Minamata **INITIAL ASSESSMENT REPORT**

Vanuatu 2022











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Our vision: A resilient Pacific environment sustaining our livelihoods and natural heritage in harmony with our cultures.

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The Government of Vanuatu is committed to ensuring the health of its citizens are protected with an environment that is free from mercury hazards.





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Acronyms

ASGM	Artisanal Small-scale Gold Mining
AVL	Airports Vanuatu Limited
BAT	Best Available Technology
BEP	Best Environment Practices
CAAV	Civil Aviation Authority Vanuatu
CCFL	Cold Cathode Fluorescent Lamps
CFLs	Compact Fluorescent Lamps
DCIR	Department of Customs and Inland Revenue
DEPC	Department of Environment, Protection and Conservation
DOE	Department of Energy
DOF	Department of Finance
DOGM	Department of Geology and Mines
DOL	Department of Labour
DOWR	Department of Water Resources
EEF	External Electrode Fluorescent Lamps
EEZ	Exclusive Economic Zone
EIA	Environment Impact Assessment
ELV	Emission Limit Value
ESM	Environmentally Sound Management
EU	European Union
FAO	Food and Agriculture Organization
GEF	Global Environment Facility
HPMV	High Pressure Mercury Vapour Lamps
JICA	Japan International Cooperation Agency
MALFFB	Ministry of Agriculture, Livestock, Forestry, Fisheries and Biosecurity
MAP	Mercury Added Product
MC	Minamata Convention
MEAs	Multilateral Environment Agreements
MFA	Ministry of Foreign Affairs
MIA	Minamata Initial Assessment
MOCCA	Ministry of Climate Change and Adaptation
MOET	Ministry of Education and Training
MOIA	Ministry of Internal Affairs
МОН	Ministry of Health
NAB	National Advisory Board
NEP	National Environment Policy
NCCC	National Chemicals Coordinating Committee
NCCM	National Chemicals Committee Management
NGO	Non-Government Organizations

OECD	Organisation for Economic Cooperation and Development
OGCIO	Office of the Chief Information Officer
PAAC	Protected Areas Advisory Committee
POP	Persistent Organic Pollutant
SPREP	Secretariat of the Pacific Regional Environment Programme
тсс	Technical Chemical Committee
UN Agency	United Nations Agency
UNDP	United Nations Development Programme
UNEP	United Nations Environment Programme
USAID	United States AID
VCCI	Vanuatu Chamber of Commerce and Industry
VCH	Vila Central Hospital
VEAN	Vanuatu Environment Advocacy Network
VNSO	Vanuatu National Statistics Office
WASH	Water, Sanitation, Health

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Foreword

Mercury (Hg) is considered a highly toxic chemical that has the ability for long-range atmospheric dispersion. Commonly found in air, soil, and water, mercury can be released naturally or through human activities, and it can remain in the environment for a long time. This causes the mercury to bioaccumulate in the environment and pose risks to animals and humans. In Vanuatu, the major sources of mercury emissions and releases come from improper disposal of mercury-added products and their wastes. With Vanuatu being extremely vulnerable to ongoing environmental hazards, the growing concerns of solid and hazardous wastes and persistent organic pollutants (POPs) can also add to the existing burden by posing major threats to Vanuatu's environment and human health.

Mercury as a chemical can also convert into methylmercury, a potent neurotoxin, which can lead to significant neurological damage, heart disease, and death, specifically in humans. Exposure to methylmercury can also lead to developmental delays and neurological damage affecting mainly the brain and muscle capacity, especially in small children. Mercury, therefore, remains a global, regional and national challenge. If not managed, mercury contamination can become a threat to human health and the environment.

In support of addressing the risks that come from the use of mercury, Vanuatu has joined other countries in the world to sign the Minamata Convention on Mercury, a global treaty designed to protect human health and the environment from the adverse effects of mercury. Joining four other Pacific island countries (PICs) to begin implementation of the Minamata Convention, Vanuatu envisions a country that is committed to ensuring the conservation and sustainable management of its biodiversity and ecosystems and to utilizing and sustainably managing its land, water, and natural resources.

Vanuatu undertook its first national mercury inventory in September 2018. The results will help to build national capacity around issues related to mercury releases and chemicals management. Assessments have also covered the legal and institutional capacity for implementation of the Minamata Convention. However, with the major gaps identified during the assessment, it calls on respective government departments to strengthen their management capacities to address mercury in Vanuatu. This report speaks directly to government departments and line agencies involved in the management of chemicals including mercury. Presenting updates from the MIA, the report provides the rationale and the imperative to act on this toxic pollutant. A mercury-free environment is our goal. We hope this report will go a long way to help in achieving this goal.



Ms. Donna Kalfatak, Director Department of Environmental Protection and Conservation

Executive Summary

This report summarizes the main outputs of the MIA project. It provides the review of inventory results, policy, legal and institutional frameworks assessment, as well as the review of potential future interventions that target major sectors responsible for mercury and hazardous waste management in Vanuatu.

Results from the National Mercury Inventory

Chapter 2 of the report covers the results from the national mercury inventory, which was developed using the UN Environment Programme's Toolkit for Identification and Quantification of Mercury Releases—the new revised Level 2 Toolkit. The mercury inventory highlights the major sources of mercury emissions and releases in Vanuatu, including supply, trade, and disposal of mercury-added products. The results from the Inventory also identified several key sectors that are responsible for emissions and releases of mercury in Vanuatu.

Total estimated releases of mercury in Vanuatu were estimated to be 389 kg Hg/ yr between 2017 and 2018. The consumer products with intentional use of mercury represent a major source of mercury releases, totalling 348Kg Hg/yr. Batteries containing mercury contributed the highest individual contribution (377 kg Hg/yr) to the total country releases. Table 1 bears a detailed summary from the Level 2 Inventory results.

Source category	Calculated Hg output, Kg/yr								
	Air	Water	Land	By-pro-ducts and impurities	General waste	Sector specific treatment /disposal	Total releases by source category	Percent of total releases*3*4	
5.1: Extraction and use of fuels/energy sources	0.1	-	-	-	-	-	0	0%	
5.2: Primary (virgin) metal production	-	-	-	-	-	-	-	0%	
5.3: Production of other minerals and mate- rials with mercury impurities*1	-	-	-	-	-	-	-	0%	
5.4: Intentional use of mercury in industrial processes	-	-	-	-	-	-	-	0%	
5.5: Consumer products with intentional use of mercury (whole life cycle)	1.1	0.1	0.9	-	346.3	-	348	90%	
5.6: Other intentional product/process use*2	0.1	3.1	0.6	0.4	1.4	1.4	7	2%	
5.7: Production of recycled metals	0.1	-	0.1	-	0.1	-	0	0%	
5.8: Waste incineration and burning	24.7	-	-	-	-	-	25	6%	
5.9: Waste deposition/landfilling and waste water treatment*3*4	0.5	0.3	2.1	-	-	-	3	0%	
5.10: Crematoria and cemeteries	-	-	6.9	-	-	-	7	2%	
SUM OF QUANTIFIED RELEASES*3*4	27	4	8	0	348	1	389	100%	

Table 1: Revised Level 2 Toolkit Summary of Results Results from the inventory provided information on four different output pathways for mercury in Vanuatu: 1) emissions to air; 2) direct releases to water; 3) direct releases to land; and 4) others. The "other" category includes output pathways for by-products, general waste, and sector-specific waste treatment. Below is a summary of mercury emissions and releases to each of these output pathways, identifying the major sectors responsible for these emissions and releases.

Emissions to Air: Estimated mercury emissions to air were 27 kg Hg/yr. The primary sectors responsible for emissions to air include waste incineration and open waste burning (24.7 kg/yr); consumer products with intentional use of mercury (whole life cycle;1.1 kg/yr); waste deposition/ landfilling, and wastewater treatment (0.5 kg/yr); other intentional use products or processes (0.1 kg/yr); extraction and use of fuels/energy sources (0.1 kg/yr); and production of recycled metals with mercury content (0.1 kg/yr).

Releases to Water: Releases to water were estimated to be a total of 4 kg Hg/yr. The main sources include other intentional products or processes (3.1 kg/yr); waste deposition/landfilling and waste water treatment (0.3 kg/yr); and consumer products with intentional use of mercury (whole life cycle;0.1 kg/yr).

Releases to Land: Mercury releases to land were estimated at 8 kg Hg/yr. The primary sources include is crematoria and cemeteries (6.9 kg/yr); waste deposition, landfilling, and wastewater treatment (2.1 kg/yr); consumer products with intentional use of mercury (whole life cycle; 0.9 kg/yr); other intentional product or processes (0.6kg/yr); and production of recycled metals (0.1 kg/yr). During the inventory, it was determined that dental amalgam fillings are utilized in limited quantity in Vanuatu, and it is thought that this output pathway will not be a significant source of mercury releases to land.

Other: Mercury releases associated with output pathways for by-products, general waste, and sector-specific waste was significant with a total of 3500 kg Hg/yr. The primary contributors to this category are consumer products with intentional use of mercury, which contributed 348 kg/yr in the general waste pathway. Other intentional use products or processes have a calculated value of 1.4 kg Hg/yr followed by production of recycled metals at 0.1 kg/yr. Additionally, other intentional use product or process also contributed 0.4 kg/yr and 1.4 kg/yr to the by-products and impurities and the sector specific treatment/disposal pathway. It is important to note that many of these values were derived from relatively course estimates, and therefore likely represent an overestimation.

Policy, Regulatory and Institutional Assessment

Chapter 3 covers the detailed assessment of existing policy, regulatory, and institutional frameworks in Vanuatu. While Vanuatu has signed the Minamata Convention, this country

has yet to institute proper measures across all levels (national, provincial, community) to manage the use of mercury in the country. The policy, legal, and institutional assessment identified systemic gaps that may impede the successful implementation of the Convention across all levels.

Strengthening regulations can increase institutional capacity, and improved coordination among and between stakeholders will be critical for the successful implementation of the Convention. Some of the primary gaps identified through this component of the MIA include:

- A standardised waste management guideline that can be adapted across all levels, that appropriately prohibits any future illegal waste disposals and adequately addresses potential releases of mercury associated with disposing mercury products.
- 2. An expansion of Vanuatu's current Waste Management Act that will help with compliance of phase-out dates and prohibitions under Article 4 and the associated Annex A of the Convention.
- 3. The Water Supply Act, Pollutions Control Act, and other associated regulations that address the release of contaminants to water provide an opportunity to strengthen control measures that protect the environment and human health from releases of mercury to streams, rivers, and lakes in Vanuatu.
- 4. The Basel Convention on the Control of Transboundary Movement of Hazardous Wastes and Their Disposal and the Waste Management Act provide a structure for effective compliance with Articles 10 and 11 of the Convention. However, a lack of organizational and human capacity to monitor the transboundary movement of hazardous wastes and no existing facility for the environmentally sound interim storage of mercury-containing hazardous wastes present challenges for the complete implementation of these Articles; and
- 5. It was generally accepted by the team of consultants and members of the Steering Committee that there is an overall lack of public awareness about the risks associated with mercury exposure in Vanuatu. An awareness-raising campaign will be an important component of any future ratification and implementation of activities.

Priority Areas for Implementation of the Convention

The priority areas for successful implementation of the Minamata Convention on Mercury were derived from the major gaps in information identified during the institutional and legislative gap analysis and the National Mercury Inventory. There exist potential synergies between the Minamata Convention and implementation strategies of other chemicals conventions (e.g., Basel Convention) and it will be beneficial for future implementation efforts to take advantage of the overlapping needs of these conventions to enhance coordination of chemicals management efforts within the country. In addition, identifying similar priority areas across countries in the Pacific region will help improve collaboration on issues such as trade and the transportation of waste and may also open greater opportunities for international funding to assist with implementation efforts.

Proposed Areas of Intervention

For Vanuatu to meet the overall goal of the Minamata Convention, at least four key areas of intervention may be taken into consideration:

- 1. Strengthen the legal and institutional framework.
- 2. Develop an interim storage and environmentally sound management plan for mercury.
- 3. Develop capacity building, education. and awareness programs; and
- 4. Implement research, monitoring, and reporting strategies.

Introduction

Background

Mercury has been recognised as a chemical of global concern owing to its long-range atmospheric transportation, its persistence in the environment once anthropogenically introduced, its ability to bioaccumulate in ecosystems, and its significant negative effects on human health and the environment (UNEP 2020). Naturally found in the Earth's crust, mercury is a chemical element that can have severe negative effects on human health and environment health (Evers and Buck 2010). Also known as quicksilver, mercury is a heavy, silvery-white liquid metal, which at room temperature evaporates into the air. Mercury exists in several forms: elemental mercury (inorganic metal); in the organic compound methylmercury; and in other organic as well as inorganic mercury compounds (Environment matters at the World Bank 2007). Mercury is released into the atmosphere from natural sources such as volcanoes and forest fires, and through industrial processes. These anthropogenic (or human) processes include coal burning; mining and smelting of iron and nonferrous metals; cement production; oil refining artisanal and small-scale gold mining; burning of consumer products or slow degradation of landfills; use of dental amalgam; chlor-alkali production; and vinyl-chloride monomer production (UNEP 2020). Mercury also poses significant health risks in adults causing kidney, heart, and respiratory problems, tremors, skin rashes, vision or hearing problems, headaches, weakness, memory problems, and emotional changes (Boening 2000). Ecological effects of mercury include harmful effects on microorganisms even at low concentrations; toxicity to aquatic organisms and birds; and physiological, reproductive and biochemical abnormalities in fish exposed to sublethal concentrations of mercury (Boening 2000). This report presents findings of the initial assessments of mercury, which form part of the early implementation of the Minamata Convention in Vanuatu.

The Minamata Convention on Mercury

In 2002, UNEP conducted the first Global Mercury Assessment (UNEP 2002), which gave widespread recognition that the nature and behaviour of mercury in the environment, including its abilities for long-range transport in the atmosphere, its persistence, and its ability to bio-accumulate in the ecosystem leading to significant adverse effects on both human health and the environment, are of global concern requiring globally coordinated action (UNEP 2013a). Initially, through the Global Mercury Partnership, UNEP was mandated by governments to coordinate actions, to address the most pressing aspects of anthropogenic releases of mercury. In 2009, an agreement to negotiate a legally binding instrument to restrict anthropogenic releases was reached by the UNEP Governing Council, which requested UNEP to convene an Intergovernmental Negotiation Committee (INC) beginning in 2010. After a series of INC meetings, the treaty text was agreed upon by 147 Governments on January 19, 2013, in Geneva, Switzerland. The Convention was then adopted and opened for country signatures at the Diplomatic Conference of Plenipotentiaries on the Minamata Convention on Mercury held in Kumamoto and Minamata, Japan, from 7 to 11 October 2013 (UNEP 2013c).

The overall objective of the Convention is to protect human health and the environment from anthropogenic emissions and releases of mercury and mercury compounds (UNEP 2013c). The Convention was adopted to promote the use of alternatives and best available techniques and environmental practices across a wide range of products, processes, and industries where mercury is used, released, or emitted. The Convention also provides for the control and phasing out and or phasing down of mercury and mercury-added products (UNEP 2013).

Minamata Initial Assessment

The Minamata Initial Assessment (MIA) was developed to help countries determine what is needed to ratify the Convention and, subsequently, to provide a basis for further work towards implementation.

MIA Report: Purpose and Objectives

The purpose and objectives of the MIA report are to provide evidence-based inputs to begin the early implementation of the Minamata Convention, facilitated by applying scientific and technical knowledge and tools through national stakeholders in Vanuatu.

Methodology

The national inventory assessment of mercury releases in Vanuatu was conducted by a team of consultants from the Grokivience Consultancy. A basic set of indicators were adapted from the UN Environment Mercury Toolkit and were used to guide the data collection process. This includes assessing existing mechanisms, for managing mercury, and collecting environmental data in order to ensure the mercury toolkit complements any existing positive mechanisms that are currently in place. The assessments also recorded information on a set of key indicators related to the likelihood of mercury impacting the environment across Port Vila, Luganville, Lenakel, and Lakatoro and were assessed in order to create a real-time evidence base for preventative action.

The year period 2016 to 2017 was used as the baseline year for data collection. Data for prior and recent years were also used when available, however, when neither is available the most recent data was used instead.

There were four data collection tools that were applied for the national inventory assessment.

- Literature Review on available sources of information about mercury categories/economic activities and their characteristic were searched through the internet. This included reviewing similar reports from other PICs, existing legislation, previous DEPC reports, lessons learned from previous hazard reports and publications related to impacts of mercury in similar contexts (such Pacific and small island nations).
- 2. Request for Information Letters were sent to relevant institutions aiming at identification of sources mercury in the country.
- Key Informant Interviews were conducted with main stakeholders, including representatives of relevant agencies, potential recipients, and users of mercurycontaining items, such as medical tools/instruments and lab devises (thermometers, manometers, etc.); and
- 4. Direct Observations were employed in this project to triangulate findings where data were gathered through close visual inspection. It was considered as an initial approach to understand the setting or context of items being sold or kept. The principal forms of direct observation were notes and photographs to assess the validity of the information received and to adjust findings from the assessment.

The main assessment locations for the MIA project included: Port Vila, Luganville, Lenakel, and Lakatoro. These four towns were pre-selected by the Secretariat of the Pacific Regional Environment Programme (SPREP) and the Department of Environmental Protection and Conservation (DEPC) because they have schools with laboratories, hospitals, shops and fuel stations or may have experience or exposure to mercury. Assessments were carried out in these selected major centres and a general analysis of Vanuatu's context with regards to the management of mercury are detailed in this report.

All data collected, including the main mercury emission and release sources across the four main towns of Vanuatu, were analysed; the process also included quantifying the mercury input-output sources. Quantitative data have been analysed using the UN Environment Programme Mercury Inventory Toolkit (LEVEL 1) spread sheet. Meanwhile, content analysis was also used to review qualitative data.

It must be noted that for more accurate estimations of mercury emissions and releases, a Level 2 inventory is required. However, an estimation of the mercury values through a direct measurement can also be used for data validation (e.g., measurement of mercury emissions from the wastewater treatment system). Thus, the current mercury inventory contains several uncertainties and inaccuracies due to the lack or absence of data on some mercury sources and subsectors. It is recommended to further build national capacity in managing mercury-related statistics and conducting mercury inventories.

Limitations

The inventory exercise was limited by the following gaps in data:

- Lakatoro, which was a key study site, did not have in existence to date any waste characterization surveys or related waste management data. Lakatoro, on the other hand, did have medical waste incineration data, which was collected in 2014, for its hospital premises (Norsup hospital).
- Given Vanuatu's high exposure to extreme disaster events such as cyclones, high amounts of waste (debris) can be produced at any time. This study did not include waste or debris produced in the aftermath of Tropical Cyclone Pam, which struck Port Vila in 2015.
- Wastewater or sewerage sludge quantities were not captured, largely because, in all sites, wastewater and sludge are disposed of via individual household onsite facilities (e.g., septic tanks, composting toilets, etc.) Should central reticulated systems be in place, then the task of obtaining wastewater data would have been more efficient.

Report Structure

This report is structured into eight chapters as follows:

- Introduction
- Chapter 1: National Background Information
- Chapter 2: Mercury Inventory and Identification of Emissions and Resources
- Chapter 3: Policy, Regulatory and Institutional Framework Assessment
- Chapter 4: Identification of Populations at Risk and Gender Dimensions
- Chapter 5: Awareness and Understanding of Workers and the Public
- Chapter 6: Implementation Plan and Priorities for Action
- Chapter 7: Mainstreaming of Mercury Priorities, Recommendations, and Conclusions

CHAPTER 1 National Background Information



Figure 1: Map of Vanuatu

The country is divided into six provinces: 1) Torba, 2) Penama, 3) Sanma, 4) Malampa, 5) Shefa and 6) Tafea. The nation's largest towns are the capital Port Vila, situated on Efate, and Luganville on Espirutu Santo. Vanuatu's larger islands are characterized by rugged volcanic peaks and tropical rainforests.

Sex	Total number	Percentage
Males	138,265	50.7
Females	134,194	49.3

Table 2: Population by Gender

Age	Total number	Percentage
0-14 years	104,561	38.4
15-29 years	70,042	25.7
30-59 years	75,418	27.7
60 years +	16,534	6.1

Table 3: Population by Age

Province	Total number	Percentage
Shefa	97,602	35.8
Sanma	54,184	19.9
Malampa	40,928	15.0
Tafea	37,050	13.6
Penama	32,534	11.9
Torba	10,161	3.7

Table 4: Population by Province

Geography

The official languages of Vanuatu include Bislama (local language), English, and French, however there are over 100 other local languages. Though small, the islands hold exceptional cultural and linguistic diversity.

The culture of Vanuatu is predominantly Melanesian and animist, with strong traditions of ancestral linkages between the land and people. Clan allegiances are strong and social structure patrilineal or matrilineal depending on your location in the archipelago. Christianity has provided a more recent overlay of modern religion but is interpreted through similarities to ancient cultural beliefs. Traditional knowledge also remains highly valued, and Vanuatu's diverse local governance systems include traditional chiefs as leaders at the village level, along with village, area and island councils. Vanuatu has a highly structured, hierarchical, village-based community social organization.

Population

According to the 2016 Census, Vanuatu's total population was estimated at 272,459 with an average annual population growth rate of 2.3%. Approximately 67,749 (25%) made up the urban population; approximately 204,710 (75%) made up the rural population. Vanuatu has a young population (64% of the total population is under 25 years old) and most of this age group live in rural areas. The average household size is five. Tables 1, 2, and 3 detail Vanuatu's population disaggregated by gender, age, and province (VNSO, 2019).

Political

The Republic of Vanuatu is a parliamentary democracy with a written constitution, headed by a President. The parliament has 54 members, elected by popular vote every four years, unless parliament is dissolved earlier. The Prime Minister is elected by the members of parliament and the Prime Minister, in turn, appoints the Council of Ministers. The Prime Minister and the Council of Ministers constitute the executive government. At the village level, chiefs are still the leading figures and may hold considerable power at the local level. The national Council of Chiefs is elected by district councils of chiefs and advises the government on all matters concerning Ni-Vanuatu culture and language.

Economic

Vanuatu is traditionally known for its strong cultural heritage, traditional activities, and subsistence farming. The four mainstays of Vanuatu's economy are agriculture, tourism, offshore financial services, and cattle. Exports include copra, kava, beef, cocoa, and timber. Imports include machinery and equipment, foodstuffs, and fuel.

In 2017, Vanuatu's economy grew by 4.4% with a strong performance over the previous three years. Subsequently, it was further projected for the economy to grow by 3.4% in 2018 from 2017 growth levels. Growth was primarily driven by construction activities related to the ongoing infrastructure development projects and reconstruction projects from Cyclone Pam (VNSO 2019; RBV 2018).

The GDP growth of 4.4% in 2017 was mainly driven by industry, followed by services and agriculture. Though the overall performance in industry has continued from the strong growth in two previous years, its contribution to GDP growth is less than services and agriculture. In terms of contribution by industries, services have the largest share of 65% which contributes to a positive growth of 1.8% in 2017 followed by agriculturefishing and forestry

Energy

The principal objectives in Vanuatu's energy sector is to reduce dependency on fossil fuels, encourage use of renewable sources, and inWcrease energy security while managing demand through energy efficiency measures. Under the National Energy Road Map (2016 – 2030), Vanuatu's government has set targets of attaining 100% electricity generation from renewable sources and the accomplishment of 100% electricity in households by the year 2030.

Biomass and imported petroleum product are the main energy sources for Vanuatu. Biomass is principally used for residential purposes such as for cooking and crop drying. However, petroleum products are important inputs into major sectors of the economy—electricity, industry, tourism, transportation, fishing, and agriculture. Presently, Vanuatu's primary needs are mainly met by imported petroleum. Consumption of petroleum has increased substantially, at an annual average rate of 6% over the years.

The bulk of electricity is derived from diesel (71%) and renewable energy (29%). Renewable sources currently being utilized include hydro, solar, wind, and biofuel.

Transportation and Infrastructure

Vanuatu's geographic and demographic structure poses obstacles to efficient development. People are scattered over about 80 widely distributed islands, of which 64 have residents (2009 National Census). This makes travel difficult and costly. The distance from the southernmost to the northernmost islands is over 800 km.

Vanuatu's geography also makes it difficult to build infrastructure efficiently and economically. Small population clusters make economic and financial justification difficult. Logistical problems of moving large construction equipment from island to island deter contractors and increases prices.

Once built, limited capacity and resources to maintain infrastructure leads to asset deterioration. Consequently, there are significant gaps in providing and operating physical infrastructure, particularly in poor and remote rural areas.

Roads

Vanuatu is estimated to have 1,800 km of roads. Of these, 234 km are sealed and 1,142 km are gravel. The remaining 400 km are simple earth roads (VISP 2014).

Port Vila and Luganville urban areas account for most of the sealed roads, and the recently improved Efate ring road and Santo East Coast Road represent the first extensive sealed roads outside the two main towns. On most islands other than Efate, Santo, and Tanna, road links have developed largely to service remote communities for their administrative and economic needs. There are still many locations where separate stretches of road on a particular island do not link.

Aviation

There are 29 airfields in Vanuatu. Airports Vanuatu Limited (AVL) operates the three main airports at Port Vila (Bauerfield), Luganville (Pekoa), and Tanna (Whitegrass). The other 26 are regulated by the Civil Aviation Authority of Vanuatu (CAAV) and run by the Public Works Department (PWD). The Bauerfield airport is Vanuatu's principal international gateway and handles approximately 250,000 international passengers annually. At present, the runway is long enough to accommodate most commercial aircraft, although some aircraft (Boeing 767, 777, and Airbus A330) have weight restrictions.

Shipping

With its population spread over 64 islands, Vanuatu depends on water transport. However, limited infrastructure restricts cargo and passenger movement. Inadequate wharves and jetties constrain vessels from calling at many destinations in all but ideal weather conditions, including the main jetty for Isangel in Tanna.

The principal wharves are in Port Vila and Luganville. There are also wharves on Malekula and Tanna that are adequate for conventional ships, but not in all sea conditions. Most calls to outer islands are made directly to a beach, or by lighters.

Industry

The industry sector overall grew by 7.1% in 2017 and with subsequent growth for 2018 placed at 7.0%, reflecting the slowdown and waning down of construction projects as they draw to completion. Forecast for 2019 was upgraded to 10.6% driven mostly by new projects.

The manufacturing sector in Vanuatu is very small and is driven by just a few players mainly based in Luganville and Port Vila. It is estimated that Vanuatu has just 3.8% of manufacturing value added as a percentage of its GDP (National Industrial Development Strategy 2018). There were improvements in the manufacturing sector with a growth rate of 3.3% in 2018 from 2.0% in 2017, with increased output from leading bottled water, beverages, and coconut oil industries in Port Vila.

Tourism

Tourism is a mainstay of the Vanuatu economy. Vanuatu has more recently embarked on a "greener" path as per its National Sustainable Tourism Policy (VSTP). The policy seeks to strike a balance between economic viability, social acceptability, and environmental responsibility. The VSTP also focuses on enhancing the resilience of Vanuatu's cultural, social, and ecological systems in the face of the changes, complexity, and uncertainty. Cyclone Pam in 2015 particularly had significant impacts in slowing growth, however the tourism sector is gradually recovering.

Given broad growth trends, total international visitor arrivals to Vanuatu for September quarter 2019 stood at 63,407, reflecting a decline of 16% over the corresponding period in 2018. On the other hand, tourism recorded an increase of 19% over the previous 2018 quarter. The decline of visitor arrivals over corresponding period were attributed by the fall in number of visitor arrivals by sea.

Visitors by air made up 58% of all international visitors to Vanuatu. This stood at 36,587, indicating an increase of 9% over corresponding quarter in 2018 and by 29% over June quarter 2019 (National Statistics Office 2019).

Agriculture and Fisheries

Agriculture

Subsistence farming in Vanuatu focuses on consumption and cultural traditions. This type of farming centers around root crops such as taro, yam, cassava, and sweet potato and makes up more than 75% of all agriculture in the country. Subsistence farming is highly dependent on rain for irrigation and basic tools are used.

Agricultural activities in Vanuatu also include small-scale semicommercial farming that is concentrated around urban areas. Semicommercial farming consists mainly of the following crops: green leafy vegetables; local island cabbage; Chinese cabbage; capsicum; eggplant; and spices and herbs. In general, the agricultural sector accounts for more than 75% of exports, of which the most important agricultural product is copra, the dried meat or dried kernel of the coconut used to extract coconut oil. Coconut, cocoa, kava, and coffee are the main cash crops. Coconut oil is also used as fuel, a trend that has major implications for the cultivation and sale of locally grown coconuts. The production of beef and timber has grown in importance for the economy.

According to the Reserve Bank of Vanuatu's Quarterly Economic Review report (2018), kava exports contributed approximately 45.1% of total exports (USD 4.3 million estimate), followed by copra exports at 19.9% (USD 2 million estimate), coconut oil at 9.3% (USD 900,000 estimate), cocoa at 8.6% (USD 800,000 million estimate), other products at 11.1% (USD 1 million estimate) and the rest contributed by other exports. In line with domestic production, kava, cocoa, beef, and coffee exports improved despite a fall in other commodities. The impact of natural disasters (tropical cyclones and Ambae volcanic eruptions) impacted the production of kava, copra, root crops and vegetables produced in the northern islands of Vanuatu, attributing to an expected weaker growth in the agriculture sector in 2018.

Fisheries

Fisheries contribution to the GDP in 2012 was estimated as USD 5.5 million, 0.7% of the national GDP. The fisheries export value in 2015 was estimated at USD 100 million and import value at USD 5.1 million. Annual per capita consumption was 32.1 kg in 2013.

Compared to other Pacific island countries, inshore marine areas are not extensive in Vanuatu. Inner reef areas are limited to narrow fringing reefs and the area covered by mangroves is quite small. A total of 161 vessels were reported in 2016 with just over half under 12 m length overall (LOA).

Vanuatu has industrial scale distant water fisheries operating in the Atlantic Ocean, the Indian Ocean and the eastern Pacific Ocean, in addition to its own Exclusive Economic Zone (EEZ) and surrounding area with at least 96 longliners, three purse seiners, and two trawlers active fishing vessels in 2015. However, total catch in distant waters has significantly reduced after the peak of almost 144 000 tonnes reached in 2006; catch was about 77 tonnes in 2016, in addition to 43 000 tonnes taken in the western central Pacific fishing area where Vanuatu is located. Coastal fishing is primarily carried out for subsistence purposes and for sales for local markets. Subsistence fishing activities include coastal line and net fishing targeting demersal and small pelagic reef and lagoon fish, as well as reef gleaning and collection of shellfish and other invertebrates.

In 2016, the aquaculture sector employed 34 women and 173 men. An estimated 38% of the people engaged in marine fishing and subsistence fisheries were women. In addition, there are some coastal fisheries that are export-oriented, including trochus, bêche-de-mer, and aquarium fish. The aquarium fishery has been in existence in Vanuatu for the last 15 years. In 2015, Vanuatu exported ornamental fish valued at USD 224 000 and corals and shells valued at USD 92 000.

Aquaculture efforts in Vanuatu have included attempts at raising oyster, rabbitfish, freshwater shrimp, trochus, green snail, and tilapia in the past. In mid-1999, some spawning trials of giant clams were carried out, and some experimental culture of Eucheuma seaweed was also undertaken.

Vanuatu aquaculture produced 16 tonnes of fish and shrimp in 2016, a drastic drop from 2014 due to devastation caused by Cyclone Pam in 2015. Vanuatu leaders had shown interest in introducing more intensive fish farming techniques from Asian countries. Vanuatu is a signatory to the UN Convention on the Law of the Sea, the Convention on the Conservation and Management of Highly Migratory Fish Stocks in the Western and Central Pacific Ocean and the Washington Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES). Vanuatu is also a party to the following treaties and agreements relating to the management of regional fisheries.

Waste

The average amount of solid waste generated per capita has increased steadily from 0.43 kg/person/day in 2011 to about 1.5 kg/person/day in 2017. Both the urban centers of Port Vila and Luganville have controlled disposal sites or landfill. Aside from disposal within the urban controlled sites, common disposal methods include open backyard dumpsites, disposal at sea or on unused land, and burning.

The management and control of a landfill, such as the Port Vila landfill, has been and continues to be a challenge. The problem of solid waste disposal is particularly pronounced in the urban areas as the waste from rural areas is generally scattered and does not pose much hazard. The Vanuatu government is currently working with JICA to improve the solid waste management situation in the country.

Reuse and recycling measures have been initiated for materials such as glass, metals, and PET bottles. In 2018, Vanuatu introduced regulations to ban the importation and use of single-use nonbiodegradable plastics including shopping bags and polystyrene containers. Through the Department of Environment and Conversation, there has been a recent expansion of the ban to include plastic cutlery and grocery packaging.

Liquid waste is not treated effectively via a reticulated system. Most houses and establishments have individual onsite disposal systems to manage liquid or sanitation wastewater.

Health and Services Sector

Life expectancy in Vanuatu has increased and now stands at 69.6 and 72.7 years for males and females, respectively (VNSO, 2009). But the country faces the dual challenges of dealing with both communicable diseases and the rapidly growing incidence of Non-Communicable Disease (NCD), notably diabetes and hypertension. People are living longer, but often with the burden of chronic illness and disability. At all levels of the health system and in the community, people are concerned about the impacts of NCDs in terms of premature death and increasing levels of disability – e.g., stroke, amputation, blindness, and mental illness. For the health system, the costs of managing the NCD crisis are huge and growing daily. While there are now fewer malaria cases, Vanuatu still has worrying levels of other communicable diseases such as Tuberculosis (TB) and Sexually Transmitted Infections (STIs). The challenge is to maintain the significant gains made as resistant strains of disease emerge, population mobility increases and development partner support decreases. And although 90% of people now have improved water supply, almost half the population does not have proper sanitation. Along with poor hygiene, this helps spread infectious diseases such as TB, Acute Respiratory Infection (ARI), diarrhoea and skin diseases.

Vanuatu still lags in terms of maternal and child health. Although nine out of ten women giving birth now have skilled birth attendants, too many women still die in childbirth. Numbers of maternal deaths have increased over the past 3 years although this may be due to improvements made in reporting processes.

The Vanuatu health system is mainly classed into three (3) focus areas: Public Health, Curative Services, and Corporate Services. The current health system structure is based on the Role Delineation Policy developed in 2004. While this is still a workable system, it is not able to achieve the first policy objective of ensuring equitable access to quality, affordable health services.

There are obvious physical challenges. Vanuatu has a small population (just over 270,000 in 2015) that is dispersed across 83 islands. Villages in remote areas are often small and isolated, and people who live there pay high transport costs (via boat or truck) to reach health facilities. In the wet season,

travel by sea is often dangerous and roads may be cut off by flooding. Overall, the health system faces significant challenges in its quest to achieve Universal Health Care.

Education

Vanuatu operates a bilingual education system, with English and French languages being taught to students throughout the country at Early Childhood Education (ECCE), Primary, and Secondary schools. Table 5 below shows the number and types of schools.

The number of enrolled children in the ECCE centres throughout Vanuatu has increased by 4.9% in 2018 compared to 2017. At primary level, the number of students has increased by 7.7% in 2018 compared to 2017 and 3.9% at secondary level in 2018 compared to 2017. In terms of teaching staff, the number of teachers in ECCE and primary schools has also increased in 2018. However, Ministry of Education and Training (MOET) is still recording the number of the ECCE, Primary and Secondary school teachers by their qualification in the Open VEMIS. It is expected that 100% of these teachers will be recorded in the system by 2019.

Overall, school grants are the major incentive that has contributed to the increase of school enrolment across the three education sectors. Many other programs may have also contributed in one way or another but the fact that more children are going to school is mainly because parents in the communities are no longer paying for their children's tuition fees (since 2010).

Environmental Overview

Vanuatu's climate is subtropical with uniform temperatures year-round and two defined seasons: the hot and wet season (November to April), and the cool or dry season (May to October). The warmest month is February, and the coolest is August. Temperatures can vary from 24°C to 30°C with a daily average of 26°C in the hot season. Rainfall is heaviest in the hot season, generally in March, while the driest month is in August. On the island of Efate, annual rainfall on the windward side is between 2400 mm – 3000 mm per year, with half that amount recorded on the leeward side (Country Profile–Vanuatu Islands, 2016).

The hot and wet season in Vanuatu is also the cyclone season. Vanuatu is located on a route occasionally traversed by cyclones, which are associated with winds of at least 34 knots (62 km/hr). The land and sea area of Vanuatu receives about two to three cyclones in a season; the greatest frequency occurs in January and February. On average, Vanuatu and its marginal seas is a common route to some 20 to 30 cyclones per decade, with three to five causing severe damage (Country Profile-Vanuatu Islands, 2016).

Vanuatu also lies on the Pacific Plate with a subduction zone to its west, and often experiences several earthquakes of varying magnitudes. There is also an ever-present danger of a major volcanic eruption from one or more of Vanuatu's active volcanoes. There are active volcanoes on several islands including Ambae, Ambrym, Lopevi, Tanna, Gaua, and Vanua Lava, in addition to underwater volcanoes (Country Profile – Vanuatu Islands, 2016).

Biodiversity

Vanuatu's flora is thought to be more closely allied with that of Solomon Islands to the north, with some elements from Fiji, and very few from Australia or New Caledonia. However, there is considerable variation between different plant families. For example, 59% of palm genera are shared with Fiji with a much lower proportion affiliated with palms in Solomon Islands. Similarly, the fauna demonstrates closer affinities with Solomon Islands. Internally, there is a biogeographic divide with islands to the north of Efate demonstrating significant differences from the islands to the south. Vanuatu's reef ecosystems support similar species to Australia's Great Barrier Reef and New Caledonia. In general, Vanuatu's biodiversity remains poorly known, with detailed studies of only a few genera and few studies of the biota of smaller or less accessible islands.

National Priorities

Protection of the environment is a central tenant of Vanuatu's National Sustainable Development Plan (NSDP) goals. The environment pillar seeks to ensure a pristine natural environment on land and at sea that continues to serve our food, cultural, economic, and ecological needs, as well as enhance our resilience and adaptive capacity to climate change and natural disasters.

Furthermore, the country's National Environment Policy and Implementation Plan 2016–2030 outlines policy actions on the following priority areas:

- 1. Conservation of biological, ecosystem, genetic, human, and cultural diversity;
- 2. Sustainable resource management;
- 3. Waste management and pollution control;
- 4. Climate change;
- 5. Environmental governance and capacity development;
- 6. Sustainable growth and development;
- 7. Financing and economic instruments.



Figure 2: Climate Profile



CHAPTER 2 Mercury Inventory and Identification of Emissions and Resources This chapter outlines the emission sources of mercury to air and release sources of mercury to land and water. The chapter also provides an overview of the initial inventory of mercury in the following categories:

- Stocks of mercury and/or mercury compounds.
- Supply of mercury, including sources, recycling activities and quantities.
- · Relevant sources of mercury inputs, emissions, and releases.
- Sectors that use mercury or mercury compounds and the amount per year, including in manufacturing processes, and to produce mercury-added products
- Trade of mercury and mercury-containing compounds as well as the import and export of mercury-added products.

Summary of Mercury Inputs, Emissions and Releases, Stockpiles, Supply, and Trade

Mercury source types present

Source category: Extraction and use of fuels/energy sources 5.1.1 Coal combustion in power plants Ν Ν 5.1.2.1 Coal combustion in coal fired industrial boilers 5.1.2.2 Ν Other coal use Mineral oils - extraction, refining and use Y 5.1.3 Natural gas - extraction, refining and use Ν 5.1.4 Other fossil fuels - extraction and use Ν 5.1.5 5.1.6 Biomass fired power and heat production Ν 5.1.7 Geothermal power production Ν Source category: Primary (virgin) metal production 5.2.1 Ν Mercury (primary) extraction and initial processing 5.2.2 Gold (and silver) extraction with mercury amalgamation processes Ν 5.2.3 Zinc extraction and initial processing Ν 5.2.4 Copper extraction and initial processing Ν 525 Lead extraction and initial processing Ν 5.2.6 Gold extraction and initial processing by methods other than mercury amalgamation Ν 527 Ν Aluminum extraction and initial processing 5.2.8 Other nonferrous metals - extraction and processing Ν Ν 5.2.9 Primary ferrous metal production Source category: Production of other minerals and materials with mercury impurities 531Cement clinker production Ν 5.3.2 Pulp and paper production Ν 5.3.3 Production of lime and light weight aggregates Ν Source category: Intentional use of mercury in industrial processes Ν 5.4.1 Chlor-alkali production with mercury-technology 5.4.2 VCM production with mercury catalyst Ν 5.4.3 Acetaldehyde production with mercury catalyst Ν Ν 5.4.4 Other production of chemicals and polymers with mercury Source category: Consumer products with intentional use of mercury Thermometers with mercury 5.5.1 Υ

 Table 5: Inventory Level 2 – Mercury Sources Identified in Vanuatu

Of the 53 mercury sources listed in the Level 2 inventory, 12 have been identified as present in Vanuatu. Table 5 provides a summary of this.

5.5.2	Electrical switches and relays with mercury	Υ
5.5.3	Light sources with mercury	Υ
5.5.4	Batteries with mercury	Υ
5.5.5	Polyurethane with mercury catalysts	?
5.5.6	Biocides and pesticides with mercury	Ν
5.5.7	Paints with mercury	?
5.5.6	Pharmaceuticals for human and veterinary uses	Ν
5.5.9	Cosmetics and related products with mercury	Ν
Source cates	gory: Other intentional product/process use	
5.6.1	Dental mercury-amalgam fillings (b	Υ
5.6.2	Manometers and gauges with mercury	Ν
5.6.3	Laboratory chemicals and equipment with mercury	Ν
5.6.4	Mercury metal use in religious rituals and folklore medicine	Ν
5.6.5	Miscellaneous product uses, mercury metal uses, and other sources	Ν
Source cate	gory: Production of recycled metals ("secondary" metal production)	
5.7.1	Production of recycled mercury ("secondary production")	Ν
5.7.2	Production of recycled ferrous metals (iron and steel)	Υ
5.7.3	Production of other recycled metals	Ν
Source categ	gory: Waste incineration*3	
5.8.1	Incineration of municipal/general waste	Ν
5.8.2	Incineration of hazardous waste	Υ
5.8.3	Incineration of medical waste	Υ
5.8.4	Sewage sludge incineration	Ν
5.8.5	Informal waste burning	Υ
Source cate	gory: Waste deposition/landfilling and wastewater treatment	
5.9.1	Controlled landfills/deposits*3	Υ
5.9.2	Diffuse disposal under some control	-
5.9.3	Informal local disposal of industrial production waste	Ν
5.9.4	Informal dumping of general waste*1*3	Υ
5.9.5	Wastewater system/treatment*2	Ν
Source categ	gory: Crematoria and cemeteries	
5.10.1	Crematoria/cremation	Ν
5.10.2	Cemeteries	Υ

Mercury Inputs to Society

Source category	Source category	Exists? (y/n/?)	Calculat. Hg input to society (kg)
Source cate	gory: Extraction and use of fuels/energy sources		
5.1.3	Mineral oils - extraction, refining and use	Υ	0
Source cate			
5.5.1	Thermometers with mercury	Υ	0
5.5.2	Electrical switches and relays with mercury	Υ	9
5.5.3	Light sources with mercury	Υ	1
5.5.4	Batteries with mercury	Υ	337
5.5.5	Polyurethane with mercury catalysts	?	2
Source cate	gory: Other intentional product/process use		
5.6.1	Dental mercury-amalgam fillings (b	Υ	7
Source cate	gory: Production of recycled metals ("secondary" metal production)		
5.7.2	Production of recycled ferrous metals (iron and steel)	Υ	0

Table 6: Inventory Level 2 – Summary of Mercury Inputs in Vanuatu(2017 – 2018)

Total estimated mercury input reported in the level 2 toolkit was 366 kg Hg/yr between 2017 and 2018 as seen in Table 6. The major sources being consumer products with intentional use of mercury and the waste incineration and burning.

Source cate	gory: Waste incineration*3		7
5.8.2	Incineration of hazardous waste	Υ	18
5.8.3	Incineration of medical waste	Υ	7
5.8.5	Informal waste burning	Υ	0
Source category: Waste deposition/landfilling and wastewater treatment			7
5.9.1	Controlled landfills/deposits*3	Υ	0
5.9.4	Informal dumping of general waste*1*3	Υ	3
Source category: Crematoria and cemeteries			7
5.10.2	Cemeteries	Υ	7
Total			

Mercury Source Types Present

Table 5: Inventory Level 2 – Mercury Sources Identified in Vanuatu

Of the 53 mercury sources listed in the Level 2 inventory, 12 have been identified as present in Vanuatu. Table 5 provides a summary of this.

Source category			Calculated Hg output, Kg/yr					
	Air	Water	Land	By-pro-ducts and impurities	General waste	Sector specific treatment /disposal	Total releases by source category	Percent of total releases*3*4
5.1: Extraction and use of fuels/energy sources	0.1	-	-	-	-	-	0	0%
5.2: Primary (virgin) metal production	-	-	-	-	-	-	-	0%
5.3: Production of other minerals and materials with mercury impurities*1	-	-	-	-	-	-	-	0%
5.4: Intentional use of mercury in industrial processes	-	-	-	-	-	-	-	0%
5.5: Consumer products with intentional use of mercury (whole life cycle)	1.1	0.1	0.9	-	346.3	-	348	90%
5.6: Other intentional product/process use*2	0.1	3.1	0.6	0.4	1.4	1.4	7	2%
5.7: Production of recycled metals	0.1	-	0.1	-	0.1	-	0	0%
5.8: Waste incineration and burning	24.7	-	-	-	-	-	25	6%
5.9: Waste deposition/landfilling and wastewater treat- ment*3*4	0.5	0.3	2.1	-	-	-	3	0%
5.10: Crematoria and cemeteries	-	-	6.9	-	-	-	7	2%
SUM OF QUANTIFIED RELEASES*3*4	27				348			100%

The following graphs further summarize the level mercury releases.



Figure 3: Mercury releases to air

Figure 3, showing a total of mercury releases to air was estimated at 27Kg/yr, with waste incineration and burning bearing the largest amount of 25Kg/yr mercury output followed by consumer products 1Kg/yr.

Mercury releases to air (Kg Hg/y)

Figure 4: Releases to water

Figure 4 highlights an estimated total 4Kg/yr of mercury released to water. Other products or processes which account for the highest and only output source in Vanuatu, covers dental amalgam fillings, manometers and gauges, lab chemicals and equipment, mercury use in religious rituals and folklore medicine, and miscellaneous product uses.



Figure 5: Land releases

8

A total of Mercury releases to land was estimated at 8 Kg/yr with crematoria and cemeteries bearing the highest output 7Kg/yr, Subsequently waste deposition and wastewater treatments is the other major land release source at 2Kg/yr. Consumer products and other products/processes were the third most common sources at 1Kg/yr each

Figure 6: Outputs to by-products

Mercury outputs to by-products and

impurities amounted to 0.4 kg/yr.

This is likely due to data gaps.

and impurities



0

0

0.1 0.2 0.3 0.4 0.5

Mercury outputs to by-products and impurities (Kg Hg/y)



5.1: Extraction and use of fuels/energy sources
5.2: Primary (virgin) metal production
5.3: Production other minerals and materials*1
5.4: Intentional Hg in industrial processes
5.5: Consumer products (whole lifecycle)
5.6: Other product/process use*2
5.7: Production of recycled metals
5.8: Waste incineration and burning
5.9: Waste deposition + waste water treatm.*3*4
5.10: Crematoria and cemetaries

5.1: Extraction and use of fuels/energy sources

5.3: Production other minerals and materials*1

5.9: Waste deposition + waste water treatm.*3*4

5.4: Intentional Hg in industrial processes

5.5: Consumer products (whole lifecycle)
5.6: Other product/process use*2
5.7: Production of recycled metals
5.8: Waste incineration and burning

5.10: Crematoria and cemetaries

5.2: Primary (virgin) metal production

Figure 7: Releases to general

wastes There wWithin this category was

derived from consumer products (whole lifecycle)



Figure 8: Releases to sector specific waste treatment

The total of mercury releases to sector specific waste treatment or disposal was estimated at 1Kg/yr (Figure 8). This is attributed to other products/processes, specifically dental amalgam fillings.



Mercury releases to sector specific waste treatment/disposal (Kg Hg/yr)

Summary of Mercury Stockpiles, Supply, and Trade

The Minamata Convention on Mercury states the obligations of each country regarding mercury stockpiles, supply, and trade. It specifically highlights primary mercury mining, individual stocks of mercury or mercury compounds (>50 tonnes), mercury supply sources (generating stockpiles >10 tonnes/ yr and import or export of mercury. Vanuatu does not have any industries which would generate or require mercury stockpiles, supply sources, or trade that would be impacted by these provisions of the Minamata Convention.

Data and Inventory on Energy Consumption and Fuel Production

Source category	Exists? (y/n/?)	Calculat. Hg input to society Calculat. Hg input to society		Calculated Hg output, Kg/yr				
			Air	Water	Land	By-pro-ducts and impurities	General waste	Sector specific treatment/disposal
Coal combustion in power plants	Ν	0	0	0	0	0	0.0	0
Coal combustion in coal fired industrial boilers	Ν	0	0	0	0	0	0	0
Other coal use	Ν	0	0	0	0	0	0	0
Mineral oils - extraction, refining and use	Υ	0.1	0.1	0	0	0	0	0
Natural gas - extraction, refining and use	Ν	0	0	0	0	0	0	0
Other fossil fuels - extraction and use	Ν	0	0	0	0	0	0	0
Biomass fired power and heat production	Ν	0	0	0	0	0	0	0
Geothermal power production	Ν	0	0	0	0	0	0	0

The inventory on energy consumption and fuel production was derived from UNELCO and VUI's yearly energy consumption reports. Estimates were based on the 2018 yearly report since the study period covered 2016 and 2017. Table 7 below shows a summary of inventory on energy consumption and fuel production in Vanuatu.

Figure 8: Releases to sector specific waste treatment

The total of mercury releases to sector specific waste treatment or disposal was estimated at 1Kg/yr (Figure 8). This is attributed to other products/processes, specifically dental amalgam fillings. Energy consumption companies present in all four towns (Port Vila, Luganville, Lenakel, Lakatoro), were assessed on how much petrol they use per year, to generate electricity.

Vanuatu does not have factories or industries that produce fuel; however, the country is a net fuel importer. The main fuels used in the country include, diesel, mazut, and benzine (which are used primarily in vehicles), ships, and boats. Diesel is also used to power electricity in Vanuatu. Other fuels like kerosene are used in rural areas for lanterns and to ignite cooking fires, while LPG are mainly used in urban areas. An estimated total 7,490,239 litre of fuel was used from 2016 to 2017, to power electricity in all the four towns (Port Vila 4,443,216 Littre, Luganville 2,376,623 Littre, Lenakel 435,200 Littre, and Lakatoro 235,200 Littre) of Vanuatu.

Petroleum products are mostly used by the transport and industry sectors and in small quantities by households (LPG and kerosene) and the commercial and agriculture sectors. According to the Organization for Economic Cooperation and Development, "in 2017, Vanuatu imported \$244M worth of energy fuel, making it the 192nd largest importer in the world. During the last five years the imports of Vanuatu have decreased at an annualized rate of -5.1%, from \$317M in 2012 to \$244M in 2017. The most recent imports are led by Refined Petroleum which represent 15.9% of the total imports of Vanuatu" (OECD, 2017). The assumption was made that liquefied petroleum gas or LPG is a part of this category. LPG is used mainly as a cooking and water heating fuel and to a lesser extent as a fuel for vehicles.

Data and Inventory on Production of Recycled Metals ("secondary" Metal Production)

Source category	Exists? (y/n/?)	Calculat. Hg input to society Calculat. Hg input to society		Calculated Hg output, Kg/yr					
			Air	Water	Land	By-pro-ducts and impurities	General waste	Sector specific treatment/disposal	
Production of recycled mercury ("secondary production")	Ν	0	0	0	0	0	0	0	
Production of recycled ferrous metals (iron and steel)	Y	0.4	0.1	0.0	0.1	0.0	0.1	0.0	
Production of other recycled metals	Ν	0	0	0	0	0	0	0	

Figure 8: Releases to sector specific waste treatment

The total of mercury releases to sector specific waste treatment or disposal was estimated at 1Kg/yr (Figure 8). This is attributed to other products/processes, specifically dental amalgam fillings.

Sub-category 1: Production of Recycled Materials

Production of recycled metals does not take place in the country. Scrap metal in the region is dismantled, crushed, containerized, and shipped for recycling at overseas facilities. Recycle Corp established in 2007 is the only company in Vanuatu which has extensive experience in dismantling large machinery and structures before processing exports.

It is estimated that a total of 350 cars were recycled in 2016 – 2017 in Port Vila. Data not available for Luganville, Lenakel, and Lakatoro.

Data and Inventory on Waste Incineration

Table 10: Waste incineration

Incinerating municipal or general waste is not a common practice in Vanuatu. Rubbish is mainly disposed in open dumpsites. There is also informal dumping and open burning of waste which usually happens within residential areas of Port Vila, Luganville, Lenakel, and Lakatoro. Amounts from this activity, however, are difficult to quantify and remain unknown. Moreover, there is no incineration of sewage sludge as well as the incineration of waste for energy recovery.

Source category	Exists? (y/n/?)	Calculat. Hg input to society	Calculated Hg output, Kg/yr					
			Air	Water	Land	By-pro-ducts and impurities	General waste	Sector specific treatment/disposal
Controlled landfills/deposits*3	Y	0	0	0	0	0	0	0
Diffuse disposal under some control	-	0	-	-	-	-	-	-
Informal local disposal of industrial production waste	Ν	0	0	0	0	-	-	-
Informal dumping of general waste*1*3	Y	3	0	0	2	-	-	-
Waste water system/treatment*2	Ν	0	0	0	0	0	0	0

Sub-category 1: Incineration of Hazardous Waste

For Port Vila namely, quarantine wastes which are generally classed as hazardous are burned at the city's landfill site. Approximately 740 tons of hazardous waste are burned at the landfill annually, producing 18kg of Hg emissions.. There is no ability for emissions reduction with the open burning of hazardous waste in Vanuatu.

Sub-category 2: Incineration or Burning of Medical Waste

Data from the incineration or burning of medical waste was obtained from the assessment findings. An estimated total of 291 tons per year (based on forecasts from a 2014 PacWaste study on medical waste) of medical waste is incinerated. A total of 4 incinerators are present in all the four towns, but during the time of visit only two were operational. There are currently no emission reduction devices employed when burning medical waste in Vanuatu.

Data and Inventory on Waste Deposition/Landfilling and Wastewater Treatment

Source category	Exists? (y/n/?)	Calculat. Hg input to society	Calculated Hg output, Kg/yr					
			Air	Water	Land	By-pro-ducts and impurities	General waste	Sector specific treatment/disposal
Controlled landfills/deposits*3	Y	0	0	0	0	0	0	0
Diffuse disposal under some control	-	0	-	-	-	-	-	-
Informal local disposal of industrial production waste	Ν	0	0	0	0	-	-	-
Informal dumping of general waste*1*3	Y	3	0	0	2	-	-	-
Waste water system/treatment*2	Ν	0	0	0	0	0	0	0

Data estimated to inform this category were obtained from the assessment findings across all four towns. It is important to note that all waste disposal sites are not considered as landfills, but only as open dumpsites. The Luganville disposal site on the other hand has established clear assigned areas by which certain wastes classes (e.g., organic, metals) can be placed. All four deposition sites are managed by provincial or municipal council authorities.

From the data collected, it is estimated that 23,350 tons of waste were deposited per year, with Port Vila having the highest percentage of waste deposition at 79%, followed by Luganville at 16%, and Lenakel at 5%. Data was not available for Lakatoro. Findings from the inventory also revealed that there is substantial informal dumping of general waste. Estimated figures collected from all four towns show that 2600 tons of rubbish are being dumped informally. Informal dumping of rubbish normally includes municipal solid and hazardous waste. Such wastes are mostly discharged from business houses, and individual households who do not wish to pay for disposal fees to dump their rubbish at the authorized dumpsites. There are no specially designed landfills for hazardous or special wastes (e.g., construction waste and asbestos waste). Information on the amount of municipal solid waste disposed is available for only designated dumpsites

The inventory team assumed that 90% of generated wastes is collected and disposed to controlled landfills, the half of that uncollected waste is either burned in the open or informally dumped.

Table 11: Waste disposal

Overall, it is estimated that around 26, 0000 of the total amounts of municipal waste is generated in the country—based on 2016–2017 figures for Port Vila, Luganville, and Lenakel. Generation figures are estimated as follows: Port Vila–20,378 tons; Luganville–4040 tons; and Lenakel–1528 tons. These wastes are collected on a weekly basis by respective municipalities and disposed of in landfills or at dumpsites.

Data and Inventory on Consumer Products with Intentional use of Mercury

Table 12: General consumption of products with intentional use of mercury

Source category: Consumer products with intentional use of mercury	Exists? (y/n/?)	Calculat. Hg input to society		Calculated Hg output, Kg/yr					
			Air	Water	Land	By-pro-ducts and impurities	General waste	Sector specific treatment/disposal	
Thermometers with mercury	Υ	0	0	0	0	-	0	0	
Electrical switches and relays with mercury	Υ	9	1	0	1	-	7	0	
Light sources with mercury	Υ	1	0	0	0	-	1	0	
Batteries with mercury	Υ	337	0	0	0	-	337	0	
Polyurethane with mercury catalysts	?	2	0	0	0	-	2	0	
Biocides and pesticides with mercury	Ν	0	0	0	0	-	0	0	
Paints with mercury	?	0	0	0	0	-	0	0	
Pharmaceuticals for human and veterinary uses	Ν	0	0	0	0	-	0	0	
Cosmetics and related products with mercury	Ν	0	0	0	0	-	0	0	

Subcategory 1: Mercury Thermometers (medical, air, lab, industrial, etc.)

Customs import records do not provide information on thermometers containing mercury. Consequently, the amount of mercury thermometers imported to the country is unknown. To identify average annual turnover of mercury thermometers, the inventory team surveyed leading pharmacies, school laboratories, public hospital laboratories, and private hospitals and clinics. More specifically, interviews were held with the drugstores in Port Vila, selected schools in all four towns, public hospitals, and private hospitals in Port Vila and Luganville to determine the annual amount of mercury thermometers purchased by population and the medical facilities during the year. Assessment results show that of all the 22 sites that were assessed, there was a total of 19 mercury thermometers (Pharmacy 3, Schools 4, Public Hospital 12, 0 in the private clinics).

Subcategory 2: Electrical Switches and Relays with Mercury

Mercury can be used in a wide range of electrical switches and relays (e.g., thermostats, water pump level switches, tilt switches, electronics, data relays) due to their inherent characteristics. Although mercury-free alternatives are gaining popularity globally, there is a lag time due to the long lifespan for working mercury switches. These switches and relays only release mercury when they are damaged or broken. Because these switches are often contained within other products, it is difficult to quantify an exact number of switches. As a result, the default toolkit calculations, customized for the rate of electrification and the country-wide population, were used to estimate the mercury inputs from this category.

Subcategory 3: Light Sources with Mercury (fluorescent, compact, others)

Data on light sources with mercury were obtained from the Customs Department import data. A few selected shops in all four towns were also visited and interviewed for this indicator. Finding from the assessment provided an indication that the annual amount of such products imported into the country is considerably large, as evidenced from the visits made to the shops. In fact, most shops visited sold light sources with mercury such as fluorescent tubes and compact fluorescent lamp. Of the 49 shops that were visited across the four towns, 33 of these shops (Port Vila 15 (31%), Luganville 10 (28%), Lenakel 20 (31%) and Lakatoro 4 (10%)) were selling light sources with mercury. This data was augmented with data from customs import data from 2017 and 2018, which documented the import of fluorescent tubes (double end), Compact fluorescent lamp (CFL single end), and mercury or sodium or metal halide light sources.

Subcategory 4: Batteries with Mercury

The figures used to input into the toolkit were taken from Customs Department import data. It was difficult to differentiate batteries with mercury and batteries without mercury during the assessment. However, estimates were made using the customs codes and descriptions. The batteries subcategory contributed over 90% of the mercury inputs to society documented in Vanuatu.

Subcategory 5: Paints with Mercury

Paints are generally not manufactured in Vanuatu instead they are imported from countries like Australia and New Zealand and are sold in shops around the country. All four towns assessed have paints present in the shops that were visited and interviewed.

However, it was difficult to ascertain the quantity of paints with mercury sold at shops to inform this subcategory. It is important to note that estimates have been collected during the assessment, but a general analysis could not be obtained, due to the lack of paint testing laboratories in Vanuatu. Contents or ingredients within paint products were not often clearly provided on product receptacles itself. Moreover, hardware and retail managers or attendants present during the time of assessments were not well versed with mercury related constituents within the paint products that they were selling. Questions for this subcategory were then directed towards whether the paint was used for exterior painting such as on building, water tanks, ships or boats.

Subcategory 6: Skin Lightening Cream and Soap with Mercury Chemicals

Beauty shops and salons where skin lightening creams and soaps are usually sold or used are not a major business in Vanuatu, mostly targeting a niche market and are guite expensive for locals to access their services. Port Vila was the only town with a few beauty shops and salons that were assessed for this indicator. Of the four beauty shops and salons assessed, none was selling or using skin lightening creams and soaps with mercury chemicals. It was therefore difficult to determine this indicator, as there are no data available on the content of domestically produced and imported face creams and soaps. There are no laboratory tests being conducted to check the quality of products against health and safety standards.



90% of MERCURY INPUTS to society is contributed by the batteries subcategory

Data and Inventory on other Intentional Product/ Process use of Mercury

Table 13: Other intentional product/process use of mercury

Source category: Consumer products with intentional use of mercury	Exists? (y/n/?)	Calculat. Hg input to society	Calculated Hg output, Kg/yr						
			Air	Water	Land	By-pro-ducts and impurities	General waste	Sector specific treatment/disposal	
Dental mercury-amalgam fillings (b	Y	7	0	3	1	0	1	1	
Manometers and gauges with mercury	Ν	0	0	0	0	0	0	0	
Laboratory chemicals and equipment with mercury	Ν	0	0	0	0	0	0	0	
Mercury metal use in religious rituals and folklore medicine	Ν	0	0	0	0	0	0	0	
Miscellaneous product uses, mercury metal uses, and other sources	N	0	0	0	0	0	0	0	

Subcategory 1: Dental Mercury Amalgam

Dental amalgam is a mixture of mercury (approximately 50%), silver, copper, tin, and zinc that is used to fill cavities in teeth. Mercury emissions and releases attributed to this category occur at all stages of the life cycle including production, application, use, and disposal, as well as being a major contributor to release from crematoria. Although mercury-free alternatives are now globally widespread, the lifespan of the amalgam filling dictates that the inventory account for fillings from 10-20 years ago in addition to new preparations and use of mercury amalgam fillings. Mercury inputs and releases and emissions were calculated using default input factors, population data, and the estimated number of dentists per 1,000 inhabitants. The final estimate show that dental mercury-amalgams contributed 7 kg Hg / yr to the total inputs to society in Vanuatu.

Subcategory 2: Laboratory Chemicals

It was also identified during the assessment that, there are no institutions, agencies, or departments in Vanuatu, who purposely register collect and monitor laboratory chemicals containing mercury. It is assumed that several laboratories in hospitals, clinics, and schools keep chemicals that are outdated, including those with mercury. These chemicals are mainly used to monitor fridge temperatures in the laboratory and for research purposes in schools. During the interview, only 1.5 kg of metal mercury was found to be stored safely in one identified chemical laboratory. Data about laboratory chemicals and laboratory equipment with mercury from the existing chemical laboratories in the country is unknown.



An estimatimation shows that dental mercuryamalgams contributed **7 kg Hg each year** to the total inputs to society in Vanuatu.
Data and Inventory on Crematoria and Cemeteries



Table 14: Crematoria and cemeteries

Subcategory 1: Crematoria

Cremation is not practiced in Vanuatu, although findings from the assessment have revealed that this method of final disposition of the dead was practiced in the town of Santo in the past.

Subcategory 2: Cemeteries

Data on cemeteries were obtained from the National Civil Registry office and the National Statistics Office in Vanuatu. Cemetery data for the reporting period 2016 to 2017 was not available; data from the period between 2017 and 2018 were used instead to inform this indicator. The number of deaths registered in 2017 and 2018 was 1,729 deaths across all four towns. Of this total, Port Vila accounts for 67% followed by Luganville 22%, Lakatoro 8%, and Lenakel 3%. It is important to note that Port Vila and Santo were the only towns with a municipal cemetery, meaning all corpses are buried in one common area, and are registered and recorded. For towns like Lenakel and Lakatoro, there are no municipal cemeteries and corpses are buried within villages and communities, with no official records-the likely factor for low recorded figures.

1,729 deaths were recorded in 2017 and 2018 across Port Vil, Luganville, Lakatoro, and Lenakel.

Sources, Stockpiles, Supply, and Trade of Mercury or Mercury Compounds

The Minamata Convention on Mercury states Parties shall identify individual stocks of mercury or mercury compounds over 50 tonnes in addition to mercury sources generating stocks over 10 tonnes per year within its borders. The primary mercury sources in the toolkit include the following industries:

- Primary mercury mining
- By-product mercury
- Chlor-alkali industry
- Recycled mercury
- Other possible mercury supply sources

Vanuatu does not have any such stocks or sources of mercury or mercury compounds. It was also determined that, based on this inventory, there are no significant trade or recycling of mercury in Vanuatu. As a result, the provisions outlined in Article 3 of the Minamata Convention are not applicable.

Potentially Contaminated Sites

An important step of Article 12 of the Minamata Convention on Mercury is endeavoring to develop a strategy for identification and characterization of potentially contaminated



Figure 9. Potentially contaminated sites

sites as the first step towards reducing and managing risk. These sites can be the result of direct. point source contamination from an industrial process or inadequate disposal of those industrial materials or the result of places

where mercury containing products have been dumped and accumulated over time. In Vanuatu, these potentially contaminated sites are in the form of landfills and dumpsites which include mercury-containing products. To date, the geographic locations of these sites are known for the Port Vila region (Figure 9). Importantly, these are also potentially contaminated sites. Further work would be needed to confirm the status of mercury contamination. This mapping exercise followed a strategy for site identification that can be replicated in the smaller towns and other islands. The identification of these sites is important for helping to understand and visualize spatial patterns and as a tool to inform and guide monitoring and mitigation efforts.



Current inventory indicates that human exposure to mercury in Vanuatu is

Mercury Impacts on Health and the Environment

Mercury is a ubiquitous, persistent pollutant of global concern. It is known to have adverse impacts on human health and the environment. It is released into the environment both by geogenic as well as by direct and indirect anthropogenic processes. Once it is released, the fate of mercury is complex as it cycles between media. The atmospheric movement and subsequent deposition of mercury makes it a pollutant that is global in scale. Furthermore, legacy mercury can be remobilized and continue to cycle for decades to centuries.

Mercury is converted to its more toxic form, methylmercury, by a suite of sulphur- and iron-reducing bacteria. Environmental conditions and characteristics (e.g., mangroves, wetlands) that optimize those bacterial processes will have higher rates of methylation. As a result, the input levels of inorganic mercury across a landscape will not always track with mercury concentrations in wildlife. Some systems that are optimal for methylation need little mercury input to pose a risk to wildlife, while other systems that are less sensitive can experience high levels of

mercury inputs with relatively little impact to wildlife and human health. Thus, it is this interplay of mercury inputs and ecosystem sensitivity that dictates the threat mercury poses in a system.

Human exposure to mercury can be attributed to both occupational and dietary pathways. Occupational exposure comes from either absorption through the skin from direct handling or inhalation of mercury vapours during burning. However, this inventory indicates that human exposure in Vanuatu is primarily through diet. Methylmercury is bioavailable and enters the food web, particularly in aquatic systems, where it bioaccumulates and biomagnifies up the trophic levels. It is primarily this trophic transfer process that exposes humans to mercury contamination through consumption of fish and other contaminated organisms. Mercury is a potent neurotoxin, impairing physiological and neurological function, particularly in young children and developing foetuses. It adversely affects behaviour and causes reproductive harm in both humans and wildlife.

CHAPTER 3 Policy, Regulatory and Institutional Framework Assessment

Policy and Regulatory Assessment

As Vanuatu has ratified the Minamata Convention on Mercury, this legally binds the country to the Convention's obligations. The ratification process involves carrying out a national situation analysis, identifying existing relevant domestic legislation, and identifying legal or administrative actions that may be needed to meet the obligations of the convention. The paragraphs and tables that follow provide a review of existing national legislation and policies addressing the following 10 articles of the Minamata Convention:

- 1. Mercury supply sources and trade (Article 3)
- 2. Mercury-added products (Article 4)
- 3. Manufacturing process in which mercury or mercury compounds are used (Article 5)
- 4. Artisanal small-scale gold mining (ASGM; Article 7)
- 5. Emissions (to air; Article 8)
- 6. Releases (to land and water; Article 9)
- 7. Environmentally sound interim storage of mercury, other than mercury waste (Article 10)
- 8. Mercury wastes (Article 11)
- 9. Contaminated sites (Article 12); and
- 10. Health aspects (Article 16)

Recommendations are also provided in this chapter, specifically where there is a need for review, updating, strengthening, or redrafting a specific legislation or policy in relation to the above articles.

More specifically, currently in Vanuatu, there are few national policies and legislation that concern the management and control of mercury and mercury compounds. That said, several activities in the Minamata Convention do not currently exist in Vanuatu, and therefore may not need to be addressed by legislation at all. For instance, the following three mercury related activities do not take place in Vanuatu:

- Mercury mining: Article 3, section 3 and section 4 of the Minamata Convention.
- The use of mercury and mercury compounds in manufacturing processes: Article 5 of the Minamata Convention.
- Artisanal small-scale gold mining: Article 7 of the Minamata Convention.

Therefore, the corresponding provisions of the Convention may not be relevant for any conversion into national law. However, concerning environmental management in general and given the presence of some imports and the existence of mercury products in Vanuatu, the Government of Vanuatu, through the DEPC and other respective departments, have developed several policies and strategies to address this environmental issue. Table 12 below lays out a list of national legislation, policies, and strategies in Vanuatu that may have some relevance to the Minamata Convention. Vanuatu has also taken several steps to address the Convention at the national level through:

- Developing and discussing the draft national roadmap with other relevant ministries and stakeholder agencies.
- Engaging with UN agencies, intergovernmental agencies, and NGOS to discuss possible actions at the national level in support for the accession to and early implementation of the Minamata Convention.
- Undertaking a preliminary analysis of key mercuryrelated issues and stakeholders at the national level.
- Organising national interministerial consultations on the Minamata Convention; and
- Identifying the national process for accession to the international instrument.

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Туре	Legislation, Policies, And Plans
Overarching instruments	 Constitution of Vanuatu National Sustainable Development Plan 2016-2030, the "People's Plan" (overarching national plan) Decentralisation Act 1994
Climate change and disaster risk reduc- tion	 Meteorology, Geo-hazards and Climate Change Act 2017 Disaster Risk Management Act No.23 of 2019 Vanuatu Climate Change Disaster Risk Reduction Policy 2016-2030
Land, planning and environment	 Customary Land Management Act 2013 Subdivision Act Land Reform Act 1988 Land Lease Act 1984 Mines and Minerals Act 1986 Pollutions (Control) Act 2013 National Parks Act 1993 Wild Bird Protection Act 1962 International Trade (Flora and Fauna) Act 1991 Prevention of Sites and Artifacts Act 2008 Physical Planning Act 1980 Land Sector Framework 2009-2018 Municipalities Act (Cap. 126) National Land Use Planning and Zoning Policy 2013 Vanuatu National Environment Policy and Implementation Plan 2016 - 2030 Draft Greater Port Vila Plan and Strategy for Efate Environmental Management and Conservation Act 2003 Waste Management Act 2014 National Waste Management and Pollution Control Strategy 2016 - 2020 Ozone Layer Protection Act 2010 Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and the Disposal, Rotterdam Convention on Prior Informed Consent Procedure for Certain Hazardous Chemicals and Pesticides in International Trade, and Minamata Convention on Mercury (Ratification) Act No. 9 of 2018 Energy Efficiency of Electrical Appliances, Equipment and Lighting Products Act 2016
Infrastructure	Vanuatu Infrastructure Strategic Investment Plan 2015-2024
WASH	Water Supply Apparatus Act 1974National Water Strategy 2008-2018
Food, agriculture, and livelihoods	 Fisheries Act 2014 Vanuatu National Plan of Action on Food and Nutrition Security 2013-2015 Vanuatu Agriculture Sector Policy 2015-2030 Overarching Productive Sector Policy National Forest Policy National Livestock Policy National Fisheries Policy Vanuatu Oceans Policy
Education	Vanuatu Education Sector Strategy 2007-2016Education Act No. 9 of 2014
Health	 Public Health Act 1994 Public Health (Amendment) Act No.11 of 2018 Food Control Act Vanuatu Health Strategy 2010-2016 National Health Plan for Climate Change Adaptation and Disaster Risk Management, 2016 – 2020
Gender	National Gender Equality Policy 2015-2019
Child protection	National Child Protection Policy 2016-2026
Disability	National Disability Policy and Plan of Action 2008-2015
Employment and labour	Employment Act 1983
Trade and imports	Customs Act 1993 and 2013

Table 15: Existing national egislation, policies, and strategies in Vanuatu

Furthermore, as per the Minamata Convention, Table 13 specifically addresses the relevant Articles of the Minamata Convention, and compares it with Vanuatu's current and existing legislation, policies, and strategies as outlined in Table 7 above. Hence, of the 24 Articles of the Minamata Convention, only 12 are relevant to Vanuatu. Table 16: Relevancy of the Minamata Convention against Vanuatu's legal frameworks

Relevant Articles of the Minamata Convention

Article 3: Supply and Trade

1

There are five sources of mercury supply under this Article: (1) Primary mercury mining; (2) By-product mercury from mining other metals; (3) Decommissioning chlor-alkali facilities; (4) Recovery of mercury from wastes and used products that contain mercury; and (5) Government or private mercury stocks. Sources of mercury supply under sections 4 and 5 of the Article may be relevant to Vanuatu, as they address mercury sources that are available for use and trade. Those sections specify conditions and procedures that must be met in circumstances where such trade is allowed.

Article 3 also establishes a prior-informed consent requirement before any mercury trade occurs between Parties to the Convention. The relationship and obligations between Parties related to mercury trade are elaborated as are rules governing Party to non-Party trade. The combination of Vanuatu's Waste Management Act, Customs Act, and the Ratification Act 2018 (Basel, Rotterdam, and Minamata Conventions) in conjunction with enforcement of requirements outlined under the Basel Convention positions Vanuatu well to effectively monitor and prevent trade of mercury and mercury-containing compounds regardless of the point of origin. Specific relevance and applicable to Vanuatu are the clauses relative to the need for written consent in both instances of export and import of commodities.

However, in Vanuatu currently, there are no laws covering the five sources of mercury supply. Also, Vanuatu presently has no significant artisanal and small-scale gold mining activity (Article 7). More specifically for 'Primary Mercury Mining,' the Mines and Minerals Act 1986 needs to be amended or provisions of the act altered for respective licensing to prohibit future mining of mercury sources. There is also no current development activity that is generating considerable stocks of mercury or mercury compounds in Vanuatu. It is recommended that the Pollutions Act as well as the Waste Management Act should be altered to develop regulations or codes of practice to integrate mercury stocks identification under both Acts if required.

Furthermore, while Vanuatu is party to the Basel Convention, there is no artisanal gold mining in Vanuatu so the import of mercury for this purpose does not occur. Also, there is no formal ban of Mercury import in any of Vanuatu's legislation outside the ethe Basel Convention which prohibits import of hazardous waste. However, it is important to create legislation that restricts / prohibits/limits the use of mercury if this issue arises in the future. DEPC also needs to work with relevant agencies and ministries to update or develop a legislation covering this issue.

2 Article 4: Mercury-added products (MAP)

A mercury-added product (MAP) is defined by the Convention as a "product or product component that contains mercury or a mercury compound that was intentionally added" (Article 2, paragraph f). The list of MAPs whose manufacturing and trade are restricted under the Convention are outlined specifically in Annex A and does not include products where mercury is not intentionally added during manufacturing (e.g., where trace contamination is derived from natural origin). The Secretariat of the Convention will continue to review other products for possible restrictions.

There are two parts to this Article, which covers areas on prohibiting the manufacture, import, and export of mercury-added products, with the Convention specifically mentioning a timeline of no later than five years after the Convention has come into effect, phase-out should have commenced.

Part I: Phase out: batteries; electrical switches and relays; compact fluorescent lamps (CFLs), high-pressure mercury vapor lamps (HPMV), mercury in cold cathode fluorescent lamps and external electrode fluorescent lamps (CCFL and EEFL); cosmetics including skin lightening soaps and creams; pesticides, biocides, and topical antiseptics; and nonelectronic measuring devices such as barometers, hygrometers, manometers, thermometers, and sphygmomanometers.

Part II: Phase down on the use of dental amalgam by implementing 2 or more of 9 proposed measures relevant to Vanuatu as a net importer and user of products that may contain mercury, including dental amalgam, and as a destination for such products at or near end-of-life. Mercury inventory indicated that dental amalgam is currently in use in Vanuatu and ban on the use of "silver" fillings might not be relevant. However, as a precautionary measure such a restrictive/complete ban clause may be introduced in the current Public Health Act. There are also no proper measures or practices in place for proper disposal of the product.

Given the diversity of products to which mercury is added (including assembled products), it is recommended to adopt a by-law in which restrictions and/or bans on the production, import, export, and placing on the market of mercury in new products are regulated. In such a by-law on "chemical products restrictions" all concerned products could be addressed one by one.

More specifically, it is recommended that the Customs Act, Pesticides Act, Electric Supply Act, and Petroleum Act should be reviewed and altered to enact a law on banning the manufacture, import or export of mercury added products in cosmetics, pesticides, biocides, topical antiseptics, and medical devices by 2020.

Also, within the Waste Management Act or specific by-law on batteries and electrical switches or relays, legal requirements on the mercury content should be set, if these are controlled by the customs department when imported.

3 Article 5: Manufacturing processes in which mercury or mercury compounds are used

Article 5 and its associated Annex B of the Convention identify manufacturing processes where mercury use will not be allowed and must be phased out (paragraph 2) and where the use of mercury and mercury compounds will be restricted (paragraph 3).

In Vanuatu, there are no known existing industries that add mercury as part of the manufacturing process. Therefore, the obligations under this article are not immediately applicable to Vanuatu.

4 Article 7: Artisanal and small-scare gold mining

Article 7 addresses ASGM where mercury is used to extract gold. Artisanal and small-scale gold mining is defined as "gold mining conducted by individual miners or small enterprises with limited capital investment and production." ASGM does not occur in Vanuatu, therefore the obligations of this article are not applicable.

5 Article 8: Emissions

Article 8 seeks to control and reduce mercury emissions to the atmosphere from major existing and new point sources. Annex D identifies these major point sources to include coal-fired power plants, coal-fired industrial boilers, smelting and roasting of non-ferrous metals, waste incineration, and cement clinker production facilities. Parties to the Convention will adopt guidance on best available techniques and best environmental practices (BAT/BEP). Parties can be eligible for assistance to support the implementation of reduction measures that are outlined in paragraph 5 of Article 8. However, emission limit values are not currently established for hazardous substances for industries including source categories listed in annex D of the convention.

In Vanuatu, emission inventories and reporting are required under the Waste Management Act 2014 although no specific mercury inventory standards or guidelines have been developed. The UN Environment Identification and Quantification of Mercury Releases toolkit, which utilizes emission factors and mass-balance methods, can be adopted for such purposes in Vanuatu's case. The National Mercury Inventory assisted the government in establishing a baseline upon which future reduction efforts in the country can be evaluated. With respect to the regulation of mercury and mercury emissions into air from existing sources, legislation should provide a legal basis for developing a national plan on controlling emissions and establishing an emissions inventory (preferably not just on mercury).

6 Article 9: Releases

Article 9 is relevant to Vanuatu as a host to potential sources of releases. The article addresses direct releases of mercury and mercury-containing compounds to land and water. Quantifying the amount of mercury entering the environment via direct releases is challenging because sources include both point and diffuse sources, some of which are related to legacy deposits from contaminated sites. Under Article 9, Parties to the Convention are required to identify source categories responsible for releases that are not addressed directly in other articles of the Convention. Parties are to identify the relevant point source categories and may prepare a national plan setting out measures, as listed in paragraph 5, to be taken to control releases and its expected targets, goals and outcomes.

Vanuatu currently has no active mineral processing sector, although special attention should also be given to identifying diffuse releases associated with legacy deposits of mercury associated with industrial centres and waste disposal sites. This is also pertinent to Article 12 (see below). The National Water Strategy forms the basis of water resources planning and controlling on a national level. It is suggested that the details of the content of such national strategy set out concrete measures to be considered to control releases of mercury and other pollutants into waters. Also, DEPC needs to make regulations mandating industries to report to it any new point sources. However, there will be a need to further elaborate on the approach and methodology for assessing releases, including the adoption of future guidance that will be provided when Vanuatu advances its' implementation of the Convention.

7 Article 10: Environmentally sound interim storage of mercury, other than waste mercury

Article 10 is relevant to Vanuatu and addresses the interim storage of mercury and mercury compounds that is intended for use under the Convention. The term "interim" is used to reflect the temporary, short-term nature of storage that should be considered during the transit of mercury. Mercury releases can occur throughout the supply chain (i.e., collection, handling, transport, and storage) and the Convention recognizes the importance of adopting recommendations for minimizing such loses. Article 10 does not address the management of mercury-containing waste as that is covered under Article 11 of the Convention. Future guidelines will be adopted by the Conference of Parties and will consider existing guidelines outlined in the Basel Convention.

Vanuatu's Waste Management Act and the Ratification Act 2018 (Basel, Rotterdam, and Minamata Conventions) reflects the requirements of the Basel and Rotterdam Conventions. These Conventions focus primarily on export-import of wastes. The Mercury inventory could not assess if Vanuatu imports commodity mercury for any approved uses under the Convention. It is only known that mercury in smaller amounts is imported for laboratory uses. The Customs Department and the Department of Environment will be important entities to engage when identifying any new regulations needed for interim storage of mercury. In fact, Vanuatu already has a provision addressing the safe handling and storage of mercury in the Environmental Protection and Conservation Act

8 Article 11: Mercury wastes

Article 11 of the Convention is relevant to Vanuatu in respect of mercury-added products at end of life and of potentially contaminated wastes imported for treatment and disposal. The article considers the guidelines developed under the Basel Convention for the environmentally sound management and disposal of mercury-containing waste. Mercury wastes can come in a variety of forms, depending upon the source. Industrial processes using mercury will create wastes from both the manufacturing process and pollution control operations. Mercury-added products become wastes when discarded, either because they are broken or when consumers decide to buy a new model (e.g., the case of electronic gadgets such as mobile phones and computers, where functioning devices are discarded and replaced with the latest models before the end of their useful life). The clean-up of contaminated sites may generate mercury wastes, such as treatment residuals and contaminated soil.

There is currently no specific definition of mercury waste in the relevant national legislations that complies with Article 11, paragraph 2 of the Convention. Such a definition could be outlined under the Waste Management Act. However, in the Environment Protection and Conservation Act, there is a provision for environmentally sound management and disposal of mercury waste.

9 Article 12: Contaminated sites

Article 12 of the Minamata Convention relates to the management of contaminated sites, including developing and adopting strategies for inventory/identification, risk assessment and mitigation/remediation measures for contaminated sites. This article is relevant to Vanuatu as it relates to current or previous waste disposal. Contaminated sites come in many forms. They can be active, where existing processes or practices continue to contribute to the contamination, or historical, where such processes or practices have stopped but the pollution remains. The sources of the contamination may be waste management activities and/or spills and emergency incidents. The risk of exposure to local communities and the potential for prolonged releases into the environment if not remediated make contaminated sites of concern.

Further, there is a need to address the following factors involving contaminated sites: determining the nature and extent of contamination, the risks to exposed populations, remediation options, and the identity of entities or persons who should assume liability for some or all or the remediation costs. While there is no specific legislation addressing this issue, the Waste Management Act, the Pollution Act covers the development of appropriate strategies for identifying, assessing, and remediating sites contaminated by mercury and mercury compounds. It is recommended that DEPC have a suitable legal basis in law for the development of appropriate strategies and actions, which should be incorporated into soil protection legislation.

In fact, the methodology for identifying contaminated sites can be harmonized with recommendations provided by the Conference of Parties. The development of appropriate management plans for any contaminated sites will help towards the goal of protecting human health and the environment from impacts associated with these sites. There is no single law in Vanuatu regulating contaminated sites. If timing is appropriate and if there is a political will from lawmakers, a soil protection law can be established to set a legal basis for contaminated sites or amendments could be made to such laws as the Land Leases Act, Customary Land Management Act, Pollution Control Act, and the Waste Management Act.

10 Article 13: Financial Resource Mechanisms

Article 13 specifies that each Party will undertake to provide, within its capabilities, resources in respect to those national activities that are intended to implement this Convention, in accordance with its national policies, priorities, plans and programmes. These resources may include domestic funding through relevant policies, development strategies and national budgets, and bilateral and multilateral funding, as well as private sector involvement.

Although Vanuatu has already ratified the Convention, there is no earmarked state funding for implementation of various provisions of the Convention. However, in case of ratification of the document, the country has internal financial resources in the form of state budget allocated to various agencies for implementation of their duties and state programmes, funds of private businesses working in the field of hazardous chemicals and waste management, including waste collection, transportation, storage, and safe disposal/treatment. Moreover, the DEPC and other relevant ministries have long-term successful experience in working with bi-lateral and multi-lateral donors, including UNDP, UNEP, FAO, UNIDO, USAID as well as Multi-Lateral Funds for the Montreal protocol and Global Environment Facility. Vanuatu NGOs are also very experienced in mobilizing financial resources for implementation of environmental projects in general, and waste management projects. Thus, it is critical to assess and mobilize domestic and international financial resources for implementation of Minamata Convention.

11 Article 16: Health Aspects

Article 16 addresses health impacts in communities and potential impacts in other industries including waste management and disposal. The Minamata Convention on Mercury was developed with the primary goal of protecting human health (and the environment) from risks of mercury exposure. As such, Parties to the Convention are encouraged to develop strategies and programmes for identifying populations at risk and for providing preventative care to these populations.

Article 16 focuses directly on Ministries of Health and Labour and identifies the need to establish and strengthen prevention programmes and improve the capacity of health care professionals for the prevention, diagnosis, and treatment and monitoring of health care risks associated with mercury exposure.

Parties are encouraged to.

- Promote the development and implementation of strategies and programs to identify and protect populations at risks.
- Develop and implement science-based educational and preventive programs on occupational exposure.
- romote appropriate health-care services for prevention, treatment, and care; and
- Strengthen institutional and health professional capacities for prevention, diagnosis, treatment, and monitoring.

Of significance as well will be the consideration of mercury exposure through sea food-based diets such as fish. There are several fish species that tend to have higher mercury content. Furthermore, given the higher proportion of population within Vanuatu that use fuel wood for cooking purposes, there is substantial potential by which households or individuals are exposed to mercury emissions via the air.

12 Article 17 & 18 Public Information, Education and Awareness

Articles 17 and 18 describes actions to reduce and, where possible, eliminate mercury use and to improve behavior in managing materials and wastes containing or contaminated by mercury. The articles relate to information shared between Parties (Article 17) and the public (Article 18). Parties are encouraged to exchange information on technological and economic information on effective alternatives to aid in the reduction and elimination of mercury in the various sectors identified throughout the Convention. This should also include scientific, epidemiological, and legal information concerning mercury and mercury compounds. Each Party to promote and facilitate:

- Provision to the public of available information relating to the use, substitution, release sources, health
 and environmental effects of mercury and mercury compounds, alternatives to them.
- Education, training, and public awareness related to the effects of exposure to mercury and mercury compounds.
- To consider use of existing mechanisms or developing mechanisms, such as pollutant release and transfer registers (PRTR) for the collection and dissemination of information on estimates of emissions, releases, and disposals.

Parties should also make available to the public information on human health and environmental effects of mercury exposure, effective alternatives to mercury and mercury-added products and progress the country is making towards meeting the obligations of the Convention.

Information exchange between Parties to the Convention can be facilitated by the DEPC and should be communicated at the national to local government levels with other relevant stakeholders. There will be several opportunities for exchange between Parties, with the Conference of Parties serving as the primary, formal mechanism. At the national level, the DEPC is responsible for public awareness on hazardous chemicals and human and environmental health risks. Such efforts should be done in close collaboration with other national stakeholders including the Ministry of Health.

13 Article 19: Research, Development and Monitoring

Article 19 addresses the importance of building on relevant information resources and to strengthen scientific capacities in mercury monitoring, including as part of global initiatives. Parties to the Convention are to cooperate to develop and improve.

- · Inventories of use, consumption and anthropogenic emissions and releases.
- · Modelling and geographically representative monitoring of mercury in human and environmental media.
- Assessment of impacts.
- Harmonized methodologies; and
- · Information on the environmental cycle, transport, transformation, and fate of mercury.

The existing legal framework for the sound management of chemicals including mercury and including any reforms required to meet the requirements of the Minamata Convention are set out in Table 8.

sed lead reform action /if	ed)		to develop text or amend provi- for respective licensing under the s and Minerals Act 1986 to prohibit timing of mercury sources.	lop regulations or codes of toe to integrate mercury stocks fication under the Pollution Control and Waste Management Act if 'ed	atu is party to the Basel Conven- There is no artisanal gold mining atu. Therefore, the import and use ercury for this very purpose does cour. wer, it is important to create legis- that restricts / prohibits/ the use of Hg if this issue arises future	C to work with relevant agencies ninistries to update or develop a ation covering this issue
Dropo	neede		/- Need sions Mines future	f Deve practi identii Acts a requir	 Vanu: t tion. 7 Vanu: vanu: of me not oc Howe lation Imits 	DEPC and n legislé
	Implication for Vanuatu		There is no law covering this issue. How ever, Vanuatu presently has no primary mercury mining activity	There is no current development activity that is generating considerable stocks or mercury or mercury compounds.	This mandate specifically targets hazarc ous chemicals which mercury belongs. I therefore covers the control of mercury import and export. Although the DEPC is the Designated National Authority for the implementation of the Rotterdam Convention in Vanuatu the Act gives the country the legal backi to control mercury trade and supply.	
	Relevant Provision		Paragraphs 3 and 4	Paragraph 5	Enforces compliance with regulations on the importa- tion, exportation, production, distribution, storage, sale, use, handling and disposal of hazardous chemicals and waste other than in the oil and gas sector. Rotterdam Convention Act provides for the banning and restriction of the use, export and import of haz- ardous chemicals and pesticides. It has provisions for the implementation of Prior Informed Consent (PIC) procedure for hazardous chemicals	There is no formal ban of Mercury Import in any of Vanuatu's legislation except in the new Basel law which prohibits import of hazardous waste
avant Act Tadialation	regulation		Ratification Act 2018 (Minamata Convention) Mines and Minerals Act 1986	Pollution Control Act' Waste Management Act Ratification Act 2018	Customs (Prohibited Import) Regulations Order No.115 of 2014 Basel Convention Rotterdam Convention Act (Ratification Act 2018)	There is no law covering this issue Basel Convention
	and	nd trade	• •	 С	• • •	• •
Relevant	Institution	y sources a	DCIR, DEPC, DOGM	DCIR, DE	DCIR. DCIR	DEPC, DCIR, Energy
Party Obligation	raity Outgation related to	*Article 3: Mercury suppl	Disallow primary mercury mining once the Convention comes into force.	Identification of stocks of mercury or mercury compounds above 50 tons and sources gen- erating stocks above 10 tons.	Disallow export and im- port of mercury. Except in instances stated in paragraph 6 (a&b) under the article.	Notification and con- sent of import/export of mercury.

Table 17. Vanuatu's national policies and strategies relevant to MIA

*Provision of Minamata Convention

*Article 4: Mercury adde	d Products				
Disallow manufacture, import, and export of mercury-added prod- ucts of part 1 of Annex A of the Convention by 2020.	MAFL, DCIR, DEPC,	 Customs (Prohibited Import) Regulations Order No.115 of 2014 Rotterdam Convention Pesticides Act Electricity Supply Act Electricital Appliances, Equipment and Lighting Products Act 2016 Petroleum Act 	Regulates and controls the importation, exportation, manufacture, advertisement, distribution, sale and use of food, drugs, cosmetics, medical devices, bottled water and chemicals. There are no legislations in place yet covering this. Article 8 of Vanuatu's Pesticides Act Cap 266 entitles the Prohibition on Importation, manufacture, formula- tion, use, and distribution of pesticides.	Given the diversity of products to which mercury is added (including assembled products), it is recommended to adopt a by-law in which restrictions and/or bans on the production, import, and export and placing on the market of mercury in new products are regulated. In such by-law on "chemical products restrictions" all concerned products could be addressed one by one.	Enact law banning the manufacture, import or export of mercury added prod- ucts in cosmetics, pesticides, biocides, topical antiseptics and medical devices by 2020. Within the Waste Management Act or specific by-law on batteries, electrical switches or relays, legal requirements on the mercury content should be set, if these are controlled by customs depart- ment when imported.
Take measures relating to mercury-added products listed in part II of Annex A of the Convention.	MOH, DEPC	 No law covers this issue, except for the governmental decree on handling dental amalgams in clinics. Public Health Act 		Mercury inventory indicated that dental amalgams are currently in use in Vanuatu and ban on the use of "silver" fillings might not be relevant. However, as a precaution- ary measure such restrictive/complete ban clause may be introduced in the current Public Health Act.	The requirements related to measures to be taken to phase down of the use of dental amalgam are diverse (see Part II of Annex A, MC). Legally, the use of dental amalgam shall be restricted to its encapsulated form (all other measures).
Discourage manufac- ture and distribution in commerce of new mer- cury added products.	DCIR DCIR	Waste Management Act	The Waste Management Act is designed to provide for the protection of the environment through encourage- ment of effective waste services and operations. The Act focuses mainly on solid waste which includes the following: garbage, household refuse, rubbish, scraps, electronic waste, trade and industrial waste, in solid form; or any other matter or thing determined in the Act to be waste. The Act does not include human waste except in the form of sludge or any other form intended for final disposal as a waste product. The Act defines waste as 'solid waste; or bulk waste; or any other mat- ter or thing determined from time to time to be waste in accordance with the Act.		Develop standards and regulations excluding mercury from batteries, elec- trical/measuring devices listed in Part 1 of Annex A of the convention, and pro- hibit the manufacture, import and export of such products in Vanuatu
Prevent incorpora- tion into assembled products of mercury added products the manufacture, import and export of which are not allowed for it	There is no law covering this issue	 There is no law covering this issue 	There is no law covering this issue		
* Article 8 - Emissions					
Controlling emissions of mercury or mercury compounds from rele- vant sources as listed in Annex D.	DEPC, MOIA	Pollution Control Act	The Pollution Control Act has provisions covering the regulation and monitoring of discharges.	This will namely be applicable to the current practice of waste incineration particularly health care and quarantine wastes	DEPC to make sectoral regulations covering the mercury emission source categories contained in Annex D of the convention to control emission of mercury and mercury compounds from such sources.

With respect to the regulation of mercury and mercury emissions into air from existing sources, legislation should provide a legal basis for developing a national plan on controlling emissions and establishing an emissions inventory (preferably not just on mercury).	ge of pollut- Control Act it Control	ge of pollut- Control Act it Control		rces of The National Water Strategy forms ied (if any) the basis of water resources planning place. and controlling on a national level. It is suggested that the details of the content of such national strategy set out concrete measures to be taken to control releases of mercury and other pollutants into waters	ge of pollutt- Control Act it Control private agulator agement agement ncludes the rernment g of private idual or t e a landfill facility
	The Act permits for the discharg ants, enforcement of Pollutant C and assessment of the Pollutan Act	The Act permits for the discharg ants, enforcement of Pollutant C and assessment of the Pollutan Act		Through this Act new point sour mercury releases will be identifi and mitigating measures put in	The Act permits for the discharg ants, enforcement of Pollutant C and assessment of the Pollutant C and assessment of the Pollutan Act This Act covers the licencing of waste operators the Act also specifies the roles responsibilities of DEPC as a re and the designated waste mane operators as operators, which ir Municipalities or Provincial Gov Councils. The Act also allows for licensin waste operators (either an indiv company) who wishes to operat site; or a waste dump; or waste site; or a waste dump; or waste
	The Pollution Control Act is designed to control the dis- charge and emission of pollution ('the introduction by persons, directly or indirectly, of substances or things into the environment which may result in harm to the environment, and hazardous to human health).	The Act control the discharge and emission of pollution in Vanuatu.		Section 2 (1) requires an assessment of public or private projects likely to have a significant impact on the environment.	The Pollution Control Act is designed to control the dis- charge and emission of pollution ('the introduction by persons, directly or indirectly, of substances or things into the environment which may result in harm to the environment, and hazardous to human health). The Waste Management Act is designed to provide for the protection of the environment through encourage- ment of effective waste services and operations. The Act focuses mainly on solid waste which includes the following: garbage, household refuse, rubbish, scraps, electronic waste, trade and industrial waste, in solid form; or any other matter or thing determined in the Act to be waste. The Act does not include human waste except in the form of sludge or any other form intended for final disposal as a waste product. The Act defines waste as 'solid waste; or bulk waste; or any other mat- ter or thing determined from time to time to be waste in accordance with the Act.
 Pollution Control Act Waste Management Act 	Pollution Control Act			 The Environmental Protection and Conservation Act Water Supply Apparatus Act Water Resources Management Act 2002 	 Pollution Control Act Waste Management Act
DEPC	DEPC	DEPC		DEPC, DOWR	DEPC
Use of best avail- able techniques and best environmental practices to control and reduce emissions from new sources.	Use of appropriate measures to control and reduce emissions from existing sources.	Establishment of an inventory of emissions from relevant sources.	* Article 9: Releases	Identification of rele- vant point source cate- gories not addressed in other provisions of the Convention.	controlling releases of mercury compounds to land or water.

Establishment of an inventory of releases from relevant sources.	DEPC, DOF, DCIR	 The Environmental Protection and Conservation Act Pollution Act Customs (Prohibited Import) Regulations 	Section 4 and Section 45 (2)(i)(iv) provides authority to ensure compliance with environmental laws, local and international, on environmental sanitation and pollution prevention and control through monitoring and regulatory measures.	This mandate will make discovery of new point sources of mercury and mercury compound releases possible. This mandate appears to cover the regula-tion of all types of MARINE transportation,	DEPC to make regulations mandat- ing industries to report to it any new point sources of mercury and mercury compound releases in their facility and set mercury releases limit values from these sources.
		Order No.115 of 2014	Control and prevent marine pollution; Inspect ships for the purposes of maritime safety, maritime security, maritime labour and prevention of Maritime pollution.	which is the main means of transporting chemicals into the country.	
			Develop, own, and operate ports and harbors; Provide safe and navigable channel; Offer cargo handling and storage services; Maintain Port facilities and equipment; Ensure safety and security; Prevention and handling of marine accidents and pollution.	This mandate appears to cover the regula- tion of all types of MARINE transportation, which is the main means of distributing chemicals.	
* Article 10: Environment.	ally sound interim	storage of mercury, other than	waste mercury		
Environmentally sound interim storage of mer- cury and mercury com- pounds pending use, noting that the article applies only to such mercury and mercury compounds intended for a use allowed to the Party under this Convention.	DEPC	 The Environmental Protection and Conservation Act Waste Management Act 	Enforces compliance with regulations on the importa- tion, exportation, production, distribution, storage, sale, use, handling and disposal of hazardous chemicals and waste other than in the oil and gas sector	These provisions of the Act cover the safe handling and storage of mercury.	DEPC should make regulations for interim storage of mercury and mercury compounds in an environmentally sound manner.
* Article 11: Mercury was	tes				
Environmentally sound management of mercu- ry wastes.	DEPC, Municipality, MOH, DCIR	 The Environmental Protection and Conservation Act Vienna Convention Vienna Convention Act 2010 Waste Management Act Pollution Act 	This Act prohibit, without lawful authority, the carrying, dumping or depositing of harmful waste in the air, and or waters of Vanuatu The general obligations of the parties under the Con- vention is to take measures to protect human health and the environment against adverse effects resulting or likely to result from human activities which modify or are likely to modify the Ozone layer The Ozone Layer Protection Act is a national legislation that was enacted to give effect to Vanuatu's obligations under the Vienna Convention for the Protection of Ozone Layer and its Montreal Protocol. The objects of the OLP Act include • protecting human health and environment from adverse effects resulting from • human activities which modify or likely to modify the ozone layer.	This Act allow for environmentally sound management and disposal of mercury waste Prohibitions and Restrictions on impor- tation, exportation, manufacture, sale of controlled substances, permits of import- ers and approved facilities	DEPC should domesticate Basel Con- vention to strengthen the implementa- tion of Harmful waste (special criminal provisions)
			for essential uses		

:					
Recovery, recycling, reclamation, or direct re-use only for a use allowed or for environmentally sound disposal.	DEPC, Mu- nicipality	 Waste Management Act Pollution Act 			
Application of the Basel Convention on Control of Trans boundary Move- ments of Hazardous Wastes and their Disposal in relation to transport of waste across international boundaries, noting that, where the Basel Convention does not apply to such transport, a Party shall consider relevant international rules, standards and guidelines.		· DEPC	Basel Convention		
* Article 12: Contaminat	ed sites				
Developing strategies for the identification and assessment of contaminated sites.	DEPC, Mu- nicipality	 The Environmental Protection and Conservation Act Waste Management Act Pollution Control Act 	DEPC has the mandate to secure a quality environ- ment conducive for good health and well-being of fauna and flora	While there is no specific legislation addressing this issue, the Act covers the development of appropriate strategies for identifying, assessing, and remediating sites contaminated by mercury and mercu- ry compounds.	DEPC to have a suitable legal basis in law for the development of appropriate strategies and actions, which should be incorporated into soil protection legislation.
					The methodology for identifying con- taminated sites can be harmonized with recommendations provided by the Con- ference of Parties. The development of appropriate management plans for any contaminated sites will help towards the goal of protecting human health and the environment from impacts associated with these sites.
Actions to reduce risks from contaminated sites shall be done in	DEPC, Mu- nicipality	 The Environmental Protection and Conservation Act 	Safe, timely, effective, and appropriate response to major or disastrous oil pollution; be responsible for surveillance and ensure compliance with all existing		
an environmentally sound manner.		 Waste Management Act Pollution Control Act 	environmental legislation and the detection of oil spills in the petroleum sector; receive reports of oil spillages and coordinate oil spill response activities throughout Vanuatu; strengthen the national capacity and regional action to prevent, control combat and miticate		

* Article 13: Financial res	sources and meche	unism			
Undertaking to provide, within its capabilities, resources in respect of those national activities intended to implement the Convention.	MFEM,	 No specific legislation covering this issue Pollution Control Act 	MFEM has the mandate to formulate and prepare long term, medium term and short-term national budgetary or fiscal management plans and to coordinate such plans across all levels. MFEM is responsible for man- aging the finances of all ministries of Vanuatu, including managing, controlling, and monitoring revenues and expenditures.	Beside annual budgetary provision, which is inadequate, there is no established sustainable financial mechanism for sound management of chemicals in Vanuatu.	There is the need to establish or review legislation on sustainable financial mechanism for the implementation of the convention's provisions to meet these gaps. Need to amend existing laws or establish new regulations for sustainable chemicals management including mercury
* Article 16: Health aspe	cts				
Promote the develop- ment and implementa- tion of strategies and programmed to identify and protect populations at risk, setting targets for mercury exposure reduction, and public education	MOH, DEPC	Food Control Act	MoH has the mandate to formulate, disseminate, pro- mote, implement, Monitor, and evaluate health policies in Vanuatu.	The mandate of MoH covers Vanuatu's obligation under the article.	The Act should be enhanced to regulate medical devices. However, there are no policy currently available, and this need be formulated by the MoH. Require the review and establishment of regulations relative to mercury monitoring in food especially sea food. About the development and implemen- tation of strategies and programmes to protect population at risk it may rather be in the competence of the Ministry of Health to prepare such strategies/ or improved standards are required with respect to health aspects should also be decided by the Vanuatu Ministry of Health
Promote the develop- ment and implementa- tion of science-based educational and pre- ventive programmed on occupational expo- sure to mercury and mercury compounds	MOH, DEPC, DOL	 Public Health Act Vanuatu Employment Act 	Regulate and control the importation, exportation, manufacture, advertisement, distribution, sale and use of food, drugs, cosmetics, medical devices, bottled water and chemicals	The Public Health Act creates capacity to promote awareness amongst chemical handlers and the public.	The Vanuatu Employment Act provides a general structure for laws and regula- tions related to occupational exposure under which facilities are required to meet certain safety requirements. However, none of these requirements deal specifically with mercury exposure in the workplace. Modifications to this law or other relevant labour regulations will help protect against occupational exposure.

ate MOH Ministry of Health has the mandate but no specific program addressing but no specific program addressing mercury.	and nd nd nd nd nd nd nd nd so sis sis source sou	nation exchange	al, DEPC • Waste Management Act The policy makes provision for the establishment Both the Pollution Control Act and Waste Enactment of law to jal • Pollution Control Act of National Committee on Chemical Management Management Act have provisions requiring formalize the NCCM srcury • Customs Act (NCCM) to promote information sharing on chemicals information exchange.	The NCCM is a national arrangement for sound management of chemicals (SMC) and information exchange on chemicals management.	 DEPC • Policy Information exchange on chemicals management nation use, use, and invitation networking and collaboration amongst stakeholders. nongst stakeholders. nongst stakeholders.
ppropriate MOH services for treatment	f populations f populations reury and mpounds and strength- tutional and essional for the and mon- ealth risks he exposure he exposure and mercu- nds	": Information exchange	echnical, DEPC and legal 1 on mercury vr.com-		1 on the DEPC r elimination luction, use, ssions and f mercury ty com- formation al and al and al and al comprounds s to mercury and and and the mercury the m

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Epidemiological information concern- ing health impacts associated with exposure to mercury. This information may be exchanged directly, through the Secretariant or in cooperation with other organizations	MOH, DEPC	 Sanitation and Hygiene Policy Public Health Act 			Ministry of Health has the mandate for this and needs to develop appropriate programs to address mercury
* Article 18: Public inforr	nation, awarenes:	s and education.			
Provision to the public of available information on effects of mercury, alternatives, issues noted in Article 17, results of research, development and mon- itoring, and its activities to meet its obligations under the Convention.	DEPC, MOH, DCIR, Municipality	There is no specific law addressing this issue	There is no specific law addressing this issue	There is no specific law addressing this issue	Develop regulations or guidelines under the Public Health Act, Employment Act, Waste Management, Food Control Act
Education training and public awareness relat- ed to the effects of ex- posure to mercury and mercury compounds on human health and the environment.	DEPC, MOH, DCIR, Municipality	National Environment Implementation Plan (NEIP)	The NEPIP outlines the collective responsibility for the environment and the importance of the involvement of each Ni-Vanuatu citizen in helping Vanuatu to move towards a sustainable future.	The implementation plan is the most important environment-related strategy in Vanuatu.	
* Article 19: Research, c	tevelopment and i	monitoring			
	DEPC	National Environment Implementation Plan	The NEPIP outlines the collective responsibility for the environment and the importance of the involvement of each Ni-Vanuatu citizen in helping Vanuatu to move towards a sustainable future.	The implementation plan is the most important environment-related strategy in Vanuatu.	
			The NEPIP forms a framework that links existing envi- ronment-related policies and provides a roadmap for Vanuatu's long-term environmental actions.		

Data and Inventory on Crematoria and Cemeteries

The Institutional framework assessment covers Sound Management of Chemicals (including mercury) in Vanuatu. There have been specific institutions that have been assessed to inform this section of the report. During the assessment, the following Ministries and Departments have been identified as having direct relevance and mandates that would contribute to the management of mercury in Vanuatu:

The Department of Environmental Protection and Conserva-

tion (DEPC) was originally established as the Environmental Unit in 1986. It was upgraded to departmental status in 2010 and is now a part of the Ministry of Climate Change Adaptation, Meteorology and Geo-hazards, Energy, Environment and the National Disaster Management Office (MCCA). In 2015, the DEPC staff worked under four divisions: Biodiversity and Conservation, Environmental Protection, Environmental Planning and Assessment, Provincial Outreach and Support Services.

The DEPC is the government agency responsible for matters relating to the environment. This includes developing, coordinating, and implementing the government's environmental policies and programs. It also includes representing Vanuatu on the international stage as the focal point for multilateral environmental agreements (MEAs).

The DEPC aims to:

- 1. Develop appropriate legislation to lead and guide clean, resilient, and sustainable development.
- 2. Strengthen compliance and enforcement of environment legislation and policies.
- Enhance coordination between all stakeholders (government sector, private sector, donor partners and NGOs);
- 4. Develop and implement the National Environment Policy (NEP) focusing on a green economy; and
- 5. Improve the resourcing, revenue collection and working environment for the DEPC.

Within these mandates, the DEPC is the Designated National Authority for the implementation of chemical -related multilateral environmental agreements (MEAs) including the Minamata Convention on Mercury. The Ministry coordinates all activities relating to chemicals management and co-chairs the National Chemicals Coordinating Committee (NCCC) that ensures cooperation and collaboration for the sound management of chemicals, including mercury, in Vanuatu across participating agencies, organisations and stakeholders. The Department also:

- controls and manages the disposal of obsolete hazardous chemicals and wastes;
- gives technical support to state ministries and

environmental agencies to promote management of hazardous chemicals and waste;

- collects data on hazardous chemicals and waste for information dissemination and maintains a national hazardous chemicals and waste data bank;
- collaborates with relevant national, regional and international agencies and NGOs on chemicals management programmes in consultation with all stakeholders and
- initiates funding; coordinates and promotes research activities on hazardous chemicals and waste management in the environment in collaboration with relevant stakeholders.

The Biodiversity and Conservation Division of the DEPC is responsible for: implementing activities relating to biodiversity conservation through terrestrial, marine, and coastal conservation/protected areas; biodiversity assessments and research; wetlands management; invasive species management, control, and eradication; and the implementation of international and regional natural resource, ecosystem management/protection, and biodiversity related conventions. In fulfilling its functions, the Biodiversity and Conservation Division deals directly with several MEAs and works closely with the Vanuatu Fisheries Department to support the implementation of other MEAs.

The Environmental Protection Division of the DEPC consists of two sections: 1) the Waste Management and Pollution Control Section; and 2) the National Ozone Unit. The Division is responsible for coordinating the implementation of the Ozone Layer Protection Act No. 27 of 2010, the Pollution (Control) Act No. 10 of 2013, the Waste Management Act No. 24 of 2014 and the National Waste Management Strategy and Action Plans for 2011-2016. The vision of the section is 'Safe Vanuatu. Protect our Environment'.

The Waste Management and Pollution Control Section is responsible for waste management and pollution control. The mission of the section is for an environmentally sustainable Vanuatu in which all types of wastes are collected, reused, recycled, and treated by environmental sound technologies suited to local conditions and waste going to landfill is minimised and pollution to the receiving environment is within acceptable standards. It also deals directly with several MEAs.

The Department of Energy (DOE) is a department within the Ministry of Climate Change Adaptation, Meteorology, Geo-hazards, Energy, Environment and National Disaster Management Office. The DOE is the main Government arm for all matters relating to the energy sector. This includes but not limited to, energy policies, energy legislations, electrification, petroleum, energy efficiency and conservation, energy awareness, and trainings. DOE is responsible for identification, implementation, management, and evaluation of energy projects, monitoring and facilitating energy activities as well as providing awareness and training activities. The vision of the DOE is "to energize Vanuatu's growth and development through the provision of secure, affordable, widely accessible, high quality, clean energy services for an Educated, Healthy and Wealthy Nation."

The DOE aims to meet the growing demands of the Government of Vanuatu and all Ni-Vanuatu for access to clean and affordable power with efficient energy usage and appliances.

The objectives of this overall goal include:

- · Enhance service delivery of the department
- · Achieve greater diversity of energy sources
- Improve access to electricity
- · Advance energy efficiency and conservation methods
- Strengthen linkages for progressing development
- Promote reliable, secure, and affordable petroleum and gas supplies

The Ministry of Health (MOH) is responsible for delivering preventative and curative health services in the country and must cater to diseases of both children and elderly people. MOH's mission is to protect and promote the health of all people in Vanuatu. The Ministry's vision is an integrated and decentralised health system that promotes effective, efficient, and equitable health services for the health and general well-being of all people in Vanuatu. It is with genuine conviction that steps to improving the health status of the people must be based on direct measures taken to 1) ensure access to health services at all levels; 2) improve the quality of services delivered at all levels; and 3) promote good management and effective use of resources (MOH-HSS 2010–2016).

The vision of the Ministry of Education and Training (MOET) is for a caring education system that provides every young person with lifelong skills, moral values, and the confidence to be self-reliant. MOET's aim is to create an education system that provides the conditions needed for the development of knowledge and aptitude, with the view of enhancing a harmonious and peaceful society conducive to the promotion of a sustainable way of life in Vanuatu.

The main objectives are to:

- Improve the quality of education.
- Increase equitable access to education for all people at all levels of education in Vanuatu; and
- · Improve planning, fiscal, and financial management.

The Department of Geology and Mines is charged with the following responsibilities:

- Formulate, disseminate, and implement related policies on mining
- Provide information and knowledge to enhance

investment in the sector.

- Regulate operations in the solid minerals sector.
- Generate appropriate revenue for the government.

The Department of Water Resources (DOWR) ensures that all Vanuatu citizens have access to safe water in enough quantities to meet basic needs, such as drinking, cooking, and sanitation. The DOWR's mission is to develop and manage the nation's water resources for social and economic well-being of the people of Vanuatu.

The Ministry of Foreign Affairs (MFA) cooperates with the Federal Ministry of Environment to coordinate all protocol issues relating to international aspects of chemicals management, such as signing of MEAs, participation in relevant international agreements and conventions including the negotiations of the Minamata Convention on Mercury. The Ministry is also responsible for the formulation, dissemination, and implementation of related policies on foreign affairs.

The Office of the Chief Information Office (OGCIO) facilitates the development of science and technology apparatus to enhance the pace of socioeconomic development of the country through appropriate technological inputs into productive activities in Vanuatu. Considering that chemical use is common in science and technology, OGCIO has an important role to play in the choice of technology for all chemical use in Vanuatu including mercury. The OGCIO is also responsible for the formulation, dissemination, and implementation of related policies on technology.

The Department of Labour and Employment (DOL) is con-

cerned with occupational health and safety issues related to the use and handling of chemicals at the workplace. The Ministry conducts workplace monitoring to ensure safe working environments for workers. This is an important mission, as it has great influence on the safety of workers in Vanuatu. The Employment Division (FID) of the department identifies and controls the hazards to workers in the workplace from exposure to chemicals and other labour associated risks.

The Ministry of Agriculture, Livestock, Forestry, Fisheries, and Biosecurity (MALFFB) is concerned with the use of agricultural chemicals for the benefit of securing food supplies in Vanuatu. The Livestock and Pest Control Department of the Ministry is responsible for collecting and disseminating information on pesticides management to farmers (i.e., the proper use and alternatives to unsafe pesticides). The Ministry is also responsible for the formulation, dissemination, and implementation of related policies.

The Ministry of Industry, Trade, and Investment is statutorily responsible for formulating and implementing policies, programmes, and incentives for industrial development of the country including chemical industries.

The Ministry of Finance and Economic Management (MFEM) provides, within its national mandate, the necessary financial

support to fulfil obligations to those MEAs to which Vanuatu is a Party. The Ministry is also responsible for the formulation, dissemination, and implementation of related policies on finance.

The Biosecurity Vanuatu is a department under the Ministry of Agriculture, Livestock, Forestry, Fisheries and Biosecurity (MALFFB). It was formerly known as the Vanuatu Quarantine and Inspection Services under the Department of Livestock and Quarantine. In 2013, it became known as the Department of Biosecurity. It manages risks to protect the health, environment, economy, and industries from exotic pests and pathogens from entering, establishing, and spreading in Vanuatu. This department is mandated to protect Vanuatu's borders and facilitate trade.

The Department of Ports and Harbour is responsible for ensuring the safe transportation, loading, unloading, and handling of goods, including chemicals, carriage, and the embarking/disembarking of passengers in or from sea going vessels. Efforts are made to ensure that all hazardous materials imported and exported are transported in accordance with international regulations, as well as the manufacturer's recommendations.

The Department of Customs and Inland Revenue is responsible for ensuring that chemical imports and exports are handled in accordance with national and international regulations. The agency controls the imports and exports of all goods including chemicals.

The Vanuatu National Statistics Office (VNSO) is mandated under the Statistics Act to coordinate statistical operations of the national statistical system in the production of official statistics in all the Ministries, Departments and Agencies, State Statistical Agencies, and Local Government Councils. The Airports Vanuatu Limited (AVL) is a corporation set up by the government and contracted by the Civil Aviation Authority of Vanuatu (CAAV). AVL coordinates all airside ground and cargo logistics from aircraft arrival to departure, and cargo handling from apron to secure storage after disinfection.

The Recycle Corp Vanuatu is the only company in Vanuatu that provides for recycling of ferrous metals. Established in 2007, the main activities of this company include: collection, processing, and export of scrap metal; and machinery hire, fabrication, and contracting. The company has extensive experience in breaking down large machinery and structures before processing exports. This includes removal of heavy earth moving equipment, steel ships including tugs and yachts, large steel town water supply tanks, and a myriad of smaller equipment.

The Vanuatu Chamber of Commerce and Industry (VCCI) is the advocate, representative, and supporter for the business community in Vanuatu. Established in 1995 under the Chamber of Commerce and Industry of Vanuatu Act, VCCI has over 1300 members in the business community. VCCI represents the interests and concerns of its members by lobbying and advising the government at local, provincial, and national levels for changes that will make Vanuatu a better place to create businesses and contribute to the development and growth of Vanuatu's economy. VCCI's vision is for a strong and respectable private sector contributing to Vanuatu's economic independence.

The Farmers Support Association provides for the needs of small-holder farmers through training and technical skills. Its mission is "farmers helping farmers" and covers capacity building, technical services, income generation, income to market, internal control service, and sustainable farming system.

Administrative and Regulatory Frameworks for Mercury Management in Vanuatu

The National Secretariat and Focal Point for the Minamata Convention on Mercury is provided by the DEPC as the UNEP focal point and the coordinating body for all chemicals-related issues in Vanuatu. The Department advises the Government of Vanuatu on mercury management issues including developing methodologies for meeting Vanuatu's obligation under the treaty, reviewing the adequacy of measures undertaken to meet the agreement's objective, reporting to the Conference of Parties of the Convention, liaising with related international organisations and agencies, and promoting cooperation with relevant stakeholders. The DEPC also engages with other relevant line ministries and stakeholder partners to implement part of the activities undertaken on mercury management to ensure information dissemination to the grassroots.

Interministerial and Stakeholder Coordination

DEPC has developed a National Chemicals Coordinating Committee (NCCC) ensuring commitment by all national stakeholders to the sound management of chemicals, including mercury, in Vanuatu. The life cycle management of mercury as a hazardous substance requires an approach that leverages the coordinated support of key institutions and stakeholders for clearly defined, pragmatic, and affordable strategies. Ensuring the proper and sustainable management of the mercury life cycle in Vanuatu will require a comprehensive, realistic, and well-coordinated framework in which all relevant departments of government, businesses, and institutions involved in the management of chemicals and wastes are engaged. Table 9, below, highlights those institutions and key stakeholders with responsibilities at various stages in the life-cycle management of mercury in Vanuatu.

	Life Cycle	Regulator/Stakeholders
1	Managing importation	Customs, Statistics, DEPC
2	Managing placement in the market	Customs, DEPC
3	Production, commercial sale, and distribution/own use	Customs, DEPC
4	Managing transport and distribution	Customs, DEPC
5	Managing use	DEPC, Department of Labour
6	Managing disposal	DEPC, MOH, Municipality, Provincial Councils, Waste Management Agencies

The monitoring, surveillance, and en-

forcement of environmental regulations is mandated by DEPC. It is expected that these enforcement-related activities will ensure that stakeholders, including those engaged in activities that use, emit, or release mercury understand the Minamata Convention's requirements and take appropriate action. Monitoring results will also provide the information base on the types and levels of mercury exposure risks.

The management of workplace related acci-

dents and emergencies is the responsibility of the Department of Labour and Employment Services, which has the mandate to respond to accidents and emergencies, in close collaboration with other relevant ministries, departments, and agencies.

Technical and analytical infrastructure

support for implementation and monitoring efforts is provided by laboratories within government agencies, industries, universities, and research institutes, as well as some private entities. The number of laboratories available to support work on the Minamata Convention is small and most will require upgrading and capacity enhancement to meet specific challenges presented by mercury.

A summary situation analysis of the current institutional capacity for mercury management in Vanuatu is set out in Table 15 Table 18. Life Cycle Management

of Mercury in Vanuatu

						ry
Sector	Relevant Institution	Regulation	Administrative Structure	Technical Infrastructure	Finance	Research and Data Management
ENVIRONMENT	DEPC	Absence of National policy and guidelines on Mercury Management	 National Secretariat and Focal Point for the Minamata Convention on Mercury National Secretariat for the NCCC Administrative structure in place but could be improved. 	 No certified analytical laboratory Limited on spot assessment equipment Absence of Chemical Emergency and Response Management centres 	Inadequate funds for Chemicals (including mercury) management Programme.	 Laboratory for quality research is absent Absence of National registers of chemicals and emergency incidence Absence of Pollutant Release and transfer register
ENVIRONMENT (Compliance, Monitoring and Enforcement)	DEPC	Inadequate specific regulations for enforce- ment of mercury related issues	Administrative structure for moni- toring and enforcement is present but could be improved.	 Laboratories that Requires upgrading. Inadequate testing equipment Inadequate infrastructure for monitoring and enforcement. DEPC currently works closely with Departments of Water and Public Works for water and soil analysis 	Inadequate funding	Inadequate laboratories for quality research on alternatives to mercury.
НЕАLTH	Ministry of Health	Not Applicable	 Administrative structure in place but could be improved Information sharing with Relevant stakeholders is weak 	Centre for Disease control present	Inadequate funding	 No research undertaken No data available
HEALTH (Compli- ance)	Ministry of Health	Inadequate regulations for effective compliance	 Officers are at the port to control import Administrative structure is present but could be improved. Information sharing is weak. 	 Laboratories that require upgrading Inadequate Testing equipment 	Inadequate Funding	 No research undertaken Data on chemical (including mercury) import is available but should be regularly updated and made accessible to the public
PROTECTION OF CONSUMERS	DEPC, Customs Department	Inadequate Regulations	Administrative structure is present but could be improved.	Inadequate Technical Infrastructure	Inadequate Funding	 No research undertaken No data available
WORKERS SAFE- TY AND HEALTH	Department of Labour and Em- ployment services	No regulations on chemical management	Administrative structure is avail- able, but needs improvement and synergy with other stakeholders	Inadequate testing equipments, inade- quate infrastructure for monitoring com- pliance and enforcement in workplace	Inadequate funding	No research undertaken
MINING (ARTISAL GOLD AND COAL MINING)	Department of Ge- ology and Mines	Not applicable	Administrative structure is present but needs improvement	Inadequate technical infrastructure	Inadequate funding	 No research undertaken Inadequate database
QUALITY CON- TROL		Inadequate regulations	Administrative structure is present but needs improvement	Inadequate technical infrastructure	Inadequate funding	 No research undertaken Inadequate database

Table 19: Summary Situation Analysis of the Current Institutional Capacity for Mercury Management in Vanuatu

General Institutional Gap Analysis

Article 3 of the Convention relates to the regulation of mercury supply sources and trade. Since there is no primary mercury mining in Vanuatu, including artisanal and small-scale gold mining (ASGM), the presence of relevant legal-regulatory frameworks and institutions for phasing out existing mercury mining or the import of mercury for ASGM, as required by Article 3 of the Convention, is not directly relevant at present. There is no chlor-alkali production in the country, so there is no need to ban the use of excess mercury from its decommissioning as required by Article 3. Therefore, presence of relevant legal-regulatory frameworks and institutional setting is also irrelevant.

Regarding the regulation of the export-import of mercury compounds used as pesticides, Vanuatu has ratified the Basel Convention and Rotterdam Convention, which have guided the country to ban the items from illegal entry. Illegal import, production, and use of such chemicals is controlled by the Customs Department and the Ministry of Agriculture. Institutional capacity gaps in this regard, as it was discussed in the previous chapter are as follows:

- inadequate knowledge and capacities of the Customs Department for effective customs' control of illegal import of mercury-based pesticides.
- limited laboratory opportunities and capacities for state examination/expertise of unidentified chemicals or chemicals concerned, including mercury-based pesticides—the Customs Office is the only authorized entity to examine chemicals concerned, per request.
- limited capacities under the Ministry of Agriculture, with no relevant accredited laboratories for detecting illegal trade within the local market of banned pesticides.

Article 4 of the Minamata Convention covers the regulation of mercury-added products listed in its Annex A. Vanuatu does not manufacture mercury-added products, however, the country does import, use, and discard mercury-added products. As a net importer of mercury-added products, Vanuatu will need to address the obligations in Article 4 via the enactment of a bylaw.

For mercury-based pesticides, capacities for detection of smuggling of chemicals and falsifications in trade are, at present, weak. Regarding phasing-down the use of dental amalgam, interviews with dental professionals and the Ministry of Health concluded that mercury-containing dental amalgam are still used in the country. Vanuatu will need to agree upon which phase-down measures it will utilize as a minimum requirement of the Convention.

Article 8 concerns the regulation (control or, where feasible, reduction) of air emissions of mercury and its compounds (referred to as total mercury) from existing and new sourc-

es. In Vanuatu, emission limit values (ELVs) are to be set for all new industries subject to an Environmental Impact Assessment (EIA) and Environmental Impact Permits (EIP), including those industrial facilities listed in Annex D of the Minamata Convention, which include:

- smelting and roasting processes used in the production of nonferrous metals; and
- waste incineration facilities.

Regarding the development and implementation of emission reduction programs and strategies for existing industries, there are no such policy mechanisms currently in place. For Vanuatu, the health and biosecurity sectors operate rudimentary waste incineration facilities. These facilities will need to be effectively managed as per requirements of Article 8.

The problem with emission inventories lies in the poor-quality control system of the information submitted. Capacities of environmental inspectors for spot and pre-planned inspections of existing facilities are very weak, particularly for stack measurements.

Article 9 concerns controlling and, where feasible, reducing releases of mercury and mercury compounds, often expressed as "total mercury", to land and water from the relevant point sources not addressed in other provisions of this Convention. In Vanuatu, in accordance with the Environmental Management and Conservation Act, the Pollution Control Act, and the Public Health Act, effluent discharge limit values are to be set for industries subject to EIA, including those industrial facilities listed in Annex D of the Minamata Convention. Like air emission limit values, effluent discharge values are not based on BAT/BET, but on end-of-pipe approach and water dilution effects. Likewise, the Water Resources Department and the Pollution Control and Waste Management Division of the DEPC do not have comprehensive capacities for setting BATs/BEPs for industries as per international standards. For wastewater discharges from water users not subject to EIA and EIP, effluent discharge limit values are not set for mercury. This is similar for wastewater sludge limits for mercury content. As for mercury release inventories, such systems are not set and operated by water management or water resource providers, which would be the appropriate resources to do so.

Article 10 encompasses the interim storage of mercury or mercury compounds, other than mercury wastes, in an environmentally sound manner and in accordance with guidelines developed under the Basel Convention or other relevant guidelines. In Vanuatu, interim storage of mercury and mercury compounds, other than wastes, is not regulated. Hence, relevant system and institutional-level capacities for such actions are absent. Article 11 contains clauses with respect to the management of mercury wastes. In Vanuatu, regulation and policy of transportation, storage, and disposal of hazardous wastes, including mercury-containing wastes, is found in the Waste Management Act, Pollution Act, and Waste Management Strategy. However, these documents do not specifically address mercury issues. Moreover, technical guidelines on the environmentally sound management of wastes consisting of, containing, or contaminated with mercury or mercury compounds that was developed under the Basel Convention are not applied here and there is no adequate capacity within Vanuatu's Pollution Control Division to comprehensively implement the Convention. Strategies and action plans for hazardous waste management are also absent. Inadequate operational capacities, including infrastructure, for the collection, treatment, storage, and disposal/elimination of hazardous wastes, particularly for mercury wastes present major problems for implementation. There are few companies in the country that are equipped to deal with environmentally safe elimination of mercury wastes.

Article 12 relates to the management of contaminated sites, including developing and adopting strategies for inventory/ identification, risk assessment, and mitigation/remediation measures for contaminated sites. At present, relevant technical regulations are not developed for safe management of contaminated sites in general, and for sites contaminated with mercury. An inventory system for contaminated sites does not exist within the Pollution Control and Waste Management Division of DEPC. Relevant capacities for developing and implementing site inventory, clean up, and remediation strategies are weak or absent.

Article 13 contains clauses relative to the effective mobilization of domestic as well as international financial resources for implementation of the Convention. There is no earmarked state funding for implementation of various provisions of the Convention. However, in the ratification of the document, the country must commit internal financial resources in the form of state budget allocated to various agencies for implementation of their duties and state programmes, funds of private businesses working in the field of hazardous chemicals and waste management, including waste collection, transportation, storage, and safe disposal/treatment. Moreover, the DEPC and other relevant ministries have long-term successful experience in working with bilateral and multilateral donors, including UNDP, UNEP, FAO, UNIDO, USAID, as well as Multi-Lateral Fund for the Montreal protocol and Global Environment Facility. Vanuatu NGOs are also very experienced in mobilizing financial resources for implementation of environmental projects in general, and waste management projects.

Article 16 touches on the health aspects of mercury. In Vanuatu, some state institutions do exist in this area, including the Ministries of Labour, Health and Justice, Environment, Biosecurity, Fisheries, Agriculture, and Internal Affairs. However, specific capacities for assessing and communicating health and environmental risks of exposure to mercury and its compounds, preventing, mitigating, and providing early warnings for industrial/chemical emergencies, and conducting effective response (rescue and recovery) measures during such accidents are weak. While health-based ambient environmental quality standards for mercury exist for all environmental media as well as for many food products (including fish and its derivatives), monitoring capacities, such as laboratory analysis and law enforcement, are weak.

Article 18 relates to matters of public information, awareness, and education. In-country institutional capacities to develop and implement awareness and educational programmes on mercury and its risks are absent. Regarding mercury inventory and its availability to the public, such capacities within relevant authorities are weak. Other information, such as mercury stock, storage, wastes, mercury-added products, and ambient environment quality is not available due to the absence of legal obligations to set up a publicly open mercury inventory system.

Awareness and educational programmes and collateral materials on mercury-related health and environmental risks, and sound management of mercury are absent in Vanuatu. Local institutions and organizations have limited or no capacity to develop and implement such measures due to a lack of knowledge and/or interest. CHAPTER 4 Identification of Populations at Risks and Gender Dimensions

Preliminary Review of Potential Populations at Risk and Potential Health Risks

Mercury is a potent neurotoxin. When inhaled, mercury vapor can produce harmful effects on the nervous, digestive, and immune systems, as well on the lungs and



kidneys, and may be fatal (Evers and Buck 2015).

Exposure to mercury can affect neurological development, be corrosive to the skin, eyes, and gastrointestinal tract, and may induce kidney toxicity if ingested (Evaluating Mercury Exposure 2008).

Unlike other pollutants, mercury is not restricted in its range, or in the size and number of the populations it can affect. Mercury

Figure 10: How mercury enters the environment

Source: Mercury - Time to Act, p 21

has a propensity to travel through air and water; without effective storage and disposal methods, this toxin can be found thousands of kilometres away from its source (Arguello, 2018).

Once released, mercury persists in environments where it circulates between air, water, sediments, soil, and living organisms. Generally, two groups are more sensitive to the effects of mercury:

- Prenatal exposure—Foetuses are most susceptible to developmental effects due to mercury, which can adversely affect a baby's growing brain and nervous system. The foetus is exposed through the passage of methylmercury across the placenta. High exposure of the foetus is the result of the mother's high exposure, typically arising from her consumption of fish and shellfish, or from her occupational exposure.
- People who are regularly exposed to high levels of mercury—This includes populations whose diets feature significant amounts of fish and shellfish,

such as those that rely on subsistence fishing; or people who are occupationally exposed (Evaluating Mercury Exposure 2008). Similarly, groups engaging in waste management activities, typically including a significant proportion of women and children, are likely to be at risk of mercury exposure. Uncontrolled scavenging, informal recycling of discarded mercury-containing products, and open burning of wastes at solid waste dump sites are likely to put women and children at particular risk.

Despite the risks to the health of women and young families, communication to these groups about the health risks they face, including from mercury exposure, is often targeted at the male heads of households, and may not reach those at particular risk. Even if it does, families may have few options to mitigate such risks or avoid the activities giving rise to exposure. It follows that communications will need to consider mercury exposure within wider aspects of socioeconomically disadvantaged groups and not target mercury exposure risk alone.

Mercury can also be used in a variety of devices and measuring instruments in the healthcare sector. Healthcare workers may be exposed to mercury through the breakage of equipment or while boogie tubes and other devices are being filled. Improper disposal of the remains from a spill from broken devices containing mercury results in the contamination of solid waste streams and further environmental contamination (Okoh 2015). Furthermore, mercury is also used widely for dental amalgam; dental workers may become contaminated through the preparation of amalgam. Waste amalgam, either remaining from preparation or removed from patients, is mostly discarded into solid waste or enters wastewater systems, potentially contaminating waste disposal and water treatment facilities and posing risks to workers there.

However, there are also possibilities that the following sectors may experience some impacts of mercury if not managed well: Agriculture. An estimated 60% of people live in rural areas, and about 50% of the country's land is dedicated to agriculture (National Census, 2016). When there is improper waste disposal, agricultural productivity is likely to suffer severe losses. Improper waste management has the potential to pose a significant negative impact on public health, the water and food supply, ecosystems, tourism and trade, natural resources, and climate change. In some parts of the country, improper waste management has already led to sanitation problems. The pollution comes from organic, solid, and liquid waste including e-waste and hazardous wastes generated from: households; public and business establishments; and industrial or construction sites. If not managed well, this waste can also be a pathway for exposure to risks posed by mercury. Land pollution also contributes to air pollution, as well as water pollution through infiltration down into the water tables or erosion runoff into the sea or open waters. Runoff into the sea or aquatic bodies can create another environmental problem such as the degradation of marine biodiversity.

Water resources. Water availability, critical to economic growth and poverty alleviation in Vanuatu, is especially vulnerable to mercury. There are already many threats to water security, including increasing demand, pollution, unsustainable extraction, and conflicts over water rights. It is expected that mercury will contribute to significant and complex water security changes associated with changes in temperature and precipitation, especially where substantive informal disposal of mercury-added products occurs. Additionally, rapid economic and population growth and rural-urban migration trends are placing severe stress on urban water supply and sanitation systems, increasing the competition for surface and groundwater resources. Such socioeconomic growth patterns are also driving factors to deteriorating water quality through point-source pollution and saltwater intrusion. Fisheries and marine resources. Commercial and subsistence marine and freshwater fisheries and aquaculture are important for food security and the economies of many countries like Vanuatu. Unsound use of mercury is also expected to have significant impacts on fisheries. Mercury risks affect the elements that influence the number and distribution of marine fish species by impacting food availability, breeding habits, and the presence and species composition of competitors and predators. In addition, competing demands for land and water, and the loss of inshore fish nursery habitats to coastal development, may cause significant changes to ecosystems and losses to commercial aquaculture. Overfishing, excessive use of pesticides, industrial pollution, diseases, red tide, and the construction of dikes and other coastal structures further increase the stress on marine resources.

Ecosystems and biodiversity. The region contains numerous global biodiversity hotspots and World Heritage sites that are home to some of the rarest and most endangered species and ecosystems (such as coral reefs) in the world. Human pressures, together with changing hydrology, may impact the productivity and resilience of these ecosystems.

Proper disposal and management of mercury-containing products: While all four towns each have a well-controlled dump site, the most concerning issues are proper disposal and management of mercury-containing products. In all four towns, especially in dumpsites. most wastes are not separated to differentiate waste classes (e.g., organics, recyclables, hazardous, etc.), and the impacts to land and the environment. In Luganville, waste is well managed and separated, unlike the other three towns. Moreover, there needs to be more awareness on how to properly manage mercury-containing items/products and ways to appropriately dispose of them. Additionally, in rural areas where there is no organized waste collection and no dedicated sites to dispose of waste, informal dumping and open burning of rubbish are prevalent practices.

Assessment of Potential Gender Dimensions Related to the Management of Mercury

The institutional gap analysis revealed that there is no mechanism to facilitate a unified chemicals information management system in the country. As a result, there is no mechanism to promote substantive gender considerations among stakeholders or participants. Future work on ratification and implementation of the Convention should ensure that participation in the process effectively considers all gender dimensions.

Vanuatu, like other Pacific island states, is a small developing country in the Pacific Ocean that is affected by significant environmental impacts because of substantial industrial activities from other developed countries. In addition to such environmental risks, mercury poses critical risks to human health for women—often those working in the low-income sector of waste recycling or the chemicals management/ production sector. The UNEP project Regional Enforcement Network for Chemicals and Waste (REN) has highlighted the need for more proactive enforcement to address the human rights and gender equality dimension of illegal or unsound waste management. Due to these gender inequalities, environmental challenges have different impacts on men, women, and children (girls and boys). As women represent two-thirds of the poor in the region, their economic insecurity is part of a cycle of disadvantages, often caused by discrimination in employment and land ownership along with limited access to resources. Gender inequality is also becoming more apparent due to rapid urbanization, the region's high vulnerability to climate change and natural disasters, as well as environmental challenges like pollution and ecosystem degradation.

Women in Vanuatu have become victims of the aworst natural disasters, as a majority live in rural communities, where this is less opportunity to earn income to sustain their family. These women must take care of the children, sick, and elderly family members at home, as the men are often away at work on the farms or fishing. Although women are also actively engaged in farming and fisheries, their role in these main livelihood sectors is still not recognized and, as a result, they are often excluded from government-run environmental management training for farmers and fishers. Therefore, these women who play pivotal social and economic roles in their communities and often are breadwinners, are the most vulnerable. In addition, one of the most vulnerable segments of any population is women of childbearing age and the foetus. The most common pathway for exposure is through fish consumption; in Vanuatu there is little to no data available to determine the severity of risk that fish consumption represents.

There is a gender component to the risks associated with occupational exposure to mercury. For instance, waste collectors and landfill workers are likely to be predominantly male. The same is likely to be true for cement factory workers and miners. No information is available on the gender distribution of employees at laboratories where mercury-containing measuring devices may represent a potential occupational exposure risk.

In the event of breakage of any household item containing mercury (e.g., compact fluorescent lamps or thermometers), the risk of exposure will depend on who the primary care giver is in the home. In Vanuatu, there is a gendered division of household labour, and such accidents may represent a disproportionate risk to women. Such accidental spills may also represent a significant risk of exposure to young children in the home.

CHAPTER 5 Understanding of Workers and the Public and **Existing Training** and Education **Opportunities of Target Groups and** Professionals

Generally, across all the four towns assessed and the country at large, there is evidence that the public in general have a very low level of awareness and understanding regarding mercury and its risks. The subject is new, not studied nor researched before, thus the lack of information in the field is evident.

Public Awareness

Developing public awareness messages on mercury and its risks is new to Vanuatu, thus creating awareness of the potential risks associated with the use of, and exposure to, mercury is key to a successful implementation of the Minamata Convention on Mercury in Vanuatu. The DEPC should coordinate all activities in close collaboration with the National Chemical Coordinating Committee (NCCC) and other line agencies to ensure effective communication and public awareness efforts are conveyed across all sectors and decision makers.

While public awareness and understanding is still low in Vanuatu, there have been programmes on the impacts and risks of chemicals where mercury is included. Since the emergence of global concern on mercury hazards and the development of the Minamata Convention, Vanuatu, through the DEPC, has already developed plans and has linkages with specific key sectors such as health, geology and mines, industry/private sector, agriculture, labour, NGOs, and academia. Such linkages can be visible through the following structures and platforms where DEPC is actively engaged or is a member:

- 1. National Chemical Coordinating Committee.
- 2. Vanuatu Environmental Advocacy Network (VEAN);
- 3. National Trade Development Committee.
- 4. National Oceans Committee.
- 5. Protected Areas Advisory Committee (PAAC); and
- 6. National Advisory Board on Climate Change and Disaster Risk Reduction (NAB).

Training and Awareness of Target Groups And Professionals

Vanuatu is a Party to several international treaties, including treaties on chemicals and waste. The country has also shown interest in becoming a Party to the Minamata Convention on Mercury by signing the accord. Public authorities with mandates relating to sound chemicals management, including mercury management, will require core officers to be trained in the development and implementation of policies, strategies, and programmes (including monitoring and enforcement activities), which are designed to protect human health and the environment from the adverse effects of chemicals and waste.

The initial activities that have taken place as part of the MIA project, represent a first stage in such training but further work will be required if the implementation of the Convention in Vanuatu is to be a success. Given the decentralisation system of governance in Vanuatu, training will need to extend beyond officials in the ministries to those within provincial authorities and within local government.

Attempts by the public sector to change the behaviour of industrial sectors engaged in mercury use and trade or implicated in the inventory as sources of mercury emissions and releases will depend on sensitising them on their responsibilities.

This mostly relates to reducing and eliminating the risks posed by mercury in terms of occupational health and safety, as well as broader public health and environmental degradation. Training of key groups and professionals in those industries, including through local chapters of the professional associations to which they belong, will be critical.

Civil society organisations also play an important role in representing communities and raising their awareness of issues such as the risks posed by mercury. They, too, can be instrumental in changing behaviour and in ensuring that the design of strategies and programmes addressing mercury risks is appropriate to the communities they target. Vanuatu is fortunate to have national and international civil society organisations that are already closely engaged in environmental protection and management issues. Engaging additional NGOs, particularly those working with local communities, through training and awareness activities, will greatly assist effective implementation.

Vanuatu is also fortunate to have scientific and socioeconomic expertise in environment and chemicals within its academic and NGO communities. This expertise has been engaged in furthering the MIA project and will be an important asset in developing and implementing measures to implement the Convention in Vanuatu. To support and enhance their work, it will be important to identify opportunities for them to cooperate regionally and internationally in, for example, research programmes and monitoring networks.

Future Training Needs for Successful Implementation of the Convention

Following the national assessments held in all four provinces, interviewees and key informants were asked to prioritize other training and capacity building exercises that would be beneficial for future implementation of the Convention. Respondents listed a variety of topics that can be summarized in four main topic areas:

- Policy and strategies that align with the convention to address waste disposal, handling, and management.
- Awareness raising about public health risks associated with mercury exposure.
- Training for responsible line agencies including customs officials about hazardous waste; and
- Improved communication and coordination (within Vanuatu and other countries).

While mercury risk is a new concept in Vanuatu, the DEPC and other key agencies will require conducting an extensive awareness raising campaign as a core program going forward. Future efforts for awareness raising can be closely coordinated with other stakeholder such as the Ministry of Health through its Public Health Department and the World Health Organization. Topics can include management of household spills of mercury (e.g., breakage of thermometers or CFLs) as well as targeted training for specific occupations (e.g., waste management personnel) about the risks associated with their fields of employment.

A one-day workshop can be organized to provide stakeholders with an overview of environmentally sound management of mercury waste. Presentations can cover topics on:

- 1. Types and sources of mercury waste.
- 2. Important concepts and approaches to the environmentally sound management of mercury waste.
- 3. Appropriate interim storage of mercury waste.
- 4. Recovery, disposal, and export of mercury waste; and
- 5. The management of sites contaminated with mercury waste.

During this workshop, information can also be shared on techniques and approaches for identifying contaminated sites (as per Article 12 of the Convention). Such techniques would include abiotic and biotic sampling of environmental media as well as other approaches. The institutional and legislative gap analyses conducted as part of the MIA project also identified several legal instruments related to limiting the transboundary movement of waste in Vanuatu that were adopted in part because of Vanuatu's participation in the Basel Convention.

A workshop on the topic of waste management, organized with government and nongovernmental organisations, would provide an opportunity for stakeholders to become more aware of on-going activities in the country and the challenges that have been identified during the project.

In addition, new technologies on environmentally sound management of mercury waste can be shared with the stakeholders. Such a workshop would also help to identify next steps needed to help ensure that Vanuatu can comply with the waste management provisions outlined in the Minamata Convention.

In addition, there will be long-term requirements for Parties to the Convention related to reporting and effectiveness evaluation. This will include a combination of standard reporting related to obligations for specific articles of the Convention, as well as monitoring related to the primary goal of reducing the risk of exposure to mercury in the environment.

It would be ideal to organise a 11/2 day workshop to discuss topics related to effectiveness evaluation, reporting, and mercury monitoring. This also includes raising public awareness through social media and other media outlets. The workshop would provide an opportunity for identifying existing information that can be collated and summarized about environmental mercury loads in the country, as well as for identifying gaps such as knowledge of mercury content in fish and shellfish, especially species that may impact local human health. It would also help prepare stakeholders for the requirements associated with reporting and the short- and medium-term obligations of the Convention. A detailed discussion on biomonitoring would be included to inform stakeholders about current methods for sample collection and globally accepted risk assessment approaches and comparisons with other relevant data sets (Buck et al. 2019).



CHAPTER 6 Implementation Plan and Priorities for Action Vanuatu ratified the Minamata Convention in 2018 and is now at the stage of scoping out appropriate implementation arrangements of the Convention. While the goal of the Convention is to protect human health and the environment from anthropogenic emissions and releases of mercury and mercury compounds, the treaty equally calls on countries like Vanuatu to ensure priority actions are in place to meet their obligations under the Convention. However, in order to ensure that Vanuatu meets its obligations to the Convention, certain actions need to be taken to address the risks and impacts resulting from unsound use of mercury. These actions may include: ensuring that the country has the necessary regulatory and administrative functions to address the Convention across all levels from the national to the community level, while also effectively working with the private sector to ensure that emissions and releases from industrial point sources are controlled and minimized; prohibiting or limiting the use of mercury-containing products and encouraging consumers to accept alternatives; assisting vulnerable populations to become aware of the impacts of mercury and to halt practices that may have serious impacts on health and the environment; and preventing mercury and mercury-containing products from entering waste streams.

More specifically, the priority areas for a successful implementation of the Convention in Vanuatu are derived from the major gaps in information identified during the institutional and legislative gap analysis and national mercury inventory. The following paragraphs form an initial set of priority actions that were drawn from the initial assessments described in the previous chapters. These priorities are listed in the context of the Convention articles, broadly reflecting the lifecycle of mercury. The actions begin with responsible authorities taking actions across all levels from the national to community level.

Priorities and Objectives for Future Implementation

Priority 1: Strengthening the legal and institutional framework in Vanuatu

The legal and institutional framework in Vanuatu requires updating and reinforcing to enable the country to implement the obligations of the Minamata Convention. It was determined that an overall, comprehensive review of existing legislation is required to ensure that Vanuatu law allows for full compliance with the Convention. Such a review would also provide an opportunity for Vanuatu to bring its legislation more in line with existing laws and regulations that are already ratified by the country.

The national mercury inventory identified the use and disposal of mercury-added products as a significant source of mercury emissions and releases. In addition, there are no existing regulations that specifically address these products, their importation, use, or disposal. It is anticipated that an updated legislation will assist with the implementation of Article 4 and will have a long-term benefit of reducing mercury emissions and releases. In addition, it was recognized that there is an overall lack of coordination at the ministerial level related to chemicals management in general, and mercury specifically. There is a need to foster greater communication between ministries and to establish a coordinating mechanism that can facilitate activities related to the Minamata Convention and other multilateral environmental agreements that focus on chemicals management.

Priority 2: Reduce the use of dental amalgam

It was identified during the assessment that few hospitals still use dental amalgam, and this is likely to continue in the future. While efforts such as developing standard operating procedures (SOPs) for proper waste disposal and recruiting focal persons to address and manage mercury waste within hospital settings are helping to eliminate the use of dental amalgam, many dental clinics still use this mercury mixture for fillings.

In Article 4 and Annex A Part II of the Convention there is a requirement to reduce dental amalgam use, to reduce the exposure of patients and dental health care personnel to mercury during dental treatment, and to avoid releases of dental amalgam from dental clinics.

Priority 3: Environmentally sound management of mercury-containing waste

Waste management practices in Vanuatu represent an important source of mercury emissions, releases, and site contamination. The development of actions to reduce these impacts will need to be taken up in coordination with key stakeholders across all levels from national to community levels within the broader context of improving waste disposal practices and services in Vanuatu. Implementing an environmentally sound management (ESM) of mercury and mercury-containing waste requires that mercury waste not be mixed with or discarded in landfills and not be incinerated. Pollution control systems need to be in place and properly treat and immobilize mercury.

In Vanuatu, there is currently no facility with the capabilities for interim storage of mercury-containing waste, nor is there a mechanism for sorting, collecting, and/or recycling mercury-containing waste. The country is also a Party to the Basel Convention and there has been some effort taken towards establishing a regulatory framework related to the movement of hazardous waste (e.g., the Law on Transboundary Movement of Hazardous Wastes). However, the legislative and institutional gap analysis as well as results from the inventory identified waste management, particularly chemical or hazardous waste management, as an important area for further strengthening. The proposed activities to address this priority should include the design and construction of an interim storage facility and the initiation of a producer responsibility program that incorporates sorting and recycling of mercury-added products. Specifically, activities can include:

- 1. Separation of mercury-containing products from general municipal waste.
- Separation of discarded medical devices containing mercury from clinical wastes.
- Consider e-waste practices from other countries that can help minimise or prevent mercury emission and release; and
- 4. Development of environmentally sound interim storage for mercury waste prior to disposal under the terms of the Basel Convention.

Priority 4: Introduce, strengthen, or upgrade a new or existing laboratory to specialise in chemical analysis where mercury is included

While this priority may be a new initiative for Vanuatu, it is important that DEPC has a support system to ensure chemicals are analysed before they are used in the country. Some activities that could be relevant to this priority may include:

- Inventory existing laboratories with the capacity to analyse mercury.
- Identify laboratories that can support chemical analyses.
- Upgrade and/or strengthen selected laboratories to meet international best practices to analyse mercury emission and releases.
- Train analytical professionals on the use of the upgraded equipment for analysing mercury and its compounds; and
- Certify the upgraded laboratories.

Priority 5: Education, awareness raising, and capacity building

During the national inventory assessment, it was identified that no effort was given to education and general awareness raising efforts for both government departments and the public at large. While education and awareness raising are important efforts to sensitize decision makers and the public about mercury related health risks and pathways for exposure, these efforts should become part of DEPC's core educational and awareness program across all levels. There should be an action plan detailing the continuity of such messaging related to mercury. A targeted education program on sorting mercury-containing waste will be an important component for DEPC.

Moreover, a targeted education initiative should also consider mercury exposure via food sources. This will entail raising awareness on exposure to certain fish species with potential elevated mercury levels and targeting vulnerable groups such as pregnant women. The renewed focus on education and awareness related to mercury should also include targeted training for all responsible line agencies including customs officials, local Irea councils and the private sector. Customs officers will play an important role in enforcing rules associated with the importation of mercury-added products and the movement of mercury-containing waste.

Priority 6: Research, Monitoring, and Reporting

Research, monitoring, and reporting will become an important component moving forward for Vanuatu. The national mercury inventory was conducted using the inventory Level 1 approach and there is a need to expand and improve on this approach. During the inventory development, it became apparent that there is a general lack of information on mercury exposure in humans and there is also limited data on mercury concentrations in environmental media (e.g., fish, birds) that are important for future effectiveness evaluation of the Minamata Convention. In addition, DEPC officials will be required to meet regular reporting requirements for the Convention.

		tition on Mercury ying and adapting the obligations of the Minamata Convention on Mercur re work needed to ensure the country is fully aware and responsible auth ns of the convention. arcury management ention and sets out specific priorities for action. The policy should also tal fention and sets out specific priorities for action. The policy should also tal fention and sets out specific priorities including, but not limited to, polic duots and national development policies including, but not limited to, polic duots and national development policies including, but not limited to, polic duots and national development policies to address sustainab gislation restricts the production, trade, use, and disposal of mercury-added prod an ufacturing processes in which mercury compounds are used in accord an infacturing processes in which mercury compounds are used in accord and responsibilities and develop compatible regulations and at a Convention at national and local levels. Is and at a responsibilities and develop compatible regulations and atta Convention at national and local levels. I and atta consultation with stakeholders. The mation plans in consultation with stakeholders.			
A original A original	AGIMIUES	 d. 1.1.1 Ratify and operationalise the Minamata Convention The legal and administrative process of ratify Vanuatu at its initial stages. There is still more take responsibilities to address the obligation 1.1.2 Develop a national policy and action plan on meres. A national policy that compliments the Conventing to energy generation and security in urbanisation and waste management, environ the should also consider integrating mercury mand wastes; and Mainstreaming sound management of leg A specific country legislation that prohibits or in accordance with articles 4 and prohibits me with article 5; It considers that mercury wastes are managed in accordance with articles 4 and prohibits me with article 5; The legislation or envision to an consider there are no considers that mercury wastes are managed in administrative rules to ensure there are no considers that environ administrative rules to implement the Minama 1.1.4 Assignment of administrative rules to implement the Minama administrative rules to implement the	or o		
	Output	 Minamata Convention on Mercury ratified Develop a national policy and costed action plan on mercury management. Amend or develop new legal or regulator practice frameworks to address the Minamata Convention and its' obligations Assign administrative responsibilities to responsible government authorities; & Establish sustainable systems to collect accurate inventory data and report on mercury use in Vanuatu. 			
Obioctivo	Objective	Strengthen legal and institutional framework in Vanuatu			
Driority	L'IIOIILY	-			
N	Reduce the use of Dental Amalgam	2 2 2 2 4.	Strengthen and update the Public Health Act on use, and disposal of dental amalgam including medical waste. Minimise or stop the use of amalgam for vulnerable patients. Dental professionals trained on altermatives to amalgam, & Reduced releases of amalgam wastes from dental clinics.	2.1.1 2.2.1 2.3.1 2.4.1	 Strengthen and update the Public Health Act on use, and disposal of dental amalgam including medical waste The DEPC and MOH should jointly develop, amend, or strengthen the Public Health Act to ensure there is strict adherence to the Best Management Practices of amalgam use, disposal, and waste handling practices. This is in line with the provisions set out in Part II of Annex A of the Convention, which specifically includes: Minimise or stop the use of amalgam for vulnerable patients Setting national guidelines that aims at dental care, prevention, and health promotion, and minimizes the need for dental restoration. Setting national guidelines that aims at dental care, prevention, and health promotion, and minimizes the need for dental restoration. Setting national guidelines that aims at dental care, prevention, and health promotion, and minimizes the need for dental restoration. Setting national guidelines that aims at dental care, prevention, and health promotion, and minimizes the need for dental restoration. Setting national guidelines that aims at dental care, prevention, and malgam, particularly in the care of children's primary teeth and of pregnant women. Dental professionals trained on alternatives to amalgam Encourage Nursing or Medical schools to educate students on the use of mercury-free dental restoration techniques and materials. Reduced releases of amalgam wastes from dental clinics Promoting best management practices at dental clinics in the use of dental amalgam and in the disposal of amalgam wastes; Establishing an environmentally sound system for the collection, storage, and disposal of amalgam wastes;
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ო	Environmentally Sound Management of HG-containing Waste	3.1 3.2 3.3 3.4	Strengthen or update Waste Management guidelines for Municipality, Hospitals, Clinics, Schools and Business house to include proper measures for disposing mercury added products. Public awareness on waste separation. Vanuatu to adapt internationally acceptable practices to prevent mercury emissions and releases; & Develop a storage facility for mercury waste.	3.1.1 3.2.1 3.3.1 3.4.1	 Strengthen or update Waste Management guidelines for Municipality, Hospitals, Clinics, Schools and Business house to include proper measures for disposing mercury added products Separation of mercury-containing products from general municipal waste Public awareness on waste separation Separation of discarded medical devices containing mercury from clinical wastes Vanuatu to adapt internationally acceptable practices to prevent mercury emissions and releases Application to e-waste practices of techniques that minimise or prevent mercury emission and release Develop a storage facility for mercury waste Development of environmentally sound interim storage for mercury waste prior to disposal under the terms of the Basel Convention.
4	Introduce, strength- en, or upgrade a new or existing laboratory to spe- cialised in chemical analysis where mercury is included	4.4 4.3 4.3	Undertake a national inventory of laboratories in country with capacity to analyse chemicals including mercury. Upgrade or strengthen laboratories with capacity to analyse chemicals; & Training lab technicians on chemical analysis; & Certification of the laboratory.	4.1.1 4.2.1 4.3.1 4.4.1	 Undertake a national inventory of laboratories in country with capacity to analyse chemicals including mercury Inventory of existing laboratories with capacity to analyse mercury Identification of laboratories that can support the analysis of chemical Upgrade or strengthen laboratories with capacity to analyse chemicals Upgrade or strengthen laboratories with capacity to analyse chemicals Upgrade or strengthen selected laboratories to meet international best practices to analyse mercury emission and releases Training lab technicians on chemical analysis Training of analytical professionals on the use of the upgraded equipment for analysing mercury and its compounds Certification of the laboratory
ى	Education and Awareness Raising	5.1 5.2 5.3	Develop an action plan on continuity of messaging related to mercury. DEPC to update existing educational programs to include mercury awareness across all levels; & Develop target training for responsible line agencies on mercury management.	5.1.1 5.2.1 5.3.1	 Develop an action plan on continuity of messaging related to mercury. DEPC to develop an action plan detailing the continuity of such messaging related to mercury. DEPC to update existing educational programs to include mercury awareness across all levels Develop a targeted education program on sorting Hg-containing waste Develop target training for responsible line agencies on mercury management DEPC to develop and deliver training for all responsible line agencies including Customs officials.
σ	Research, Monitor- ing and Reporting	6.3 6.3	Develop a national research centre or mechanism where chemical research including Mercury are included. Monthly outlet or repository of public information on chemical management; & Develop and standardize a reporting tool for collecting, monitoring, and reporting of chemicals including mercury in key biota such as fish and birds to assess temporal trends and risk.	6.2.1 6.3.1	 Develop a national research centre or platform where chemical research including Mercury as part of its' core activities While this is a new initiative of Vanuatu, chemicals research should be part of the National research centre/mechanism where relevant information can be collected to inform program activities and country reporting DEPC should develop a standard monthly chemicals outlet where information can be shared with the public on best practice approaches and how to manage waste etc. DEPC should develop a standard monthly chemicals outlet where information can be shared with the public on best practice approaches and how to manage waste etc. Develop and standardised a reporting tool for collection, monitoring and reporting of chemicals including mercury to vanuature. National reporting template that can be standardised and can be used a national reporting for chemical management vanuatu



CHAPTER 7 Mainstreaming of Mercury Priorities In order to meet its obligations to the Minamata Convention, Vanuatu will need to develop an integrated approach to addressing a sound management of mercury, which engages both the public and private sector in all aspects of the implementation of the Convention. In Vanuatu, preparations have been made to begin mainstreaming by assessing the institutional and regulatory capacity gaps that can be prioritised for national development plans. However, while mercury risk is a new concept in Vanuatu, it would require a substantial amount of awareness and capacity building support before the country at large can fully grasp the significance of mercury management relative to the Convention's requirements.

Accordingly, specific line ministries will need to ensure effective mercury management is mainstreamed into national plans and priorities including a National Waste Management Action Plan and a National Environmental Policy and Implementation Plan. These documents are based on the country's development goals and reflect current and future steps the country needs to take for sound chemicals management including mercury.

Recommendations

Implementing mercury management at the national level requires a variety of actions that together form an enabling environment. Some of these actions are likely to be beyond the direct mandate of the DEPC. Typically, several ministries and line agencies may need to act, and cost-effectiveness gains need to be available where actions are coherent and well-coordinated between national agencies. From the assessment findings, a few recommendations to support Vanuatu in its approaches to address mercury in Vanuatu are outlined here:

- Adapt and train responsible line agency officers on the UN Environment Mercury toolkit, ensuring it is standardized to become a mandatory country reporting practice for responsible agencies, to report on Vanuatu's progress in addressing the Minamata Convention.
- Development of different communication and technical guidance materials, for example, how to recycle metals, especially for towns such as Tanna and Malekula where there are no specific recycling services.
- Develop a proper guidance for stakeholder on reducing the likely impacts of mercury on the environment. This is ensuring that any development plans or interventions in the country has environmental considerations.

Challenges Encountered

Vanuatu is an island nation consisting of 83 islands, separated by large ocean areas. This makes logistics and operation for this project challenging. The common means of transportation between the islands is usually by air, as using any ship or boat usually take between two to three days. Within the island, people mostly walk long distances to reach a meeting place or use a local truck, which is usually quite expensive.

- 4. Link up with DEPC officers on the ground and work through their networks to support the mercury inventory assessment. It is important to note that provincial officers based in each of the assessment locations will have contacts with different stakeholders within their locality—remote areas can then be reached through such networks.
- Provide an in-depth explanation of what the assessment is about, and clearly explain its purpose. If possible, make an appointment with the next upper-level manager or supervisor to address the situation.
- 6. Provide awareness on issues related to mercury before conducting the assessment. If possible, bring the targeted group of people together in a room and provide a general awareness on the matter, and explain the intended outcome of the project, and what information they are expected to provide; and
- Ensure that any tool to be used in the community or provincial context are adapted to Vanuatu context before implementing the assessment. It is important that you know what to collect, so as not to confuse those you interview.

This adds to the challenges of having to conduct assessments in four different provinces, all located in four different islands. While the assessments are completed, listed below are a few challenges highlighted in relation to logistical and operational aspects of the assessment that can be taken into consideration for future planning and implementation of similar activities in Vanuatu:

- Remoteness and the spread of the assessment coverage within the island made it difficult and costly to reach schools, especially those with laboratories and which are located out of town.
- 2. The unwillingness of stakeholders to provide the consultant with information. In most instances, the assessment is being classified as a threat to the company or shop. Shop owners and managers were reluctant to provide information as required.
- 3. Since mercury risk is a new norm in two of the four towns of Vanuatu, it took a while for the consultant

to clearly explain what the issue is and outlines the common risk to the environment, before conducting the assessment: and

4. Adapting the toolkit to a Vanuatu context was a challenge. While it is important to clearly explain what information is needed, it is also important not to lose the exact meaning of a specific set of question. The consultant was only able to collect estimates of all the questions required, to quantify the information. However, this can be an issue to address in the future when similar projects arise.

Conclusion

The MIA assessment has reinforced the need to provide cohesive and sustainable capacity building support to principal agencies where implementation of the Minamata Convention is concerned. The DEPC as the lead agency will need to improve its coordination and joint initiatives for a more efficient mercury management in Vanuatu.

More pointedly in these respects, the outputs of the assessments have provided a broad set of knowledge and skills at the national level along with the directions to establish policy guidelines for:

- Capacity building, especially in terms of technical training and awareness in mercury control and management; and
- The enhancement of the convention, in terms of joint and coordinated solid waste management control decisions and operations by DEPC.

Therefore, by engaging the Government of Vanuatu in the implementation of activities both at policy and operational levels, DEPC can ensure full ownership of the project deliverables. Moreover, the project has expanded the base of stakeholders by which collaboration is much needed to build national level expertise for holistic mercury management.

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Awareness programs with schools and communities on Santo and Sola in 2021 on mercury products under the Minamata Convention.



