



The 13th Annual Asia Pacific Mercury Monitoring Network (APMMN) Partners Meeting

Mercury Management Strategies in Taiwan



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Content



The Minamata Convention on Mercury



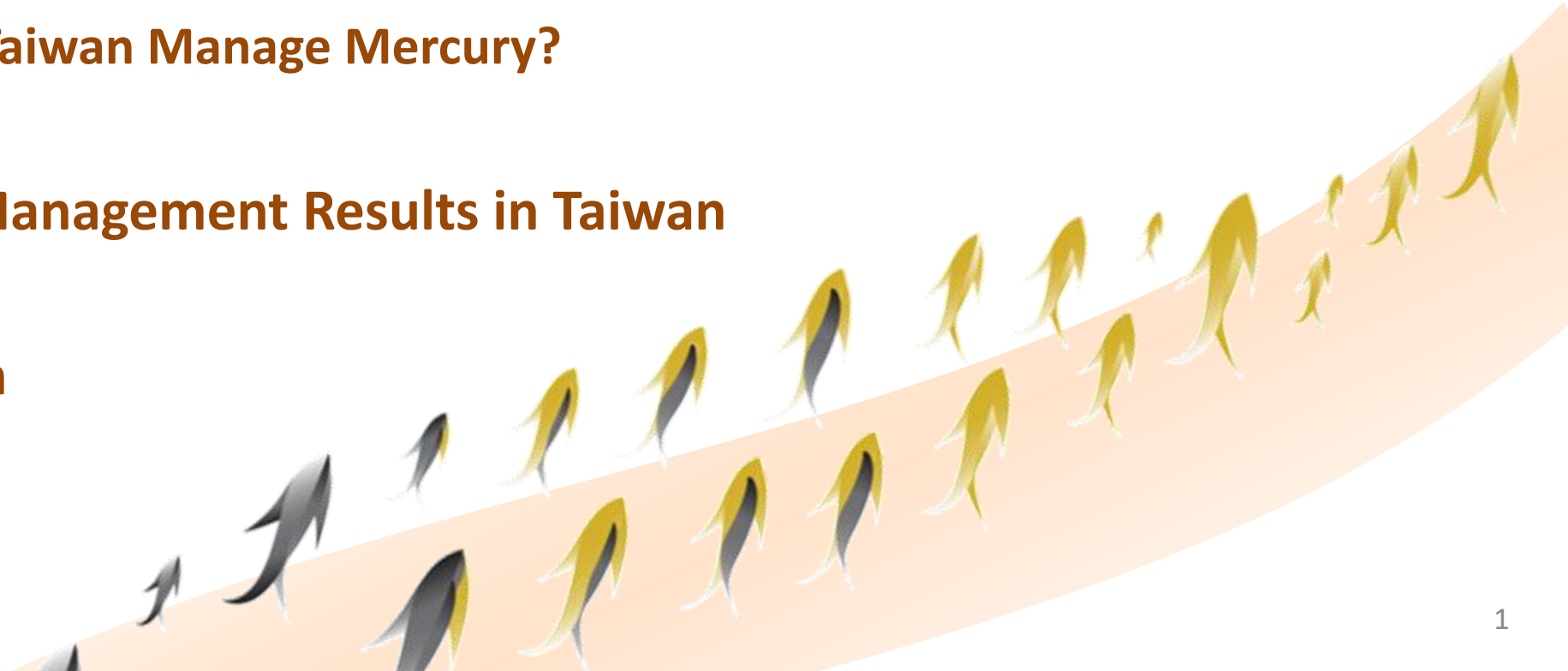
How does Taiwan Manage Mercury?



Mercury Management Results in Taiwan



Conclusion



The Minamata Convention on Mercury

- Mercury poses global adverse effects to the environment and human health, as it has the properties:
 - ✓ Long-range transport
 - ✓ Environmental persistence
 - ✓ High bio-accumulation
- The United Nations Environment Programme (UNEP) established the Minamata Convention on Mercury to protect the environment and human health from the impacts of mercury and mercury compounds.



The Minamata Convention on Mercury came into effect on August 16, 2017.



<https://reurl.cc/b9dR9r>

The Convention's Content

- 35 Articles and 5 Annexes

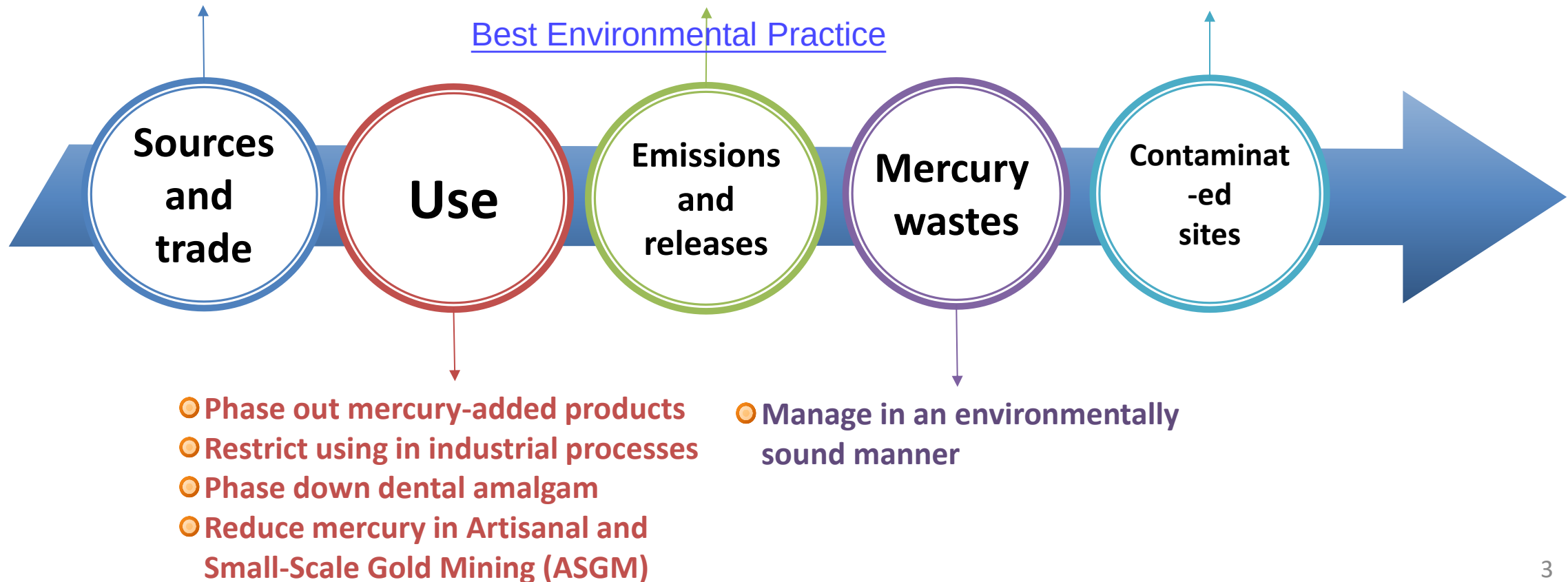
- Regulate primary mercury mining
- Prohibit the export of mercury

Best Available Techniques

- Take measures, BAT, or BEP to control

Best Environmental Practice

- Take actions to reduce the risk



Phase-out Deadlines for Mercury-Added Products

2020



1. High Pressure Mercury Vapor Lamps



2. Pesticides, Biocides and Topical antiseptics



3. Non-electronic measuring devices
Thermometers Sphygmomanometers
Barometers Hygrometers Manometers

2025
~
2027



4. Batteries



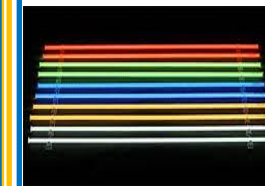
5. Switches and Relays



6. Compact Fluorescent Lamps



7. Linear Fluorescent Lamps

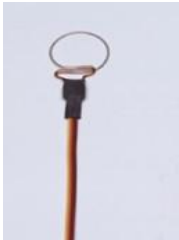


8. CCFL及EEFL for Electronic Display

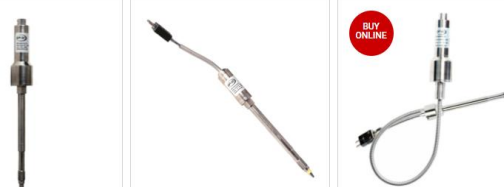


9. Cosmetics

2025



10. Strain gauges to be used in plethysmographs



11. Melt pressure transducers, melt pressure transmitters and melt pressure sensors



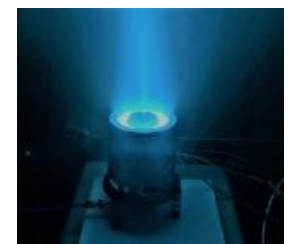
12. Mercury vacuum pumps



13. Tyre balancers and wheel weights



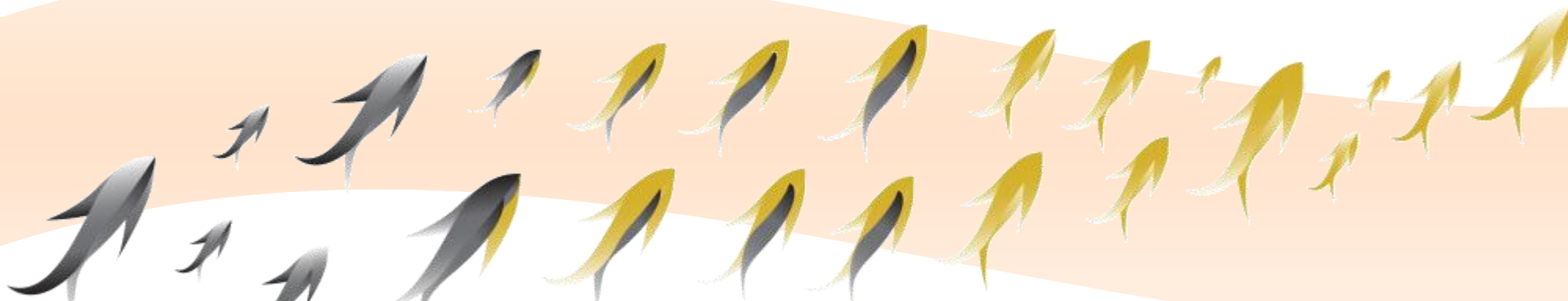
14. Photographic film and paper



15. Propellant for satellites and spacecraft



How does Taiwan Manage Mercury?



Mercury Management Strategies in Taiwan



**Precise Measurement
and Monitoring**



Reduce



**Industrial Emission
Reduction**



**International
Collaboration and
Knowledge Sharing**

The National Implementation Plan (NIP) in Taiwan

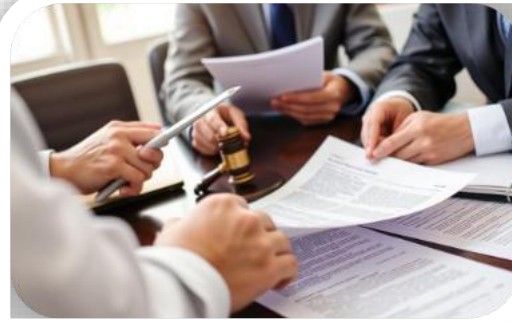
4 Strategies

Establishing NIP on June 27, 2016



Intensify Cross-Ministerial Cooperation

- ✓ Set up an intergovernmental task team



Formulate and Amend Regulations

- ✓ Review international norms and draft or amend regulations



Strengthen Mercury Management

- ✓ Strengthen environmentally sound mercury management
- ✓ Encourage industry to use mercury-free products
- ✓ Eliminate the exposure risk



Reinforce Propaganda and International Exchanges

- ✓ Raise public awareness by propaganda



Intergovernmental Task Team Members and Duties



Learn about Mercury-Management Experiences



- To deeply understand the Mercury Convention and learn about mercury-management experiences, Director General Hsieh of the CHA led a team to visit Japan on July 31, 2018, and attend an exchange meeting.

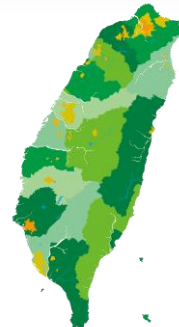
Japan

- ☑ Ministry of the Environment, Tokyo, Japan
- ☑ Ministry of Economy, Trade and Industry
- ☑ United Nations International Environmental Technology Center
- ☑ Minamata Environmental Research Institute
- ☑ Minamata Disease General Research Center



Taiwan

- ☑ Ministry of Environment (MOENV)
- ☑ Ministry of Health and Welfare (MOHW)
- ☑ Ministry of Economic Affairs (MOEA)
- ☑ Ministry of Agriculture (MOA)
- ☑ National Taipei University of Technology



Gaining Global Insights through International Engagement



Theme : **From Minamata to Africa and Beyond**: Addressing Mercury Challenges in Global Environment Change



Objective: To understand the benefits of implementing the convention by exchanging measures to reduce global mercury emissions and exposure

Summary

Data Gaps and Challenges

- the **insufficient** global mercury monitoring data, especially in developing countries
- This is due to **differing methods** used for monitoring.
- The convention is working to identify and address these data gaps.

International Cooperation

- The Ministry of the Environment of Japan (MOEJ) has committed to supporting developing countries' efforts through the MOYAI initiative.
- This initiative aims to assist with monitoring mercury in the environment and in humans.

Consistent Observations

- To effectively reduce mercury emissions under the Minamata Convention, consistent observations are needed across continents.
- These observations will help determine the scale of the problem and assess the effectiveness of emissions reduction efforts over time.

Implementation Strategies

- Implementation strategies for BAT/BEP will vary significantly between countries based on their socio-economic conditions.
- Parties can share their experiences to learn from each other.

Gaining Global Insights through International Engagement

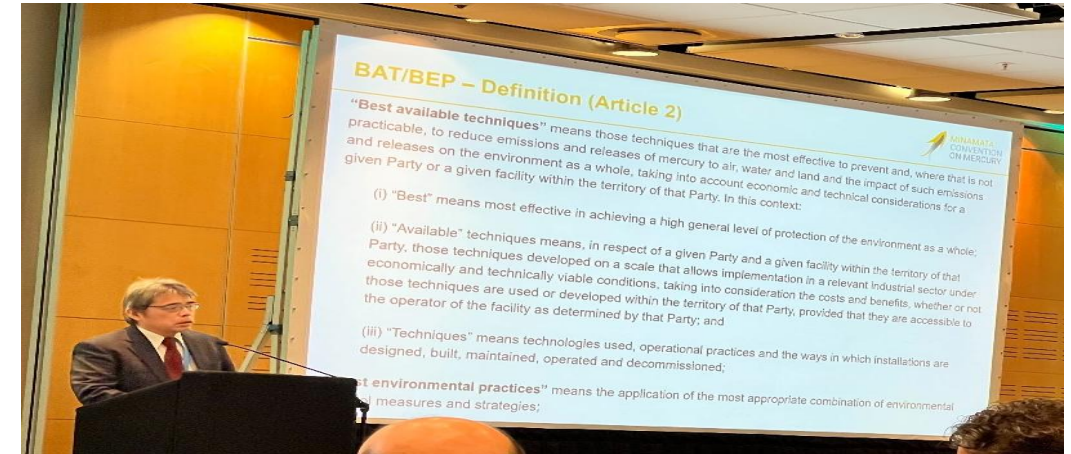
Establishment of Mercury Waste Thresholds



At the 2023 Minamata Convention COP5, the threshold for mercury-containing waste was set at a total concentration of **15 mg/kg**, providing a global standard for responsible mercury waste management.

Eisaku Toda, Secretariat Of The Minamata Convention

Minamata Convention Guidance on Best Available Techniques and Best Environmental Practices

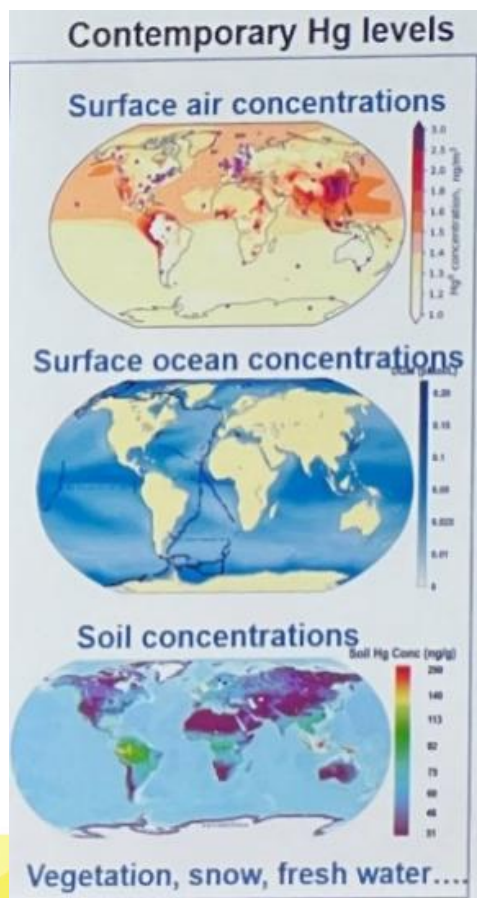


The Minamata Convention has adopted guidelines on **BAT and BEP** to control mercury releases, promoting sustainable and environmentally responsible industrial practices

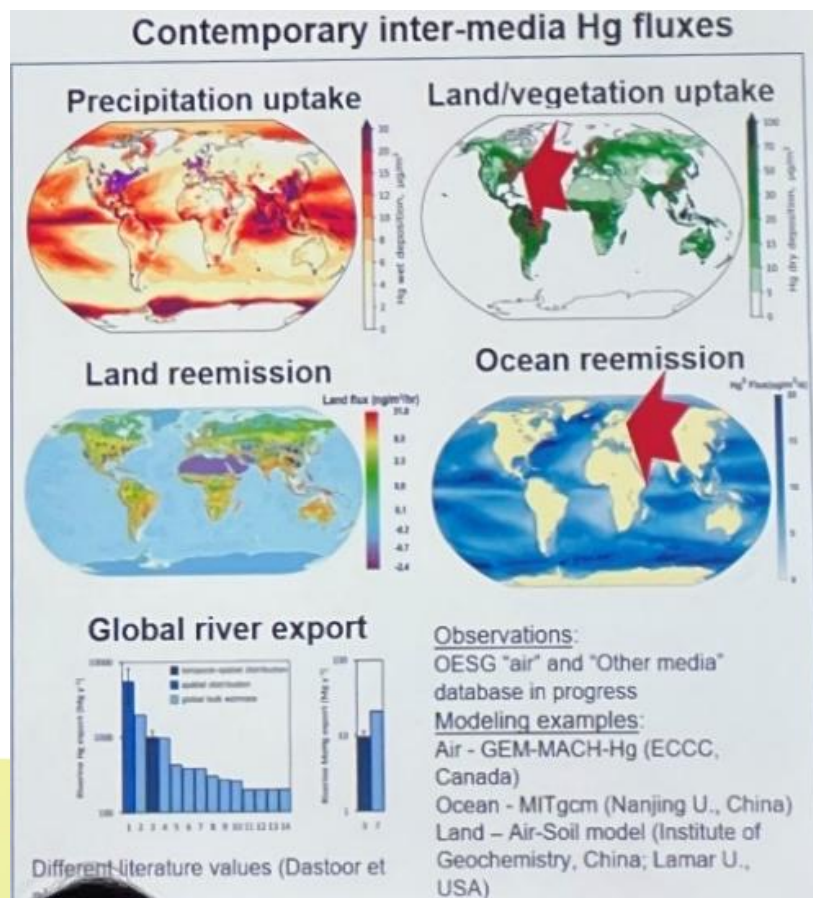
Gaining Global Insights through International Engagement

Effectiveness Evaluation of the Minamata Convention

Contemporary Hg levels in the air, ocean, and soil



Contemporary inter-media Hg fluxes



Challenges Faced :

- Limited media and spatial coverage
- Lack of inter-media fluxes to constrain global Hg cycling (few direct observations), critical to Hg trend simulation and analysis Lack of temporal trends in "other media"
- Natural archives inform all-time changes in environmental Hg levels (legacy Hg effects) but have higher uncertainties and low temporal resolution
- Multi-model approach is helpful, but data gaps need to be addressed!

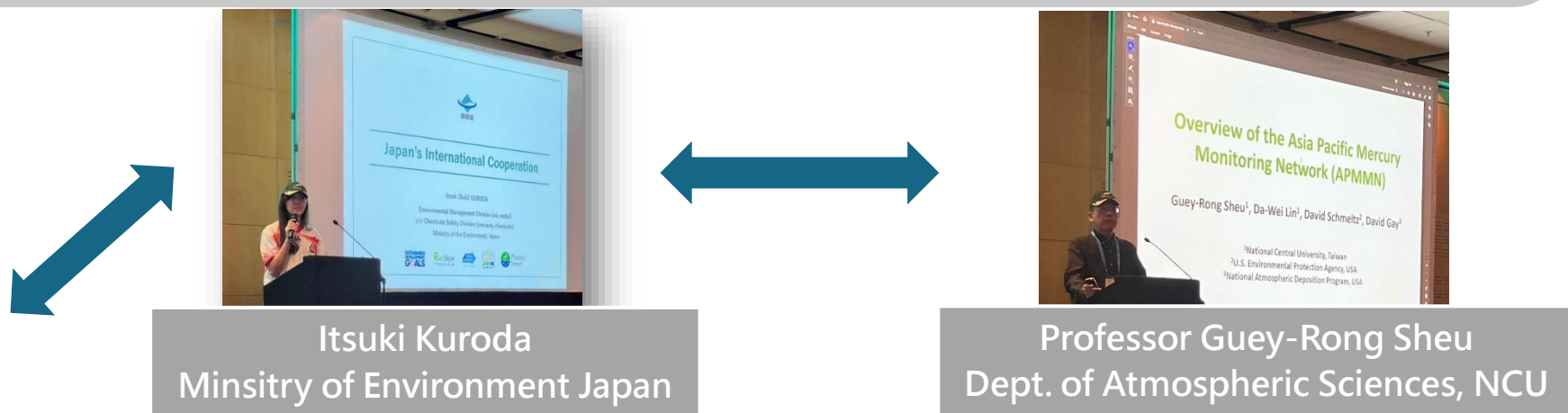
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Inter-comparison Study

We have partnered with Japan to concurrently conduct an inter-comparison study at National Central University (NCU) and National Institute for Minamata Disease (NIMD) to assess the variability of wet Hg deposition measurements using different types of wet deposition samplers.



At the 2019 Minamata Convention COP3, the Chemicals Administration of the Ministry of Environment had an exchange with Itsuki Kuroda outside the venue



Wet Deposition Samples Received and Analyzed

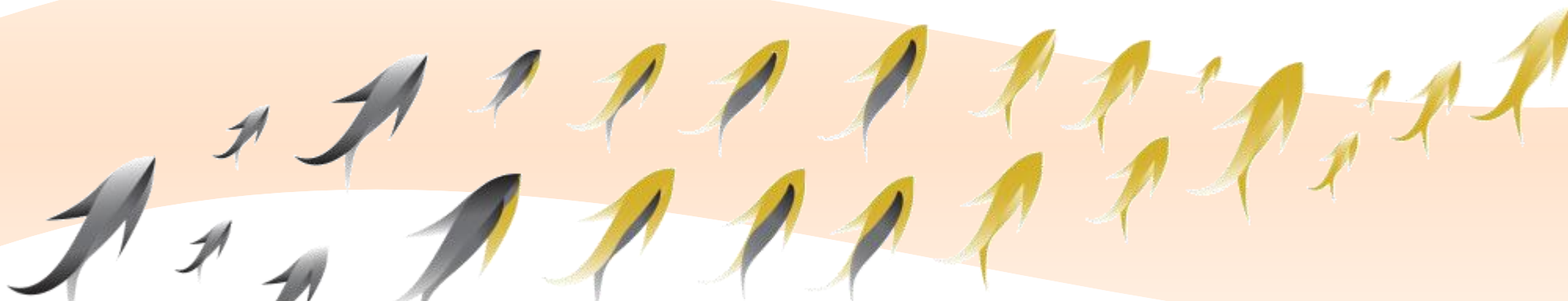
Year	2016-17	2018-19	2020	2021	2022	2023	Sum
Number	279	336	175	266	282	289	1627

Year	Total Hg Concentration ¹ (ng L ⁻¹)		
	Mean±S.D	Minimum	Maximum
2016-17	8.6±8.7	0.4	59.3
2018-19	12.2±12.7	0.3	97.8
2020	19.4±21.3	1.5	99.8
2021	17.8±17.5	0.3	97.4
2022	21.4±19.8	1.3	95.2
2023	25.3±23.3	0.7	94.7

¹Concentrations greater than 100 ng L⁻¹ are not included because of QA/QC concern.



Mercury Management Results in Taiwan



 The manufacture and import/export of nine categories of mercury-containing products has been banned by December 31, 2020 in Taiwan.

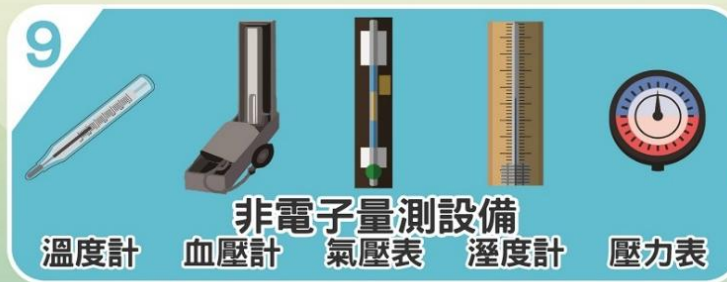


永水俣公約

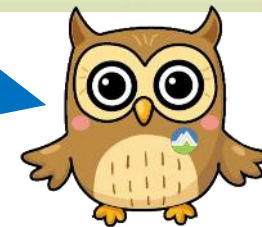
Minamata Convention on Mercury



Starting from 2021, the manufacture and import of mercury-containing products are prohibited.



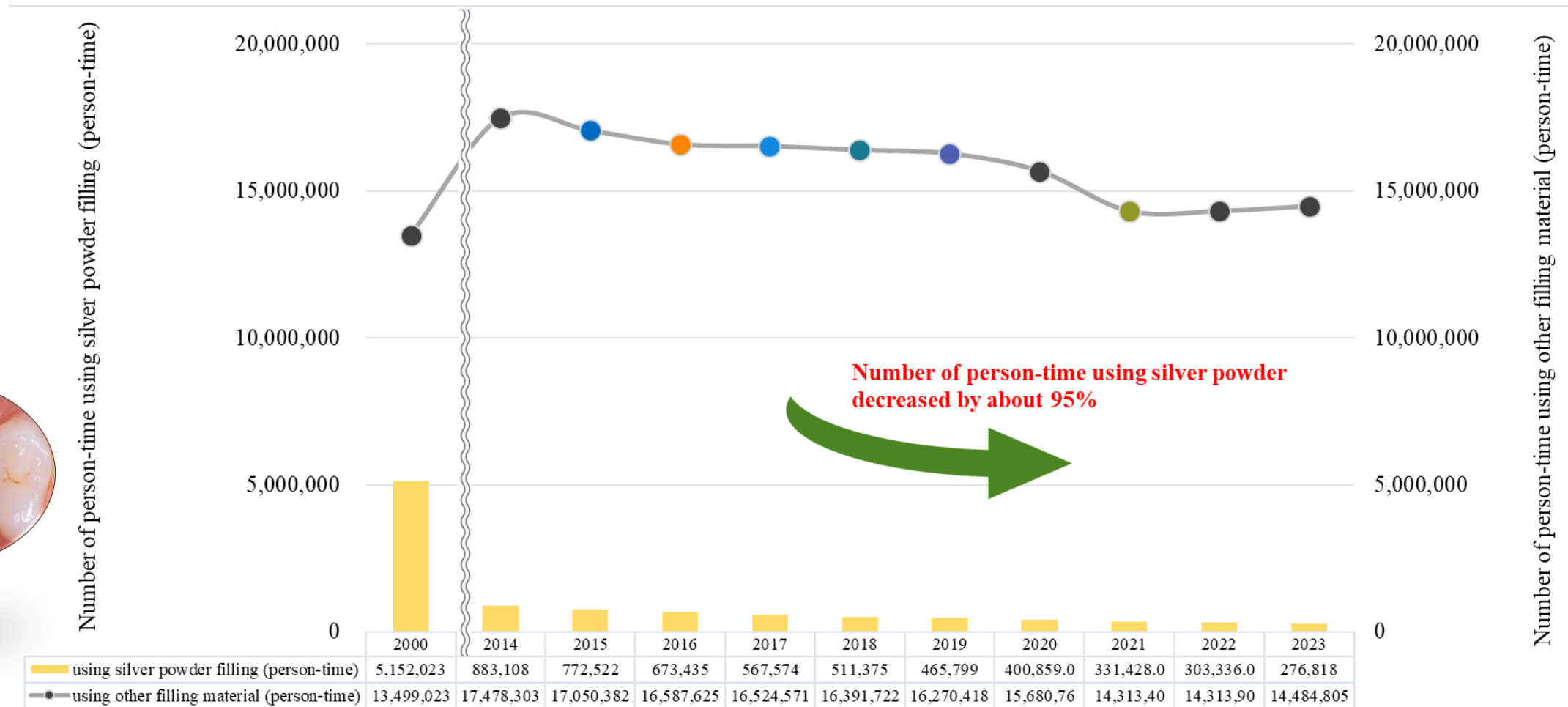
Information website:
<https://topic.moenv.gov.tw/hg/mp-3.html>



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Chemicals Administration
Ministry of Environment

Phase Down Dental Amalgam

The dental silver powder usage dropped significantly in Taiwan

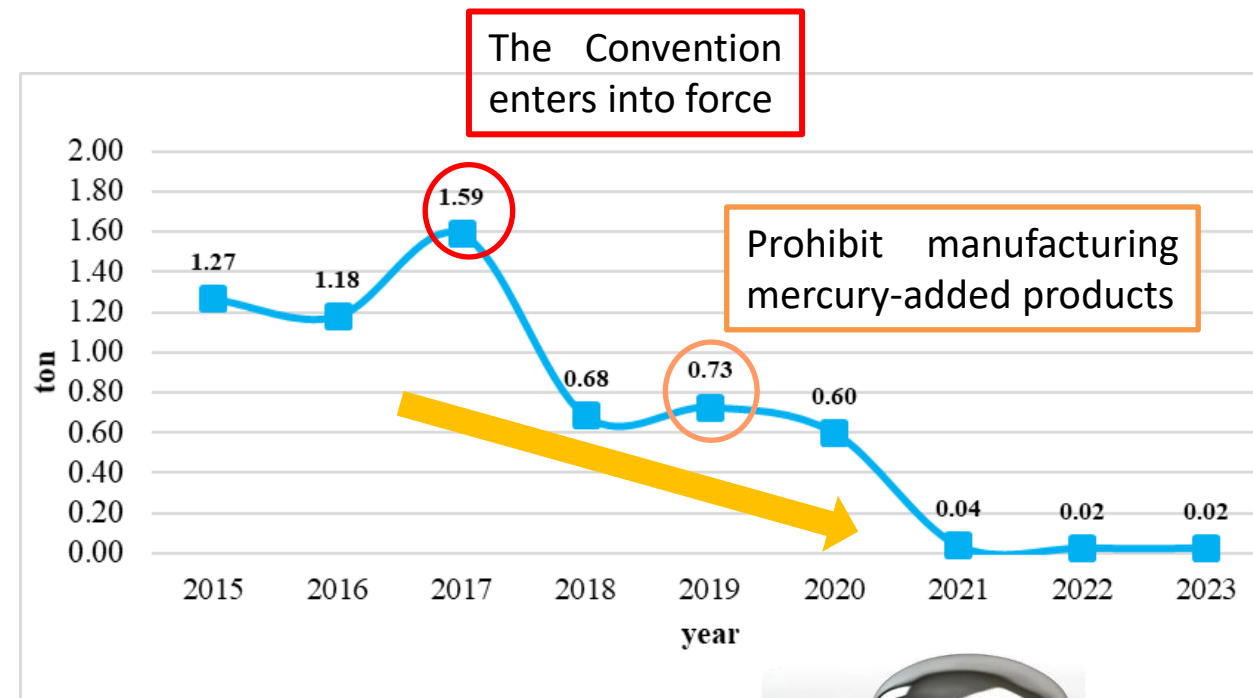


The Operational Quantity of Mercury in Taiwan

- Without mercury mining in Taiwan
- Toxic and Concerned Chemical Substances Control Act: lists Hg as a Class 1 toxic chemical substance and prohibits its use in manufacturing, industrial catalyst, etc.
- The use of mercury dropped significantly, and it is mainly used in research, experimentation, and education.

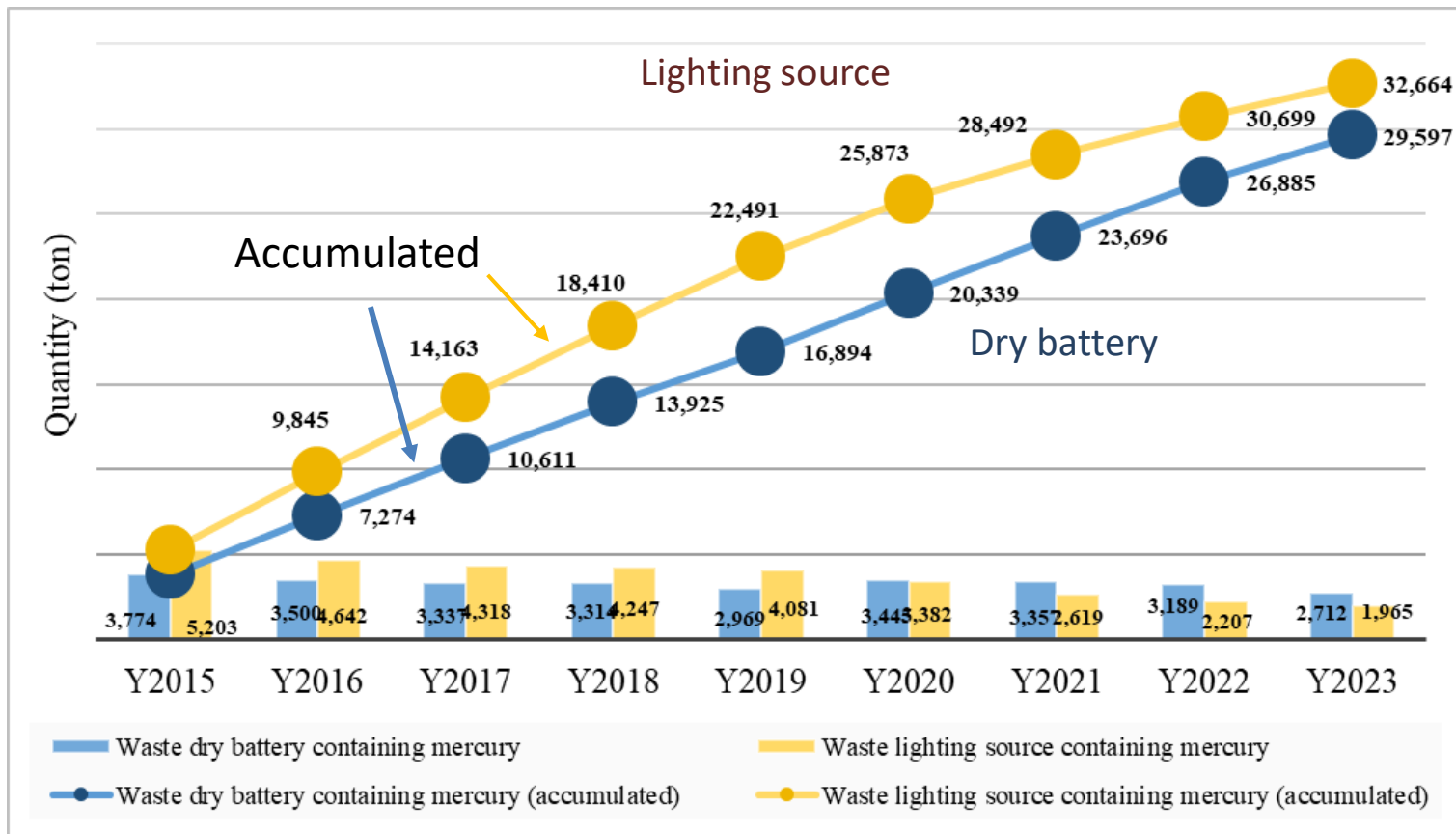
year	Manufacture	Import	Sale	Export	Total
2015	0.98	0.02	0.16	1.04	1.27
2016	0.38	0.03	0.14	1.04	1.18
2017	0.47	0.01	1.63	0.00	1.59
2018	0.39	0.03	0.27	0.86	0.68
2019	0.15	0.00	0.01	0.55	0.73
2020	0.16	0.00	0.27	0.00	0.60
2021	0.60	0.00	0.00	0.00	0.04
2022	0.12	0.00	0.01	0.00	0.02
2023	0.30	0.00	0.05	0.00	0.02

(unit: ton)



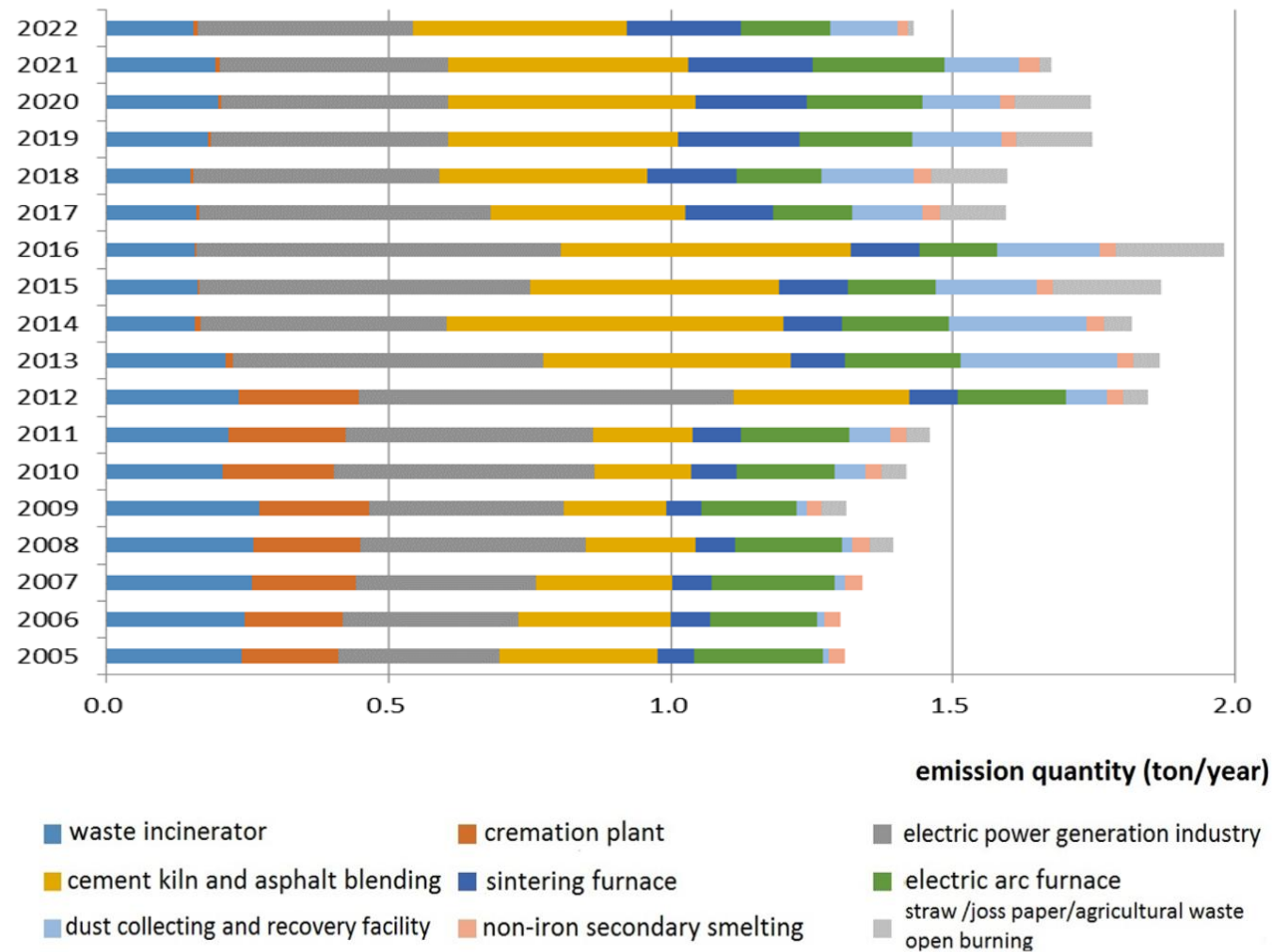
Recycling Dry Batteries and Lighting Sources

- Ban the import of mercury-added waste
- Promote the recycling of mercury-added dry batteries and lighting sources
- Recycle dry batteries of **2,712** tons and lighting sources of **1,965** tons in **2023**



Emissions Hg-Monitoring

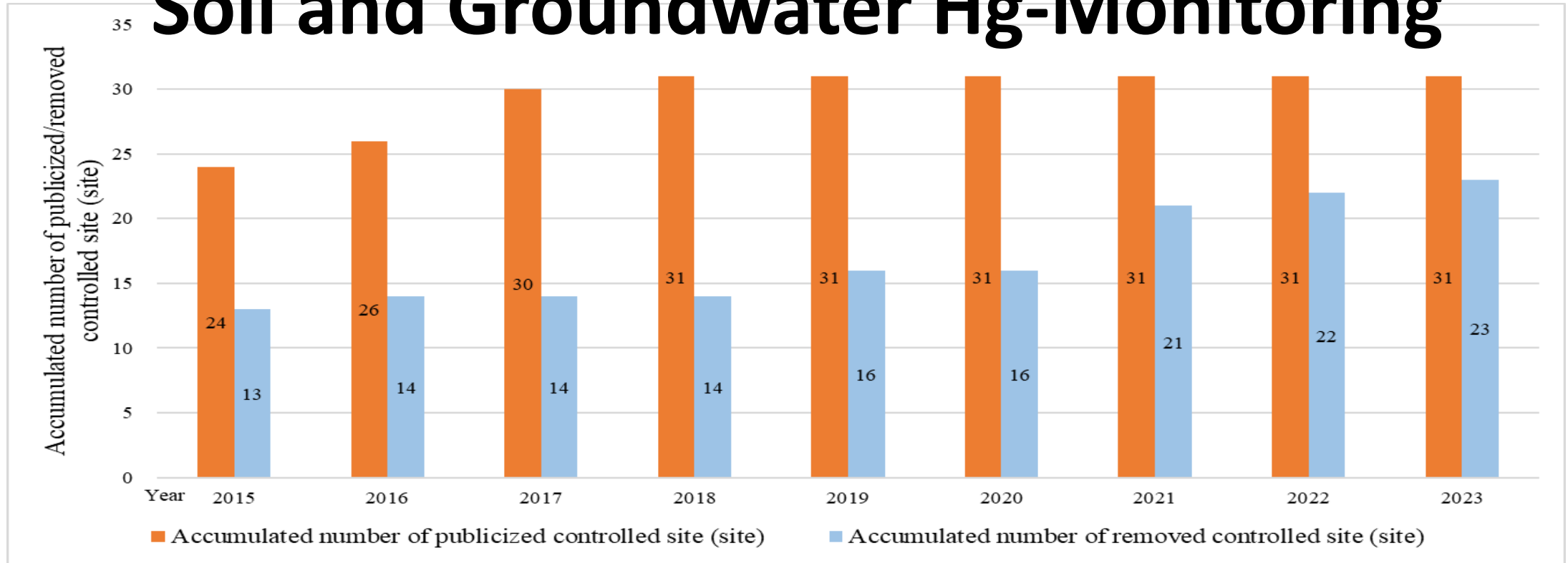
- Mercury released into atmosphere in **2022** was about **1.44 tons**.
- The **main sources** were from **cement kilns** and **power generation industries**.
 - ✓ Formulate the standards for waste incinerators and power generation facilities
 - ✓ Draft amendments to air pollutant standards for the cement industry



<https://www.dnv.com/article/why-is-the-cement-industry-labelled-hard-to-abate--241192>

Photograph: eye35.pix/Alamy

Soil and Groundwater Hg-Monitoring



Mercury-contaminated sites: **23** sites were delisted after remediation during **2015-2023**.



Water Bodies Hg-Monitoring

River sediment 2018-2023

- 30 rivers; avg. conc.: ND - 1.47 mg/kg dw
- Methylmercury was not detected

River fish 2018-2023

- 30 rivers; avg. conc.: ND -0.237 mg/kg ww
- Lower than the domestic food sanitation standard (0.5 mg/kg ww)

Drinking Water 2015-2022

6,205 samples: all meet the drinking water quality standard (0.001mg/L)

River and Sea 2011-2023

- All samples meet the relevant domestic water quality standards

Year	Rivers		Seas
	Number of rivers	N	N
2011~2012	91	316	104
2013~2017	88	296	105
2018~2021	85	303	105
2022~2023	85	304	125

Number of Sampling points (N)



Food Hg-Monitoring

- During 2015-2023, Taiwan FDA randomly tested 2,645 food samples.
- Those exceeding the limit were dealt with according to the regulations.



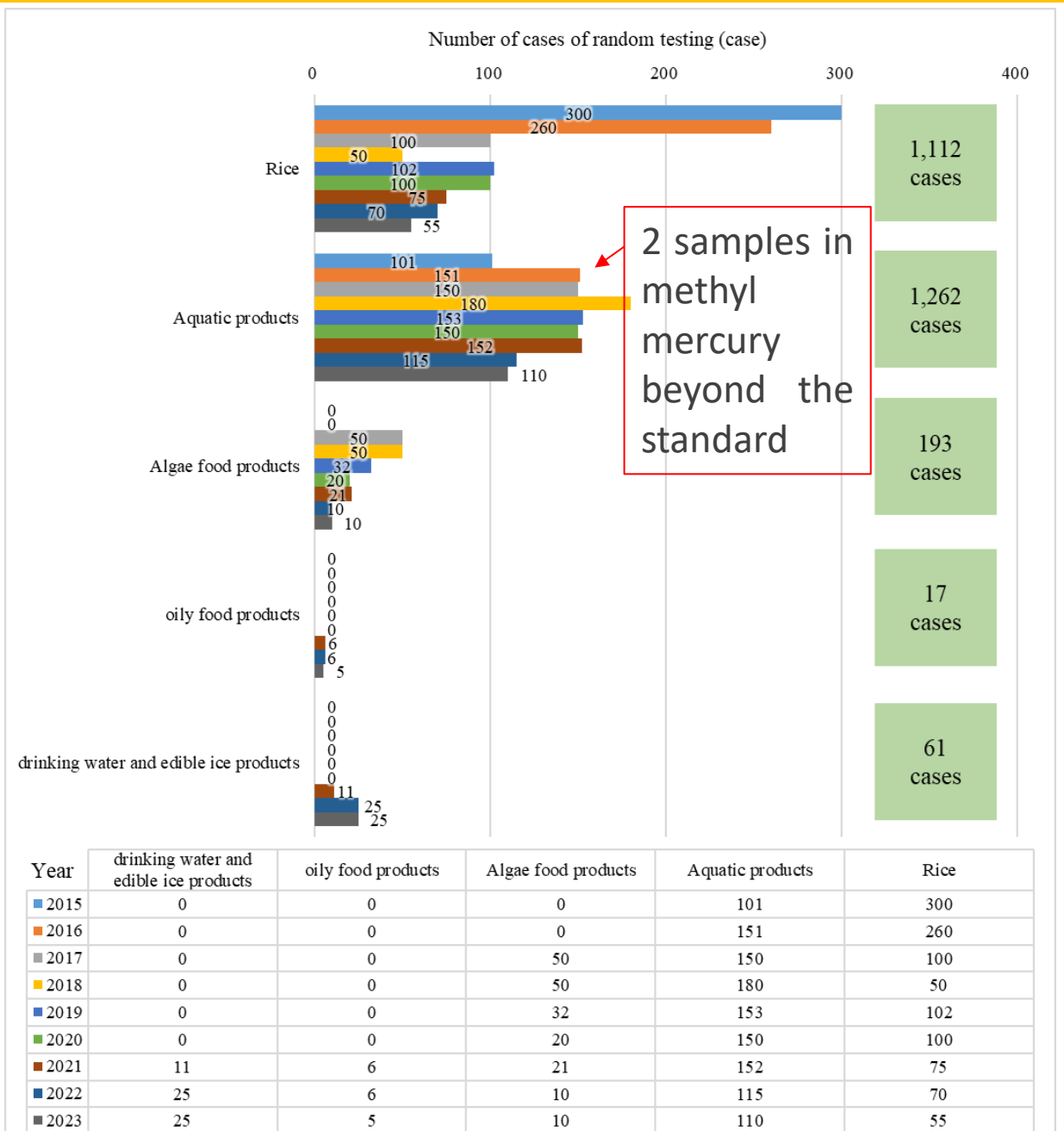
<https://reurl.cc/v7KjmN>



<https://independent.boun.edu.tr/en/food.php>



<https://reurl.cc/QXV45>



Number of samples for mercury in foods during 2015-2023

Aquatic Products Hg-Monitoring

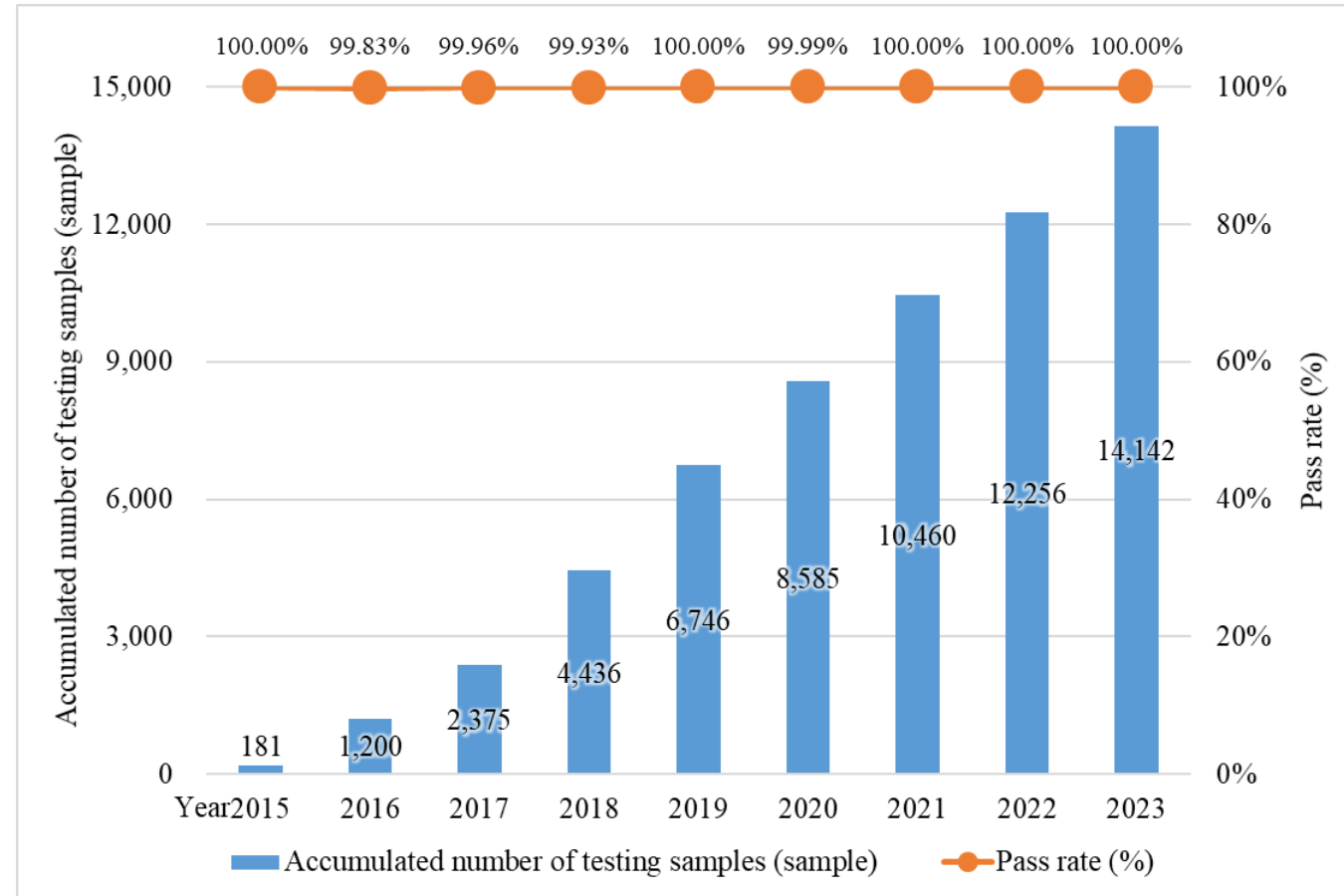
- **14,142** aquatic products samples were tested for mercury during 2015-**2023**.
- Aquatic products include:
 - ✓ Cultivated
 - ✓ Caught in offshores
 - ✓ Farmed oysters in the west coast
- 7 samples beyond the standard: enhancing further management



<https://reurl.cc/qLKjyy>



<https://reurl.cc/WG8ZQ9>

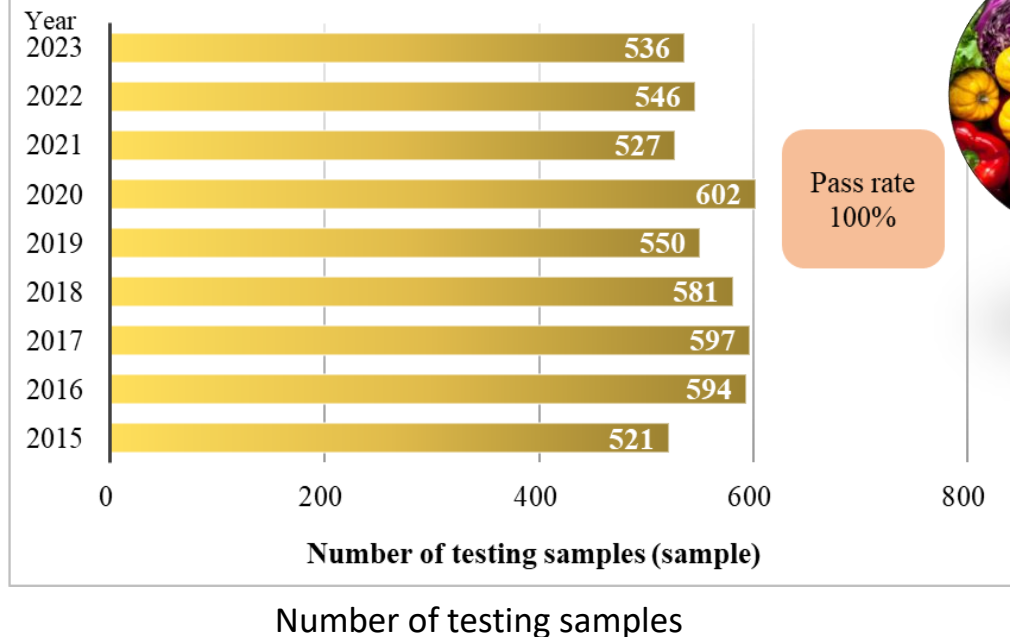


Agricultural Products and Poultry Feeds

Hg-Monitoring

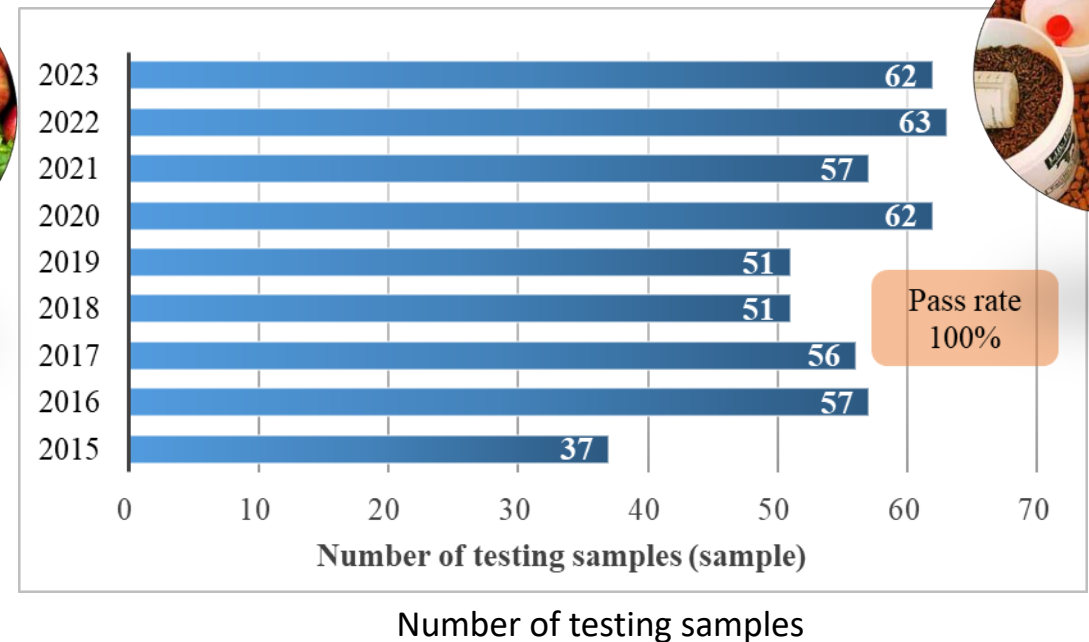
Agricultural products

- The agriculture department randomly tested **5,054** samples during 2015-2023
- Average conc.: ND-0.023 mg/kg
- All complied with the standard (0.05 mg/kg)



Poultry feeds

- The agriculture department randomly tested **496** samples during 2015-2023
- All the results met the standard 0.5 mg/kg



Risk Communication

- Strengthen risk communication with stakeholders to avoid mercury exposure
 - ✓ Set up the mercury information website with propaganda materials (videos, audios, leaflets, posters, etc.)
 - ✓ Provide handbooks and fish-intake guidance for sensitive groups (infants, pregnant or breastfeeding women and children)



(<https://topic.moenv.gov.tw/hg/mp-3.html>)



Conclusion

Aim to reduce the mercury exposure and ensure a healthy environment



**Strengthen
cross-ministerial
cooperation**

- Strengthen cooperation among departments



**Keep following
the Convention's
development**

- Keep following the latest development of the Convention



**Enhance
management and
propaganda**

- Monitor environmental media, biological matrices, and commodities; raise public awareness via propaganda



**Reinforce
international
cooperation and
exchanges**

- Actively participate in international affairs and share experiences with the international communities



環境部化學物質管理署
Chemicals Administration
Ministry of Environment

Thank you

