



Project for
**Promoting
Minamata
Convention
on Mercury**



by making the most of Japan's
knowledge and experiences

Inter-laboratory Comparison for Gold Amalgamation Trap Analysis

United Nations Environment Programme

3 September 2024

Project Information

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Project title	Promoting Minamata Convention on Mercury by making the most of Japan's Knowledge and Experiences
Participating countries	Indonesia, Japan, Malaysia, Maldives, Mongolia, Myanmar ^{*1} , Nepal, Palau, Philippines, Sri Lanka, Thailand, and Vietnam
Implementing partners	Minamata Environmental Academia, National Institute for Minamata Disease, Asia Pacific Mercury Monitoring Network
Project outcome	Countries increasingly generate and apply information on how to monitor and reduce mercury emissions and releases in their legislations, policies or action plans.
Project period	July 2019 – June 2025 (72 months)
Donor	Ministry of the Environment, Japan
Total budget	US\$2,999,990

*1: Participation of Myanmar: July 2019 – January 2021



Project Features and Partner Countries

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*: Partner until Feb. 2021, currently suspended



Contribution to the
Minamata Convention

Connecting Minamata
and Minamata



Networking analytical
institutions

Capacity Development

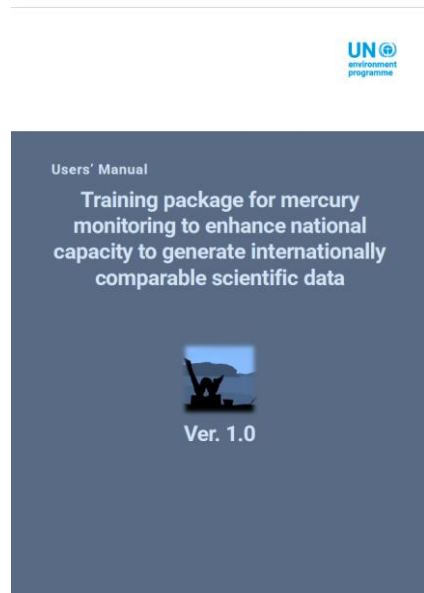
- Mercury monitoring:
 - Training package development.
 - Trainers' training.
 - Local hands-on trainings.



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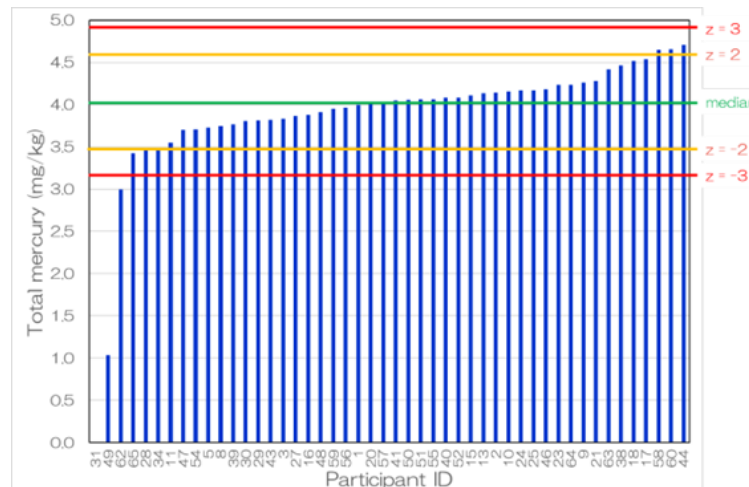
Trainers' Training (Dec. 2022,
Thailand)



Local Training (June
2023, Maldives)

Laboratory Proficiency Testing

- 1st round PT (Human hair)
 - 34 labs registered, 26 submitted the results.
 - 18 labs had satisfactory outcomes.
- 2nd round PT (Fish)
 - 55 labs registered, 48 submitted the results.
 - 40 labs had satisfactory outcomes.
- 3rd round PT (Sediment)
 - 43 labs registered.



Maldives: Mercury Flow and Monitoring

- Local trainings for mass flow development and hands on for hair survey.

Training
Package

Local trainings on
mercury flow and
monitoring



Hair mercury
survey for
residents



Indonesia: Provincial Mass Flow

- Improving mercury inventories at provincial level.



Bali and Nusa Tenggara



Java and Banten



Nepal: Gold Plating Sector

- Evaluating the current mercury situation in and around gold plating facilities

Strengthening national monitoring laboratory

Conduct environmental and health study



Mercury Laboratory in AIT

- New mercury laboratory set up in AIT, Thailand.
- Instruments:
 - Mercury Analyzer for **solid / liquid / gas** samples.
 - Gas Mercury Analyzer for **atmospheric** air.
 - GC-ECD for **methylmercury**.
(to be installed)
- Training, survey, analytical service available upon request.



Quality Assurance for Air Monitoring

- Air monitoring technologies.
 - Different methodology applies different sampling media.
 - Special instrument is needed to analyse air mercury level (on-site and off-site).
- External QA for air monitoring.
 - Difficulty to prepare standardized reference air samples.
 - Not included in NIMD/UNEP proficiency testing (PT).



Sampling and Analysis

- Manual sampling method is a comparable method to automated method.
 - Simple and easy to collect ambient air samples.
 - Limited numbers of laboratories receive samples from other countries/laboratories.
 - Inter-comparability among these laboratories has not been systematically addressed.



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<https://emcr-journal.org/> **Article**

Comparison between a manual monitoring method based on active sampling and an automatic active monitoring method at urban and rural sites: Toward the accumulation of comparable data for effectiveness evaluation of the Minamata Convention

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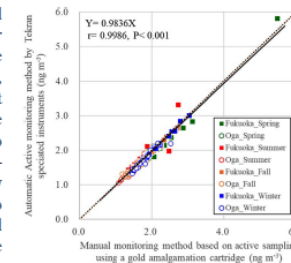
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ABSTRACT

Three monitoring methods, including manual monitoring methods based on active and passive samplings and an automatic active monitoring method, for atmospheric mercury (Hg) concentrations are recommended in the guidance on monitoring Hg based on Article 22 of the Minamata Convention on Mercury, which entered into force in 2017. However, among these methods, the dataset obtained by manual monitoring based on active sampling and automatic active monitoring has not yet been verified. Parallel observations using these two methods were conducted in one month for each season from May 2021 to February 2022 at urban and rural sites in Japan. The main objective of this study was to evaluate the comparability of the observations obtained using the two methods. Because the sampling duration of the manual monitoring method based on active sampling using the Japanese monitoring network was 24 h, the data on the daily mean concentrations of atmospheric Hg obtained by both methods were compared, and their consistency was evaluated using *t*-test, correlation analysis, and Bland–Altman analysis.

The observation values obtained by the two methods were consistent (correlation coefficients = 0.99 or higher) in all seasons, despite the large seasonal variation in meteorological conditions, and the unpaired *t*-test indicated that there were no differences between them in each season. Moreover, the Bland–Altman analysis showed that more than 96% of the data points were found to be within the 95% limit of agreement. Therefore, the manual monitoring method based on active sampling used in this study was in better agreement with the automatic active monitoring method. These results indicate that the data obtained by both methods are comparable. Additionally, manual monitoring based on active sampling can be used to build mercury monitoring networks at a lower cost than automatic active monitoring. Overall, the data obtained by both methods were proven to be beneficial for the effectiveness evaluation of the Minamata Convention.



Inter-laboratory Comparison Study

- Testing protocol.
 - Testing samples with the same concentration (injecting mercury gas to the sampling tubes).
 - Sufficient numbers of testing samples are distributed to the laboratories as the whole sample is used for a single analysis.
 - The results are shared among the participating laboratories.



Institutional Arrangement (Proposed)

Name	Organization	Function
Mick Saito	United Nations Environment Programme	Overall project supervision.
Koichi Haraguchi	National Institute for Minamata Disease	Technical advisory
Guilberto Borongan	Asian Institute of Technology	Project implementation, laboratory engagement, sample distribution.
Tatsuya Hattori	IDEA Consultants, Inc.	Sample preparation, report writing.

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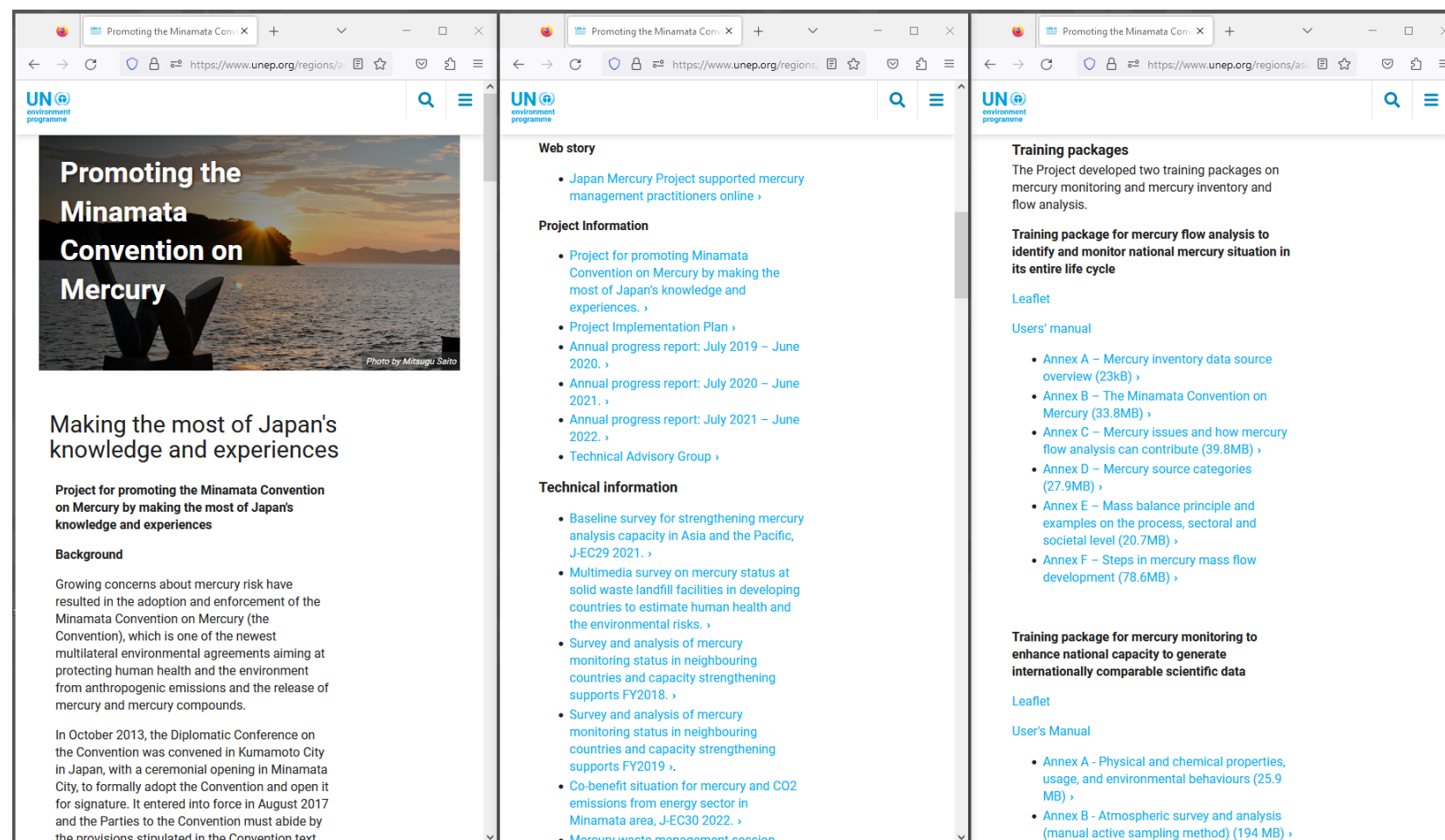
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Information Portal



Dedicated project website.
<https://www.unep.org/regions/asia-and-pacific/our-projects/project-promoting-minamata-convention-mercury-making-most>



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