the use of alternative products.

Table 10: Mercury-added Electrical Switches and Relays and their Alternatives (IMERC, 2014; IMERC, 2018).

Potentially Mercury-added Component or Product	**Mercury-free Alternative(s)**
Float switch	Mechanical, magnetic dry reed, optical, conductivity, metallic ball, sonic or ultrasonic, pressure transmitter, alloy, thermal, and capacitance float switches
Tilt switch	Metallic ball, electrolytic, mechanical, solid-state, and capacitance tilt switches; potentiometers
Pressure switch	Mechanical or solid-state switches
Temperature switch	
Mercury displacement relay	Dry magnetic reed, electro-mechanical, and solid-state relays; silicon-controlled rectifiers
Mercury wetted reed relay	
Mercury contact relay	
Flame sensor	Electronic ignition systems

Potentially Mercury-added Component or Product	Mercury-free Alternative(s)
Mercury thermostat	Electromechanical Thermostats (e.g., reed switch, snap-switch etc.); Digital Thermostat (electronic programmable)

Data Collection and Assessment

As electrical switches and relays are typically found as components of larger products, determining quantities that are in use in a country and their mercury content is extremely difficult. Default Toolkit calculations were used to estimate mercury input to society and output from this category. The calculations utilized the number of inhabitants and the percent electrification rate from 2011 to give a more accurate estimation of the historical consumption and 2021 disposal rates. Table 11 details the factors used to estimate mercury releases to various output pathways from the use and disposal of mercury-added electrical switches and relays.

Table 11: Analysis of mercury inputs and outputs from the historical use and disposal of mercury-added electrical switches and relays.

Electrical Switches and Relays with Mercury	Unit	Use and Disposal of Electrical Switches and Relays
Activity rate	inhabitants (2011)	14,974
Input factor for phase	Percent of population with access to electricity	99.00
	g Hg/y*inhabitant	0.14
Calculated input to phase (no separate collection. Waste handling controlled)	**Kg Hg/y**	**2.08**
Output distribution factors for phase:		
- Air	N/A	0.1
- Water	-	-
- Land	N/A	0.1
- Products	-	-
- General waste treatment	N/A	0.8
- Sector specific waste treatment	-	-
Calculated outputs/releases to:		
- Air	Kg Hg/y	0.21
- Water	Kg Hg/y	-
- Land	Kg Hg/y	0.21
- Products	-	-
- General waste treatment	Kg Hg/y	1.66
- Sector specific waste treatment	-	-

2.3.2 Use and Disposal of Light Sources

Mercury has been used in various discharge lamps including linear fluorescent tubes (LFLs), compact fluorescent lamps (CFLs), mercury vapour lamps, high-pressure sodium lamps and

metal halide lamps. CFLs and LFLs are typically used for general lighting in residences and buildings, while high-pressure sodium lamps and metal halide lamps can be used in streetlights and lights utilized in stadiums. The amount of mercury contained in these light sources vary and depend on the type of bulb. While mercury-free Light Emitting Diode (LED) bulbs have become more popular in recent years, mercury added lighting devices are still found in stock globally.

Mercury is not considered a threat to the environment when it is contained within the glass tube of the bulbs. However, when lighting devices are broken accidentally or through disposal, mercury can be released into the environment (UNEP, 2019a).

Lighting products containing mercury are not produced in CKI, however, they are imported.

Data Collection and Assessment

Customs data for 2020 indicated that a total of 252,414 lighting devices were imported. There was no distinction amongst the different types of lighting nor whether the devices contained mercury. To estimate the number of mercury-added lighting devices for the inventory development, extrapolations were made based on observations in retail stores visited as detailed in Table 12.

Number of single-ended bulbs: 75% x 252,414 = 189,310 units

Number of Hg-containing CFLs: 1/9 x 189,310 = 21,034 units

Number of double-ended bulbs: 25% x 252,414 = 63,104 units

Number of Hg-containing LFLs: 1/3 x 63,104 units = 21,035 units

Assumption that no other types of lighting devices contain Hg as unable to distinguish types from Customs data, trends also indicate LED alternatives becoming more popular.

Mercury-free LED single-ended and linear bulbs were the predominant types found, although CFLs and LFLs were also noted in lesser quantities. Most lighting fixtures sold were LED-compliant.

In terms of High Intensity Discharge Lamps (HIDLs), LED and LED-compliant lighting fixtures appeared to be the most commonly available. Based on this observation, the number of mercury-added metal halide lamps were assumed to be negligible.

In order to estimate the number of CFLs and LFLs sold in 2021 for entry in the Toolkit, assumptions based on population data and retail store observations were made as detailed in Table 12.

Table 12: Assumptions made in Data used for Input in Toolkit to Estimate Mercury Releases for Lighting Products

Toolkit Source Category for Lighting Products	Estimated Number of Items Sold in 2020	Assumptions made
Linear Fluorescent Tubes (LFL double ended)	21,035	In comparison to single-ended bulbs, double-ended bulbs were observed in lower quantities in retail stores. Approximately 1/4 of lighting devices (resulting in 63,104 units) were estimated to be double-ended. Approximately 1/3 of the double-ended bulbs observed were mercury-added LFLs (1/3 x 63,104 = 21,035 units).
Compact Fluorescent Lamp (CFL single end)	21,034	In comparison to double-ended bulbs, single-ended bulbs were observed in higher quantities in retail stores. Approximately 3/4 of lighting devices (resulting in 189,310 units) were estimated to be single-ended. Approximately 1/9 of the single-ended bulbs observed were mercury-added CFLs (1/9 x 189,310 = 21,034 units).
Overall assumptions: 1. Observations made in retail stores would be representative of the rest of the country. This estimation also did not take into account businesses or public institutions. 2. HIDLs (includes High pressure sodium lamps and Metal Halide Lamps) were not accounted for as it was assumed that the total number of lighting devices imported in 2020 were either single or double-ended lighting devices.		

Table 13 summarises the mercury inputs and releases to CKI from the estimated number of mercury added lighting devices sold in 2020. The input factors and output distribution factors used to estimate mercury releases were obtained from the Toolkit.

Table 13: Analysis of mercury inputs and outputs from the use and disposal of lighting devices

Use and Disposal of Lighting Devices	Unit	LFLs	CFLs
Activity rate	items/y	21,035	21,034
Input factor for phase	mg Hg/t	8.00	2.70
Calculated input to phase	**Kg Hg/y**	**0.17**	**0.06**
		0.23	
Output distribution factors for phase *(No separate collection; Waste Handling Controlled)*:			
- Air	N/A	0.05	
- Water	N/A	-	
- Land	N/A	-	
- Products	N/A	-	
- General waste treatment	N/A	0.95	
- Sector specific waste treatment	N/A	-	
Calculated outputs/releases to:			

Use and Disposal of Lighting Devices	Unit	LFLs	CFLs
- Air	Kg Hg/y	0.01	
- Water	Kg Hg/y	-	
- Land	Kg Hg/y	-	
- Products	Kg Hg/y	-	
- General waste treatment	Kg Hg/y	0.22	
- Sector specific waste treatment	Kg Hg/y	-	

2.3.3 Use and Disposal of Batteries

Mercury has been used in various types of batteries such as primary, non-rechargeable batteries which contain mercury include mercury oxide batteries, some cylindrical alkaline batteries, and some button cell batteries (alkaline, zinc/air, silver oxide) over the years. Mercury concentrations have ranged greatly amongst different types of batteries from less than 1% wet weight (w/w) to 30-32% w/w. Once intact, mercury added batteries do not pose a threat to human health or the environment while in use but become a hazard when the batteries are damaged or disposed of.

As of 2019, global market data on mercury-added batteries found that many well-known global battery suppliers only supply mercury-free batteries. Furthermore, as of January 2021, China prohibited the manufacturing and import of mercury-added batteries except for the types still allowed under the Minamata Convention (UNEP, 2019a).

In CKI, batteries are imported for use in various equipment and applications. There is no separate collection of batteries for disposal.

Data Collection and Assessment

Import data received from Customs indicated that 173.064 tonnes (173,064 kg) of batteries for 2020 were imported. This value likely included all types of batteries such as larger car batteries among other types. It is assumed that batteries of relevance for the inventory would only make up a small portion of the total tonnes recorded. The following assumptions were made to determine the weight of mercury-added batteries imported for entry in the Toolkit:

- A rough estimation that 10% of the total weight of battery imports refer to alkaline and button battery cells = 1.73 t.
- Based on global trends that have indicated that most manufacturers (Panasonic, Energizer etc.) have phased out the use of mercury in batteries since 2019, it was assumed that approximately 50% of relevant batteries contain mercury = 0.87 tonnes.
- Based on weight of the types of mercury-added batteries available, it was assumed that:
    - Alkaline button cells = 25% x 0.87 t = 0.218 tonnes
    - Silver oxide button cells = 25% x 0.87 t = 0.218 tonnes
    - Alkaline, other than button cells = 50% x 0.87 t = 0.435 tonnes.

Table 14 indicated the amount of mercury estimated to be released from this source.

Table 14: Analysis of mercury inputs and outputs from the use and disposal of batteries with mercury

Use and Disposal of Batteries with mercury	Unit	Alkaline button cells	Silver oxide button cells	Alkaline, other than button cell shapes
Activity rate	t/y	0.218	0.218	0.435
Input factor for phase	Kg Hg/t	5.00	4.00	0.25
Calculated input to phase	**Kg Hg/y**	**1.10**	**0.90**	**0.10**
		2.07		
Output distribution factors for phase *(No separate collection; Waste Handling Controlled)*:				
- Air	N/A	-		
- Water	N/A	-		
- Land	N/A	-		
- Products	N/A	-		
- General waste treatment	N/A	1.00		
- Sector specific waste treatment	N/A	-		
Calculated outputs/releases to:				
- Air	Kg Hg/y	-		
- Water	Kg Hg/y	-		
- Land	Kg Hg/y	-		
- Products	Kg Hg/y	-		
- General waste treatment	Kg Hg/y	2.07		
- Sector specific waste treatment	Kg Hg/y	-		

2.4 Data and Inventory on Other Intentional Product/Process Use

2.4.1 Dental mercury-amalgam Fillings

Dental amalgam, which is a mixture of metals including mercury, is used in dental restoration procedures to fill cavities (FDA, 2017). The amalgam can be supplied to dentists in the following forms:

- Pre-capsulated dental amalgam (silver amalgam) (single-dental restoration capsules of pre-dosed amalgam)
- Powdered mercury alloy or liquid elemental mercury (requires manually taking out needed amounts and mixing).

Mercury releases from dental amalgam fillings occur to the air, water and waste during the production of amalgam at factories; when amalgam is being prepared, placed, shaped or repaired at clinics; through natural wearing away in a person's mouth; during disposal of the amalgam after it is removed; and when a person with amalgam is buried or cremated after death (UNEP, 2019a).

Under the Minamata Convention on Mercury, the manufacture, import and export of dental amalgam is not yet prohibited but a phase-down approach is outlined by which Parties should

adopt at least two (2) of several suggested approaches for restricting use. Further to the recommended measures, as of 2022, Parties are obligated to, "exclude or not allow, by taking measures as appropriate, the use of mercury in bulk form by dental practitioners". The use of pre-capsulated single-dose dental restoration capsules which have a lesser risk of mercury exposure is allowed.

As of 2022, Parties will also be expected to take appropriate measures to prevent dental amalgam use for patients under 15 years of age, and of pregnant and breastfeeding women, except when considered necessary.

Data Collection and Assessment

To gather information on the use of dental mercury amalgam fillings, phone calls and a site visit with the Dental division of Te Marae Ora (TMO), Cook Islands Ministry of Health were carried out. Prior to 2021, it was estimated that between 1 – 4 Kg of dental amalgam may have been used per year but since 2021, the use of dental amalgam had been largely phased out. It is, however, still available in some cases of emergency or upon request from elderly patients who were averse to newer versions of fillings. It was also noted that mercury from dental amalgam was last sent to the medical waste incinerator in 2017, having been largely phased down.

In order to estimate mercury releases from dental amalgam fillings used and disposed of over the years, default calculations derived from the Toolkit were used. These calculations utilized the number of dentists per 1,000 inhabitants (estimated to be 0.5556 for CKI according to the Toolkit) as well as the number of inhabitants.

Given that the preparation of dental amalgam since 2021 has been largely phased out according to TMO, the mercury input and releases occurring from the use of amalgam fillings were expected to have been from amalgam placed 10 years prior in 2011 since mercury amalgam can last between 10-20 years before needing to be replaced. Mercury input from the disposal of dental amalgam was calculated using the country's population from 2011 as well.

According to the Toolkit, the overall input of mercury to society from the use and disposal of dental amalgam over the years was calculated to be approximately 1.20 Kg Hg/y once double-counting assumptions were accounted for. The summary of estimated inputs and releases of mercury from dental amalgam is provided in Table 15.

Due to the gradual phasing out of mercury amalgam, estimated releases from this sector are expected to be reduced in further years.

Table 15: Analysis of mercury inputs and outputs from the preparation, use and disposal of dental amalgam.

Dental Mercury-Amalgam Fillings	Unit	Use	**Disposal** (In countries where only dental chair filters/strainers are used in most clinics)
Activity rate	Inhabitants (2011)	14,974	14,974
	Dentists per 1000 inhabitants	0.5556	0.5556
Input factor for phase	g Hg/(y*inh)	0.2	0.2
Calculated input to each phase	**Kg Hg/y**	**2.01**	**2.01**
Total input	**Kg Hg/y**	**1.20**	
Output distribution factors for phase:			
- Air	N/A	-	-
- Water	N/A	0.02	0.28
- Land	N/A	-	0.08
- Products	N/A	-	0.06
- General waste treatment	N/A	-	0.08
- Sector specific waste treatment	N/A	-	0.08
Calculated outputs/releases to:			
- Air	Kg Hg/y	-	-
- Water	Kg Hg/y	0.04	0.56
- Land	Kg Hg/y	-	0.16
- Products	Kg Hg/y	-	0.12
- General waste treatment	Kg Hg/y	-	0.16
- Sector specific waste treatment	Kg Hg/y	-	0.16

2.5 Data and Inventory on Waste Incineration

2.5.1 Incineration of General Waste

General waste is considered to consist of non-hazardous solid waste and household waste. (UNEP, 2019a). Controlled burning of municipal solid waste may occur without pre-treatment or with treatment in order to produce ‘refuse-derived fuel' (UNEP, 2019a). Mercury may be released from incinerated consumer products that may include thermometers, lighting devices, and mercury containing chemicals; it may also be released from human secretions.

Data Collection and Assessment

Based on a waste audit conducted by PRIF (2021), it was noted that incineration of airport waste (inclusive of incoming aircraft waste) occurs at Rarotonga Airport. Waste is incinerated in large steel drums in a designated area of the airport compound. A 2016 study by Tonkin and Taylor Ltd. (2016) estimated that approximately 50 – 100 t/y of waste is incinerated at the airport. The median value of 75 t/y was assumed to be the volume of waste incinerated in 2021 and entered into the Toolkit (Table 16) to estimate mercury releases.

Table 16: Analysis of mercury inputs and outputs from controlled incineration of general waste

Incineration of general waste	Unit	Waste Incinerated
Activity rate	Waste incinerated, t/y	75.00
Input factor for phase	g Hg/t waste	1.00
Calculated input to phase	**Kg Hg/y**	**0.10**
Output distribution factors for phase:		
- Air	N/A	1.00
- Water	-	-
- Land	-	-
- Products	-	-
- General waste treatment	-	-
- Sector specific waste treatment	-	-
Calculated outputs/releases to:		
- Air	Kg Hg/y	0.10
-Water	-	-
- Land	-	-
- Products	-	-
- General waste treatment	-	-
- Sector specific waste treatment	-	-

2.5.2 Incineration of Medical Waste

Medical waste is any waste generated from medical activities taking place at hospitals, healthcare facilities, dental clinics, etc. and usually includes human secretions, pharmaceuticals, packaging materials and various tools used in medical treatment. Incineration is usually used to destroy different toxins, pathogens and viruses contained within the waste (UNEP, 2019a).

Mercury may be released from incinerated medical products that may include medical thermometers, blood pressure gauges, dental amalgam fillings and mercury containing chemicals; it may also be released from human secretions.

Data Collection and Assessment

Based on a 2014 survey conducted, it was indicated that a medical waste incinerator was present at the Rarotonga Hospital. It was noted that the diesel-powered incinerator was in good condition, functioned regularly and was situated in a good position away from main hospital buildings (ENVIRON Australia Pty Ltd, 2014). The available estimates for 2014 of the amount of medical waste incinerated at Rarotonga Hospital was found to be 4,940 Kg/y. It was assumed that this would be similar to the amount of waste incinerated in 2021 and was therefore entered into the Toolkit (Table 17).

Table 17: Analysis of mercury inputs and outputs from medical waste incineration

Medical Waste Incineration	Unit	Waste incinerated
Activity rate	Waste incinerated, t/y	4.94
Input factor for phase	g Hg/t waste	24.00
Calculated input to phase	**Kg Hg/y**	**0.10**
Output distribution factors for phase:		
- Air	N/A	1.00
- Water	-	-
- Land	-	-
- Products	-	-
- General waste treatment	-	-
- Sector specific waste treatment	-	-
Calculated outputs/releases to:		
- Air	Kg Hg/y	0.10
-Water	-	-
- Land	-	-
- Products	-	-
- General waste treatment	-	-
- Sector specific waste treatment	-	-

2.5.3 Open Waste Burning on Landfills and Informally

Informal/open waste burning refers to waste incineration undertaken in informal conditions such as in barrels, containers, or on bare land without emission controls (UNEP, 2019a). Mercury present in waste is released to air and incineration residue which may pollute the air, land, groundwater, and surface waters (UNEP, 2019a).

Data Collection and Assessment

While formal waste collection systems are available to the majority of residents in Rarotonga and Aitutaki, some areas including The Outer Islands, depend on informal systems (SPREP, 2023). Quantified data was not available to determine the amount of waste burnt informally. As such, estimations were determined based on several assumptions. According to a 2016 census conducted, approximately 7.6% of households in CKI did not use formal waste collection systems. Using the amount of waste estimated to be sent to landfills (4,200 t/y based on calculations by ADB, 2014), the following was calculated:

- Assuming that 4,200 t/y represents the total amount of waste for CKI that is sent to landfills, it can be deduced that this figure represents 92.4% of the total waste stream for CKI per year.
- Therefore, 7.6% of waste disposed of informally results in (4,200/92.4 x 7.6) 345 t/y of waste.
- Of the amount of waste disposed of informally, it was estimated that 41% is burnt resulting in 141.45 t/y being estimated for entry in the Toolkit (Table 18).

Table 18: Analysis of mercury inputs and outputs from informal burning of waste

Informal Burning of Waste	Unit	Waste burnt
Activity rate	Waste burnt, t/y	141.45
Input factor for phase	g Hg/t waste	1
Calculated input to phase	**Kg Hg/y**	**0.14**
Output distribution factors for phase:		
- Air	N/A	1.00
- Water	-	-
- Land	-	-
- Products	-	-
- General waste treatment	-	-
- Sector specific waste treatment	-	-
Calculated outputs/releases to:		
- Air	Kg Hg/y	0.14
-Water	-	-
- Land	-	-
- Products	-	-
- General waste treatment	-	-
- Sector specific waste treatment	-	-

2.6 Data and Inventory on Waste Deposition/Landfilling and Wastewater Treatment

2.6.1 Controlled Landfills

Controlled landfills refer to specially designated areas for waste deposition which are specially designed to prevent or reduce releases and emissions of waste components to the environment. Different types of designs for controlled landfills exist ranging from areas lined with impermeable materials such as clay or the development of leachate ponds to isolate liquid run-off to more technical engineering designs. Wastes deposited in landfills with efficient built-in measures are more effective at preventing contamination of surrounding areas with hazardous waste components including mercury (UNEP, 2019a).

Mercury in municipal waste varies typically depending on the amount of discarded, damaged or broken MAPs disposed of in the landfills (UNEP, 2019a). Mercury contained within MAPs may evaporate resulting in air emissions and small amounts of mercury may leach into waterways.

Data Collection and Assessment

In CKI, the Rarotonga waste facility which includes a sanitary landfill and the Arorangi recycling facility, provides waste services for most of Rarotonga where the majority of the population of CKI live (SPREP, 2013). The Aitutaki Waste Facility provides formal waste disposal services for Aitutaki.

For the purpose of the inventory, waste estimates were obtained from the Solid Waste Management in the Pacific Cook Islands Country Snapshot (ADB, 2014) which estimated the

amount of waste deposited yearly at the Rarotonga landfill to be 4,200 t. It was assumed that this estimation would be the same in 2021. The amount of waste disposed of at the Aitutaki Waste Facility was not quantified and based on population size of Aitutaki, was assumed to be negligible for the purpose of the inventory development.

Mercury-added product waste is not separated from general waste. Table 19 provides a summary of the estimated mercury releases from controlled landfills/deposits for CKI. When calculations were adjusted to account for double-counting of mercury inputs due to other categories, it was determined that total releases to the environment was 0.04 Kg Hg/y released to air.

Table 19: Analysis of mercury inputs and outputs from controlled landfills/ deposits

Controlled Landfills/ Deposits	Unit	Controlled Landfills
Activity rate	Waste landfilled, t/y	4,200
Input factor for phase	g Hg/t waste	1
Calculated input to phase	**Kg Hg/y**	**4.20**
Output distribution factors for phase:		
- Air	N/A	0.01
- Water	N/A	0.0001
- Land	-	-
- Products	-	-
- General waste treatment	-	-
- Sector specific waste treatment	-	-
Calculated outputs/releases to:		
- Air	Kg Hg/y	0.04
-Water	Kg Hg/y	0.00
- Land	-	-
- Products	-	-
- General waste treatment	-	-
- Sector specific waste treatment	-	-

2.6.2 Informal Dumping of General Waste

Informal dumping refers to the disposal of general waste in areas that are not specifically designated for waste and are without any safeguards to prevent the release of pollutants into the environment (UNEP, 2019a). Waste may consist of residential, green and construction waste which may have trace amounts of mercury present in materials or through the disposal of MAPs.

Data Collection and Assessment

Informal dumping of waste may occur in areas in CKI where formal waste disposal systems are not readily accessible. As noted in the previous section on informal waste burning, approximately 7.6% of households in CKI did not use formal waste collection systems, resulting in 345 t/y of waste. Estimating that 41% of those households burn their waste, the remaining 59% is assumed to dump waste informally resulting in an estimated 203.55 t/y. This value was entered in the Toolkit to estimate releases as seen in Table 20.

Table 20: Analysis of mercury inputs and outputs from informal dumping of waste

Informal Dumps	Unit	Waste dumped
Activity rate	Waste dumped, t/y	203.55
Input factor for phase	g Hg/t waste	1
Calculated input to phase	**Kg Hg/y**	**0.20**
Output distribution factors for phase:		
- Air	N/A	0.1
- Water	N/A	0.1
- Land	N/A	0.8
- Products	-	-
- General waste treatment	-	-
- Sector specific waste treatment	-	-
Calculated outputs/releases to:		
- Air	Kg Hg/y	0.02
-Water	Kg Hg/y	0.02
- Land	Kg Hg/y	0.16
- Products	-	-
- General waste treatment	-	-
- Sector specific waste treatment	-	-

2.6.3 Wastewater System/Treatment

Wastewater systems or treatment processes are considered to be intermediate mercury release pathways for mercury that may have originated from MAPs such as dental amalgam that may have entered waterways through preparation or disposal or from other MAPs such as broken thermometers and other devices or industrial discharges. Atmospheric mercury, originating from both natural and anthropogenic sources may also enter wastewater when washed out by precipitation which makes its way into soil, surface and ground water (UNEP, 2019a).

Depending on the type of wastewater treatment, mercury content and distribution will vary as it may be released into waterways after treatment, distributed through sludge as fertiliser on land or as waste deposited at a landfill (UNEP, 2019a).

Data Collection and Assessment

In CKI, septic tank systems are common, and it was noted that there has been land application of septic sludge for planting (SOPAC, 2007). The presence of a reticulated sewerage system in Rarotonga for residents has also been noted (SOPAC, 2007).

No data on the amount of wastewater generated was available at the time of the inventory development.

2.7 Data and Inventory on Crematoria and Cemeteries

Mercury can accumulate in humans through the use of dental amalgam, exposure to mercury contained in products and intentionally used in processes, and consumption of mercury contaminated aquatic species. This mercury may be released after death when a corpse is cremated or buried.

2.7.1 Cemeteries

During decomposition, mercury in human corpses can be released into the soil in cemeteries. Mercury in corpses was typically estimated to be due to dental amalgam releases.

Data Collection and Assessment

Across CKI, cemeteries are located typically within communities. The number of deaths estimated in 2021 was provided by TMO and was used for entry in the Toolkit. Estimated mercury releases from burials are shown in Table 21.

Table 21: Analysis of mercury inputs and outputs from cemeteries

Cemeteries	Unit	Cemeteries
Activity rate	Corpses buried/y	124
Input factor for phase	g Hg/corpse	4
Adjustment for dental personnel density as dental amalgam is the major contributor to mercury in the human body	Dentist per 1000 inhabitants, country	0.5556
Calculated input to phase	**Kg Hg/y**	**0.33**
Output distribution factors for phase:		
- Air	-	-
- Water	-	-
- Land	N/A	1
- Products	-	-
- General waste treatment	-	-
- Sector specific waste treatment	-	-
Calculated outputs/releases to:		
- Air	-	-
-Water	-	-
- Land	Kg Hg/y	0.33
- Products	-	-
- General waste treatment	-	-
- Sector specific waste treatment	-	-

2.8 Stocks of Mercury and/or Mercury Compounds and Storage Conditions

As per Article 3, Part 1 of the Minamata Convention on Mercury, "mercury" and "mercury containing compounds" refer to mixtures of mercury with other substances, mercury (I) chloride, mercury (II) oxide, mercury (II) sulphate, mercury (II) nitrate, cinnabar and mercury sulphide.

Article 3, Part 5a states that each Party shall endeavour to identify individual stocks of mercury or mercury compounds (not including MAPs) over 50 metric tonnes. If any such stocks are identified, Article 10 of the Convention regarding environmentally sound interim storage of mercury, other than waste mercury, would also apply.

CKI does not currently have any notable stocks of mercury and/or mercury compounds as no significant activities occur that would require such stocks.

2.9 Supply and Trade of Mercury and Mercury Containing Compounds Including Sources, Recycling Activities and Quantities

Article 3 of the Minamata Convention also lists provisions for Parties to regulate the supply, export and disposal of mercury and mercury containing compounds. Part 5a states that each Party shall endeavour to identify sources of mercury supply generating stocks exceeding 10 metric tonnes per year, that are located within its territory.

Based on the inventory, it was determined that no significant sources, trade, or recycling of mercury and/or mercury compounds are present in CKI, and, therefore the interim storage provisions outlined in Article 10 of the Minamata Convention are not currently applicable to CKI.

2.10 Identification of Hot Spots of Mercury Contamination (Contaminated Sites)

Article 12 of the Minamata Convention on Mercury states that Parties should "develop appropriate strategies for identifying and assessing sites contaminated by mercury or mercury compounds". Risk reduction activities should be conducted using environmentally sound measures and should incorporate an assessment of the risks to human and environmental health from present mercury or mercury compounds. Hot spots of mercury contamination exist as the direct result of the use and release of mercury in processes leading to on-site deposition, as well as the inadequate disposal of mercury-contaminated materials. Previous deposits of mercury may still have the potential to release significant amounts of mercury and pose a risk to human health and the environment. Potential hot spots may include reservoirs where mercury containing materials have been stored, dumped or accumulated over many years.

Table 22 indicates potential sites that may be sources of mercury contamination. Figure 11 shows a map of Rarotonga, CKI where tracking of the locations of potentially mercury contaminated sites was initiated. Further geospatial data on the other islands of CKI is recommended to provide a clearer indication of potential sites of interest for the country as a whole.

Mercury inputs to the environment do not always directly correlate with mercury levels in biota and humans. Once in the environment, mercury can be converted into its more toxic and bioavailable form, methylmercury, by communities of iron- and sulphur- reducing bacteria. Methylmercury can bioaccumulate in individual organisms through time and biomagnify up trophic levels. A suite of factors impacts the potential of a particular system to methylate mercury depending on how favorable conditions are for the bacterial communities to methylate mercury.

For example, the wet-dry cycle associated with wetlands and mangroves or the ability of forest canopies to scavenge mercury from the air make ecosystems particularly sensitive to mercury inputs. Sensitive systems may exhibit high concentration and effects of mercury in biota despite low to moderate mercury inputs, while conversely, areas with low methylation potential may exhibit little mercury impact despite high inputs. As a result, it is important to understand the spatial context of potentially mercury contaminated sites to inform the threat from mercury contamination in the environment.

Table 22: Potentially contaminated sites for further analysis.

Potentially Contaminated Site	Description
Landfills and Open Dumps	Consumer products with mercury disposed of at landfills and open dumps may cause contamination of the site with mercury. The Rarotonga waste facility is identified in Figure 10. Data on other islands in CKI was not available for mapping but it is also noted that the Aitutaki Waste Facility may be a potential site of interest as well as the informal open dumps present across the country.
Hospital	Medical waste generated at hospitals is potentially contaminated with mercury. On-site waste storage areas and wastewater may be sources of mercury contamination.
Medical Waste Incinerator	Medical waste generated at hospitals is potentially contaminated with mercury which may be released when incinerated. The Rarotonga Hospital was noted to have a diesel-powered medical waste incinerator.
Sewage outflow	Wastewater can contain mercury waste from a variety of sources, including intentional use in products or processes. Wastewater treatment plants are sources of releases.
Power plant and fuels	Fossil fuels naturally have small amounts of mercury that can be released during incineration or accumulate slowly through time. In Rarotonga, the operational power plant is powered by diesel though efforts to transition fully to solar power is underway.

Further research on the spatial distribution of potentially contaminated sites in relation to ecosystem characteristics that increase the methylation potential of mercury inputs should be conducted to inform locations prioritized for further study on the threat from mercury on human health and the environment and for future use in evaluating the effectiveness of the Minamata

Convention. Additionally, these – and any additional – potentially contaminated sites should be verified by the relevant national authorities.

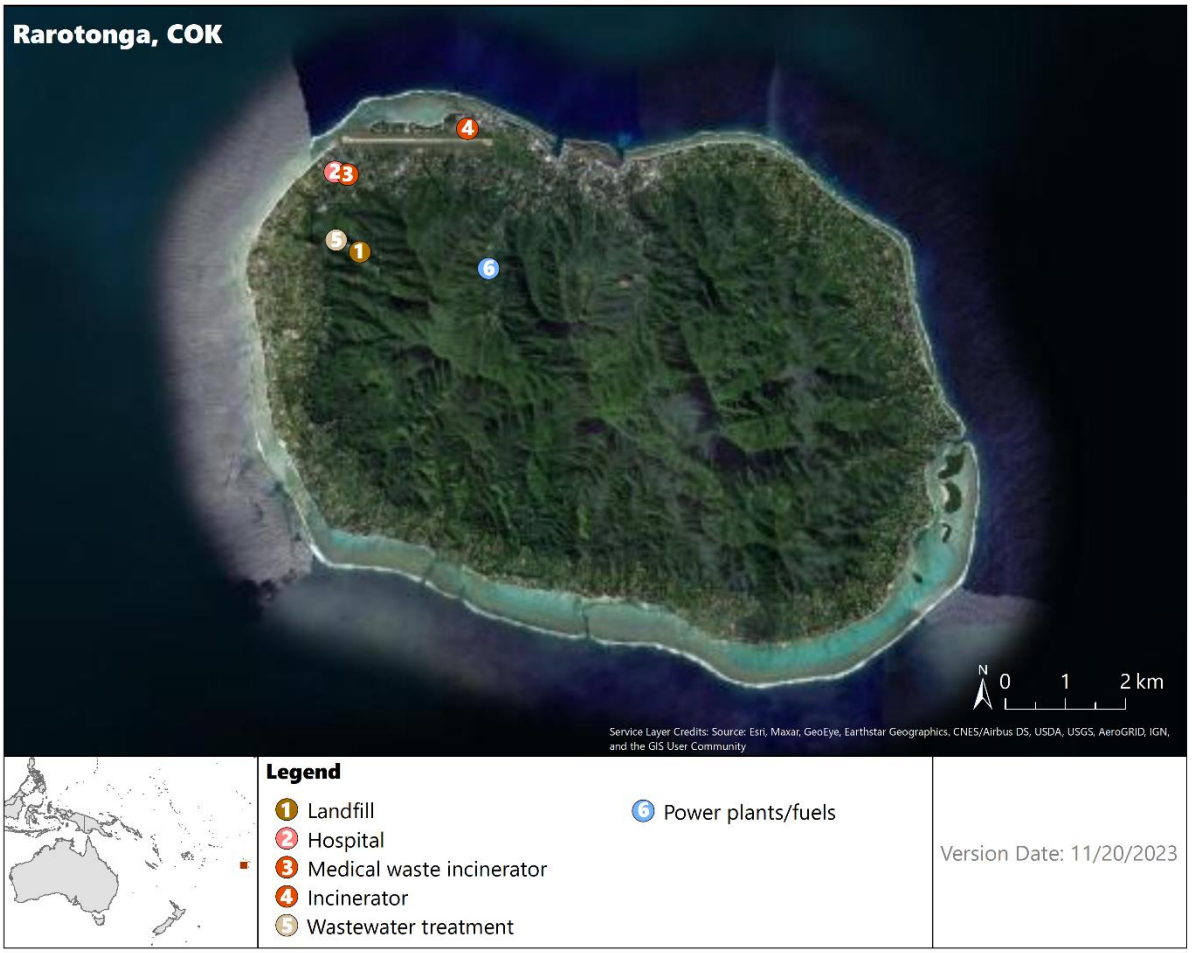


Figure 11: Map indicating potentially mercury contaminated sites in Rarotonga, CKI.

2.11 Impact of Mercury on Human Health and the Environment[2]

Elemental mercury, which is found in 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, is toxic to humans because it can biomagnify in food webs and bioaccumulate over time in organisms. A neurotoxin, methylmercury can cause physiological harm and behavioral disorders in people. Fish from the sea or freshwater systems can be a major source of methylmercury. 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. Many of the fish available in the Pacific are safe to eat, although more information is needed about the mercury

[2] Section contains extracts from "State of Mercury in the Pacific Region" (BRI, 2023).

concentrations to better characterize how mercury is distributed in different species of fish in the waterscape of Pacific nations.

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 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.

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 the greatest risk of mercury methylation include wetlands, mangroves, and aquatic habitats near contaminated sites (such as landfills). Wildlife at greatest risk of mercury contamination (besides fish species) include Albatrosses, Cormorants, Frigatebirds, Petrels, Shearwaters and Tern.

BRI, in collaboration with other entities under the Minamata Convention on Mercury, is working on several fronts to conduct and promote mercury biomonitoring across the globe. Biomonitoring is the process of assessing the health of organisms and ecosystems and tracking changes in mercury risk and exposure over time. Monitoring mercury exposure to humans will help the global community to meet the requirements of the Minamata Convention on Mercury and will also help identify global biological hotspots that represent elevated levels of mercury exposure that may pose serious threats to both ecosystem and human health.

In CKI, coordination between BRI and NES is being discussed to conduct a rapid mercury analysis of potential fish species of interest.

Chapter 3 Policy, Regulatory and Institutional Framework Assessment

To determine the legislative and institutional framework that would benefit CKI's accession of the Minamata Convention on Mercury, an assessment of existing legislation, policies and institutions was undertaken in relation to the relevant obligations of the Minamata Convention on Mercury. The Convention has 35 Articles outlining the functions of the Convention, its obligations for Parties to control mercury releases, support mechanisms and administrative arrangements.

Based on the findings of Chapter 2 of this report, the Articles of the Minamata Convention that are relevant to CKI are summarized in Table 23 below and form the basis of the legislative and institutional framework assessment detailed in Tables 24 and 25.

Table 23: Relevant Articles of the Minamata Convention on Mercury for CKI.

Control Measure Mechanisms		
Article	**Description**	**Relevance to CKI**
Article 4: Mercury Added Products	Prohibits the manufacture and trade after specified phase out dates of certain mercury-added products listed in Annex A Part I; and sets out measures to be taken to phase down the use of other mercury-added products listed in Annex A Part I; and sets out measures to be taken to phase down the use of other mercury-added products listed in Part II of the Annex.	CKI imports mercury added products listed in Annex A Part 1 such as mercury added lighting devices and batteries. Under Annex A Part 2, measures for the phase down of dental amalgam are outlined.
Article 8: Emissions	Controls and reduces emissions of mercury and mercury compounds to the atmosphere from certain point sources listed in Annex D (coal-fired power plants, coal-fired industrial boilers, non-ferrous metal smelting and roasting processes, waste incineration, and cement production).	In CKI, a point source listed in Annex D that is present is waste incineration facilities. Under the convention, air emissions must be monitored and Best Available Techniques/Best Environmental Practices should be implemented to reduce mercury emissions to air.
Article 9: Releases	Controls and reduces releases to land and water from relevant point sources not addressed in other provisions of the Convention.	The inventory of mercury releases detailed in Chapter 2 of this report identifies several potential sources of mercury releases to land and water that should be addressed.
Article 11: Mercury Wastes	Ensures that mercury wastes are managed in environmentally sound manner, only recovered for uses allowed, and only transported internationally for environmentally sound disposal in conformity with the Basel Convention.	Mercury wastes from the disposal of mercury added products and processes have been noted in Chapter 2.
Article 12: Contaminated Sites	Parties shall endeavor to develop strategies for identification and assessment of sites contaminated by mercury or mercury compounds.	A preliminary list of potential sources of mercury contamination are listed in Section 2.10 of this report.
Article 16: Health Aspects	Promotes the development and implementation of strategies and programmes to identify and protect populations at risk.	Vulnerable populations to mercury exposure have been identified and measures should be implemented to protect their health.

Convention Support Mechanisms		
Article	**Description**	**Relevance to CKI**
Article 13: Financial Resources and Mechanism	The Convention recognizes that providing financial assistance to developing countries will improve the effective implementation of the Convention. Funding mechanisms can be accessed through the GEF Trust Fund and a Specific International Programme to support capacity building and technical assistance under the Minamata Convention.	As a SIDS, CKI can benefit from funding to enhance implementation of the Minamata Convention.
Article 14: Capacity-building, Technical Assistance and Technology Transfer	Requires Parties to cooperate to provide timely and appropriate capacity building and technical assistance to developing country Parties, in particular LDCs, SIDS and Parties with economies in transition.	As a SIDS, CKI can benefit from the assistance and mechanisms available under the Minamata Convention.
Article 17: Information Exchange	Facilitates the exchange of information pertinent to the objective of the Convention and its effective implementation.	Relevant to CKI to meet reporting obligations under the Convention, as well as benefit from opportunities of information shared directly or through other relevant organisations (e.g. SPREP)
Article 18: Public Information, Awareness and Education	Promotes the provision of public information, education training and public awareness related to mercury.	Beneficial for the overall awareness raising amongst stakeholders in CKI on mercury issues.
Article 19: Research, development and monitoring	Promotes cooperation to develop and improve research, development and monitoring of mercury	Beneficial for the continued understanding of the impacts of mercury through monitoring activities.
Article 21: Reporting	Requires Parties to report to COP on the measures taken to implement provisions of the Convention.	Should CKI become a Party, regular reporting will be required.

3.1 Assessment of Policies and Legislation

An assessment of the existing MEAs, policies and legislation of relevance to the articles of the Minamata Convention outlined in Table 23 is provided in Table 24.

Table 24: Existing Policy and Regulatory Measures, Gaps and Recommendations for Implementation of the Minamata Convention

Article	Existing Policy/Regulatory Measure	Relevance
Article 4 – Mercury-added products	**Customs Revenue and Border Protection Act 2012**	Regulates border control and management, and the import/export of goods. Schedule 1 lists goods prohibited from import into Cook Islands. Section 90(3) enables regulations to prohibit importation into the Cook Islands "any specified goods…" or "goods… of a specified class or classes" if prohibition is necessary in the public interest.

		Section 91(3) enables regulations to prohibit exportation from the Cook Islands "any specified goods" or "goods…of a specified class or classes" if prohibition is necessary in the public interest. Note: Opportunity to amend Schedule 1 to include the Convention's Part I Annex A mercury-added products, or establish regulations to ban import/export.
	Environment Act 2003	Section 70(s) allows creation of regulations prohibiting or regulating the importation or disposal of recyclable or non-recyclable products. An example of regulations created is the Prohibition on Importation of Plastic Shopping Bags Regulations 2012, making the import of non-biodegradable shopping bags into the Cook Islands an offence. Note: Opportunity to establish regulations prohibiting the import of Part I Annex A mercury-added products.
	Solid and Hazardous Waste Bill (currently under development and planned to be passed 2022)	Section 8 provides for the import of articles and substances listed in Schedule 1 is prohibited. Articles and substances listed in Schedule 1 lists articles and substances that are declared to be or that generate, unnecessary waste or waste that is difficult to dispose of in the Cook Islands. Note: Opportunity to add Part I Annex A mercury-added products to Schedule 1 while Bill is in drafting. Otherwise, create regulations (under Section 42) to add these products to Schedule 1 following enactment.
	Public Health Bill (currently under development)	The Public Health Bill is currently under development (will replace the current Public Health Act 2004). Section 178(c) of the Bill allows for the creation of regulations to regulate activities declared to be a present risk to health.

Outstanding regulatory or policy aspects that would need to be addressed/developed to ensure compliance with the Convention's provisions *(only in relation to binding provisions)*

- Consider including Part I Annex A mercury-added products to Schedule 1 of the draft SHW Bill.
- Establish regulations under Customs Revenue and Border Protection Act, Environment Act or SHW Bill/Act to prohibit import/export (unless exported in environmentally sound manner) of Part I Annex A mercury-added products.
    - The Environment Act can only create regulations to prohibit import of mercury-added products (section 70(s)). Regulations to regulate or prohibit the export, would only apply to mercury-added products as a "hazardous waste" (section 70(e)).
    - Inclusion or creation of regulation to add Part I Annex A mercury-added products to Schedule 1 of the SHW Bill will only prohibit import. Otherwise, SHW Bill regulates disposal (not including export) of waste – does not provide potential to prohibit export of mercury added-products.
    - Customs Revenue and Border Protection Act enables regulations to prohibit both import and export of products that are not (yet) wastes - thus can include mercury-added products (Note: if included in Schedule 1 of SHW Bill, they will automatically become prohibited imports for the purpose of Customs Revenue and Border Protection Act 2012 (section 8(3) of Bill).
    - Provision to prohibit import/export of pesticides that contain mercury (as listed in Part I Annex A of Convention) could be regulated under above-mentioned Acts and would ensure they are not allowed to be registered under the Pesticides Act. To further enhance identification of mercury-added products being imported, guidance on the use of Harmonised System (HS) Codes to categorise products should be incorporated. Guidance for the possible development of specific HS Codes for mercury added products is being developed.

▪ Consider inclusion of provisions to ensure measures will be taken to prevent the incorporation of products listed in Part I Annex A into larger, assembled products; and discourage the manufacture and distribution of mercury-added products not covered by any known use. ▪ Consider alternative compliance pathway (Article 4.2) to address phase out of Part I Annex A products, as may be able to demonstrate that Cook Islands amounts are de minimis levels, subject to conditions provided in Article 4.2. ▪ Take measures to continue to phase down use of dental amalgam in accordance with provisions set out in Part II Annex A of Convention (to be done in consultation with Ministry of Health) e.g. prohibit import of dental amalgam other than in encapsulated form under the Public Health Bill. Note, this could also be done through regulations under section 178(c) of the Public Health Bill as use of dental amalgam is a present risk to health. ▪ Inclusion of mercury-added products in existing/new policies relating to Solid and Hazardous Waste and human health.		
Article 8 – Emissions	**Cook Islands National Infrastructure Investment Plan 2021-2030**	The NIIP outlines Cook Islands priorities and plans for major infrastructure over the next 10 years. It includes two high-priority projects to deliver a solid waste incinerator and recycling transfer station for Rarotonga (marked as 'not committed').
	Cook Islands Solid Waste Management Policy 2013-2016	Vision that only when refuse, reduce, reuse, recycle alternatives have been explored and deemed technically or economically unviable, is non-hazardous waste to be considered for final disposal using landfill or incineration – thus, potentially reducing emissions. Also outlines objectives for developing a strong monitoring and evaluation system (Objective 6), by providing accurate and up-to-date statistics, and the monitoring of environmental standards at waste disposal facilities.
	Environment Act 2003	Establishes NES with functions to protect and manage the environment; and prevent, control and correct the pollution of air, water and land. Regulation making power under section 70(d) to establish regulations regulating or prohibiting pollution of air. Any new (waste incineration) facility would be subject to environmental impact assessment under Act.
Outstanding regulatory or policy aspects that would need to be addressed/developed to ensure compliance with the Convention's provisions *(only in relation to binding provisions)*		
▪ Consider developing a national action plan for a new source/waste incineration facility, with best available techniques and best environmental practices in place or associated emission limit values. ▪ Need to develop a national action plan to manage emissions from waste incineration facilities to establish measures to be taken to control emissions: expected goal, targets and outcomes for reducing emissions. Establish inventory of emissions for these waste incineration sources to be developed and maintained (with any guidance from COP, Article 9 of Convention).		
Article 9 – Releases	**Environment Act 2003**	Establishes NES with functions to protect and manage the environment; and prevent, control and correct the pollution of air, water and land. Section 36 provides for environmental impact assessment for project permits for any (new) point source or activity likely to cause significant environmental impact. Any project permit issued may be subject to terms and conditions to which the permit is issued. Regulation making power under section 70(d) to establish regulations regulating or prohibiting pollution of air, water or land.

	Public Health Bill (currently under development)	Section 64 provides for regulations about water. Section 64(2)(a) and (b) enables regulations to prohibit the discharge of any material or chemical that may present a risk to health into, or contamination of, any water source or wastewater and imposes offences and penalties for breach of regulations. Thus, providing for a potential avenue to control and reduce releases to water through the creation of regulations.
Outstanding regulatory or policy aspects that would need to be addressed/developed to ensure compliance with the Convention's provisions *(only in relation to binding provisions)*		
▪ Establish and develop inventory of significant sources of releases to land and water, and maintain inventory of releases. ▪ Consider developing a national action plan with best available techniques and best environmental practices (BAT/BEP) in place, and associated release limit values in order to control and reduce releases to land and water. ▪ Consider developing regulations under the Environment Act which set release limit values that place limits on the concentration of mercury/mercury compounds released from a point source, in order to control/reduce releases to land and water. Consider developing regulations under the Public Health Bill to address any obligations under Article 9 to control and reduce releases to water.		
Article 11 – Mercury wastes	**Basel Convention**	The Cook Islands is a party to the Basel Convention. It regulates the transboundary movements of hazardous wastes (listed in Annex I and includes mercury and mercury compounds) and other wastes. Exports of hazardous wastes is prohibited unless importing country consents in writing, and any hazardous wastes to be exported are to be managed in environmentally sound manner. Note: No specific implementing national legislation or PIC procedures for management and export of mercury as hazardous waste currently applied in Cook Islands.
	Waigani Convention	The Cook Islands is a party to the Waigani Convention. It controls the transboundary movement and management of hazardous wastes (listed in Annex I and includes mercury; mercury compounds) within the south pacific region. Under the Convention parties are obliged to cooperate with one another to facilitate the availability of adequate treatment and disposal facilities and to improve and achieve the environmentally sound management of hazardous wastes (Art 10). Note: No specific implementing legislation.
	Environment Act 2003	Section 56 makes it an offence to dispose of any toxic chemical or waste in a manner likely to harm the environment – thus requiring sound storage/management until export. Section 70 allows the creation of regulations: regulating or prohibiting the pollution of air, water, or land, and the depositing, or dumping of litter, rubbish, or any substance of a dangerous, noxious, or offensive nature (s70(e)); regulating or prohibiting the exportation, importation, or transportation of hazardous wastes into or out of the Cook Islands, for the purpose of implementing any regional or international conventions, treaties, protocols, or agendas (s70(g)); prohibiting or regulating the importation or disposal of recyclable or non-recyclable products (s70(s)).
	Public Health Bill (currently under development)	Section 178(h) allows for regulations to be made to regulate storage, use, handling, transport and disposal of any waste material (except waste water) that may present a risk to public health.

	Infrastructure Act 2019	Section 6 defines infrastructure to include "solid and hazardous waste facilities". A principle in the implementation of the Act is the management of infrastructure in an environmentally sound manner.
	Solid and Hazardous Waste Bill (currently under development and planned to be passed 2023)	Defines hazardous waste "waste in solid, liquid or gaseous form that is likely to be a health or environmental hazard if released into the environment". Part 3 provides for the collection and disposal of waste. Section 16 relates to responsible disposal of hazardous waste - prohibiting disposal by burning, burying or dumping on land, or dumping in water. It provides that hazardous waste must be disposed of by delivering it to a waste facility that accepts hazardous waste or putting it out for collection in accordance with relevant conditions. Section 17 provides that if hazardous waste is collected, it must be kept separate from other waste during collection, and it must be transported safely and securely. Section 23 provides the Ministry must ensure waste at all waste facilities is disposed of in a responsible manner, and in the case of hazardous waste: - to be exported, by disposal to facility overseas that is approved by the Ministry to be suitable for that purpose by putting it in secure indefinite storage only for high temperature incineration
	National Sustainable Development Agenda 2020+ (NSDA)	Zero waste goal within 25-year timeline. Goal 4: Manage solid and hazardous waste. Indicator 4.2: Tracks percentage of hazardous waste that is accounted for and managed – this ensures we closely monitor, effectively manage and safely dispose of hazardous waste. Target of 100% disposal of all ODS (HDFC) off island by 2031 – could develop a similar target for mercury.
	National Infrastructure Investment Plan 2021-2030	Section 3.7.2 addresses overall solid waste management including hazardous waste challenges. Identifies candidate infrastructure projects – hazardous waste handling upgrade for Rarotonga, and outer island recovery centers which are considered second tier priorities (marked as 'not committed').
	Cook Islands Solid Waste Management Policy 2016 - 2026	Purpose: Improve Cook Islands management of solid waste. Vision: Hazardous waste and other products that cannot be recycled or appropriately processed or disposed of on-shore are temporarily stored in appropriate containment facilities to be transferred to facilities overseas for processing. Export will only occur where the Government is satisfied there will be appropriate processing and safe disposal of the waste in the receiving country. Objective 3: Develop appropriate waste management infrastructure including separation and storage facilities - Policy 3.2: Store hazardous waste (including e-waste) safely as an interim arrangement, prior to its transfer to environmentally sound disposal facilities overseas. Provides "hazardous substances" include heavy metals (mercury, lead, cadmium) & "hazardous wastes" includes substances identified as hazardous for the purposes of the Basel Convention and Waigani Convention.

	Cook Islands Solid Waste Management Strategy 2013-2016 (due for renewal)	Opportunity to include management of hazardous/mercury wastes in a renewed strategy.
	National Health Strategic Plan 2017-2021	Improvements of various kinds of waste management highlighted as objectives. Opportunity to include management of hazardous/mercury wastes in a renewed strategy.
	Advanced Recovery and Disposal Fee Policy 2022 (currently under development)	Acknowledges the Cook Islands has no consistent mechanism to export recyclable and hazardous packaging and products for safe disposal and recycling.
	Workplace Health and Safety Policy	Informs creation of regulations under the draft Workplace Health and Safety (WHS) Act. The policy also outlines risk management requirements for employers of workplaces that handle, use or store hazardous substances (specified in draft regulations) to: ensure correct labelling, obtain safety data sheet for all hazardous substances, prepare inventory list of all hazardous substances handled, implement risk controls specified on safety data sheet, manage risks to health and safety associated with using or storing hazardous substances Note: Relevant to waste disposal operators & hazardous waste/export providers (in terms of environmentally sound management).
Outstanding regulatory or policy aspects that would need to be addressed/developed to ensure compliance with the Convention's provisions *(only in relation to binding provisions)*		
▪ The Solid and Hazardous Waste Bill needs to be passed to strengthen legislation relating to waste management. ▪ Ensure definitions (of hazardous/mercury waste) are consistent with Art 11.2. May need to incorporate thresholds of quantity defined by COP. (Note national legislation and policies refer to 'hazardous waste' but do not specifically state that mercury/mercury compounds/mercury waste qualify as hazardous waste. However, 'hazardous waste' defined in Basel and Waigani Conventions' (which Cook Islands has ratified) and includes mercury and mercury compounds to include mercury and mercury compounds – and Solid Waste Management Policy is consistent with these conventions). ▪ Include specific language in the Solid and Hazardous Waste Bill to ensure hazardous waste is to be managed in an environmentally sound manner. ▪ Although no specific implementing legislation for Basel Convention, potential to create regulations under section 70(g) of Environment Act to regulate transportation of hazardous wastes/mercury wastes to comply with Art 11.3(c). ▪ Need to identify receiving countries (similar to trade licensing system under Art 3) in order to meet PIC requirements. Consider drafting regulations under the WHS Bill/Act outlining management requirements for workplaces that handle, use or store (any) hazardous substances (only if "hazardous substances" under the WHS Bill cover mercury/mercury compounds/mercury wastes – otherwise wording would need to specifically refer to mercury/mercury compounds/mercury wastes).		
Article 12 – Contaminated sites	**Environment Act 2003**	Establishes National Environment Service (NES) which functions to protect, conserve and manage the environment. As such NES deals with any issues impacting the environment, which would allow NES

		to develop strategies to identify and assess mercury/mercury compound contaminated sites.
	Public Health Bill	Subpart 6 provides for Public Health Emergencies and requires the Secretary to prepare and maintain a Public Health Emergency Plan under section 119. The plan must specify mitigation strategies to be adopted to reduce risk of public health emergencies arising, and for dealing with a public health emergency if it arises.
	Solid and Hazardous Waste Bill (planned to be passed 2023).	There are several regulations in draft form under the SHW Bill, including: Facility Operation Regulations and Health and Safety Regulations. These provide potential to address potentially contaminated waste management sites and developing risk reduction activities through these regulations.
Outstanding regulatory or policy aspects that would need to be addressed/developed to ensure compliance with the Convention's provisions *(only in relation to binding provisions)*		
▪ Develop strategies to identify and assess mercury/mercury compound contaminated sites based on guidance developed by COP, ensuring risk reduction activities (if any) are taken in environmentally sound manner. Consider development of risk reduction activities to be included within the Public Health Emergency Plan (under the Public Health Bill) and/or regulations in the SHW Bill and/or regulations under the Workplace Health and Safety Bill/Act.		
Article 14 – Capacity building, technical assistance and technology transfer	*N/A*	-
Outstanding regulatory or policy aspects that would need to be addressed/developed to ensure compliance with the Convention's provisions *(only in relation to binding provisions)*		
▪ Ongoing cooperation with SPREP for continued capacity-building and technical assistance and technology transfer opportunities. Follow recommendations by COP on how capacity-building, technical assistance and technology transfer could be further enhanced under Article 14.		
Article 16 – Health aspects	**Public Health Bill 2022**	Part 10 covers Health Promotion Objectives and Functions. Section 145 provides that in seeking to achieve objectives, the Ministry must prepare plans and strategies to inform evidence-based practices and work with local communities to develop and implement strategies.
	NSDA 2020+	Goal 7: Health and healthy lifestyles. Indicator 7.2: Recognizes government spending is crucial for the health of people, and increases investment in healthcare.
Outstanding regulatory or policy aspects that would need to be addressed/developed to ensure compliance with the Convention's provisions *(only in relation to binding provisions)*		
▪ Develop strategies that identify populations and protect populations at risk (e.g. by establishing fish consumption guidelines and increasing public awareness), including understanding current potential for chronic dietary exposure and its effects. ▪ Healthcare services for prevention and treatment of affected populations and capacity building for TMO to recognize, diagnose and monitor mercury exposure health risks. Monitoring and sampling (e.g. hair samples) to track exposure in vulnerable populations.		
Article 17 – Information exchange	**Environmental Act 2003**	Functions of NES include reporting obligations. In addition, it is the designated national focal point for Basel Convention and Waigani Convention – thus has reporting obligations as the national focal point to these MEAs.

	Cook Islands Immigration Act 2021	As above, due to the Ministry of Foreign Affairs and Immigration (MFAI) being the political focal point for all international partners, development partners and for bilateral and multilateral agreements. Also, MFAI is the national focal point of the Stockholm Convention.
Outstanding regulatory or policy aspects that would need to be addressed/developed to ensure compliance with the Convention's provisions *(only in relation to binding provisions)*		
▪ Becoming a Party to the Minamata Convention. ▪ Ensure a national focal point is established for exchange of information under this Convention, including for trade related consent under Article 3.		
Article 18 – Public information, awareness and education	**Environmental Act 2003**	Legislated function of NES to provide and assist in provision of training and public information and includes public awareness duty.
	Cook Islands Immigration Act 2021	As above, due to MFAI being a political entry point for all international partners, including being a political entry point for international development partners, including for bilateral and multilateral agreements. Also, MFAI is the national focal point of the Stockholm Convention.
	National Youth Policy 2021-2026	Youth Priority Area 2: Youth are learning and developing. Calls for action to enhance the status of young people by providing opportunities for growth, supporting causes to become responsible citizens through participation and dialogue. Thus, it is important to include youth in training and awareness activities.
Outstanding regulatory or policy aspects that would need to be addressed/developed to ensure compliance with the Convention's provisions *(only in relation to binding provisions)*		
Development of a Communications Strategy/Plan to ensure information is shared appropriately and effectively with the public, including awareness, education and training activities to take place.		
Article 19 – Research, development and monitoring	**Solid Waste Management Policy 2016-2026**	Provides for monitoring and evaluation - Objective 6: Develop strong monitoring and evaluating system (collect up to date national statistics on solid waste; ensure solid waste disposal facilities are monitored and managed in accordance with approved standards to minimise environmental damage).
	NSDA 2020+	Research conducted in the Cook Islands must be aligned to the goals outlined in the NSDA 2020+.
	Cook Islands National Research Policy	Provides a framework to manage all research activities conducted in the Cook Islands. All research undertaken in the Cook Islands must meet research and ethical standards to protect those participating in the research. Establishes the Cook Islands Research Ethics Committee (CIREC) which became operational in 2022. All research applications are required to seek ethics approval in the Cook Islands (unless exempted in the National Research Policy).
Outstanding regulatory or policy aspects that would need to be addressed/developed to ensure compliance with the Convention's provisions *(only in relation to binding provisions)*		
▪ Development of research gaps/priorities and data hub as part of NES strategy. ▪ Harmonised methodologies for mercury research adopted and implemented (e.g. provided by BRI) in collaboration with other partners/stakeholders (e.g. MOE, MMR). ▪ May require research permits and must seek ethics approval with the CIREC.		
Article 21 – Reporting	**Environment Act 2003**	Legislated function of NES to provide monitoring and reporting.
Outstanding regulatory or policy aspects that would need to be addressed/developed to ensure compliance with the Convention's provisions *(only in relation to binding provisions)*		
▪ Will need to establish a national focal point with reporting responsibilities (i.e. MFAI or NES)		

(Note NES is focal point for Basel Convention and Waigani Convention; MFAI is focal point for Stockholm Convention and Rotterdam Convention).

- Establish an inventory of processes established and measures taken for implementation of provisions to the Convention (as established in the MIA) – will need to be maintained as a basis for reporting under Article 21.

3.2 Assessment of Institutional Capacity

An assessment of the existing institutional capacity for the implementation of the key articles of the Minamata Convention outlined in Table 23 is provided in Table 25.

Challenges in implementation include the limited human resource capacity and technical capacity to carry out continuous activities related to mercury management. To address this, it is important to recognise the linkages between mercury issues and issues related to other hazardous or potentially harmful chemicals and how approaches can be harmonised. It is recommended that a national working group consisting of representatives from the aforementioned institutions be established with assigned representatives from the NES acting as the Chair. This working group can be linked to other environmental committees that may have been or will be established to avoid duplication of work. For example, under the GEF ISLANDS project, national stakeholders will need to coordinate related environmental work under a steering committee and sub-committees. Furthermore, it is important to recognise regional linkages that can be made to further opportunities for information exchange and capacity building which is ongoing through agencies such as SPREP, among others.

Table 25: Existing Institutional Capacity for Mercury Management, Gaps and Recommendations for Capacity Building

Article 4 – Mercury-added products	
Name of Relevant Institution/Stakeholder	**Related Role**
Business Trade and Investment Board (BTIB)	**Role with respect to above listed provisions:** ▪ Responsible for the promotion of trade, investment and business in the Cook Islands. ▪ Can ensure that new investments are not made relating to manufacture of Part I Annex A mercury-added products.
	Relevant institutional capacity in place to comply with the above listed provisions: ▪ Mandated under the Development Investment Act 1995-96.
National Environment Service (NES)	**Role with respect to above listed provisions:** ▪ Government agency responsible for protection and conservation of the environment, ensuring it is managed sustainably. ▪ Can develop regulations prohibiting or regulating import of products – see for example: Prohibition on Importation of Plastic Shopping Bags Regulations 2012. ▪ NES will be responsible for any regulations created under the Environment Act 2003 to prohibit/regulate import and export of mercury-added products and regulate export of mercury-added products (however, can only regulate/prohibit export of mercury-added products a hazardous waste – see LGA pg 4).
	Relevant institutional capacity in place to comply with the above listed provisions: ▪ Environment Act 2003 provides overarching legislation in place and ability to develop regulations pursuant to Act as needed (Section 70). ▪ In-house legal counsel able to support and assist in development and drafting of any necessary regulations. ▪ Compliance Division within NES already established to support enforcement (of Act/regulations). However, this will require strengthening of resources with respect to personnel and training to build capacity, thus associated financial resources required for such.
Infrastructure Cook Islands (ICI)	**Role with respect to above listed provisions:** ▪ Government ministry responsible for most capital infrastructure projects as well as management of solid waste in the Cook Islands (in collaboration with other agencies NES/TMO). ▪ Currently leading drafting/preparation for submission of the Solid and Hazardous Waste Bill (that includes provisions to prohibit importation of certain articles and substances). ▪ Able to make the addition of Part I Annex A mercury-added products to Schedule 1 of the Solid and Hazardous Waste Bill or use regulating powers under section 42 following enactment (if agreed to by partnering agencies NES and TMO).
	Relevant institutional capacity in place to comply with the above listed provisions: ▪ ICI's mandate legislated by the Infrastructure Act 2019.

	▪ Can work with partnering agencies NES and TMO in order to decide whether to include Part I Annex A mercury-added products to Schedule 1 of the Solid and Hazardous Waste Bill while it is in drafting. ▪ The Waste Division within ICI is established, however significantly under-resourced in terms of personnel and central waste management facilities at the Rarotonga resource recovery center (lack of space, equipment, sound storage etc). ▪ Note however, the agencies that are responsible for waste management (ICI, NES, TMO) will have a portion of their annual budgets that may be allocated to waste management activities (including new/upgraded solid waste/waste management facilities).
Ministry of Finance and Economic Management (MFEM) – Customs Service	**Role with respect to the above listed provisions:** ▪ Agency within the RMD Division of MFEM responsible for overseeing and managing border security and imports/exports into and out of the Cook Islands. ▪ Role also includes promoting Cook Islands trade and investigating illegal activities (e.g. illegal imports). ▪ Ability to create regulations under the Customs Revenue and Border Protection Act 2004, prohibiting import and export of certain specified goods or specified classes of goods if prohibition is necessary in the interest of the public. ▪ Note also, if Part I Annex A mercury-added products become included under Schedule 1 of the SWH Bill (refer to above), they will automatically become prohibited for the purpose of the Customs Revenue and Border Protection Act so Customs Service will need to be aware of this.
	Relevant institutional capacity in place to comply with above listed provisions: ▪ Legislation in place authorising Customs' mandates (Customs Revenue and Border Protection Act 2004). ▪ Customs systems include tariff codes to classify goods being imported/exported. ▪ Goods imported/exported subject to control of Customs, with customs officers in place to monitor and inspect items - but customs officers will need to be trained in dealing specifically with mercury-added products.
Ministry of Agriculture/Pesticides Board	**Role with respect to the above listed provisions:** ▪ Ministry responsible for administering the Pesticides Act 1987 (which establishes board consisting of Secretary of Agriculture) ▪ Responsible for promoting efficient, prudent and safe use of pesticides. ▪ Responsible for assessing and evaluating applications for registration of pesticides for import.
	Relevant institutional capacity in place to comply with above listed provisions: ▪ The Board established under the Pesticides Act 1987. ▪ Will already have an established list of registered pesticides but will need to ensure Part I Annex A mercury-added products (i.e. pesticides that contain mercury) are not granted registration (thus prohibiting import) and comply with provisions.
Te Marae Ora (Ministry of Health)	**Role with respect to the above listed provisions:** ▪ Government ministry responsible for the health system. ▪ Importer of dental amalgam for use.

	▪ Currently leading drafting/preparation for submission of Public Health Bill (that allows creation of regulations to regulate activities declared to be a present risk to health). ▪ Can take measures to phase down use of dental amalgam, for example: make addition in the Public Health Bill (or through regulations) to prohibit import of dental amalgam other than in encapsulated form.
	Relevant institutional capacity in place to comply with above listed provisions: ▪ Mandate legislated under Public Health Act 2004 and Ministry of Health Act 2013. But note, new Public Health Bill is currently under development and will replace the Public Health Act. ▪ Consultations required with TMO to agree on a phase down plan (of dental amalgam use) through measures listed in Part II Annex A (e.g. prohibiting import/restricting use to its encapsulated form).
Crown Law Office (CLO)	**Role with respect to the above listed provisions:** ▪ Statutory organization/legal arm of government responsible for providing legal advice to government ministries. Oversees, undertakes and reviews drafting of national legislation and regulations. ▪ Will need to provide an overview of any amendments made to legislation or any regulations created to ensure consistency with national laws and international obligations.
	Relevant institutional capacity in place to comply with above listed provisions: ▪ Crown counsel who assist with legislative development for Cook Islands, however face under-resourcing due to lack of personnel and overburdened workload.
Private Sector	**Role with respect to the above listed provisions:** ▪ Cook Islands Trading Corporation (CITC) – retail and wholesale business that imports certain mercury-added products e.g. light bulbs/lamps, switches, batteries etc.
	Relevant institutional capacity in place to comply with the above listed provisions: ▪ Importers of mercury-added products are likely to have processes in place for import. However, will require support through information and training to ensure they are aware of any import prohibitions of Part I Annex A mercury-added products, to ensure they stop importing once they are prohibited.
Remaining Capacity Gaps at National Level that need to be addressed before provisions can be met:	
▪ Agencies to work together and Government to decide what steps to take to address outstanding regulatory aspects (see LGA pg 4-5). Then the relevant agency needs to work towards establishing regulations under current legislation or including language regarding Part I Annex A mercury-added products to draft legislation (once decision is made as to what option to take). For example, a decision needs to be made as to whether: NES should work towards creating regulations under the Environment Act to prohibit import of mercury-added products; or, ICI should work towards including mercury added products to Schedule 1 of the SHW Bill (while it is still in drafting phase) in order to prohibit import; or, whether MFEM/Customs Services should create regulations under the Customs Revenue and Border Protection Act to prohibit import/export of mercury-added products. ▪ Extra resources required (e.g. extra personnel, technical assistance/legal support to assist with drafting as CLO overburdened which hinders progress). ▪ Customs tariffs need to be in line with regional/international codes (thus, technical/regional support in this area would be helpful).	

▪ Training required for relevant agencies (e.g. MFEM/Customs Service, Private Sector importers of mercury-added products) to understand obligations and apply provisions. Plans will also need to be put into place to train customs officers about mercury-added products. ▪ General increased public awareness is also required to ensure compliance, including targeted private sector and relevant businesses. ▪ TMO to take measures to phase down use of dental amalgam in accordance with Part II Annex A of Convention, ensuring viable alternatives are available.	
Article 8 – Emissions	
Name of Relevant institution/stakeholder	**Role**
National Environment Service (NES)	**Role with respect to above listed provisions:** ▪ Government agency responsible for protection and conservation of the environment, which functions include to prevent, control and correct pollution of air, water and land. ▪ Responsible for issuing project permits subject to environmental impact assessments (e.g. for new waste incineration facilities). ▪ Can develop regulations to manage/regulate pollution of air and emissions, or otherwise require that best available techniques and best environmental practices be followed. ▪ Can provide technical support and guidance in the development of best practice guidelines for new sources and measures to be taken to control/reduce emissions from existing sources. ▪ Would likely be responsible for monitoring and reporting of emissions inventories.
	Relevant institutional capacity in place to comply with the above listed provisions: ▪ Environment Act 2003 provides overarching legislation in place and ability to develop regulations pursuant to Act as needed (Section 70) and issue project permits subject to environmental impact assessment (section 36). ▪ In-house legal counsel able to support and assist in development and drafting of any necessary regulations. ▪ Compliance Division within NES already established to support enforcement (of Act/regulations). However, this will require strengthening of resources with respect to personnel and training to build capacity, thus associated financial resources required for such.
Infrastructure Cook Islands (ICI)	**Role with respect to above listed provisions:** ▪ As the Government ministry responsible for the management of solid waste in the Cook Islands (in collaboration with other agencies NES/TMO), ICI will have a role as emissions from existing point sources (i.e. waste incineration facilities at hospital and airport) need to be controlled/reduced (in accordance with Article 8). ▪ ICI is also responsible for most capital infrastructure projects, and there may likely be one new point source (under Article 8) as a new incinerator is proposed for the main waste facility on Rarotonga, according to the National Infrastructure

	Investment Plan 2021-2030. (Note, it will be a 'new' point source if construction of the proposed incinerator commences more than a year after the Convention is ratified). ▪ ICI will need to be made aware of any regulations/national action plans (developed by NES) managing/regulating emissions from waste incineration facilities and provide support to waste incinerator operators to ensure best available techniques and best environmental practices are followed.
	Relevant institutional capacity in place to comply with the above listed provisions: ▪ ICI's mandate legislated by the Infrastructure Act 2019. ▪ The Waste Division within ICI is established, however significantly under-resourced in terms of personnel and central waste management facilities at the Rarotonga resource recovery center (lack of space, equipment, sound storage etc). ▪ Note however, the agencies that are responsible for waste management (ICI, NES, TMO) will have a portion of their annual budgets that may be allocated to waste management activities (including new/upgraded solid waste/waste management facilities). ▪ Relevant ICI staff will require training and guidance with respect to regulations/national action plans in order to properly understand and apply best practice guidelines (for any potentially new sources e.g. new incinerator for main waste facility on Rarotonga) and provide support to ensure measures are taken to reduce emissions (for existing sources).
Te Marae Ora (Ministry of Health)	**Role with respect to the above listed provisions:** ▪ Government ministry responsible for the health system. ▪ Responsible for a medical waste incinerator based at the Rarotonga hospital.
	Relevant institutional capacity in place to comply with above listed provisions: ▪ Mandate legislated under Public Health Act 2004 and Ministry of Health Act 2013. ▪ Relevant staff trained in operating and managing the medical incinerator. ▪ Will require training and support with respect to implementing regulations/national action plans to control/reduce mercury from the existing medical waste incinerator.
Airport Authority	**Role with respect to above listed provisions:** ▪ Responsible for a waste incinerator based at Rarotonga airport.
	Relevant institutional capacity in place to comply with above listed provisions: ▪ Relevant staff trained in operating and managing the waste incinerator. ▪ Will require training and support with respect to implementing regulations/national action plans to control/reduce mercury from the existing airport waste incinerator.
Remaining Capacity Gaps at National Level that need to be addressed before provisions can be met:	
▪ Capacity building and training of NES staff and technical support with respect to establishing emissions inventory as well as monitoring and reporting. ▪ Legal support and assistance required to assist NES with any potential regulation drafting as CLO overburdened which hinders progress.	

▪ Technical assistance may be required to assist NES with any national action plans that may be developed with best available techniques and best environmental practices to be followed. ▪ Capacity building and training of ICI, TMO and Airport Authority staff to manage waste incinerators appropriately and take measures to reduce control/reduce emissions. ▪ Passing of Solid and Hazardous Waste Bill to strengthen legislation relating to waste management.	
Article 9 – Releases	
Name of Relevant institution/stakeholder	**Role**
NES	**Role with respect to above listed provisions:** ▪ Government agency responsible for protection and conservation of the environment, which functions include to prevent, control and correct pollution of air, water and land. ▪ NES will be responsible for obtaining relevant information in order to identify any relevant point source category (that is not addressed by other provisions of the Convention. ▪ NES is responsible for issuing project permits for any potential new point source/activity to be subject to environmental impact assessments. ▪ Can take measures to control releases to land and water. For example: develop regulations with release limit values (i.e. standards/limits on concentration of mercury/mercury compounds released from a point source). ▪ Can provide technical support and guidance in the development of a national plan setting out measures taken to control releases, as well as require that best available techniques and best environmental practices to control releases be followed. ▪ Would likely be responsible for monitoring and reporting release inventories.
	Relevant institutional capacity in place to comply with the above listed provisions: ▪ Environment Act 2003 provides overarching legislation in place and ability to develop regulations pursuant to Act as needed (Section 70) and issue project permits subject to environmental impact assessment (section 36). ▪ In-house legal counsel able to support and assist in the development and drafting of any necessary regulations. ▪ Compliance Division within NES is already established to support enforcement (of Act/regulations). However, this will require strengthening of resources with respect to personnel and training to build capacity, thus associated financial resources required for such.

Te Marae Ora (Ministry of Health)	**Role with respect to above listed provisions:** ▪ Government ministry responsible for health system. ▪ Can require proposals for any potential new point source/activity to be subject to health impact assessments – and can use this as an avenue to require best available techniques and best environmental practices to control releases (particularly to water) to be controlled. ▪ Can take measures to control releases to water. For example: develop regulations with release limit values (i.e. standards/limits on concentration of mercury/mercury compounds released from a point source).
	Relevant institutional capacity in place to comply with the above listed provisions: ▪ Mandate legislated under Public Health Act 2004 and Ministry of Health Act 2013. ▪ The Public Health Bill currently under development provides for health impact assessments of an activity if the Secretary/Minister of Health believes it may have a substantial adverse effect on public health. TMO will have Health Officers to undertake health impact assessments but may require training specifically with respect to mercury/mercury compound releases. ▪ Public Health Bill, section 64 provides ability to create regulations with respect to water and enables regulations to prohibit discharge of any material/chemical that may present a risk to health into, or contamination of, any water source/wastewater (s64(2)(a) and (b). However, it is likely that TMO will require assistance with development of any regulations.
Ministry of Agriculture (MOA)	**Role with respect to above listed provisions:** ▪ Ministry responsible for managing the agricultural sector in the Cook Islands. ▪ MOA data collectors may be able to identify mercury releases – and will be able to provide assistance to NES with monitoring and reporting of release inventories.
	Relevant institutional capacity in place to comply with the above listed provisions: ▪ Mandate legislated under the Agriculture Act 2021. ▪ Section 19 of the Agriculture Act provides for the appointment of data collectors to the MOA. The roles of data collectors include collecting data to identify or measure risk to agriculture production. ▪ Data collectors may require specific training in order to identify mercury releases to land and water in their data collection duties, so that their data collected can better assist NES with the monitoring/reporting of release inventories.
Remaining Capacity Gaps at National Level that need to be addressed before provisions can be met:	
▪ Capacity building and training of NES staff, TMO health officers and MOA data collectors (who may offer assistance to NES). ▪ Technical support for NES with respect to establishing release inventories as well as monitoring and reporting. ▪ Legal support and assistance required to assist NES and/or TMO with any potential regulation drafting as CLO overburdened which hinders progress.	

▪ NES should work towards developing a national plan setting out measures taken to control releases, including best available techniques and best environmental practices (and may require technical support to assist).	
Article 11 – Mercury wastes	
Name of Relevant institution/stakeholder	**Role**
National Environment Service (NES)	**Role with respect to the above listed provisions:** ▪ Government agency responsible for protection of the environment, which role includes preventing, correcting and controlling pollution; and ensuring the environmentally safe disposal of toxic chemicals and wastes. ▪ Can develop regulations under the Environment Act 2003 regulating exportation/transportation of hazardous waste/mercury wastes, as well as regulating disposal of waste. ▪ NES is the Cook Islands focal point to the Basel Convention and will be responsible for providing advice with regard to Basel Convention and guidelines and ensuring compliance and reporting.
	Relevant institutional capacity in place to comply with the above listed provisions: ▪ Environment Act 2003 provides overarching legislation in place and ability to develop regulations pursuant to Act as needed (Section 70). ▪ Can ensure mercury wastes is managed in an environmentally sound manner(pursuant to section 56 of the Environment Act, which makes it an offence to dispose of toxic chemicals or waste in a manner likely to harm the environment). ▪ In-house legal counsel able to support and assist in development and drafting of any necessary regulations. ▪ Compliance Division within NES already established to support enforcement (of Act/regulations). However, this will require strengthening of resources with respect to personnel and training to build capacity, thus associated financial resources required for such.
Infrastructure Cook Islands (ICI)	**Role with respect to the above listed provisions:** ▪ Government ministry responsible for management of solid waste in the Cook Islands (in collaboration with other agencies NES, TMO). ▪ Currently leading the drafting/preparation for submission of Solid and Hazardous Waste Bill (that includes provisions outlining requirements for disposal of hazardous waste). ▪ Will likely be responsible for ensuring waste disposal facilities are adequate for environmentally sound management of hazardous wastes. ▪ Can work towards (in consultation with NES) the inclusion of specific language in the Solid and Hazardous Waste Bill to ensure hazardous waste is managed in an environmentally sound manner, as it is still in drafting phase. ▪ Will be responsible for approving overseas facilities in receiving countries, before mercury wastes can be exported.
	Relevant institutional capacity in place to comply with above listed provisions:

	▪ ICI's mandate for waste management legislated by the Infrastructure Act 2019 (also provides for management of solid and hazardous waste facilities in an environmentally sound manner). But note, the Solid and Hazardous Waste Bill currently under development deals specifically with management of waste in the Cook Islands. ▪ The Waste Division within ICI is established, however significantly under-resourced in terms of personnel and central waste management facilities at the Rarotonga resource recovery center (lack of space, equipment, sound storage etc.). ▪ Note however, with the drafting of the Solid and Hazardous Waste Bill, the agencies that are responsible for waste management (ICI, NES, TMO) will have a portion of their annual budgets that may be allocated to waste management activities (including new/upgraded solid waste/waste management facilities).
Island Governments	**Role with respect to above listed provisions:** ▪ Responsible for waste management in the Pa Enua on their respective islands.
	Relevant institutional capacity in place to comply with above listed provisions: ▪ Have current processes in place with respect to waste disposal but will need training to ensure compliance with any mercury waste/hazardous waste disposal (particularly with respect to Solid and Hazardous Waste Bill provisions once passed).
Te Marae Ora/Ministry of Health	**Role with respect to the above listed provisions:** ▪ Government ministry responsible for the health system. ▪ Functions of TMO include implementing laws, requirements and programs and initiatives relating to public health issues affecting the health of the community and environment – including waste management. ▪ Can develop regulations regulating storage, transport and disposal of waste under the Public Health Bill being developed.
	Relevant institutional capacity in place to comply with above listed provisions: ▪ Mandate legislated under Public Health Act 2004 and Ministry of Health Act 2013, with ability to make regulations. ▪ The Public Health Bill currently under development provides for regulations to be made to regulate storage, use, handling, transport and disposal of any waste material (except waste water) under section 178(h).
Ministry of Internal Affairs (INTAFF)	**Role with respect to above listed provisions:** ▪ Government ministry mandated to ensure that employers comply with workplace obligations such as occupational health and safety (relevant for waste collectors and exporters of hazardous waste to comply with requirements for environmentally sound management of mercury wastes). ▪ May need to work towards ensuring mercury wastes are covered in the Workplace Health and Safety Bill (in consultation with NES).
	Relevant institutional capacity in place to comply with above listed provisions: ▪ Leading national reform on Workplace Health and Safety. ▪ The Workplace Health and Safety Bill is currently being drafted by CLO and NZCPO.

	▪ Workplace Health and Safety Policy informing creation of regulations requiring risk management of hazardous substances and actions by employers of workplaces that handle, use or store hazardous substances regarding labelling, safety data sheets, inventory lists, implementing risk controls and manage risks to health and safety – (i.e. relevant for T&M and CIGT). Note however, mercury wastes may not be classified as a hazardous substance under the Bill.
Private Sector	**Role with respect to the above listed provisions:** ▪ T&M Heather Ltd – current contractors for the Rarotonga roadside collection of municipal solid waste and recyclables. ▪ Cook Islands General Transport (CIGT) – a land and sea transport business, and exporter of wastes/hazardous wastes.
	Relevant institutional capacity in place to comply with the above listed provisions: ▪ Collectors of waste currently have equipment for collection, but this would require strengthening through training/information to ensure compliance particularly with respect to disposal and collection of hazardous wastes/mercury wastes requirements (under the Solid and Hazardous Waste Bill once passed). ▪ Exporters of hazardous waste have facilities in place to store/manage, but this would require strengthening through training/information to ensure they meet relevant storage/export criteria of the Convention (as well as international standards and best practices).
Remaining Capacity Gaps at National Level that need to be addressed before provisions can be met:	
▪ Capacity building and training regarding disposal of mercury wastes/hazardous waste once the Solid and Hazardous Waste Bill comes into force (e.g. for waste collectors to ensure compliance with collection/disposal requirements). ▪ Need to ensure waste management facilities and exporters of hazardous waste are informed of requirements (e.g. capacity building through information training, workshops etc) and have required resources in terms of space, storage and equipment (e.g. facility upgrades or expansion) – as increased capacities needed to store mercury waste prior to export. ▪ General increased public awareness is also required to ensure compliance, including targeted private sector and relevant businesses. ▪ Support to identify countries willing to receive mercury wastes and approving facilities in those countries. ▪ Ensure details of approved (receiving) facilities are provided to exporters of hazardous waste. ▪ Legal support and assistance required to assist NES, ICI, TMO and INTAFF with any potential drafting of regulations and/or inclusion of specific language in draft legislation.	
Article 12 – Contaminated sites	
Name of Relevant institution/stakeholder	**Role**
National Environment Service (NES)	**Role with respect to the above listed provisions:** ▪ Government agency responsible for protection of the environment, which role includes preventing, correcting and controlling pollution; and ensuring the environmentally safe disposal of toxic chemicals and wastes. ▪ Will likely be responsible for developing strategies to assess mercury/mercury compound contaminated sites.
	Relevant institutional capacity in place to comply with the above listed provisions:

	▪ Environment Act 2003 provides overarching legislation in place and ability to develop regulations pursuant to Act as needed (Section 70). ▪ Environmental Policy and Planning Division within NES is already established to support development of any strategies developed, and Compliance Division responsible for monitoring. However, this will require strengthening of resources with respect to personnel and training to build capacity, thus associated financial resources required for such.
Te Marae Ora/Ministry of Health	**Role with respect to the above listed provisions:** ▪ Government ministry responsible for the health system. ▪ Functions of the Ministry include implementing laws, requirements and programs and initiatives relating to public health issues affecting the health of the community and environment. ▪ Likely to work closely with other agencies (NES, INTAFF) in developing strategies to assess mercury contaminated sites, as well as determining nature of contamination and the risks exposed to populations and risk reduction activities. ▪ Can include any risk reduction activities taken at contaminated sites to be included in any Public Health Emergency Plans that may be developed. ▪ The medical waste incinerator at the Rarotonga hospital is a potential site for contamination.
	Relevant institutional capacity in place to comply with above listed provisions: ▪ Mandate legislated under Public Health Act 2004 and Ministry of Health Act 2013. ▪ Public Health Bill currently under development and provides for ability to prepare and maintain Public Health Emergency Plans that specify mitigation strategies to be adopted to reduce risk of public health emergency arising and dealing with public health emergency once it arises.
Infrastructure Cook Islands (ICI)	**Role with respect to the above listed provisions:** ▪ Government ministry responsible for most capital infrastructure projects as well as management of solid waste in the Cook Islands (in collaboration with other agencies NES, TMO). ▪ Potential sites for contamination are waste management facilities e.g. a new incinerator proposed for the main waste facility on Rarotonga. ▪ ICI will need to be made aware of strategies for identifying/assessing contaminated sites, and any risk reduction activities to ensure they are taken in an environmentally sound manner.
	Relevant institutional capacity in place to comply with above listed provisions: ▪ ICI's mandate legislated by the Infrastructure Act 2019. ▪ The Waste Division within ICI is established, however significantly under-resourced in terms of personnel and central waste management facilities at the Rarotonga resource recovery center (lack of space, equipment, sound storage etc.).

	▪ Note however, with the drafting of the Solid and Hazardous Waste Bill, the agencies that are responsible for waste management (ICI, NES, TMO) will have a portion of their annual budgets that may be allocated to waste management activities (including new/upgraded solid waste/waste management facilities). ▪ ICI staff may require training to assist with identifying contamination at waste management facilities.
Ministry of Internal Affairs (INFAFF)	**Role with respect to above listed provisions:** ▪ Government ministry mandated to ensure that employers comply with workplace obligations such as occupational health and safety (relevant for facilities that may face potential contamination). ▪ Will likely be responsible for identifying and assessing contaminated sites that may be reported. ▪ Will likely be responsible for ensuring medical and airport waste incinerator operators, as well as (potential) waste incinerator at Rarotonga waste facility operators and hazardous waste storage providers (i.e. sites that are all subject to potential contamination) comply with any risk reduction activities at contaminated sites.
	Relevant institutional capacity in place to comply with above listed provisions: ▪ Leading national reform on Workplace Health and Safety. ▪ The Workplace Health and Safety Bill is currently being drafted by CLO and NZCPO. ▪ Workplace Health and Safety Policy informing creation of regulations under the Bill, requiring risk management of hazardous substances and actions by employers of workplaces that handle, use or store hazardous substances regarding labelling, safety data sheets, inventory lists, implementing risk controls and manage risks to health and safety. ▪ INTAFF staff may require training to assist with identifying and assessing contaminated sites that may be reported. Alternatively, an MOU may be signed to delegate this part to NES.
Airport Authority	**Role with respect to above listed provisions:** ▪ The waste incinerator based at Rarotonga airport is a potential site for contamination. ▪ Airport Authority will need to be made aware of strategies for identifying/assessing contaminated sites, and any risk reduction activities to ensure they are taken in an environmentally sound manner.
	Relevant institutional capacity in place to comply with above listed provisions: ▪ Relevant staff trained in operating and managing the waste incinerator, but they may require training to assist with identifying contamination at airport waste incinerator site.
Private Sector	**Role with respect to the above listed provisions:** ▪ Cook Islands General Transport (CIGT) – a land and sea transport business, and exporter of wastes/hazardous wastes (requiring environmentally sound storage before export). Thus, storage facilities for export of waste are potential sites for contamination. ▪ Will need to be made aware of strategies for identifying/assessing contaminated sites, and any risk reduction activities to ensure they are taken in an environmentally sound manner.
	Relevant institutional capacity in place to comply with the above listed provisions:

	▪ Exporters of hazardous waste have facilities in place to store/manage waste. ▪ Staff may require training to assist with identifying contamination at waste storage facilities.
Remaining Capacity Gaps at National Level that need to be addressed before provisions can be met:	
▪ NES to work towards developing strategies to identify and assess contaminated sites and how to address them (e.g. determining nature and extent of contamination, risks exposed, remediation options etc) and what can be done to reduce risk (can work closely with other agencies on this – TMO and INTAFF). ▪ Capacity building and technical assistance required to assist NES to develop strategies. ▪ Potential inclusion of risk reduction activities to be included in any Public Health Emergency Plans that may be developed by TMO. ▪ Capacity building and training required on strategies for identifying/assessing contaminated sites, for agencies that have potential sites for contamination (TMO, ICI, Airport Authority, CIGT). ▪ Capacity building and training for INTAFF staff to assist with identifying and assessing contaminated sites that may be reported, or decision as to whether an MOU should be signed to delegate this part to NES to be made. ▪ Financial resources to support above capacity building, technical assistance and training capacity gaps.	
Article 14 – Capacity building, technical assistance and technology transfer	
Name of Relevant institution/stakeholder Description of Article	**Role**
National Environment Service (NES)	**Role with respect to the above listed provisions:** ▪ Government agency responsible for protection and conservation of the environment. ▪ Will require capacity building and technical assistance with respect to development of regulations, plans and strategies (e.g. to assess mercury contaminated sites), monitoring and enforcement.
	Relevant institutional capacity in place to comply with the above listed provisions: ▪ Environmental Partnerships Division within NES already established – manages delivery of donor and partner projects. ▪ Familiar with and able to receive foreign aid/assistance programs e.g. cooperation with SPREP for continued capacity building, technical assistance, and technology & knowledge transfer opportunities.
Infrastructure Cook Islands (ICI)	**Role with respect to the above listed provisions:** ▪ Government ministry responsible for most capital infrastructure projects as well as management of solid waste in the Cook Islands (in collaboration with other agencies). ▪ Will require capacity building and technical assistance due to being significantly under resourced in personnel and waste management facilities. Will require up-to-date environmentally sound technology/adequate waste disposal facility for hazardous waste.
	Relevant institutional capacity in place to comply with above listed provisions: ▪ ICI's mandate legislated by the Infrastructure Act 2019.

	▪ The Waste Division within ICI is established, however significantly under-resourced in terms of personnel and central waste management facilities at the Rarotonga resource recovery center (lack of space, equipment, sound storage etc.).
Te Marae Ora/Ministry of Health	**Role with respect to the above listed provisions:** ▪ Government ministry responsible for health system. ▪ Will require capacity building and technical assistance to assist with dental amalgam phase down plan and strengthening of resources to assist with development of potential regulations, plans and strategies.
	Relevant institutional capacity in place to comply with above listed provisions: ▪ Mandate legislated under Public Health Act 2004 and Ministry of Health Act 2013. ▪ Public Health Bill currently under development which provides for ability to establish regulations and prepare plans/strategies.
Ministry of Transport (MOT)	**Role with respect to above listed provision:** ▪ Government ministry responsible for licensing for storage and use of dangerous goods. ▪ MOT staff may require capacity building/training and technical assistance regarding potential mercury storage requirements and guidelines.
	Relevant institutional capacity in place to comply with above listed provisions: ▪ Responsible for administering the Dangerous Goods Act 1984 and any licensing pursuant to the Act (requires storage and use of dangerous goods is only permitted in licensed premises). ▪ Likely has a set process and criteria for granting of licenses, and authority to inspect storage premises, but would need training in respect to any potential mercury storage requirements.
Ministry of Internal Affairs (INTAFF)	**Role with respect to above listed provision:** ▪ Government ministry mandated to ensure employers comply with workplace obligations such as occupational health and safety. ▪ Will require capacity building and training with respect to any mercury storage requirements and guidelines, as well as identifying/assessing contaminated sites. ▪ Will require capacity building and technical assistance to assist with drafting of any regulations under the Workplace Health and Safety Bill, and any drafting to include mercury/mercury compounds/mercury wastes language to the draft Bill.
	Relevant institutional capacity in place to comply with above listed provisions: ▪ Leading national reform on Workplace Health and Safety. ▪ Workplace Health and Safety Bill currently being drafted by CLO and NZCPO (but can provide input to draft).
Island Governments	**Role with respect to above listed provisions:** ▪ Responsible for waste management in the Pa Enua on their respective islands.

	▪ Will need capacity building/training to ensure compliance with proper mercury/hazardous waste disposal.
	Relevant institutional capacity in place to comply with above listed provisions: ▪ Have current processes in place with respect to waste disposal but will require strengthening.
Crown Law Office (CLO)	**Role with respect to the above listed provisions:** ▪ Statutory organization/legal arm of government responsible for providing legal advice to government ministries. Oversees, undertakes and reviews drafting of national legislation and regulations. ▪ May require technical assistance/legal support to assist with any potential legal drafting (as CLO face overburdened workload).
	Relevant institutional capacity in place to comply with above listed provisions: ▪ Crown counsel who assists with legislative development for Cook Islands.
Private Sector	**Role with respect to the above listed provisions:** ▪ T&M Heather Ltd – current contractors for the Rarotonga roadside collection of municipal solid waste and recyclables. ▪ Cook Islands General Transport (CIGT) – a land and sea transport business, and exporter of wastes/hazardous wastes. ▪ Collectors of waste and exporters of hazardous waste will require capacity building/training with respect to collection/disposal/storage/export criteria of hazardous/mercury waste and training to assist with identifying contamination at waste storage facilities. May also require upgrading/expansion of storage facilities.
	Relevant institutional capacity in place to comply with the above listed provisions: ▪ Collectors of waste currently have equipment for collection. ▪ Exporters of hazardous waste have facilities in place to store/manage.
Remaining Capacity Gaps at National Level that need to be addressed before provisions can be met:	
▪ Capacity building and technical assistance/legal support needed to assist with any legal drafting of provisions/regulations and amendments to national legislation. ▪ Capacity building/training and technical assistance required to assist with any plans, strategies and guidelines that need to be developed and implemented. ▪ Capacity building/training needed with respect to waste management to ensure obligations are met with respect to collection, storage, disposal and export of mercury wastes. ▪ Technical assistance required to establish emissions/releases inventory any support with monitoring and reporting obligations. ▪ Capacity building/training required for relevant stakeholders to understand and apply new provisions/regulations and obligations under both domestic laws and Convention. ▪ Up-to-date environmentally sound technology particularly with respect to waste storage and disposal facilities.	
Article 16 – Health aspects	
Name of Relevant institution/stake holder	**Role**
	Role with respect to the above listed provisions:

Te Marae Ora/Ministry of Health	▪ Government ministry responsible for the health system. ▪ Will be responsible for developing and implementing fish consumption guidelines to identify and protect populations at risk, and providing services for prevention and treatment of potentially affected populations. ▪ Will require strengthening of capacities through capacity building/training to prevent/diagnose/treat/monitor mercury exposure health risks (and will be responsible for promotion of this).
	Relevant institutional capacity in place to comply with above listed provisions: ▪ Mandate legislated under the Public Health Act 2004 and Ministry of Health Act 2013. ▪ The Public Health Bill is currently under development which provides for the ability to establish regulations and prepare plans/strategies. ▪ Can prepare plans and strategies in order to meet health promotion objectives and functions.
Ministry of Marine Resources (MMR)	**Role with respect to the above listed provisions:** ▪ Government ministry responsible for conservation, management, and development of marine resources. ▪ Likely to work with TMO to develop fish consumption guidelines.
	Relevant institutional capacity in place to comply with above listed provisions: ▪ Mandate legislated by Marine Resources Act 2005. ▪ Team in place with access to relevant data to assist TMO with development of fish consumption guidelines.
Ministry of Internal Affairs (INTAFF)	**Role with respect to above listed provisions:** ▪ Government ministry mandated to ensure that employers comply with workplace obligations such as occupational health and safety. ▪ Can promote occupational exposure educational and preventative programs in workplaces (relevant for those dealing with mercury waste collection/storage/export and current waste incinerator operators, and potential storage facility providers of mercury/mercury compounds), or an MOU can be signed to delegate this to TMO.
	Relevant institutional capacity in place to comply with above listed provisions: ▪ Leading national reform on Workplace Health and Safety. ▪ Workplace Health and Safety Bill is currently being drafted by CLO and NZCPO. ▪ Workplace Health and Safety Policy informing creation of regulations under the Bill.
NGOs	**Role with respect to above listed provisions:** ▪ Advocates for environment and human health. ▪ Awareness raising, public education and engagement.
	Relevant institutional capacity in place to comply with above listed provisions: ▪ Several NGOs established with focal areas relating to waste, environmental consumption and human health.

	▪ Various communications experience.
Remaining Capacity Gaps at National Level that need to be addressed before provisions can be met:	
▪ Development of strategies i.e. fish consumption guidelines. ▪ Capacity building and training for TMO in order to strengthen institutional and health capacities for the prevention, diagnosis, treatment and monitoring of health risks. ▪ Educational and preventative programs promoted through INTAFF or TMO (decision to be made as to whether MOU will be signed to delegate this to TMO).	
Article 17 – Information exchange	
Name of Relevant institution/stakeholder	**Role**
Ministry of Foreign Affairs and Immigration (MFAI)	**Role with respect to the above listed provisions:** ▪ Government ministry responsible for managing foreign relations and is the political focal point (including reporting to and ensuring compliance with administrative provisions of international conventions to which Cook Islands is a party to). ▪ Ability to facilitate exchange of information pursuant to Article 17.
	Relevant institutional capacity in place to comply with above listed provisions: ▪ Responsible for concluding bilateral and multilateral treaties. ▪ Dedicated division established to manage multilateral environmental agreements with ability to report on progress of implementing convention obligations.
NES	**Role with respect to the above listed provisions:** ▪ A Government agency responsible for protection and conservation of the environment, ensuring it is managed sustainably. ▪ Would likely be responsible for monitoring and reporting of emissions/release inventories and environmental implications. ▪ Ability to facilitate exchange of information pursuant to Article 17.
	Relevant institutional capacity in place to comply with the above listed provisions: ▪ The Environment Act 2003 provides overarching legislation, which includes reporting obligations. ▪ Current operational focal point for many multilateral environmental agreements, with ability to collect and disseminate information and report on progress. ▪ Compliance Division within NES has already been established to support enforcement (of Act/regulations and Convention).
Te Marae Ora/Ministry of Health	**Role with respect to the above listed provisions:** ▪ Government ministry responsible for the health system. ▪ No current data on health and safety of humans however TMO is responsible for providing such information.
	Relevant institutional capacity in place to comply with above listed provisions: ▪ Mandate legislated under Public Health Act 2004 and Ministry of Health Act 2013.

	▪ Public Health Bill currently under development which provides for ability to establish regulations and prepare plans/strategies.
Ministry of Finance and Economic Management (MFEM) – Customs Service	**Role with respect to the above listed provisions:** ▪ Agency within the RMD Division of MFEM responsible for overseeing and managing border security and imports/exports into and out of the Cook Islands. ▪ Responsible for keeping record of all exports (in conjunction with NES) e.g. mercury wastes exported for disposal.
	Relevant institutional capacity in place to comply with above listed provisions: ▪ Legislation in place authorising Customs' mandates (Customs Revenue and Border Protection Act 2004). ▪ Customs systems include tariff codes to classify goods being imported/exported. ▪ Exports/imports subject to the control of Customs, with customs officers in place to monitor and inspect items - but customs officers will need to be trained in dealing specifically with mercury to ensure accurate records.
Remaining Capacity Gaps at National Level that need to be addressed before provisions can be met:	
▪ The relevant information will need to be developed before it can be exchanged/shared. ▪ Relevant agencies may require capacity building/training with respect to data collection and reporting obligations.	
Article 18 – Public information, awareness and education	
Name of Relevant institution/stakeholder	**Role**
NES	**Role with respect to the above listed provisions:** ▪ A Government agency responsible for protection and conservation of the environment, ensuring it is managed sustainably. ▪ Likely responsible for promoting information regarding environmental effects of mercury and mercury compounds, annual quantities of emissions, results of research and development and activities to meet Convention obligations.
	Relevant institutional capacity in place to comply with the above listed provisions: ▪ Environment Act 2003 provides overarching legislation, which includes training, public information and awareness duty. ▪ Goal 6 of NES Strategic Framework 2022-2027 is communications. ▪ NES Environmental Communications Strategy 2022-2027 in place which provides overview of NES communications and goals. ▪ NES is also responsible for managing Cook Islands Environmental Data Portal (created by SPEP), which provides open access information to public on environment information (https://cookislands-data.sprep.org/) and can be utilised for public information and awareness raising activities.
Te Marae Ora/Ministry of Health	**Role with respect to the above listed provisions:** ▪ Government ministry responsible for health system. ▪ Responsible for promoting information regarding health effects of mercury and mercury compounds.

	▪ No current data on health and safety of humans however TMO is responsible for providing and sharing such information.
	Relevant institutional capacity in place to comply with above listed provisions: ▪ Mandate legislated under Public Health Act 2004 and Ministry of Health Act 2013. ▪ Ability to engage with range of stakeholders to facilitate education, training and public awareness – but will require capacity building/training and financial resources. ▪ Required to achieve health promotion objectives (under Public Health Bill currently under development). ▪ Can prepare information on health and safety of humans.
Infrastructure Cook Islands (ICI)	**Role with respect to the above listed provisions:** ▪ Government ministry responsible for most capital infrastructure projects as well as management of solid waste in the Cook Islands (in collaboration with other agencies NES, TMO). ▪ Can promote information regarding annual quantities of mercury/mercury compounds managed and disposed of.
	Relevant institutional capacity in place to comply with above listed provision: ▪ ICI's mandate legislated by the Infrastructure Act 2019. ▪ ICI provides public information through social media and its website on waste collection, recycling, how to reduce waste, etc. Thus, ICI's social media and website can be utilised as a platform for public information and awareness raising activities. ▪ Waste Division within ICI is established and can assist with information to be provided to relevant platforms.
NGOs	**Role with respect to above listed provisions:** ▪ Advocates for environment and human health. ▪ Awareness raising, public education and engagement.
	Relevant institutional capacity in place to comply with above listed provisions: ▪ Several NGOs have been established with focal areas relating to waste, environmental consumption, and human health. ▪ Various communications experience.
Remaining Capacity Gaps at National Level that need to be addressed before provisions can be met:	
▪ Capacity building for relevant agencies to ensure any training, education and public awareness activities are carried out appropriately and with sufficient resources. ▪ Development of a Communications Strategy/Plan to ensure information is shared appropriately and effectively with public.	
Article 19 – Research, development and monitoring	
Name of Relevant institution/stakeholder	**Role**

NES	**Role with respect to the above listed provisions:** ▪ A Government agency responsible for protection and conservation of the environment, ensuring it is managed sustainably. ▪ Would likely be responsible for development and monitoring of emissions/release inventories, and assessments of impact on environment. ▪ Ability to facilitate exchange of information pursuant to Article 17.
	Relevant institutional capacity in place to comply with the above listed provisions: ▪ Environment Act 2003 provides overarching legislation, which includes investigations, research, and monitoring functions. ▪ Compliance Division within NES already established to support enforcement and monitoring but will require support and strengthening of resources to monitor emissions/release inventories.
ICI	**Role with respect to above listed provisions:** ▪ Government ministry responsible for most capital infrastructure projects as well as management of solid waste in the Cook Islands (in collaboration with other agencies NES, TMO). ▪ Responsible for monitoring and evaluation of waste disposal facilities (i.e. waste incineration emissions, hazardous/mercury waste exports) and collecting up to date statistics on solid waste.
	Relevant institutional capacity in place to comply with the above listed provisions: ▪ ICI's mandate legislated by the Infrastructure Act 2019. ▪ The Waste Division within ICI is established, however significantly under-resourced and may require support with respect to monitoring.
Te Marae Ora/Ministry of Health	**Role with respect to the above listed provisions:** ▪ Government ministry responsible for the health system. ▪ Would likely be responsible for development of assessments and monitoring of impact on human health, particularly in respect of vulnerable populations.
	Relevant institutional capacity in place to comply with above listed provisions: ▪ Mandate legislated under Public Health Act 2004 and Ministry of Health Act 2013. ▪ Note, Public Health Bill currently under development.
Ministry of Finance and Economic Management (MFEM) – Customs Service	**Role with respect to the above listed provisions:** ▪ Agency within the RMD Division of MFEM responsible for overseeing and managing border security and imports/exports into and out of the Cook Islands. ▪ Responsible for keeping record of all imports/export (in conjunction with NES) e.g. mercury wastes exported for disposal – i.e. monitoring trade data.
	Relevant institutional capacity in place to comply with above listed provisions:

	▪ Legislation in place authorising Customs' mandates (Customs Revenue and Border Protection Act 2004). ▪ Customs systems include tariff codes to classify goods being imported/exported. ▪ Goods imported/exported subject to control of Customs, with customs officers in place to monitor and inspect items - but customs officers will need to be trained in dealing specifically with mercury to ensure accurate monitoring (for e.g. keeping accurate records relating to mercury wastes exported for disposal).
Ministry of Marine Resources (MMR)	**Role with respect to the above listed provisions:** ▪ Government ministry responsible for conservation, management, and development of marine resources. ▪ Likely to work with TMO to develop fish consumption guidelines i.e. assessment of impact on human health.
	Relevant institutional capacity in place to comply with above listed provisions: ▪ Mandate legislated by Marine Resources Act 2005. ▪ Team in place with access to relevant data to assist.
Ministry of Education (MOE)	**Role with respect to the above listed provisions:** ▪ Charged with overseeing the education system in the Cook Islands. ▪ Would need to be aware of any research methodologies adopted and implemented.
	Relevant institutional capacity in place to comply with above listed provisions: ▪ Mandate legislated by Education Act 2012. ▪ Established Tertiary Education Committee that advises government on tertiary education policy.
University of the South Pacific – Cook Islands Campus (USP)	**Role with respect to above listed provisions:** ▪ University institution with campus in Rarotonga that has strong international relations and quality research.
	Relevant institutional capacity in place to comply with above listed provisions: ▪ Existing Bachelor of Science program with aims to develop research skills.
Cook Islands Research Ethics Council (CIREC)	**Role with respect to above listed provisions:** ▪ CIREC reviews all research requests submitted to ensure the highest possible ethical standards are met.
	Relevant institutional capacity in place to comply with above listed provisions: ▪ Cook Islands National Research Policy establishes the Cook Islands Research Ethics Committee (CIREC) which became operational in May 2022. ▪ All research applications are required to seek ethics approval by CIREC.
Remaining Capacity Gaps at National Level that need to be addressed before provisions can be met:	
▪ Capacity building/training and technical assistance required for relevant agencies with respect to developing and monitoring inventories systems, data hub(s), research gaps and priorities, undertaking assessments of impact of mercury/mercury compounds on human health and environment, monitoring mercury levels in vulnerable populations etc.	
Article 21 – Reporting	

Name of Relevant institution/stakeholder	Role
Ministry of Foreign Affairs and Immigration (MFAI)	**Role with respect to the above listed provisions:** ▪ Government ministry responsible for managing foreign relations and is the political focal point (including reporting to and ensuring compliance with administrative provisions of international conventions to which Cook Islands is a party to).
	Relevant institutional capacity in place to comply with above listed provisions: ▪ Responsible for concluding bilateral and multilateral treaties. ▪ Dedicated division established to manage multilateral environmental agreements with ability to report on progress of implementing convention obligations.
National Environment Service (NES)	**Role with respect to the above listed provisions:** ▪ A Government agency responsible for protection and conservation of the environment, ensuring it is managed sustainably.
	Relevant institutional capacity in place to comply with the above listed provisions: ▪ The Environment Act 2003 provides overarching legislation, which includes reporting obligations. ▪ Current operational focal point for many multilateral environmental agreements, with ability to collect and disseminate information and report on progress. ▪ Compliance Division within NES already established to support enforcement (of Act/regulations and Convention).
Remaining Capacity Gaps at National Level that need to be addressed before provisions can be met:	
▪ Will need to establish a national focal point with reporting responsibilities (i.e. MFAI or NES) (Note: NES is focal point for Basel Convention and Waigani Convention; MFAI is focal point for Stockholm Convention and Rotterdam Convention). ▪ NES should maintain an inventory on progress of processes and measures taken to implement provisions of Convention (for the purposes of meeting reporting obligations under Article 21).	

Chapter 4: Identification of Populations at Risk and Gender Dimensions

4.1 Preliminary Review of Potential Populations at Risk and Potential Health Risks

Mercury is known to be highly toxic to human health, but its level of impact varies based on a number of factors including:

- form of mercury (methylmercury is the most toxic form of mercury to humans);
- amount of mercury the person is exposed to;
- age, sex, and condition of person exposed;
- duration of exposure;
- route of exposure; and
- dietary patterns of fish consumption (WHO, 2021a)

Figure 12 below summarises the typical ways in which humans may be exposed to mercury and its effects which can range from short-term to long-term.

HUMAN EXPOSURE TO MERCURY AND ITS COMPOUNDS

Mercury form	Source of exposure	Pathway of exposure	Absorption rate	Main excretion pathways	Toxicity
Elemental **Hg^0**	Dental amalgam, air, accidental spills, worksites, food from contaminated sites	Inhalation	75–85%	Urine, faeces	Acute: lungs, gastrointestinal tract
		Ingestion	Almost no absorption		Chronic: central nervous system, kidneys
		Dermal			
Inorganic **Hg^{2+}**	Cosmetics, soaps	Ingestion	10–30%	Urine	Acute: gastrointestinal tract (vomiting, bloody diarrhoea), kidneys (nephritis)
		Dermal	Can be high		Chronic: kidneys (kidney damage), central nervous system, skin (acrodynia in children), immune system
Organic **MeHg**	Food, mother during pregnancy	Ingestion	95%	Faeces (half life ($T_{1/2}$) is 45–70 days in adults)	Central nervous system, cardiovascular system
		Parenteral	100%		
		Transplacental			

Figure 12: Human exposure to mercury and its compounds (WHO, 2021b).

Depending on the type of exposure, mercury can affect several functions throughout the body. Children, infants and foetuses (through their mother during pregnancy) are more susceptible to central nervous system damage that can result in long term developmental issues with brain function and motor skills (WHO, 2021b). Newborns may typically be exposed to mercury through the consumption of contaminated breastmilk. As such, new mothers, pregnant women and women who may become pregnant are also considered to be vulnerable to the effects of

mercury (WHO/UNEP, 2008). Other vulnerable groups include persons who suffer from diseases of the liver, kidney, nervous system, and lung (WHO/UNEP, 2008).

In the Pacific, research has been conducted to assess potential trends in mercury exposure. In 2018, a global study was conducted in which hair samples for 757 women of child-bearing age were analysed for mercury concentrations and it was found that 58% of samples indicated an elevated mercury body burden exceeding 1 ppm (IPEN et al., 2018). The Cook Islands was among the countries assessed that had an average range of mercury concentrations that exceeded 1 ppm for the total samples analysed. Based on the responses to surveys conducted for the sample group, frequent consumption of fish was a common trend found amongst persons with high mercury concentrations in their hair samples (IPEN et al., 2018).

Humans are most exposed to the most toxic form of mercury, methylmercury (MeHg), through dietary consumption. Due to the presence of mercury in waterways and the bioaccumulation of mercury up the food chain, frequent consumption of mercury-contaminated fish is considered to be the most common source of methylmercury exposure to humans (WHO/UNEP, 2008). Predatory fish and large, long-living fish species tend to contain elevated levels of mercury, though further analysis of fish species should be conducted to more accurately inform this.

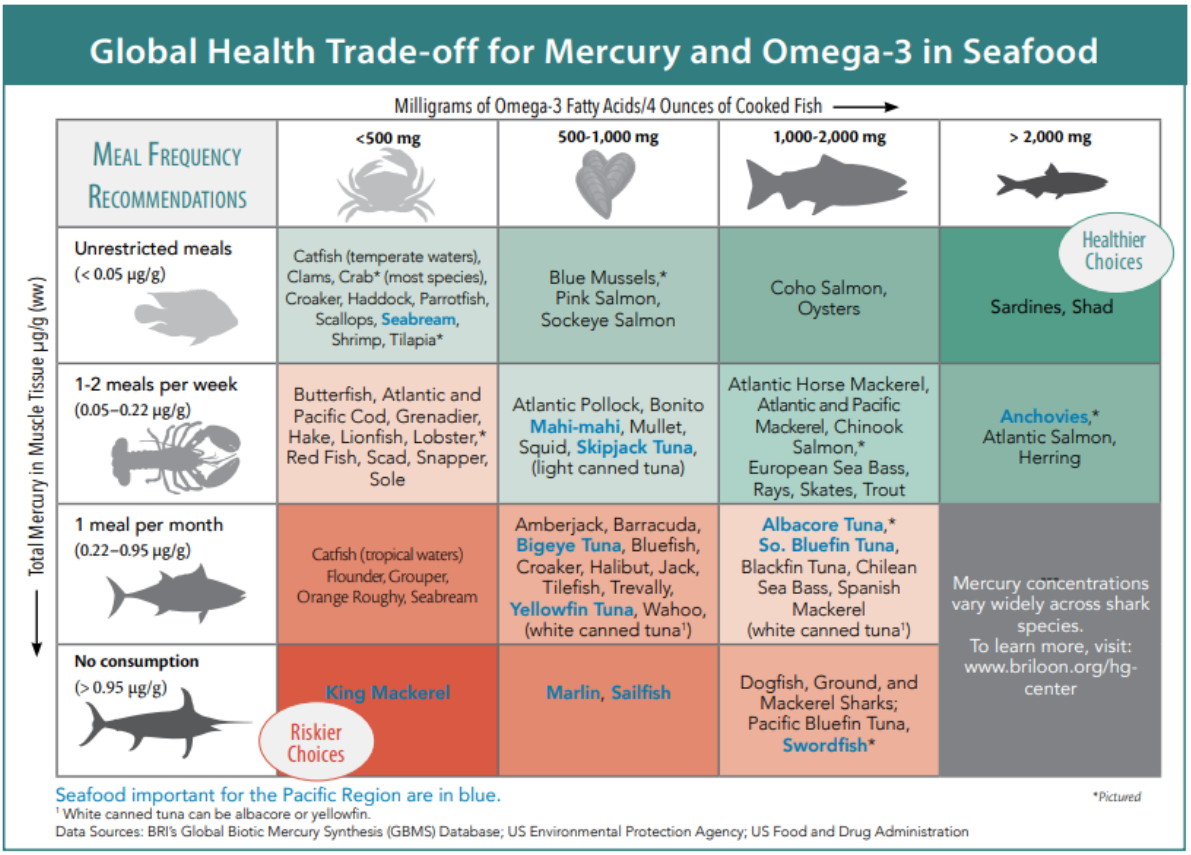


Figure 13: Example of Fish Consumption Guidelines developed for the Pacific Region (BRI, 2022).

Fish are a staple to many people in the Pacific region and other SIDS as fish are an essential source of protein that tends to be more accessible than other sources of animal protein; additionally, certain species such as tuna are exported commercially (FAO, 2022). Recognising the benefits associated with fish consumption, it is essential to educate the population on recommended consumption patterns to help limit mercury exposure to protect human health as well as the livelihoods of persons who depend on fisheries economically. Fish consumption guidelines (as illustrated in Figure 13) that are based on scientific research are recommended to assist vulnerable populations in determining the recommended frequency in consuming fish that considers their health benefits versus potential mercury risks.

In terms of occupational exposure to mercury in the Pacific, possible groups that may be affected include dental care professionals who prepare dental amalgam fillings, and waste handling and disposal personnel who may deal with mercury-containing waste.

Dental care professionals (this includes dentists and dental assistants/technicians) may be exposed to low levels of mercury when preparing dental amalgam fillings for implantation. Exposure may occur via inhalation of mercury vapors. To limit exposure, the use of proper personal protective equipment (PPE) such as face masks and gloves are recommended. Further to that, limiting the type of dental amalgam used to pre-capsulated types rather than using powdered alloys or elemental mercury will reduce the risk of exposure.

Many consumer products with mercury such as lighting devices and thermometers, do not pose a danger to human health while in use, but once broken, mercury can be released to the environment and to humans. During the handling of waste that may contain these items, waste workers may be routinely exposed to mercury. The use of proper PPE is recommended for all waste handlers. Diverting end-of-life mercury-added products from landfills for environmentally sound storage, handling and disposal will greatly reduce this occupational risk of exposure in the long-term.

4.2 Assessment of Potential Gender Dimensions related to the Management of Mercury

Gender mainstreaming is a strategy used to recognise the varying impacts of activities on different genders and to ensure that concerns or experiences of all genders are incorporated into the design, implementation, monitoring and evaluation of all policies and programs for the achievement of gender equality (ECOSOC, 1997).

As discussed in the previous section of this chapter, it is apparent that certain groups are more vulnerable to the effects posed by mercury and as such, mercury management strategies must be developed accordingly.

The development of future activities to continue research on the effects of mercury on the population must take into account the heightened vulnerability of women of childbearing age and pregnant women. Human biomonitoring activities to assess mercury concentrations are typically done via biomarkers such as hair, urine, blood, and umbilical cord blood (WHO,

2021b). It is noted that results of mercury assessments on maternal hair samples can act as a proxy for determining foetal mercury exposure to further inform the overall population's mercury exposure (WHO, 2021b).

Any development and dissemination of communication materials on mercury management should include measures to ensure that materials can be easily accessed by women. For example, in the Pacific, women tend to be the primary household caretakers (PRIF, 2016); and as such communication materials on fish consumption guidelines should be widely accessible by the overall population but especially by women who may be the primary preparers of meals in the household.

In terms of occupational exposure, further research is needed to inform the gender considerations that should be implemented.

Administratively, previous research in the region has indicated that women are poorly represented in government and private institutions resulting in women having less active participation in discussions, planning and monitoring of national programmes (PRIF, 2016). Ensuring that women are adequately represented in the committees responsible for making future decisions for mercury management in the Cook Islands, including in the development of communication strategies for mercury, is a key factor to be implemented for successful implementation.

Chapter 5: Awareness/Understanding of the Workers and Public; and Existing Training and Educating Opportunities of Target Groups and Professionals

Under Article 18 of the Minamata Convention on Mercury,

"Each Party shall, within its capabilities, promote and facilitate:

a) 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 compounds;

iii. The topics identified in paragraph 1 of Article 17;

iv. The results of its research, development and monitoring activities under Article 19; and

v. Activities to meet its obligations under this Convention;

b) 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…"

In the Cook Islands, the risks associated with mercury releases are considered to be mainly from the use and disposal of consumer products such as CFLs and other mercury-added lighting devices; and the preparation, use and disposal of dental amalgam fillings. Other perceived mercury risks are related to the potential consumption of mercury-contaminated fish over a period of time.

Currently, the level of awareness on the risks associated with mercury amongst workers (such as dental professionals and waste disposal workers) and the general public is not considered to be high and measures should be adapted to educate these groups on the issue.

Under the MIA Project, a brief animated awareness raising video was developed for dissemination in the Cook Islands (Figure 14). The video aims to educate the general public on the potentially mercury-added household products that may be present, the need for the safe disposal and the promotion of mercury-free alternatives that are already popular on the local market.

It is recommended that the video be shared widely via social media by all key stakeholder organisations.

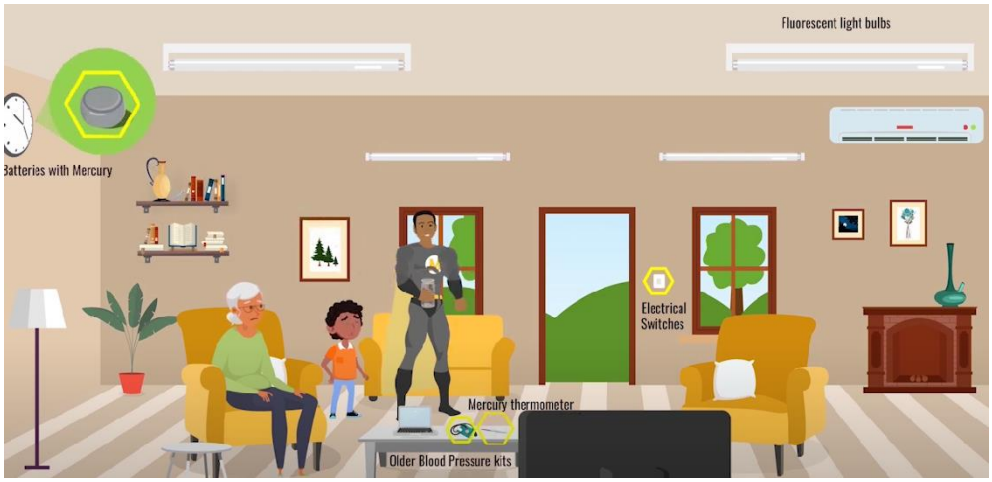


Figure 14: Scene in the awareness raising video developed under the project.

To educate key stakeholders on the estimated sources of mercury releases and recommendations for mercury management developed under the project, a technical briefing document that summarises the main findings of the MIA Project was developed.

Further to the MIA Project, the Cook Islands is also participating in the GEF ISLANDS Programme that will include information dissemination, inclusive of gender considerations, on mercury related issues to inform stakeholders and change behaviours in the Pacific region via the Coordination, Communication and Knowledge Management (CCKM) activities.

Stakeholder outreach and school campaigns to educate persons on various environmental issues are common tools implemented by government bodies responsible for the environment. The materials developed under this project and the ongoing GEF ISLANDS project can be utilised in future public education campaigns on environmental awareness.

In order to better inform the public on the potential risks associated with consumption of fish, further information on mercury concentrations in CKI and the Pacific region is being gathered by BRI in collaboration with NES.

Coordination with other relevant governmental, private and non-governmental organizations is recommended to further promote mercury management awareness.

Chapter 6: Implementation Plan and Priorities for Action

Under Article 20 of the Minamata Convention on Mercury, Parties, "may, following an initial assessment, develop and execute an implementation plan, taking into account its domestic circumstances, for meeting the obligations under this Convention" (UNEP, 2023). Further guidance on the development of an implementation plan can be obtained from the Minamata Convention Secretariat.

This Chapter serves to highlight some of the potential target areas that should be considered for the successful implementation of the Minamata Convention by the Government of CKI.

Priorities for Action:

1. **Become a Party to the Minamata Convention on Mercury**

   Based on the findings of the MIA, CKI is in a position to accede to the Minamata Convention on Mercury. Further capacity building opportunities to enhance implementation can be accessed through the UNEP Global Mercury Partnership and funding opportunities are made available to Parties under Article 13 of the Minamata Convention.

   Practical steps for accession to the Minamata Convention is available at: https://minamataconvention.org/en/resources/practical-steps-ratification-acceptance-approval-or-accession-processes-and-notifications

   It is key to note that through participation in the ongoing GEF-funded programme, Implementing Sustainable Low and Non-Chemical Development in Small Island Developing States (ISLANDS), CKI will also benefit from the development of draft model legislation to control mercury-added products for use by Pacific SIDS that can be tailored for adoption, and the provision of support for the sound repackaging, shipping, collection, and disposal of mercury waste. However, in order to implement these activities, CKI must be a Party to the Minamata Convention prior to the start of these project activities.

2. **Establish a Coordinating Mechanism for Mercury Management**

   Under the GEF ISLANDS Project, a national steering committee is being formed to oversee the project's activities (which include mercury management activities). It is recommended that this committee or a sub-committee comprising of stakeholders from all relevant authorities identified in Chapter 3 of this report, continue to coordinate the development of activities for mercury management. A mechanism for information exchange on mercury issues amongst these stakeholders should also be established. Gender considerations must also be factored into the makeup of the committee as well as for the

implementation of management activities as women and children have been identified as the more vulnerable groups to the impacts of mercury on health.

3. Implement measures to address identified sources of mercury releases.

These measures may include:

a. Promotion of the continued phase-out and phase down of mercury-added products.

Mercury-added products (and other intentional products/process uses) have been identified as a main source of mercury releases in CKI. In addition to regulatory bans to phase out their importation, sensitisation of government agencies, the private and public sectors is needed to ensure the sound phase out of these products.

Mercury-free alternative products are increasingly available on the global and local markets and have been proven to be highly reliable replacements. A summarised list for some key mercury-added products and their readily available alternatives is provided in Table 26.

Table 26: Summarised List of Key Mercury-added Products and their Mercury-free Alternatives

Mercury-added Product	Mercury-free Alternative
CFLs, LFLs, Mercury Vapour Lamps, some HIDLs	Light Emitting Diodes (LEDs), mercury-free HIDLs
Mercury thermometers	Digital thermometers, infra-red non-contact thermometers, alcohol thermometers
Mercury-added electrical switches, relays and thermostats such as, mercury wetted reed relays and mercury thermostats.	Mercury-free switches; mercury-free relays; electromechanical or digital thermostats *(over the past 20 years, mercury-free electrical switches, relays and thermostats have become the predominant type on the global market)*
Blood pressure medical measuring devices such as Mercury-added sphygmomanometers	Aneroid sphygmomanometers and several types of automated (electronic) blood pressure gauges.
Mercury-added batteries such as: Mercury Oxide/Mercury-Zinc Batteries, Zinc-air Button Cells, Alkaline Button Cells, Silver Oxide Button Cells, Alkaline, other than button.	Most of these types of alkaline and button cell batteries are now mercury-free on the global market.
Dental mercury amalgam (fillings)	Composite (resin) fillings
Mercury-added Skin Lightening Products	Global databases are currently under development and many existing databases are available online to guide on skin lightening products that should be avoided due to mercury contamination or other harmful ingredients.

For dental amalgam, under Article 4, Annex A, Part II of the Convention, Parties are expected to phase down dental amalgam by taking at least 2 provisions specified. Some key provisions for consideration by stakeholders in CKI include:

- Promoting the use of cost-effective and clinically effective mercury-free alternatives for dental restoration;
- Encouraging representative professionals to educate and train dental professionals on the use of mercury-free dental restoration alternatives and on promoting best management practices;
- Promoting the use of best environmental practices in dental facilities to reduce releases of mercury and mercury compounds to water and land.

Furthermore, as of 2022, Parties shall, "exclude or not allow, by taking measures as appropriate, the use of mercury in bulk form by dental practitioners" and Parties are expected to, "take appropriate measures to prevent dental amalgam use for patients under 15 years of age, and of pregnant and breastfeeding women, except when considered necessary".

b. Ensuring a regulatory framework and BAT/BEP implementation for monitoring and preventing mercury releases.

Under the Environment Act 2003, regulations on environmental standards for management of mercury releases to the air, water, land and for waste management should be developed. Guidance on appropriate mercury thresholds can be obtained through the Minamata Convention Secretariat. The addition of mercury, mercury compounds and mercury added products to the list of prohibited items for importation under relevant legislation is also recommended.

Close coordination amongst stakeholders across the government and private sector to build capacity and infrastructure for sound waste management is key to reducing mercury releases from major sources. The incorporation of mercury management under national waste strategies and training of relevant personnel in the subject is highly recommended.

4. Public awareness and sensitisation of relevant stakeholders on mercury issues

It is recommended that greater awareness and education of the general public and key stakeholders through existing outreach programmes be carried out. Further details on this priority are provided in Chapter 5 of this report.

5. Strengthen understanding of mercury issues in CKI through monitoring programmes.

To enhance the understanding of the risks posed by mercury locally, efforts to enhance strategies to identify potential mercury hotspots in the local environment through mapping and monitoring programmes can be coordinated. Partnering with regional and

global organisations like SPREP, the UNEP Global Mercury Partnership and BRI, among others for the development of funded projects to enhance monitoring capabilities can be assessed. Currently global mercury monitoring activities are being conducted by organisations such as BRI for the collection and analysis of human hair samples, fish muscle tissue samples, blood, feather and egg samples from birds and blood or fur samples from bats. Data generated will contribute to a global mercury database in coordination with UNEP.

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Annex 1: UNEP TOOLKIT Calculation Spreadsheet

The UNEP Toolkit Calculation Spreadsheet is available for download at the following link:

https://docs.google.com/spreadsheets/d/1qUoDUSrA8cn5e3sYfqqHlU5-3i7hBZLv/edit?usp=drive_link&ouid=111368229179989433735&rtpof=true&sd=true