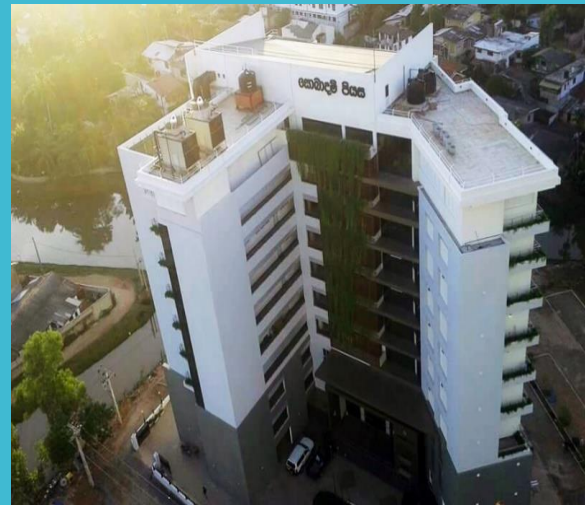


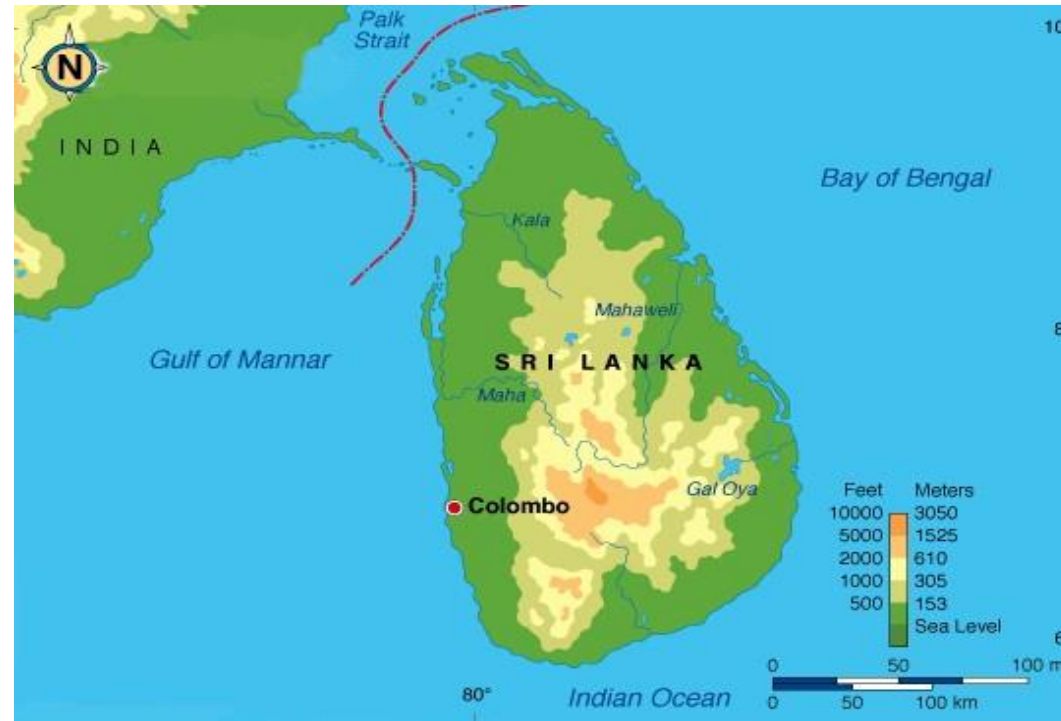
Mercury Management in Sri Lanka

**07th Annual Asia- Pacific Mercury Monitoring Network Partners Meeting
05th – 07th September 2018 – Manila, Philippines**

**Sujeewa Kulasekera Fernando
Assistant Director
Environment Pollution Control &
Chemical Management Division
Ministry of Mahaweli Development & Environment
Sri Lanka**



Sri Lanka Country Status



Land Area – 65,610 km²
Population - 20.9 million
Capital – Sri Jayawardenapura Kotte
Middle level income
Literacy rate 92.2%
Per Capita GDP – 3842 US\$
Currency – Rupees (Rs)



Minamata Convention

Convention Details

- Date of Signature - 08-10-2014
- Date of Ratification -19-06-2017(as 60th member country)

Mercury Initial Assessment (MIA) Project Details

- Date of Commence - 9th September 2016
- Duration - 24 months

Sources of Mercury Emission in Sri Lanka

- Compact florescent lights and mercury vapor lights
- • Thermometers, manometers, and sphygmomanometers
- • Batteries
- • Dental amalgams
- • Some skin lightening creams
- • Emissions from coal power plants
- Cement Industry

Current Status

- Mercury Initial Assessment – Health, Industry, Education sectors completed – pending validation and submission
- Institutional capacity needs identified
- Reviewed existing legislation, legal gaps identified
- Generated National Mercury Profile Report
- Conference Room Paper (CRP) submitted on Small scale jewelry sector – COP 1 (Article 07)
- Conducted awareness programmes to minimize health and environmental impacts in education, health and industry sectors
- In the process of identifying new (better) technologies to minimize health and environmental hazards caused due to mercury.

II Phase Mercury Management

- Agreement Signed with UNIDO to initiate Study on Small Scale jewelry sector (3000 jewelers)
- Objective :
- Improve their practices and introduced more environmental friendly alternatives and technologies

Health Sector



1. National Hospital	01
2. Teaching Hospitals	20
3. Provincial General Hospitals	03
4. District General Hospitals	18
5. Base Hospital Type – A	22
6. Base Hospitals Type – B	46
7. Divisional Hospital type –A (More than 100 patients beds)	42
8. Divisional Hospital Type –B (Between 50 to 100 patients Beds)	129
9. Divisional Type – C (Less than 50m patient Beds)	322
10. Primary Medical Care Unit (Central Dispensaries & Maternity Homes)	474
11. Board Managed Hospitals	02
12. Special Hospitals	05

TOTAL 1084

Private Hospitals -204,
Laboratories 632,
1880 Clinics,
MOOH 330,
12 universities

=====

Actions taken to minimize emissions and environmental health impacts

- Health Sector
- Procurement of Mercury containing Blood Pressure Apparatus to Health Institutions banned
- Expects to phase out Dental Amalgum from 2019
- Mercury Separators procured for dental clinics
- CFL bulbs collected for recycling
- Mercury Spill Management trained.
- Relevant Circulars guidelines issued

Mercury Usage



Blood Mercury
Monitoring-
Occupational
Safety

Health Sector



Incinerator Operations



1. C/W Inspection at Site
2. Temporary Storage of C/W
3. Weighing of C/W before Incineration



Incineration of Clinical Waste – Sisili Hanaro



☐ (MetaMizer – Steam Sterilizer)



Mercury Bulb (CFL) Recycling Industry (Asia Recycling Industry – Orange Bulb)



0.5 million
disposed every
month



Electronic Waste Management



- ❑ Institutions collecting electronic waste are registered under Central Environmental Authority
- ❑ Around 4500 MT of e waste exported annually for recycling
- ❑ Drop off events carried out annually island wide



SKIN WHITENING CREAMS

Cosmetic product	Sample No.	Level of Mercury(mg/kg)	Level of Lead (mg/kg)
XIN JIAOLI 10 WHITENING SP. RE2	CA04	1506.52	<0.05
XIN JIAOLI 10 WHITENING SP. RE2	CB04	1218.53	<0.05
PAI MEI WHITENING SPOT CRM	C007	30167.66	<0.05
CAIKE GINSENGWHITEN CREAM	C008	19699.1	<0.05
LOREAL WHITE PERFECT DAY	C012	<0.02	<0.05
EMAMI FAIR AND HANDSOM	C014	<0.02	<0.05
FAIR N LOVELY C.FAIRNESS C.	C019	<0.02	33.27
THAI ROSE WHITENING CREAM	C023	4.17	<0.05
FAIREVER FAIRNESS CREAM	C024	0.45	<0.05
EVE FAIRNESS	C030	25.46	<0.05
VASELINE HELTHY WHITE (BCD3:49)	C031	<0.02	<0.05
NATURE SECRETS MULBERRY FAIRNESS CREAM	C032	1.92	<0.05
NATURE SECRETS MULBERRY FAIRNESS CREAM	C033	<0.02	<0.05
VASELINE HELTHY WHITE (BCD3:48)	C034	<0.02	<0.05

Actions Taken

- Ministry of Health Nutrition & Indigenous Medicine is responsible
- Cosmetic Devices and Drugs Act
- Standards are developed (Consumer affairs Authority, Sri Lanka Standard Institute)
- Awareness creation

Education Sector



**Around 10,000 schools/
16 Govt. Universities**

Progress

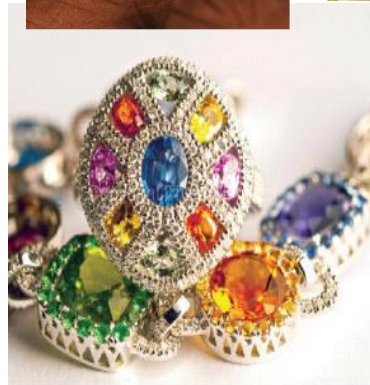
Education Sector:

- Mercury procurement for laboratory purposes minimized

Mercury Emissions/ Usage in Sri Lanka



Lakwijaya Coal Power Plant – Norocholai –
300x3 MW (01 plant)



3000 small scale
jewelry makers

Rasa Shashthra, the Power of Miraculous Healing

Rasa Shashthra is a robust & effective medical therapy administered by fusion of purified metals, herbs and other substances to treat illnesses. It uses gold, silver, iron, copper, tin, lead, zinc and bell metal including Mercury considered toxic by western medical treatment to produce medications.

These metals and substances are not used in organic or elemental form but are subjected to thorough detoxification described as "Shodhana" or "Purification". It is the process for preparation of "Bhasma" (Ash) for administration.

Rasa Medicines are highly potent formulas administered in small doses. They act fast and enable speedy miraculous cure. Rasa medicine is a proven cure for chronic, life threatening, non communicable and life style diseases & many afflictions. Its peerless healing power obviates the need for risky surgeries. It is easily affordable compared to expensive surgical procedures.

The proposed ban of heavy metals if implemented would seriously jeopardize the existence of this medical wonder, depriving the humanity of its priceless benefits.

It is imperative that UN, WHO together with the Global Lobby for banning of heavy metals, take well considered view on the proposed measures and carry out a meticulous analysis on the beneficial use of heavy metals in Rasa Medicine Treatment for the benefit of mankind.

It is incumbent upon Global Bodies to preserve time-tested Rasa Medicine treatment for the benefit of posterity by permitting use of metals and substances for Rasa Medicine purposes.

“Mercury brings miraculous relief from diseases that are considered incurable”
says the leading Rasa Shashthra Practitioner in Sri Lanka,
Dr. R. L. Kularatna

FOR MORE INFORMATION ON RASA SHASTRA PRACTICE IN SRI LANKA , VISIT
www.medirasa.com



Storage, Usage to be
improved

Fish

- Certain Species of Fish in Deep sea has been found contaminated with mercury
- Needs further Research

Mercury Testing

- Blood
- Waste
- Waste water carried out (Discharge standards available)

Central Environmental Authority

Air Quality Monitoring

- Regulator
- One station in Colombo
- Mobile Station
- Measures Air quality in other districts .

Air Quality Regulations – Central Environmental Authority

---	    <u>Regulations published under the Gazette Notification No. 1295/11 dated 30.06.2003</u> (Re: Air emission, fuel & vehicle importation standards)
---	<u>Order published under the Gazette Notification No. 1309/20 dated 10.10.2003</u> (Re: Prohibition of Ozone depleting substances)
---	<u>Order published under the Gazette Notification No. 1557/14 dated 09.07.2008</u> (Re: List of vehicle exhaust emission standards)
---	<u>Regulations published under the Gazette Notification No. 1562/22 dated 15.08.2008</u> (Re: Permissible Ambient Air Quality Standards in relation to class of Air Pollutants)
---	<u>Amended Regulations published under the Gazette Notification No. 1887/20 dated 05.11.2014 with the corrected Gazette Notification No. 1895/43 dated 02.01.2015</u> (Re: Air emission, fuel & vehicle Importation standards)

The National Environmental (Ambient Air Quality) Regulations,

Pollutant	Averaging Time*	Maximum Permissible Level		Method of measurement
		µgm-3	ppm	
3. Particulate Matter - Aerodynamic diameter is less than 10 µm in size (PM 10)	Annual .	50	-	Hi-volume sampling and Gravimetric or Beta Attenuation
	24hrs.	100	-	
4. Particulate Matter - Aerodynamic diameter is less than 2.5 µm in size (PM 2.5)	Annual .	25	-	Hi-volHi-volume sampling and Gravimetric or Beta Attenuation
	24 hrs .	50	-	

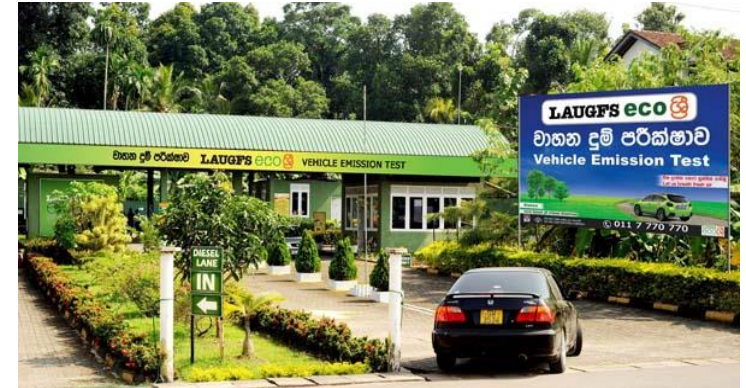
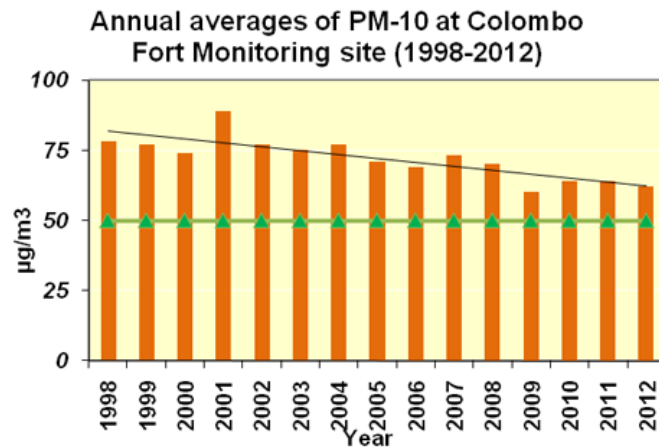
Pollutant	Averaging Time*	Maximum Permissible Level		+ Method of measurement
		µgm ⁻³	ppm	
3. Nitrogen Dioxide (NO ₂)	24 hrs.	100	0.05	Colorimetric using saltzman Method or equivalent Gas phase chemiluminescence
	8 hrs.	150	0.08	
	1hr.	250	0.13	
4. Sulphur Dioxide (SO ₂)	24 hrs.	80	0.03	Pararosanilene Method or equivalent Pulse Fluorescent
	8 hrs.	120	0.05	
	1hrs.	200	0.08	
5. Ozone (O ₃)	1 hr.	200	0.10	Chemiluminescence Method or equivalent Ultraviolet photometric
6. Carbon Monoxide (CO)	8 hrs.	10,000	9.00	Non-Dispersive Infrared Spectroscopy"
	1 hr.	30,000	26.00	
	Any time	58,000	50.00	

National Building Research Organization (NBRO)



**10 Districts – Air quality measuring is carried out.
It will be expanded to cover the rest of the districts**

Activities



Emission Standard in Sri Lanka

For Petrol & LPG Vehicles

Type of Vehicle	Carbon Monoxide CO (%v/v)	Hydrocarbon HC (ppm v/v)	
Petrol Motor Cycles	6	9000	
Petrol Motor Tricycles	6	9000	
Other Petrol Vehicles	4.5	1200	Both Idling and 2500 RPM/No load

%v/v = Percent by volume

ppm v/v = Parts per million by volume

How air pollutants affect you

SO₂ - Even moderate concentrations may result in a fall in lung function in asthmatics. Sulphur dioxide pollution is considered more harmful when particulate and other pollution concentrations are high.

CO - This gas prevents the normal transport of oxygen by the blood. This can lead to a significant reduction in the supply of oxygen to the heart, particularly in people suffering from heart disease.

NO₂ - It can irritate the lungs and lower resistance to respiratory infections such as influenza. Continued or frequent exposure to concentrations that are typically much higher than those normally found in the ambient air may cause increased incidence of acute respiratory illness in children.

PM₁₀ - Fine particles can be carried deep into the lungs where they can cause inflammation and a worsening of the condition of people with heart and lung diseases. In addition, they may carry surface-absorbed carcinogenic compounds into the lungs.

Air That We Breathe....

Location: Railway Station, Colombo Fort

Duration: From 05/02/2006 to 11/02/2006

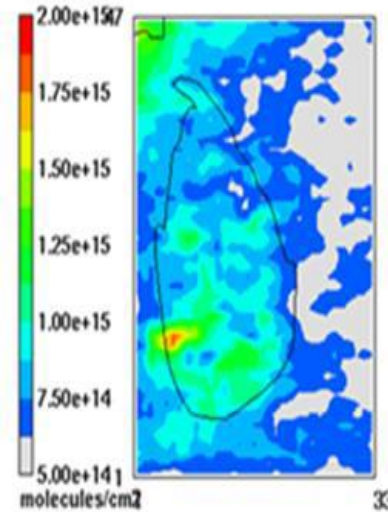


Air Pollutant	Sri Lanka Air Quality Index (SLAQI)
Carbon Monoxide (CO)	SLAQI = 6 (1.464 ppm)
Sulphur Dioxide (SO ₂)	SLAQI = 105 (0.084 ppm)
Nitrogen Dioxide (NO ₂)	SLAQI = 56 (0.073 ppm)
Particulate Matter (PM ₁₀)	SLAQI = 73 (109 µg/m ³)
Colour Code	
SLAQI 0 - 50	Good
SLAQI 51 - 100	Moderate
SLAQI 101-150	Unhealthy for Sensitive Groups
SLAQI 150-200	Unhealthy

One hour maximum concentration has been recorded.

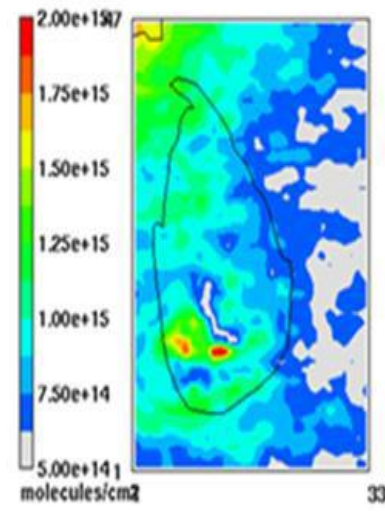
Source: Air, Noise & Vibration Monitoring Unit, Central Environmental Authority
Prepared by: Air Resource Management Center (AirMAC)
Ministry of Environment and Natural Resources For more details, see: www.ces.lk

Satellite Images showing Air Pollution



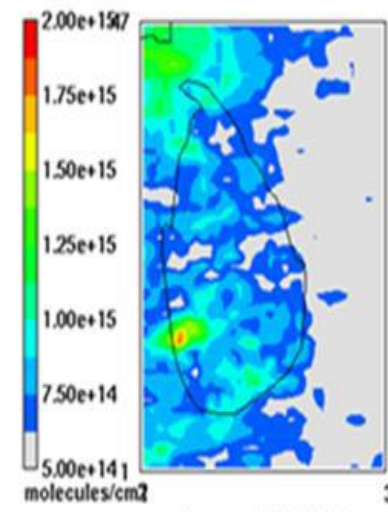
(a) 2005

Maximum: 1.82×10^{15} molecules/cm²
Minimum: 4.60×10^{14} molecules/cm²



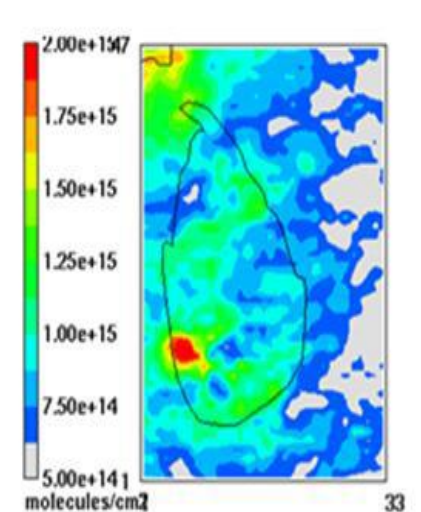
(b) 2008

Maximum: 2.24×10^{15} molecules/cm²
Minimum: 4.79×10^{14} molecules/cm²



(c) 2010

Maximum: 1.80×10^{15} molecules/cm²
Minimum: 3.44×10^{14} molecules/cm²



(d) 2012

Maximum is 2.42×10^{15} molecules/cm²
Minimum: 3.84×10^{14} molecules/cm²

Clean Air Action Plan



Vertical Forest garden



Stakeholders (BRSM Co- ordinating Committee)

- Science, Technology and Research
- Ministry of Education
- • Ministry of Finance
- • Ministry of Fisheries • Ministry of Health, Nutrition and Indigenous Medicine
- • Ministry of Higher Education
- • Ministry of Industry and Commerce
- • Ministry of Local Government and Provincial Councils
- • Ministry of Mahaweli Development and Environment
- • Ministry of Power and Renewable Energy •
- Central Environment Authority
- • Centre for Environmental Justice • Consumer Affairs Authority
- • Coordinating Secretariat for Science, Technology and Innovation
- • Cosmetic Devices and Drugs Regulatory Authority • Dental Institute
- • Department of Meteorology • Faculty of Chemical and Process Engineering, University of Moratuwa
- • Gem and Jewellery Research and Training Institute
- • Import and Export Control Department
- • Industrial Development Board of Ceylon
- • Industrial Technology Institute

Stakeholders

- Institute of Indigenous Medicine
- • Institute of Oral Health
- • Marine Environmental Protection Authority
- • National Aquatic Resource Authority (NARA)
- • National Aquatic Resources Research and Development Agency (NAARA)
- • National Cleaner Production Centre • National Engineering Research and Development Centre of Sri Lanka
- • National Gem and Jewellery Authority
- • Post Graduate Institute of Agriculture, University of Peradeniya
- • Sri Lanka Customs
- • Sri Lanka Standards Institution
- • Sri Lanka Sustainable Energy Authority

Issues

- ❑ Lack of Mercury Disposal Facility
- ❑ Lack of emission standards for Mercury
- ❑ Alternative Technology

Atmospheric Mercury Monitoring

- **Asia- Pacific Mercury Monitoring Network (APPMN)**

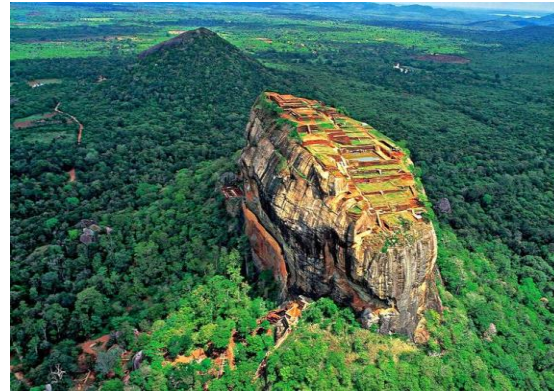
APPMN has supported Sri Lanka in providing 03 Mercury Monitoring Machines. (Wet Deposition Sampler)

- Already 01 machine received

The four Institutions identified are

- Central Environmental Authority (CEA)
- National Building Research Organization (NBRO)
- Department of Meteorology
- University of Peradeniya

Thank You



Dr Anuruddha
Karunaratne

Way
Forward

Mercury Monitoring

Collaborat
ion



Training Requirement t