



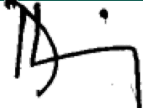



#4, September 2023

## Annual Progress Report

for

### Project for Promoting Minamata Convention on Mercury by making the most of Japan's Knowledge and Experiences

(Reporting Period: July 2022 – June 2023)

Approved by Regional Director	 Dechen Tsering	Date:	9 November 2023
Cleared by Deputy Regional Director	 Marlene Nilsson	Date:	9 November 2023
Reviewed by Regional Coordinator	 Mushtaq Memon	Date:	19 September 2023
Prepared by Programme Management Officer	 Mitsugu Saito	Date:	12 September 2023

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# 1 Project Information

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 <sup>1</sup> , Nepal, Palau, Philippines, Sri Lanka, Thailand, and Vietnam
Project outcome	Generation and use of information for science-based policy development on mercury management are enhanced at regional level.
Executing agency	UNEP Regional Office for Asia and the Pacific
Project period	July 2019 – June 2024 (60 months) <sup>2</sup>
Reporting period	July 2022 – June 2023
Total budget	US\$3,000,000

## 2 Summary

The project for 'Promoting Minamata Convention on Mercury by making the most of Japan's knowledge and experiences' passed through the midpoint and entered the latter half of the implementation period. It has made significant progress in implementing activities, particularly key activities in Output 1 (training component). The main efforts of the Project have moved to Output 2 (monitoring component) and Output 3 (outreach component).

The Project has reviewed its progress, results and shortfalls, and realigned the activities for the remaining period. The mid-term review (MTR) report was finalised and approved, and the mid-term workshop (MTW) was conducted for the consultation with the partner counties. Six (6) recommendations were presented and most of them were agreed on.

The Project is focusing on two topics, i.e., 'mercury flow analysis' and 'mercury monitoring' as a fundamental and cross-cutting skills for national mercury management. Training packages for these topics have been developed with multimedia files (video) and trainers' trainings (ToTs) were held to promote national/local trainings by participating countries. The first-round of laboratory proficiency testing (PT) has been successfully completed, and the second-round PT has been undertaken, which attracted approx. 50 laboratories. The analytical results from participating laboratories have been received.

The survey and research are undertaken in Nepal and Palau while laboratory capacity assessment was done for Vietnam. The arrangement for continuous data collection is under discussion. National level activities such as trainings and awareness events were the key focus in this period. The local trainings have been conducted in Indonesia and Maldives on mercury mass flow and monitoring. A site visit was organized in Minamata for the national focal points of the partner countries.

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<sup>1</sup> The participation to the project activities has been suspended since February 2021.

<sup>2</sup> Project extension is under preparation.

The Project has obtained a dedicated page under UNEP website (<https://www.unep.org/regions/asia-and-pacific/our-projects/promoting-minamata-convention-mercury>) where the links to the Project files are classified. The Project information is uploaded to the website and publicly available, which includes the Training Package for mercury mass flow and monitoring.

At this moment, some Output indicators have already been achieved, and some others are in good progress. The Outcome statement was revised and became identical with the statement in the global project. The Project Outcome indicators and targets are examined, and the means of verification were confirmed at mid-term workshop.

New UNEP Medium-term strategy has already started, and the Project will be transferred under new UNEP programme “Pollution and Health Programme” and global project “Chemicals, Environment, and Health” when they are ready. The new global project that this Project will fall under has been drafted. This global project will go through UNEP’s internal review process for approval.

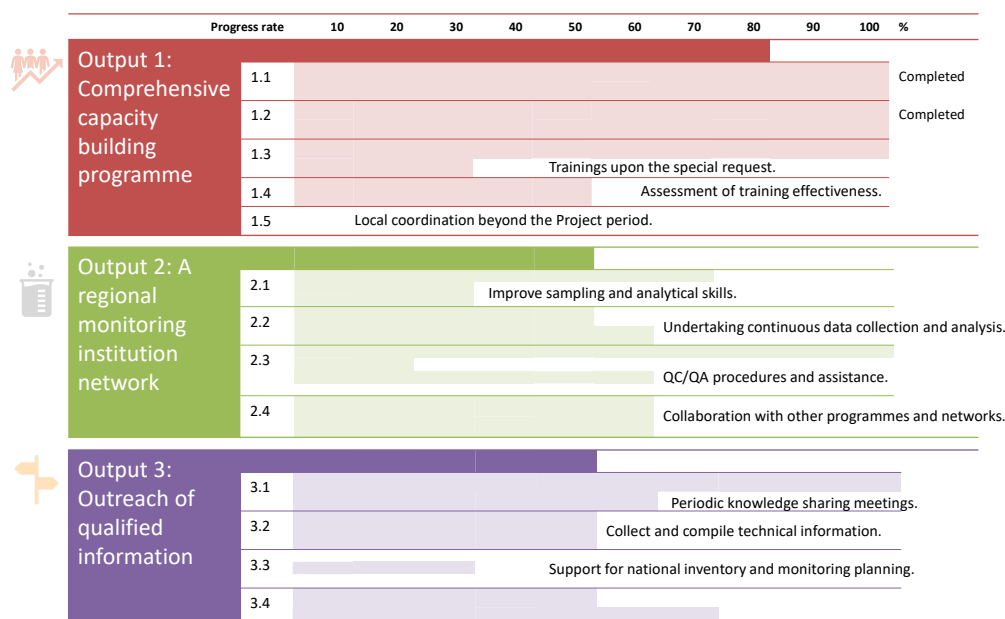
The workplan in July 2023 to June 2024 will make more efforts in Outputs 2 and 3 to reflect individual needs of the partner countries. The dissemination of the project results and outreach will be enhanced. Continuous data collection will be further promoted in collaboration with Ministry of Environment Japan (MOEJ) and Asia Pacific Mercury Monitoring Network (APMMN). The second round of PT will prepare the evaluation report. The third round of PT will also be initiated in collaboration with National Institute for Minamata Disease (NIMD). At least two human hair surveys will be completed in Palau and Maldives, and other surveys will be explored. Also, the dissemination of the project results and outreach to national/local stakeholders will be enhanced in Output 3.

The Project risks are regularly monitored and updated in a semi-annual basis. The initial risk of COVID-19 was logged in the implementation plan, which underestimated the actual impact so that the Project had to adjust the implementation arrangement.

## 3 Annual report July 2022 – June 2023

### 3.1 Overall progress

The Project has reviewed its progress, results and shortfalls, and realigned the activities for the remaining period. Key activities in Output 1 (training component) have been almost completed. The main efforts of this reporting period were formulation and implementation of national-level activities under Output 2 (monitoring component) and 3 (outreach component). The mid-term review (MTR) was completed, and the results were presented at the mid-term workshop (MTW). The Project information is uploaded to the website (<https://www.unep.org/regions/asia-and-pacific/our-projects/promoting-minamata-convention-mercury>) and publicly available, which includes the Training Package for mercury mass flow and monitoring. Activities to enhance the visibility are enhanced.



### Progress rating of Activities

The mid-term review (MTR) was initiated in July 2022 to review the past 3-year implementation of the Project. The ‘inception report and workplan’ was prepared in October 2022, which undertook an initial review of existing documents and information and set up review methods and time schedule. The review was completed in February 2023 and the mid-term review (MTR) report was finalised and approved, and the mid-term workshop (MTW) was conducted for the consultation with the partner countries. Six (6) recommendations were presented and most of them were agreed on.

Output 1: The Project is focusing on two topics, i.e., ‘mercury flow analysis’ and ‘mercury monitoring’ as a fundamental and cross-cutting skills for national mercury management. Training packages have been developed with multimedia files (video) to promote national/local trainings by participating countries. Trainers’ trainings (ToTs) were held in person in November and December 2022 to the participating countries. The Project recommended the participants to submit proposals for local trainings to improve the knowledge and skills at national and sub-national levels.

Output 2: Virtual laboratory assessment continues as a feasible and efficient modality under COVID-19 settings. The third assessment mission was e-dispatched to Vietnam. The laboratory proficiency testing (PT) has been successfully completed for its first-round. The second-round PT has been undertaken, and the analytical results from participating laboratories have been received. The assessment report will be prepared by Q4 2023. Continuous data collection by partner countries is an important objective of this Output. In collaboration with Ministry of the Environment **Japan** (MOEJ) and Asia Pacific Mercury Monitoring Network (APMMN), harmonised SOP and QA/QC system has been discussed. Virtual laboratory assessment continues to send the expert mission to partner countries. **Sri Lanka** is preparing the internal arrangement to nominate the laboratories subject to the assessment. The virtual assessment in **Nepal** resulted in the joint research between Prefectural University of Kumamoto (PUK), National Institute for Minamata Disease (NIMD) and Ministry of Forests and Environment Nepal. **Palau** is conducting the human hair survey to assess the mercury exposure to general public.

Output 3: National level activities such as trainings and awareness events were the key focus in this reporting period. **Indonesia** organized two local trainings on mercury mass flow development. **Maldives** also organized the training on mercury inventory and monitoring. The hospitals in different districts acquired skills for human hair sampling. Compilation and dissemination of information and

data are continuously undertaken in the dedicated website. Two training packages on mercury mass flow and monitoring including annexes are uploaded and widely available. The mid-term workshop invited the national focal points of the partner countries to Minamata to discuss the realignment of the Project. A site visit was also organized in collaboration with Minamata City. The Project also organized a mini symposium to improve the visibility to demonstrate the Project results to enhance the impact of the Project.

The new UNEP global project “Chemicals, Environment, and Health” that this Project will fall under has been drafted. This global project which is in line with MTS 2022-2025 will go through UNEP’s internal review process for approval. Once the formulation process is completed this Project will be transferred to the new global project.

## 3.2 Project revision

### *Project mid-term review*

The Project undertook the mid-term review (MTR) to assess the progress of the Project from its inception in July 2019 up to June 2022. The review followed UNEP guidance for project evaluation with the review criteria A) Strategic Relevance, B) Quality of Project Design, C) Effectiveness, D) Financial Management, E) Efficiency, F) Monitoring and reporting, G) Sustainability, and H) Factors affecting performance and cross-cutting issues.

The review found lower rating on alignment to cross cutting issues such as gender and human rights, adaptive management to COVID-19 impacts, communications and Project visibilities, etc. On the other hand, alignment to donor initiative, project finance, monitoring design and implementation are rated highly satisfactory.

The MTR has found 5 lessons learned and proposed 6 recommendations to reflect the weakness / shortfall or augment to strength of the Project.

No.	Recommendation and challenge/problem to be addressed by the recommendation	Type and priority level	Timeframe	Responsible
1	Revisit the TOC and result framework to ensure the alignment to new UNEP MTS, delivery model, and evaluation framework.	Corrective, High priority	Short term	Project, Partner countries
2	Examine the remaining Project activities and adjust the duration, as appropriate, to achieve intended results.	Corrective, High priority	Short term	Project, Donor, Partner countries
3	Prepare an exit strategy with relevant stakeholders to sustain the Project results beyond the Project period.	Augmentative, High priority	Medium term	Project, Stakeholders
4	Strengthen Project communications and improve the visibility to demonstrate the Project results.	Augmentative, Medium priority	Short term	Project
5	Identify key local stakeholders and explore the collaboration and joint implementation with them.	Augmentative, Medium priority	Medium term	Project, Stakeholders

6	Examine the Project beneficiaries in different population groups, e.g., gender, age, occupation, etc. to support marginalized groups.	Augmentative, Opportunity of improvement	Medium to long term	Project
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*National consultation at mid-term workshop*

The Project invited the focal points of the partner countries to hold the mid-term workshop (MTW) to discuss the necessary realignment for better addressing the needs and priorities of the countries. The workshop discussed 3 strategic questions to highlight the directions of the Project focus:

1. Implementing activities for the rest of the Project period.
2. Project result structures and monitoring indicators.
3. Ensuring sustainability after the Project closure.

The partner countries stressed the Activity 3.3 (national level activity) should be focused for the rest of the Project period. They also highlighted the importance of high-level visibility. The detailed outcomes of the workshop are available in Annex 5.6.

*Review by Project Steering Committee*

The Project Steering Committee (PSC) meets on a semi-annual basis to provide strategic direction to the Project. The outlines of the MTR and results of the MTW were presented to the PSC members. The draft management responses were also presented. The PSC acknowledged the development of the recommendations and provided positive suggestions for future Project activities.

### 3.3 Activities implemented

The activities implemented in this period are reported below. The progress rates in percent indicate the cumulative percentages of the completed work against total work in each activity. For those activities which do not have discrete values, e.g., number of trainings, etc., relative progresses were estimated by the Project Management UNIT (PMU).

*(Activity 1.2.1) Develop standard training materials for training courses, and (Activity 1.2.2) Develop data books or technical handbooks that compile assessed information for government officers and practitioners.*

Progress: 100%

The project has prepared two (2) training packages on ‘mercury monitoring’ and ‘mercury flow analysis.’ A training package is composed of multimedia files, i.e., videos, which provide substantive information when organizing a training programme. The video material is prepared using Microsoft PowerPoint with pre-recorded narration embedded in each slide, then grouped by decks in each topic/subject. The ‘Users’ Manual’ provides a sample course with full scope that uses materials in one consistent programme.

### Training package for mercury monitoring to enhance national capacity to generate internationally comparable scientific data

This training package addresses specific skills for laboratory managers and technicians to produce reliable data. It enhances national capacity to generate scientific data from focus of multi-media and from focus of different applications that meets international standards. The material provides not only manual skills to use devices and instruments, but also the principles of quality assurance and quality control to address comparability issues as 'quality' is value of produced data. Practical examples to reduce data bias and uncertainty are also provided.

Users' Manual (<https://wedocs.unep.org/20.500.11822/41424>) is composed of following six (6) chapters:

- Executive summary
- Chapter 1: Background
- Chapter 2: Introduction
- Chapter 3: Trainers' guidance
- Chapter 4: Supplementary information and literature
- Chapter 5: Editable PowerPoint files
- Chapter 6: List of annexes

Nine (9) PowerPoint slides are annexed to the Users' Manual as follows:

- Annex A: Lecture 1: Physical and chemical properties, usage, and environmental behaviour (<https://wedocs.unep.org/20.500.11822/41429>).
- Annex B: Lecture 2: Atmospheric survey and analysis (manual active sampling method) (<https://wedocs.unep.org/20.500.11822/41435>).
- Annex C: Lecture 3: Solid sample (soil, sediment, and biota) survey and analysis (<https://wedocs.unep.org/20.500.11822/41436>).
- Annex D: Lecture 4: Water sample survey and analysis (<https://wedocs.unep.org/20.500.11822/41437>).
- Annex E: Lecture 5: Human biological sample analysis (<https://wedocs.unep.org/20.500.11822/41438>).
- Annex F: Lecture 6: Methylmercury analysis (<https://wedocs.unep.org/20.500.11822/41439>).
- Annex G: Lecture 7: Mercury monitoring and the Minamata Convention (<https://wedocs.unep.org/20.500.11822/41440>).
- Annex H: Lecture 8: Quality management (<https://wedocs.unep.org/20.500.11822/41441>).
- Annex I: Lecture 9: Laboratory safety and environmental management (<https://wedocs.unep.org/20.500.11822/41442>).





### Training package for mercury flow analysis to identify and monitor national mercury situation in its entire life cycle

This training package addresses particularly the economic activities such as mercury trade, production, use (sales), manufacturing, etc. in addition to emissions and releases to the environment. It introduces a comprehensive mass flow concept to outline the national mercury situation throughout its life cycle. It supports the improvement of national mercury inventories by compiling various types of information. UNEP has developed the Mercury Inventory Toolkit levels 1 and 2, which have been used by many countries and stakeholders for developing their emission/release inventories.

Users' Manual (<https://wedocs.unep.org/20.500.11822/42257>) is composed of following six (6) chapters:

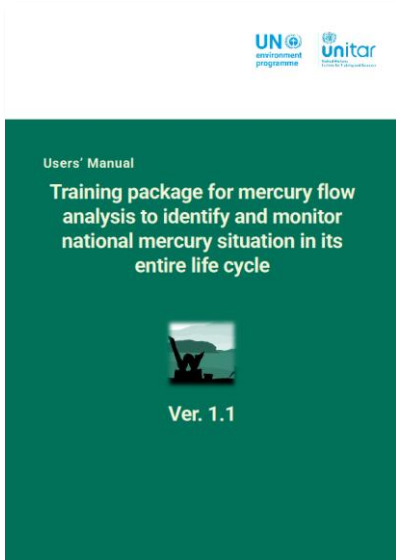
- Executive summary
- Chapter 1: Background
- Chapter 2: Introduction
- Chapter 3: Trainers' guidance
- Chapter 4: Supplementary information and literature
- Chapter 5: Editable PowerPoint files
- Chapter 6: List of annexes

An Excel spreadsheet and five (5) PowerPoint slides are annexed to the Users' Manual as follows:

- Annex A: Excel for Mercury inventory data source overview (<https://wedocs.unep.org/20.500.11822/42258>).
- Annex B: Lecture 1: The Minamata Convention on Mercury (<https://wedocs.unep.org/20.500.11822/42259>).
- Annex C: Lecture 2: Mercury issues and how mercury flow analysis can contribute (<https://wedocs.unep.org/20.500.11822/42263>).
- Annex D: Lecture 3: Mercury source categories (<https://wedocs.unep.org/20.500.11822/42264>).

- Annex E: Lecture 4: Mass balance principle and examples on the process, sectoral and societal level (<https://wedocs.unep.org/20.500.11822/42267>).
- Annex F: Lecture 5: Steps in mercury mass flow development (<https://wedocs.unep.org/20.500.11822/42269>).

The Training Package for mass flow is currently in the process of co-publication with UNITAR. Once the agreement is finalised, the documents will be uploaded and publicly available.



*(Activity 1.3.1) Formulate and implement skill up training programmes*

Progress: 100%

The Project held two (2) trainers' trainings (ToTs) in Q4 2022. The ToT on mercury mass flow held on 14 – 16 November 2022 in Jakarta, Indonesia with 15 participants from 8 countries (see Annex 5.2). The ToT on mercury monitoring held on 6 – 8 December 2022 in Pathum Thani, Thailand with 21 participants from 10 countries (see Annex 5.3).

Trainers' Training Programme #1: Organizing a training programme on mercury mass flow development

Participation details:

- Date: 14-16 November 2022
- Venue: Artotel, Jakarta, Indonesia
- Participating countries: Indonesia, Malaysia, Maldives, Mongolia, Nepal, Palau (online), Sri Lanka, and Vietnam

The participants were encouraged to develop local training programmes and submit UNEP through their focal points.

Trainers' Training Programme #2: Organizing a training programme on national mercury monitoring

Participation details:

- Date: 6-8 December 2022
- Venue: Asian Institute of Technology (AIT) Conference Centre, Pathum Thani, Thailand.

- Participating countries: Indonesia, Malaysia, Maldives, Mongolia, Nepal, Palau, Philippines, Sri Lanka, Thailand, and Vietnam

The participants visited a mercury laboratory in AIT which was just established in its campus. The participants were encouraged to develop local training programmes and submit UNEP through their focal points.

After the ToTs, participating countries are encouraged to submit concepts on local trainings on mercury mass flow or monitoring (or both). The Project has received the concept notes from **Indonesia, Maldives, Palau, Sri Lanka, and Vietnam**. All of them are unique to the countries and the focus and related actions are different. The Project has engaged Training Facilitator, an international consultant, to communicate with each country for elaborating the workplans and provide unique supports by making use of all possible resources and options under the Project and beyond.

#### *(Activity 1.4) Follow-up assessment of the effectiveness of the training programme*

Progress: 50%

The project is to undertake assessment of the effectiveness of the training programmes (i.e., how the programmes have brought difference to the participants) in an annual basis. The project implemented four (4) online training programmes in between December 2020 and February 2022 for mercury monitoring and flow analysis. From 6 September to 29 November 2022, a follow up survey was conducted by an online questionnaire to the participants in the four (4) training programmes, which accounts for 352 participants excluding duplication. After examining the eligibility of the respondents, 115 responses found valid for the assessment (response rate: 33%). 18 of them did not remember if she/he has taken any of these trainings. 97 respondents explicitly indicated their participation to the trainings.

The information collected in these surveys will serve as the basis of the future planning of the training programmes. The results of the assessment are available in Annex 5.1.

#### *(Activity 2.1.1) Capacity assessment of existing monitoring laboratories*

Progress: 65%

This work aims at evaluating the current mercury monitoring capacity of the analytical institutions that are monitoring (or will monitor in the near future) mercury levels in the country. Vietnam was selected as the third survey country, and the survey was conducted to the Analytical Laboratory for Environment, Dioxin and Toxins, Northern Center for Environmental Monitoring, Vietnam Environment Administration.

The survey team, which composes of four international experts and a coordinator, were e-dispatched to the laboratory. They collaboratively assessed the local settings and consolidated their views in the assessment report (see Annex 5.4). An online interview was conducted on 5 October 2022 and a virtual video survey was conducted on 12 October 2022.

#### *(Activity 2.1.2) Provide advice to improve sampling; (Activity 2.1.3) Provide advice to improve analysis*

Progress: 30%

Based on the finding from capacity assessment (Activity 2.1.1) conducted in **Nepal**, a research plan on mercury pollution from gold plating sector was developed in collaboration between Nepal and Japan. Estimated mercury emission in Nepal in 2016/17 was approx. 20 tons, among which the gold plating sector accounted for approx. 13 tons. Mercury at gold plating workshop is directly released to the environment without effective means of emission control. There is strong needs to assess the current status for Nepali Government to take necessary measures to protect human health as well as the environment.

The survey addresses the mercury status from three dimensions, i.e., environment, human, and animal.

1. 'Environmental risk assessment by multi-media monitoring' examines the fate of mercury during preparation, handling, and emission to the environment.
2. 'Human health risk assessment by novel sample collection technique' introduces practical methodology of urine sampling, as a bio indicator of inorganic mercury exposure, in such locations where no capacity for mercury analysis facility as well as preservation facility of the collected samples is available.
3. 'Survey of companion dogs as sentinel animals for mercury exposure' tests the applicability of dog hair samples as a proxy indicator of local mercury pollution.

A pre-survey mission and site selection was conducted on 26-28 March 2022 in Kathmandu, Nepal, where gold plating workshops are located. The mission was led by UNEP with 2 researchers from PUK who looked after the research theme 1 and 3 above and 2 researchers from National Institute for Minamata Disease (NIMD) who looked after the research theme 2.

The mission made a courtesy visit to Secretary of the Ministry of Forests and Environment (MOFE). He particularly favoured NIMD, a national research institution of Japanese government, being a team. The government-to-government relation between Nepal and Japan was welcomed. MOFE confirmed that that it will fully commit the survey and make necessary coordination for successful research, which is the first ever study on this topic. Department of Environment (DOE) has its own environmental laboratory and dedicated laboratory staff. They will participate in the study in collaboration with Japanese team. As the result of the training and discussions, Nepal is also working towards ratification to the Minamata Convention.

Ministry of Health and Population (MOHP) is the competent authority in Nepal on human health issue. As Nepal has not yet ratified the Minamata Convention, MOHP does not have mandate on mercury at this moment. At this moment, it is unclear if National Public Health Laboratory (NPHL) will join this survey. On the other hand, MOHP is willing to assist the ethical clearance for human-biomonitoring of the survey component.

The mission visited FHAN (a federation of handicraft in Nepal) and met the president who are also a gold plater in profession. The mission requested to identify sufficient numbers of workshops to collect environmental and human bio samples. It was also discussed the control site where no gold plating is exercised in the proximity.

The mission visited 2 workshop and conducted preliminary exercises for sample collection, interview, etc.

- Workshop A: 27°40'55.6"N, 85°19'32.7"E, 1294H. Approx. 200m<sup>2</sup> with approx. 10 workers on site. The workshop is enclosed, and exhaust fan is installed to blow off the mercury fume when heating.

- Workshop B: 27°40'22.0"N, 85°19'21.9"E, 1330H. Approx. 80m<sup>2</sup> with only a few workers when visited. It is located at rooftop of a commercial building where surrounding is relatively open.



*(Activity 2.2.1) Develop and/or harmonize methodologies and standard operating procedures*

Progress: 50%

The Project has communicated with APMMN and Japan to promote ambient mercury monitoring. It was agreed that the Standard Operating Procedures (SOP) will be drafted and discussed with APMMN participating institutions. Once it is approved, the Project will promote the use of the SOP for the project partner countries.

*(Activity 2.2.2) Undertake continuous data collection and analysis*

Progress: 60%

The Project continues to collect and analyse ambient mercury concentration at Maki, Japan in order to evaluate the feasibility and challenges for introducing ambient mercury monitoring by gold trap method. The Project also invites other countries to initiate/continue data collection based on their needs and priorities.

*(Activity 2.3.2) Develop a QC/QA guidebook for mercury monitoring*

Progress: 20%

Ambient air monitoring that the Project is promoting is conducted in several countries. The inter-laboratory comparability of the analytical results will be ensured by a systematic QC/QA procedures among laboratories. The Project has worked with MOEJ to propose a process among laboratories on a voluntary basis in the APMMN workshop.

*(Activity 2.3.3) Undertake inter-laboratory data quality assessment for continual improvement*

Progress: 65%

This activity aims at evaluating the performance of mercury analyses conducted by the laboratories in the region, which provides individual proficiency levels and collective mercury monitoring capacity in the region. The first round of laboratory proficiency testing (PT) was participated by 34 public laboratories and laboratories in universities that undertake mercury analysis. Finally, 26 laboratories successfully submitted their analytical results to the Project, which was assessed and statistically compiled in collaboration with the National Institute for Minamata Disease (NIMD) in

September 2022.

([http://nimd.env.go.jp/docs/Final\\_Report\\_ProficiencyTesting\\_no1\\_JapanMercury.pdf](http://nimd.env.go.jp/docs/Final_Report_ProficiencyTesting_no1_JapanMercury.pdf)).

The second round of the PT, which was organized by NIMD with UNEP support, was announced in September 2022 to call for the expression of interest.

([http://nimd.env.go.jp/docs/ProficiencyTesting\\_2\\_2022.pdf](http://nimd.env.go.jp/docs/ProficiencyTesting_2_2022.pdf)). Approx. 50 laboratories have registered. The 2<sup>nd</sup> PT has received the expression of interest from 55 laboratories. The samples were shipped to the laboratories and the results were received. The initial deadline, 14 April 2023, was extended to 2 June 2023 due to the low submission rate. Finally, 48 laboratories have submitted the results (See Annex 5.5).

#### *(Activity 2.4.1) Collaborative activities with other programmes*

Progress: 60%

The Project has participated in the 11<sup>th</sup> annual APMMN Partners Meeting held virtually on 2 November 2022. The Project activities related to the mercury monitoring were presented and the participants were invited to enrol relevant activities.

#### *(Activity 2.4.2) Mathematical modelling, research and environmental studies*

Progress: 60%

The Project has conducted a human hair survey in **Palau** in connection with the Earth Day event on 21 April 2023. The samples were further collected from different districts in the country and sent to AIT, Thailand for analysis. Another human hair survey is also planned for Maldives, where demonstration and training were provided to local hospital staff who will undertake sample collection.



#### *(Activity 3.1.2) Convene periodic stakeholders' meetings to share project results*

Progress: 60%

The Project held the mid-term workshop for informing Project progress and results to the partner countries. It also aimed at listing the necessary realignment of the activities for better addressing the needs and priorities of the countries. The workshop was held on 20-22 February 2023, which was composed of 2-day discussion and a site visit in Minamata on the third day. Nine (9) out of 12 partner countries participated in the workshop. A meeting of Technical Advisors was arranged back-to-back to this workshop. (See Annex 5.6).

The Project held an online webinar on ‘Strengthening mercury research capacity in developing countries for science-based policy making’ in collaboration with the Minamata Secretariat under its **Minamata Online** platform on 30 June 2022 (see Annex 5.7).

The Project also held an online mini workshop on the same topic as a side event of the **International Conference on Mercury as a Global Pollutant (ICMGP)** on 19 July 2022. This mini workshop provided information on the project and disseminate the achievements for wider audiences. It provided replicative information to non-partners countries especially peers in other regions. Four (4) topics were presented by relevant experts and two training packages were introduced (see Annex 5.8).

An exhibition booth was set up at 7<sup>th</sup> Session of the **Committee on Environment and Development (CED7)** held on 29 November – 1 December 2022 in Bangkok, Thailand. The Committee on Environment and Development is an intergovernmental body of the United Nations Economic and Social Commission for Asia and the Pacific (ESCAP). UNEP’s engagement to Asian Institute of Technology (AIT) was highlighted for the distribution materials in collaboration with other project on plastic pollution, circular economy and air quality.

A mini symposium on ‘AIT-UNEP Collaboration on Pollution Action and Circular Economy’ was held on 30 May 2023 in Bangkok, Thailand as a side event of **Asia Pacific Air Quality Action Week** (see Annex 5.9).

### *(Activity 3.2) Accumulate and compile technical data and make it publicly available online*

Progress: 50%

The Project-dedicated webpage has continuously updated, and new information was added in prompt manner. The Training Packages and their Annexes have been added after completing the publication process. All information is available at <https://www.unep.org/regions/asia-and-pacific/our-projects/promoting-minamata-convention-mercury>.

Several studies and developed articles on mercury situation and survey method were uploaded to the Project website including:

- Baseline survey for strengthening mercury analysis capacity in Asia and the Pacific, Proceedings of the 29th Symposium on Environmental Chemistry, June 2021.
- Multimedia survey on mercury status at solid waste landfill facilities in developing countries to estimate human health and the environmental risks, Status Report of Environmental Monitoring and Contaminants Research, February 2022.
- Co-benefit situation for mercury and CO<sub>2</sub> emissions from energy sector in Minamata area, Proceedings of the 30th Symposium on Environmental Chemistry, June 2022.

### *(Activity 3.3.2) Conduct country level technical workshops*

Progress: 30%

The Project has received numbers of proposals from partner countries for local programmes.

Ministry of Environment and Forestry, **Indonesia** focused on the provincial level training on mercury inventory and flow analysis. 2 two-day trainings were conducted in Bali on 1-2 March 2023 and in Jakarta on 16-17 May 2023. The two-day training aims at deepening the knowledge of a) disseminate information to local governments regarding the mass flow of mercury; b) exchange of information related to data in the energy sector and ASGM in each region/province; c) increase local

government awareness and understanding regarding mercury emissions and releases and their potential emissions and releases; and d) increase knowledge and skills in arranging mass flow of Mercury in the region.



Bali workshop was attended by 28 participants (16 female and 12 male) from ministries and local government. Jakarta workshop was attended by 40 participants (20 female and 20 male) from ministries and local government. They were composed of 3 sessions. Session 1 described the mercury reduction in the energy sector as one of the priority sectors in Indonesia, and general information on ASGM sectors in the country. Section 2 introduced the UNEP Toolkit. Session 3 introduced MIRO application for creating mass balance and tasked the participants to calculate the mass balance.

Environmental Quality Protection Board (EQPB), **Palau** proposed public awareness on basic mercury issue at the Earth Day event on 21 April 2023 where many citizens participated in various activities. The event was attended by the citizens in Koror and students. It was composed of 2 parts in a half day, which included awareness raising for general public and specific training on mercury health survey. The topic of the event covered mercury issue on human health and environment, mercury monitoring and survey, and Minamata Convention on Mercury. On 21 April 2023 was designated as Green Fair in Koror State. The project has been provided a hut to display mercury information and to set up a mercury health survey desk. The Fair has received visitors in and out at the venue throughout the day.

The Ministry of Environment Climate Change and Technology (MoECCT) in **Maldives** proposed back-to-back workshops on mercury mass flow and monitoring on 20-21 June 2023 in Malé. The training material on mass flow was used during Day 1 of the workshop to better understand the Maldives's mercury situation throughout its life cycle, which was attended by 14 participants (5 female and 9 male) from ministries and agencies relevant to the national mercury management. By introducing a mercury mass-flow model for the Maldives, this workshop discussed extensively the mercury in the country for identifying data gaps and how to address them (human resources, technical assistance, technology etc.). It aimed to ensure stakeholders' responsibility and improve data availability to ultimately improve the current national mercury inventory for better science-based policy making and implementation; more immediately, informing the National Action Plan as part of the ratification process.



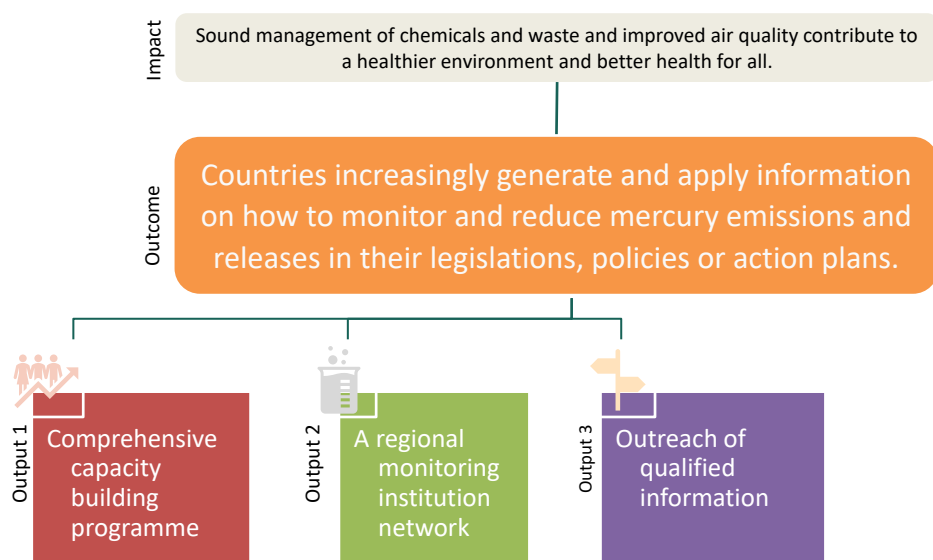


The training material on monitoring was used during Day 2 of the workshop to train sample collectors as part of implementing a nationwide biomonitoring program to identify the significance of human exposure within Maldives, which was attended by 12 participants (7 female and 5 male) from regional hospitals throughout the country. It aimed to provide the sample collectors with supplementary contextual and technical information regarding the survey program as well as carefully explain, demonstrate, and practice sample collection and handling procedures. The assessment of mercury exposure level for citizens in Maldives due to high-level fish consumption in daily diet is planned. Hair sampling is chosen as a simple and reliable method to measure the methylmercury exposure. The survey plan is currently reviewed by National Health Research Council. The participants of the workshop will undertake the sample collection in respective regions.

### 3.4 Results achieved

The Project has conducted the substantial revision to address the recommendations made by the mid-term review. The review recommended to align the result framework of the global umbrella project and this Project (as one of the sub-projects). The Outcome statement will be revised and become identical with the statement in the global project.

The implementation plan sets out three (3) Outputs that will contribute towards the direct project Outcome. The project results are evaluated against the established indicators and target values set out in the Result Framework (see Annex 5.11). Some Output indicators have already been achieved, and some others are in good progress.



## Theory of Change in the Project Implementation Plan

### *(Output 1) Comprehensive capacity building programme based in Minamata developed and implemented.*

Output 1 is to strengthen the capacity of the participating countries to monitor and reduce mercury emissions and releases. It was initially planned to develop a comprehensive and unique programme in Minamata, but the COVID-19 pandemic forced the Project to take a more virtual and universal approach.

Indicator 1.1: Number of capacity building programme package for specific subjects developed and implemented.

Baseline: 0, Target: 2, Status: 2

Narrative note: achieved: Project has published two (2) capacity building programmes on mercury mass flow and monitoring. Trainers' trainings (ToTs) have been conducted to partner countries, which has started local training programmes utilising the materials.

The training packages have gone through UNEP publication process and got approval as the official UNEP publications. The materials including Annexes are uploaded to the Project website.

Indicator 1.2: Local coordination structure in Minamata developed.

Baseline: 0, Target: 1, Status: 2

Narrative note: achieved: Local coordination structure with Minamata City and the National Institute for Minamata Disease established.

The Project has established collaborative relationships with 2 agencies in Minamata, where a lot of knowledge and experiences on mercury management have been accumulated when responding the outbreak of Minamata disease.

Indicator 1.3: Percentage (%) of trained participants who successfully apply the knowledge and skills on mercury management in their work disaggregated by gender and age range.

Baseline: 0, Target: 50%, Status: Total 47%, Female 53%, Male 41% in 2022

Narrative note: on target: A questionnaire survey indicated that approx. half of the respondents have used the information for themselves. Female participants applied the obtained knowledge more than male participants.

### *(Output 2) A regional monitoring institution network in Asia and the Pacific established.*

Output 2 supports national mercury monitoring activities. A few countries will be selected, and the monitoring capacity will be enhanced. The activities are organized from two angles, i.e., assessment and assistance, thus, the output indicators are set for each of them.

Indicator 2.1: Number of countries with national institutions on the network that meet international standards on mercury analysis.

Baseline: 0, Target: 3, Status: 4 as of 2022

Narrative note: on target: The first round PT (2021-22 period) result indicated that national laboratories from four (4) partner countries demonstrated satisfactory performance.

As quality control (QC)/quality assurance (QA) is a continuous process, it must ensure such proficiency should sustain for longer period, so the Project called another PT in 2022-23 period to verify it. The second round PT attracted more interest from laboratories and results will be announced in Q4 2023.

Indicator 2.2: Number of existing regional networks establishing partnership with this programme.

Baseline: 0, Target: 2, Status: 2 as of 2023

Narrative note: on target: Collaboration with the Asia Pacific Mercury Monitoring Network is undertaken. Another network among analytical laboratories is under discussion.

The Project is inviting laboratories competent to analyse gold amalgamation traps as the ambient monitoring media. QA/QC procedures are currently discussed.

*(Output 3) Outreach of qualified information in support of early implementation of the Convention implemented.*

Output 3 enhances generation and accumulation of monitoring data and other scientific information. It also promotes the visibility of the project by enhancing the outreach activities at local, regional, and global levels.

Indicator 3.1: Number of countries submitting information to the information portal

Baseline: 0, Target: 6, Status: 1

Narrative note: preliminary: Engagement of Project partner countries has been progressed and numbers of countries are currently preparing/undertaking data collection and analysis. Such results will be reported in due course.

The partner countries have started producing 'information' on mercury status in the countries. The Project has advised and encouraged the countries to make such information publicly available. The Project website can serve as the portal, or they may use their own platforms.

Indicator 3.2: Number of countries outside of the project partners that received information through project activities.

Baseline: 0, Target: 30, Status: 25 in 2021, 35 in 2022

Narrative note: achieved: The dissemination events were announced through the global platform such as the Minamata Convention Secretariat, Global Mercury Partnership, International Conference on Mercury as a Global Pollutant. It resulted in more participation from countries other than the Project partner countries.

*(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*

The achievement of the Project Outcome is evaluated against three (3) indicators set out in the result framework. The indicators and targets were presented to partner countries at the mid-term workshop. They agreed to maintain the indicators that properly reflect the expectation. The target values were also examined and adjusted to fit to the national situation, which will go through the internal UNEP process for approval.

Indicator 1: Number of countries that embed scientific data collection in their mercury management policies.

Baseline: 0, Target: 6, Status: Not available

Narrative note: preliminary: Project mid-term workshop undertook the national consultation and updated expectation of the participating countries. The target numbers will be adjusted accordingly.

Indicator 2: Number of countries that regularly put information on mercury monitoring available via the information portal.

Baseline: 0, Target: 6, Status: 0

Narrative note: in progress: Project mid-term workshop undertook the national consultation and updated expectation of the participating countries. The target numbers will be adjusted accordingly.

Atmospheric monitoring is undertaken at one station. More stations will be engaged in collaboration with APMMN. Harmonizing methodologies of mercury monitoring among network partners is under discussion.

Indicator 3: Number of new, adequate policies and legislation in effect on mercury management.

Baseline: 0, Target: 3, Status: (1)

Narrative note: in progress: Project mid-term workshop undertook the national consultation and updated expectation of the participating countries. A few countries indicated their plan for ratification of the Minamata Convention. The target numbers will be adjusted accordingly.

### *Summary of the outcome and output indicators*

The Project has made numbers of positive contribution for sound mercury management in project partner countries in the course of its implementation. The logical linkage of the project results to the chemicals, waste, air quality objective of UNEP MTS 2018-2022, which is regarded as the Impact statement, is still valid. However, it is premature to judge the overall project level achievement. Most of the Outputs are in good state towards the achievement. The Project Outcome indicators and targets are examined, and the means of verification were confirmed at mid-term workshop.

<b>Outcome</b>	1	Preliminary	2	In progress	3	In progress
<b>Output 1</b>	1.1	Achieved	2.1	On target	3.1	Preliminary
<b>Output 2</b>	1.2	Achieved	2.2	On target	3.2	Achieved

<b>Output 3</b>	<b>1.3</b>	<b>On target</b>	
Colour codes	Achieved or good progress towards the achievement	Slow progress or insufficient data to assess the progress	Failed or difficult to be achieved

### 3.5 Risk management

*(Risk log #5) Covid-19 pandemic persists for many years.*

The Project risks are regularly monitored and updated on a semi-annual basis. The initial risk log listed 5 risks including 'Covid-19 pandemic persist for many years' with the rating of impact 4 (major) and likelihood 3 (moderate) at the time of December 2020. This assessment underestimated the actual risk so that the Project had to adjust the implementation arrangement.

The Project revisited the COVID-19 risk and reclassified as the impact 4 (major) and likelihood 4 (likely) in August 2022, which is too late and still too optimistic. Both impact and likelihood are re-classified as 5 (severe and almost certain, respectively)

*(Risk log #6) Pro-democracy protest in Thailand leads social unrest.*

The Project risks are regularly monitored and updated on a semi-annual basis. Thailand undertook the general election in May 2023 which resulted in the landslide victory of the opposition parties. The risks of the political transition should be carefully assessed.

*(Risk log #7) Political instability in Myanmar continues.*

The likelihood is re-classified to 5 (almost certain) as no positive sign in the current government.

*(Risk log #10) Nepali coalition government may increase frequent turnover of high-level officers.*

Following the general election, Nepal formed a coalition government. Ministers and high-level government official have been appointed/replaced in short cycle, which may interrupt the continuous engagement to the Project activities.

### 3.6 Lessons learned

*(Lessons learned log #6) Joint promotion with other ROAP projects*

Most of the projects have outreach/promotion components but they have done so far individually. Development of a common promotion material that can be used by all projects run by UNEP ROAP will increase the opportunities for disseminating project information. A joint promotion among 6 projects (including mercury) run by UNEP ROAP was arranged in collaboration of the Asian Institute of Technology. It is a new approach that different projects prepare information materials and disseminate altogether.

### *(Lessons learned log #7) New mercury laboratory at AIT*

Private sectors, two manufacturer of mercury analysers and a monitoring consultant company, decided to invest AIT laboratory to strengthen the mercury monitoring capacity. It enables UNEP to utilise this capacity to undertake cooperative activities more effectively with Asian countries. Engagement with private sectors will be a good strategy for the sustainability of the Project results. The Project has engaged Asian Institute of Technology (AIT) to implement mercury monitoring programme for support the Project partners. AIT decided to upgrade their own laboratory to extend the mercury monitoring capacity.

## 3.7 Financial status

The total amount of USD2,999,990 has already been transferred to UNEP, which is sufficient for all project activities in the implementation plan.

Preliminary sum of the total expenditures<sup>3</sup> were USD1,942,471, which is approx. 64.7% against total project budget of USD3,000,000 (see Annex 5.13).

Category	Income (USD)		Expenditure (USD)			Delivery Rate (%)
	Planned	Received	Committed	Actual	Total	
Project cost	2,980,198	2,980,188	313,025	1,607,866	1,920,891	64.5
Exchange loss/gain	-	-	-	1,788	1,788	-
UN Levy (1%)	19,802	19,792	0	19,792	19,792	100.0
<b>TOTAL</b>	<b>3,000,000</b>	<b>2,999,990</b>	<b>313,025</b>	<b>1,629,446</b>	<b>1,942,471</b>	<b>64.7</b>

The delivery was severely affected by the COVID-19 pandemic in 2019-20 period and continued at the Q3 2020, after that the Project activities resumed in Q4 2020 onward. The levels of activities are continuously growing.

Reporting period	2019-20	2020-21	2021-22	2022-23
Annual expenditure (USD)	69,681	398,054	651,913	822,689
Cumulative (USD)	69,681	467,735	1,119,782	1,942,471
Delivery rate (%)	2.3	15.6	37.3	64.7

## 3.8 Management progress and results

### *Transition to new UNEP Medium-term Strategy 2022-25*

New UNEP Medium-term Strategy has already started since January 2022. The Project is currently implemented under the global project titled 'Generating and sharing knowledge for influencing decision-making on sound management of chemicals and waste', which will be transferred to a new global project. This Project remains its operation until the global arrangement is completed.

### *Project steering committee*

<sup>3</sup> Certified amount will be finalized by UNON.

The Project Steering Committee (PSC) is composed of the representatives of UNEP ROAP, Minamata Secretariat, UNEP Chemicals & Health Branch and MOEJ with the ROAP to serve as the chair. PSC held the fourth and fifth dialogue webinar on 12 October 2022 and 14 March 2023, respectively, for providing the strategic direction to the project towards expected the project outcome. Due to the retirement of the ROAP Deputy Regional Director, the Regional Sub-programme Coordinator served as the chair ad interim for the fifth session. New chair took the role in April 2023.

The PSC reviewed project progress and planned activities presented by the Project. It encouraged the Project to explore more partnership, including with regional entities and appreciated the progress and unique role to promote collaboration with Asian Institute of Technology (AIT) and Asia Pacific Mercury Monitoring Network (APMMN). The PSC also informed that BCRC-SEA, Indonesia is also competent and experienced.

The project outreach and promotion through GMP and Convention events including the COP was suggested.

The PSC also reviewed the mid-term review process and the recommendations suggested by the report. It reaffirmed the importance of the sustainability of the results and suggested incorporating the outputs to the UNEP regional activities.

### *Communications and visibility*

The Project has implemented most of the activities in closed format or online mode. Thus, the visibility and impact of the Project have not extended beyond the direct participants. After the COVID-19 restriction was lifted, the Project promotes the visibility of its achievements to wider audiences. The Project has been taking various opportunities and events to disseminate the communication materials, leaflets, USBs (data files) to stakeholders and interested parties.

A joint booth exhibition was organized at the 7<sup>th</sup> Committee on Environment and Development (CED7) held at UN Conference Centre on 29 November – 1 December 2022 as a collaborative promotion with other projects in ROAP. Project brochure and leaflets that explain the Project results were produced and distributed.

Other opportunities to disseminate project information included OEWG 1.2 for Science Policy Panel on 30 January – 3 February 2023, Regional Preparatory Meeting for BRS COPs on 14 – 15 March 2023, Climate and Clean Air Conference 2023: Air Quality Action Week on 29 May – 1 June 2023.

### *Monitoring, evaluation, and reporting*

The Project has developed a monitoring and reporting process with seven (7) types of monitoring reports. The project monitored its financial status monthly as an internal control, and the Programme Management Officer examined and took measures to align it in accordance with the approved budget. The semi-annual reports were prepared in September 2022 and January 2023 for the fourth and fifth PSC meetings. An annual report together with the financial statement was prepared and submitted to donor in September 2022.

The Project undertook the mid-term review, to analyse whether the project is on-track, what problems or challenges the project is encountering, and what corrective actions are required. It was conducted internally by the Project team in line with the UNEP evaluation policy. The Inception Report and Workplan was developed and approved internally by UNEP ROAP in October 2022. Data analysis, online questionnaire and interviews were conducted by mid-December 2022, and the 1st

draft report was developed and is disseminated to a wider group of stakeholders for inputs. The Review Report was approved in February 2023.

## 4 Workplan in July 2023 – June 2024

Based on the overall implementation plan approved for the entire project period and following the project progress in July 2022 – June 2023, the workplan for July 2023 – June 2024 is presented. (See Annex 5.10)

In this implementation period, more efforts will be made in Output 2 and 3 to reflect individual needs of the partner countries. The dissemination of the project results and outreach will be enhanced.

### *Activities under output 1*

Major activities in the Output 1 have been done and the effort in this period is the follow up of the trainings provided. The enhancement of the impacts of the training programmes will be done under output 3 by using the training packages developed under Output 1.

A special training (Activity 1.3) on mercury trade will be organized in this period as a response to the Bali Declaration launched at the Minamata COP4 in March 2022.

### *Activities under output 2*

Output 2 continues to be implemented as the main component of the project activities. All four (4) activities under the Output 2 will be undertaken in the next year. Under Activity 2.1, capacity strengthening activity will be implemented in Nepal in which gold plating sector is the largest mercury emission.

Continuous data collection will be further promoted under Activity 2.2 in collaboration with APMMN and MOEJ, particularly atmospheric monitoring using gold amalgamation method. Harmonized methodologies and operating procedures of mercury monitoring will be developed. Project partners are advised to start more regular monitoring/sampling of ambient air. The Project will coordinate with MOEJ and APMMN to assist data analysis of the collected samples.

As for the Activity 2.3, the second round of laboratory proficiency testing (PT) will be conducted by reevaluating received results and preparing the report. The individual results will be returned by September – October and final report will be published by October – November 2023. The Third round of the PT will also be initiated in collaboration with National Institute for Minamata Disease (NIMD) with new sample media. The call for expression of interest will be announced in Q4 2023.

Activity 2.4 focuses on the partnerships and collaborations for science-based policy making. The Project and APMMN will continue the reciprocal representation and joint implementation of events as much as possible. The Project will also conduct national surveys responding the proposals from partner countries. At least two human hair surveys will be completed in Palau and Maldives, and other surveys will be explored.

### *Activities under output 3*



The Project continues to upload information to the dedicated website (Activity 3.2). Communication materials such as brochures and leaflets were developed and will be made publicly available. The other reading materials such as web stories will also be developed.

County-level activities (Activity 3.3.2) will be conducted in participating countries based on the Proposal. The Project will continue to receive concepts from the participating countries and conduct local workshops and/or trainings depending on the improvement of the local situation.

Besides the planned activities mentioned above, improving the Project visibility is important task for the Project. The Project seeks occasions in existing meetings and events to disseminate the results.

#### *Project coordination, monitoring for workplan*

The Project Steering Committee (PSC) meeting will be held in every 6 months to inform project the strategic direction towards expected project outcome. It could meet either physically or virtually.

PMU will continue to monitor the project progress, results, financial status, and risks. Prior to the PSC meetings, semi-annual reports (this report) will be prepared and shared to the PSC members in Q3, 2023 and Q1, 2024.

The management response plan of the MTR has been developed in Q1, 2023. The PMU will work with UNEP internally to obtain the endorsement of the amendment, which includes the extension of the project implementation period, additional activity, adjustment of the Project targets, etc.

## 5 Annex

### 5.1 Follow-up assessment of the effectiveness of the training programme

#### *Baseline setting for effectiveness assessment*

The project is to undertake assessment of the effectiveness of the training programmes (i.e., how the programmes have brought difference to the participants) in an annual basis. In order to assess such changes, baseline information before the project is collected.

The project implemented four (4) online training programmes in between December 2020 and February 2022 for mercury monitoring and flow analysis. The participants were asked to answer the online questionnaire before the training to indicate the level of understanding. This information will be periodically monitored to assess the changes/improvements over the course of the project implementation.

#### Summary of the 1<sup>st</sup> online training programme

Title	Role of monitoring laboratory for national mercury management (#1)
Date & venue	2 – 4 December 2020, virtual meeting
Participants	Laboratory managers, technicians and technical officers who are in charge of mercury management.
Attendance record	Participants: 103 from 10 countries (Indonesia, Malaysia, Maldives, Mongolia, Myanmar, Nepal, Philippines, Sri Lanka, Thailand, and Vietnam) Observers: 2, Resource persons: 13, Host and guest speakers: 4, Organizers: 6, Secretariat: 4
Respondents	73 (after removing duplication, <u>55 responses are valid</u> , female:32, male:19 NA:4)

#### Summary of the 2<sup>nd</sup> online training programme

Title	Mercury inventory and material flow analysis (#2)
Date & venue	2, 4, and 12 March 2021, virtual meeting
Participants	Ministries/agencies responsible for monitoring/management of mercury emissions and releases to air, water, and soil. Universities, research institutes or consulting companies which are engaged in development of mercury inventory. National Focal Points of the Minamata Convention.
Attendance record	Participants: 85 from 9 countries (Indonesia, Malaysia, Maldives, Mongolia, Nepal, Philippines, Sri Lanka, Thailand, and Vietnam) Observers: 5, Resource persons: 7, Organizers: 10, Secretariat: 4
Respondents	58 (after removing duplication, <u>50 responses are valid</u> , female:30, male:18, NA:2)

### Summary of the 3<sup>rd</sup> online training programme

Title	Laboratory management for mercury survey and monitoring (#3)
Date & venue	7 – 9 December 2021, virtual meeting
Participants	Public laboratories and laboratories in universities that undertake mercury analysis (or will undertake near future) for monitoring, survey or research purposes. The laboratories which are able to obtain analytical results by themselves without external resources/supports. Laboratories participating in the 1 <sup>st</sup> round of the proficiency testing (PT) were also invited.
Attendance record	Participants: 138 from 33 countries/regions (10 from project partners, 7 from Asia-Pacific other than project partners, 16 from other regions) Resource persons: 9, Organizers: 8, Secretariat: 4
Respondents	Among 138 participants, 111 participants responded that they have not participated in the previous training programmes. They were asked the baseline questions and <u>104 responded</u> at least partially (female:59, male:45)

### Summary of the 4<sup>th</sup> online training programme

Title	Developing and updating mercury mass flow and inventory (#4)
Date & venue	19-20 January and 8 – 9 and 19 February 2022, virtual meeting
Participants	Ministries/agencies responsible for monitoring/management of mercury emissions and releases to air, water, and soil. Universities, research institutes or consulting companies which are engaged in development of mercury inventory. National Focal Points of the Minamata Convention.
Attendance record	Participants: 103 from 6 countries (Indonesia, Mongolia, Nepal, Philippines, Thailand, and Vietnam) Observers: 4, Resource persons: 9, Organizers: 5, Secretariat: 3
Respondents	Among 103 participants, 59 participants responded that they have not participated in the previous training programmes. They were asked the baseline questions and <u>58 responded</u> at least partially (female:30, male:28)

#### *Follow up assessment*

From 6 September to 29 November 2022, a follow up survey was conducted by an online questionnaire to the participants in the four (4) training programmes, which accounts for 352 participants excluding duplication. A total of 120 responses were received. After the initial screening, 115 responses found valid for the assessment (response rate: 33%). 18 of them did not remember if she/he has taken any of these trainings. 97 respondents who explicitly indicated their participation to the trainings.

#### *Survey design – baseline and follow up assessment*

The project highlights two main topics to address, i.e., mercury monitoring and flow analysis. The survey asks the participants the fundamental knowledge on mercury as well as specific knowledge for each topic.

## Survey topics

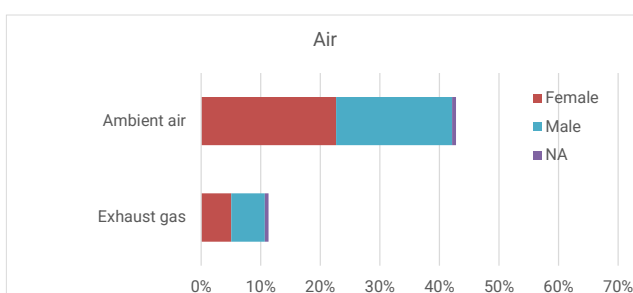
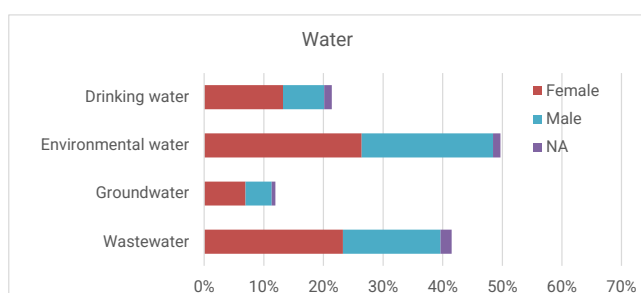
Monitoring training			Flow analysis training		
Q			Q		
1	Specific	Experience on mercury analysis.	1	Specific	Experience on mercury emission/release calculation.
2	Common	Knowledge on different mercury species.	2	Common	Knowledge on different mercury species.
3	Common	Mercury use in products and processes.	3	Common	Mercury use in products and processes.
4	Specific	Mercury detection theory.	4	Specific	Global mercury cycling.
5	Common	Mercury survey design for different sectors.	5	Common	Mercury survey design for different sectors.
6	Specific	Human biomonitoring and media selection.	6	Specific	Gold extraction methods with and without mercury.

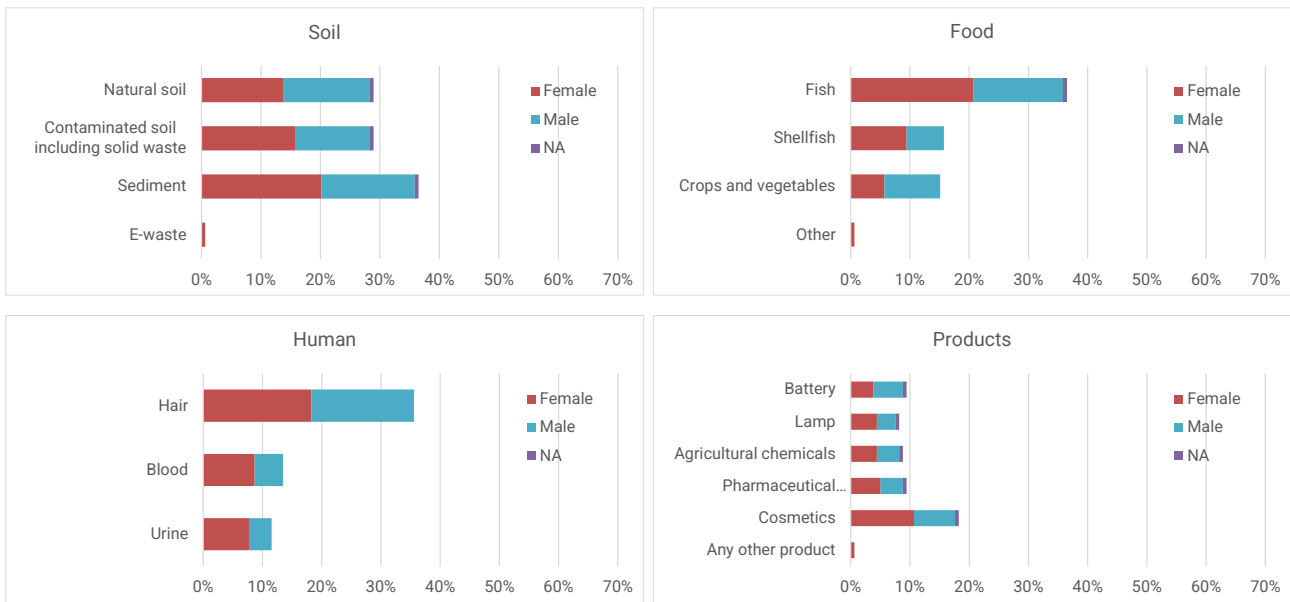
## Assessment results

### Question 1: Experience on mercury analysis and mercury emissions/releases calculation (specific)

Question 1 asked about their experiences on mercury analysis (#1, #3) and mercury emission/release calculation (#2, #4).

Question	Have you ever done mercury analysis in following media? <u>Select all that apply to you.</u>
Selections	<p>Water: <input type="checkbox"/> drinking water, <input type="checkbox"/> environmental water, <input type="checkbox"/> groundwater, <input type="checkbox"/> wastewater</p> <p>Air: <input type="checkbox"/> ambient air, <input type="checkbox"/> exhaust gas</p> <p>Soil: <input type="checkbox"/> natural soil, <input type="checkbox"/> contaminated soil including solid waste, <input type="checkbox"/> sediment</p> <p>Food: <input type="checkbox"/> fish, <input type="checkbox"/> shellfish, <input type="checkbox"/> crops and vegetables, <input type="checkbox"/> other <u>please specify</u></p> <p>Human: <input type="checkbox"/> hair, <input type="checkbox"/> blood, <input type="checkbox"/> urine</p> <p>Products: <input type="checkbox"/> battery, <input type="checkbox"/> lamp, <input type="checkbox"/> agricultural chemicals, <input type="checkbox"/> pharmaceutical products, <input type="checkbox"/> cosmetics, <input type="checkbox"/> any other product: <u>please specify</u></p> <p><input type="checkbox"/> Wildlife: <u>please specify</u></p> <p><input type="checkbox"/> Any other media: <u>please specify</u></p>

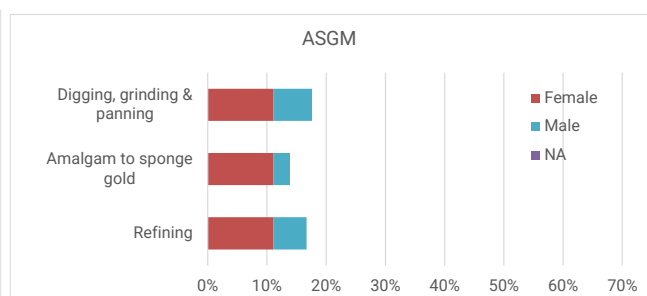
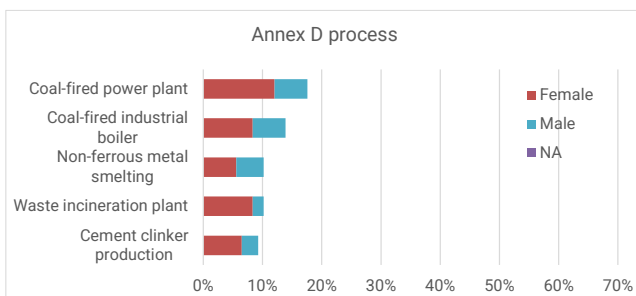


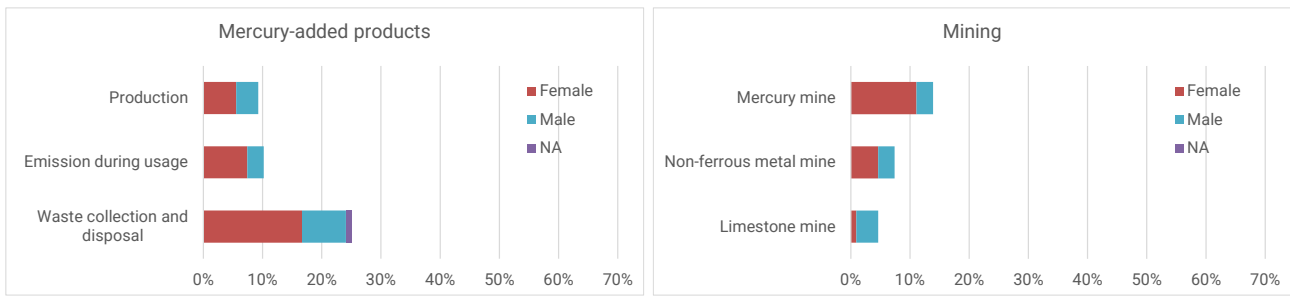


Water is predominant media that the participants choose to monitor especially environmental water and wastewater as many countries set environmental and effluent standards on mercury. Ambient air and fish are also principal media of choice for their relevance to assess mercury risks for human health and environment. Solid samples are also often the choice of the environmental monitoring including sediment sample. As for the 'Food' category, mixed meal that assesses overall daily intake was also mentioned. Human biomonitoring especially hair monitoring is also popular media for mercury analysis. As for the 'Products' category, fuel oil was mentioned. There was no specific monitoring media in 'Wildlife' category.

For the flow analysis training, the experience of mercury inventory preparation was asked.

Question	Have you ever calculated mercury emissions and releases in following sectors? <u>Select all that apply to you.</u>
Selections	Annex D process: <input type="checkbox"/> coal-fired power plant, <input type="checkbox"/> coal-fired industrial boiler, <input type="checkbox"/> Non-ferrous metal smelting, <input type="checkbox"/> waste incineration plant, <input type="checkbox"/> cement clinker production ASGM: <input type="checkbox"/> digging, grinding & panning, <input type="checkbox"/> amalgam to sponge gold, <input type="checkbox"/> refining Mercury-added products: <input type="checkbox"/> production, <input type="checkbox"/> emission during usage, <input type="checkbox"/> waste collection and disposal Mining: <input type="checkbox"/> mercury mine, <input type="checkbox"/> non-ferrous metal mine, <input type="checkbox"/> limestone mine, <input type="checkbox"/> other <u>please specify</u> <input type="checkbox"/> Any other sector: <u>please specify</u>





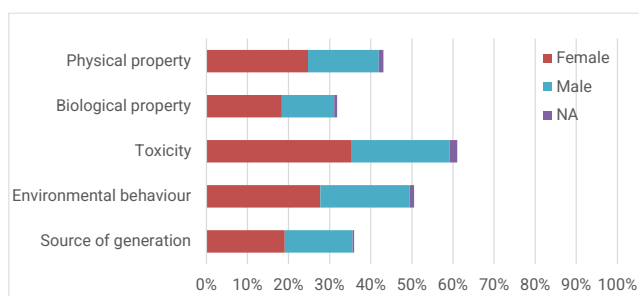
Comparing to the mercury analysis, the participants were less involved in the calculation of mercury emissions/releases. As there are not much difference in percentage among the items, such tasks might have been conducted by limited number of experts in each country.

**Question 2: Knowledge of different mercury species (common)**

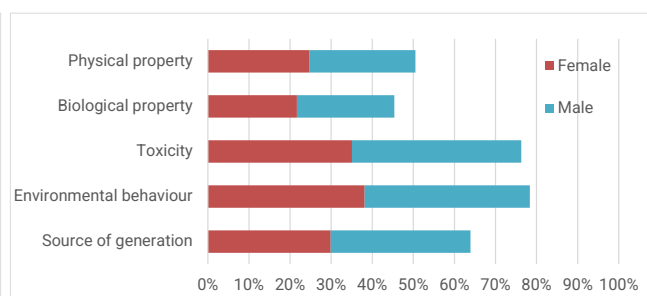
Question 2 asked about the knowledge on different mercury species for the participants.

Baseline question	Do you know the difference between elemental mercury and methylmercury in following areas? <u>Select all that apply to you.</u>
Selections	<input type="checkbox"/> Physical property, <input type="checkbox"/> biological property, <input type="checkbox"/> toxicity, <input type="checkbox"/> environmental behaviour, <input type="checkbox"/> source of generation
Follow up question	Do you think the training programme helped improving your understanding on the difference between elemental mercury and methylmercury in following areas? <u>Select all that apply to you.</u>
Selections	<input type="checkbox"/> Physical property, <input type="checkbox"/> biological property, <input type="checkbox"/> toxicity, <input type="checkbox"/> environmental behaviour, <input type="checkbox"/> source of generation

**Baseline**



**Follow up**



The participants recognized toxicity and environmental behaviour better than the other areas. In general, the level of understandings is improved, to some extent, in all areas.

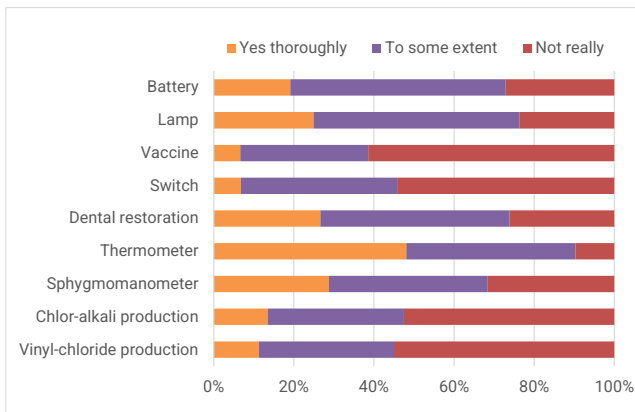
**Question 3: Knowledge on mercury-added products (common)**

Question 3 asked about the mercury use in products and processes.

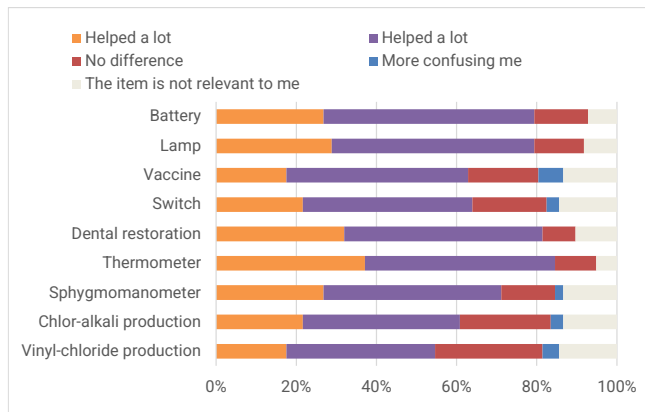
Baseline question	Are you able to explain why mercury is used in following products?
Selections	Battery, Lamp, Vaccine, Switch, Dental restoration, Thermometer, Sphygmomanometer (manometer), Chlor-alkali production, Vinyl-chloride production

	<input type="checkbox"/> Yes thoroughly, <input type="checkbox"/> to some extent, <input type="checkbox"/> not really
Follow up question	Do you think the training programme helped your understanding why mercury is used in following products and processes?
Selections	Battery, Lamp, Vaccine, Switch, Dental restoration, Thermometer, Sphygmomanometer (manometer), Chlor-alkali production, Vinyl-chloride production  <input type="checkbox"/> Helped a lot, <input type="checkbox"/> helped to some extent, <input type="checkbox"/> no difference, <input type="checkbox"/> more confusing to me, <input type="checkbox"/> the item is not relevant to me

### Baseline



### Follow up



The Participants know better about the mercury used for thermometer, lamp, battery, sphygmomanometer, etc. Knowledge on vaccine, switch, chlor-alkali, vinyl-chloride is low. This means the relevance and importance of particular products and processes in their national context. Although some items that have a better understanding, still many people who do not have a full understanding.

At the follow up stage, approx. 20 % of the participants responded that the programmes helped them a lot, but at the same time more participants also responded that there was no difference, more confusing, or not relevant. Therefore, the contribution of the programmes to the mercury-added products was relatively small.

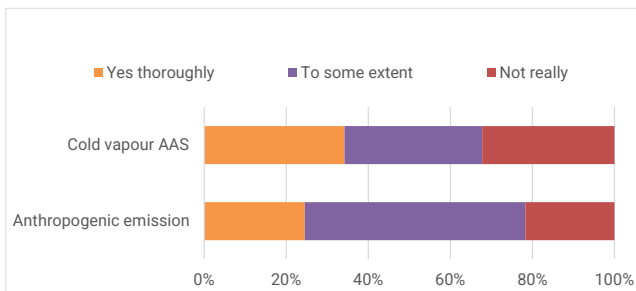
### Question 4: Knowledge on theory relevant to their tasks (specific)

Question 4 asked about the specific technical knowledge for undertaking their tasks of mercury monitoring and flow analysis. For mercury monitoring, the fundamental of mercury detection theory was asked. For flow analysis, the fundamental of global mercury cycling was asked.

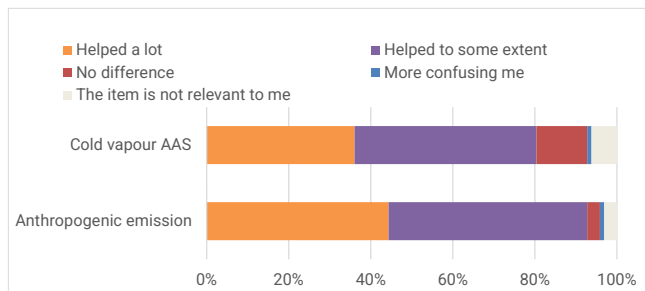
Baseline question	Can you explain the mercury detection theory in cold vapour atomic absorption spectrometry?
Selections	<input type="checkbox"/> Yes thoroughly, <input type="checkbox"/> to some extent, <input type="checkbox"/> not really
Follow up question	Do you think the programme helped your understanding on the mercury detection theory in cold vapour atomic absorption spectrometry?
Selections	<input type="checkbox"/> Helped a lot, <input type="checkbox"/> helped to some extent, <input type="checkbox"/> no difference, <input type="checkbox"/> more confusing to me, <input type="checkbox"/> the item is not relevant to me

Baseline question	Can you explain how anthropogenic mercury emissions results in the elevated mercury levels in fish?
Selections	<input type="checkbox"/> Yes thoroughly, <input type="checkbox"/> to some extent, <input type="checkbox"/> not really
Follow up question	Do you think the programme helped your understanding on the anthropogenic mercury emissions results in the elevated mercury levels in fish?
Selections	<input type="checkbox"/> Helped a lot, <input type="checkbox"/> helped to some extent, <input type="checkbox"/> no difference, <input type="checkbox"/> more confusing to me, <input type="checkbox"/> the item is not relevant to me

Baseline



Follow up



As the target audience of the mercury monitoring training included the staff of analytical laboratories, there was already some level of understanding on mercury detection theory. For the flow analysis training, most of the participants knew the global mercury cycling for certain level although many of them were not very confident. The important nature of the mercury is its global impacts as well as local poisoning risks, which are not easily recognized. Improving the fundamental science of the global mercury science is important.

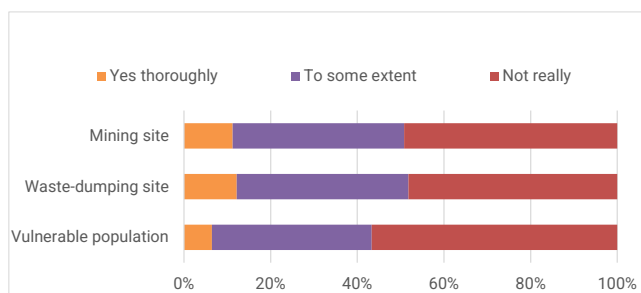
Question 5: Knowledge on mercury survey design (common)

Question 5 asked about mercury survey design for different sectors, mining sites, waste-dumping site, and vulnerable population. This skill is particularly important for researchers to develop and implement meaningful data collection system in local surveys.

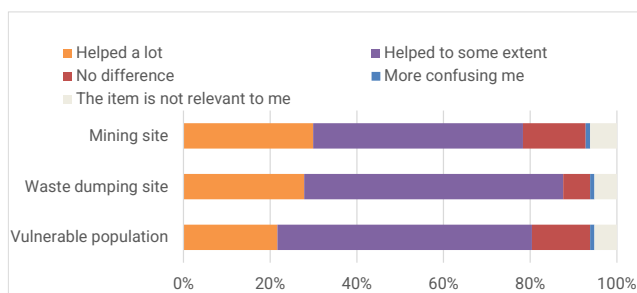
Baseline question	Can you properly select and design the monitoring methodology for following surveys?
Selections	Mining site, waste-dumping site, vulnerable population <input type="checkbox"/> Yes thoroughly, <input type="checkbox"/> to some extent, <input type="checkbox"/> not really
Follow up question	Do you think the programme helped your ability to properly select and design the monitoring methodology for following surveys?
Selections	Mining site, waste-dumping site, vulnerable population <input type="checkbox"/> Helped a lot, <input type="checkbox"/> helped to some extent, <input type="checkbox"/> no difference, <input type="checkbox"/> more confusing to me, <input type="checkbox"/> the item is not relevant to me



## Baseline



## Follow up



More than half of the participants did not have much knowledge/skills for survey design. This is one of the challenges for many countries which do not have necessary data. At the follow up stage, most of the participants felt that the programmes helped their understandings, but not in full confidence. This is a need for capacity strengthening in partner countries.

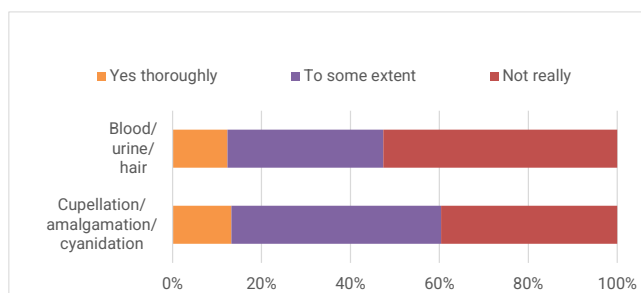
### Question 6: Advanced knowledge on mercury technologies (specific)

Question 6 of monitoring training asked about human biomonitoring and media selection. For the flow analysis training, the comparison of gold extraction methods with and without mercury was asked. The knowledge is not an immediate need for their routine tasks, but more indicative to the level of available information locally.

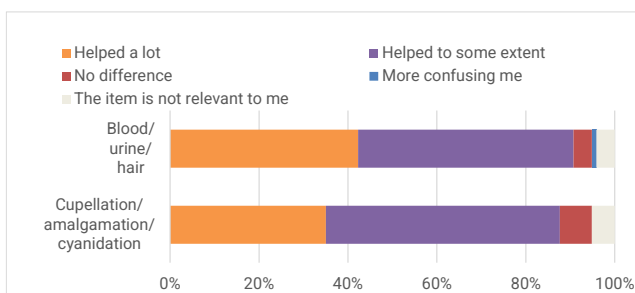
Baseline question	Can you differentiate the blood, urine, and hair testing for assessing human health risk due to mercury exposure?
Selections	<input type="checkbox"/> Yes thoroughly, <input type="checkbox"/> to some extent, <input type="checkbox"/> not really
Follow up question	Do you think the programme helped differentiating the blood, urine and hair testing for assessing human health risk due to mercury exposure?
Selections	<input type="checkbox"/> Helped a lot, <input type="checkbox"/> helped to some extent, <input type="checkbox"/> no difference, <input type="checkbox"/> more confusing to me, <input type="checkbox"/> the item is not relevant to me

Baseline question	Can you differentiate the environmental and health risks of cupellation, amalgamation and cyanidation processes for gold and silver smelting?
Selections	<input type="checkbox"/> Yes thoroughly, <input type="checkbox"/> to some extent, <input type="checkbox"/> not really
Follow up question	Do you think the programme helped differentiating the environmental and health risks of cupellation, amalgamation and cyanidation processes for gold and silver extraction?
Selections	<input type="checkbox"/> Helped a lot, <input type="checkbox"/> helped to some extent, <input type="checkbox"/> no difference, <input type="checkbox"/> more confusing to me, <input type="checkbox"/> the item is not relevant to me

## Baseline



## Follow up



The participants had certain level of knowledge although the level of confidence was not high. The training has provided relatively good introduction to them for improving their knowledge.

### *Assessment of the effectiveness*

The information collected in these surveys will serve as the basis of the future planning of the training programmes.

### Level of knowledge and the improvement

Question 3 – 6 asked the participants the level of their knowledge and the improvement through the training programmes. The knowledge on fundamental theory relevant to the tasks (in Question 4) was relatively higher than the other types of knowledge, and the training programmes somewhat contributed their improvement. This knowledge could be further strengthened by hands-on training and group exercises focused on each topic.

The knowledge of survey design (in Question 5) was still low and further strengthening is needed to achieve the Project's Outcome. This knowledge should also be strengthened by actual participation to the mercury surveys in addition to the training programme.

The knowledge of mercury-added products (in Question 3) varied significantly in different product types, which might have been affected by the familiarity to the products in question. This type of knowledge can be further improved by awareness programme (rather than training), which can be embedded in the project outreach events.

The advance knowledge on mercury technologies (in Question 6) is limited to small portion of the participants. It would be included the programme to target audiences, as necessary.

### Focus area and target people

In the monitoring programme, following Six (6) media were identified as the principal analytical items in participants: environmental water, wastewater, ambient water, sediment, fish, and hair. Based on the results, it should be noted that these media could be prioritised for further monitoring programmes.

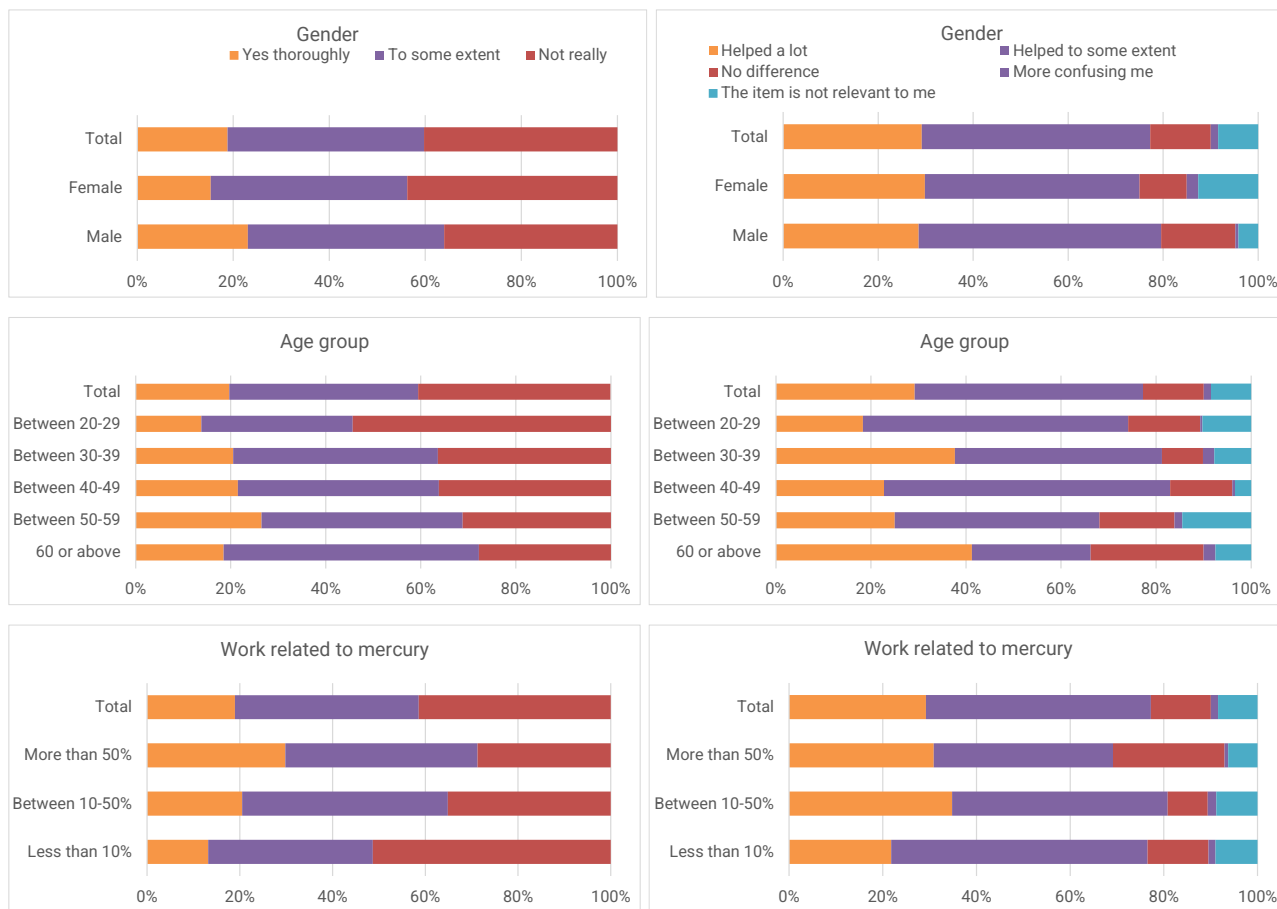
As for the flow analysis programme, target people who lead the mass flow development should be identified, and more intensive small group training should be considered for them.

### Disaggregated analysis of gender and other aspects

The responses in Question 3 – 6 were brought together and then disaggregated with gender, age group and proportion of the participants’ work related to mercury.

### Baseline

### Follow up



The baseline knowledge of female was slightly lower than the knowledge of male. The programme was equally helped both female and male participants based on the follow up assessment. As the programme itself (i.e., mercury monitoring and flow analysis) is not a gender focused topic, the increasing female participants may contribute the narrowing the gender gap.

The baseline knowledge level in youth group is lower than the other age groups. The programme was also not intended to address the youth issue, so the perception of the participants to the training programme was more or less similar at the follow up stage. This could also be addressed by increasing the participants in this age group.

The baseline knowledge was proportional to the level of the individuals’ dedication to mercury issue. It is consistent with the general expectation. The programme helped the people who are involved in between 10 % and 50 % the most. This group could be the people who need the support the most. Although the Project is not able to selectively invite the participants in this category, the programme could be designed to this target audience.

## 5.2 Trainers' training for mercury mass flow

### *Outlines of the online seminar programme*

Date & venue	14-16 November 2022, Artotel, Jakarta, Indonesia
Title	Organizing a training programme on mercury mass flow development
Objective	To familiarise the training package and develop local training programmes by the participants as the organizers and/or facilitators. It introduces templates and examples for preparing a training programme, and supplemental technical information to deepen the understanding of the topic.
Programme	<p>The trainers' training programme is composed of 5 sessions (3 and a half hours each) in 3 days. As the smaller size of the participants, more discussions and exchange of view are arranged during the sessions.</p> <p>Session 1: Outlines of Training Package</p> <p>Session 2: Technical brief of mass flow concept and analysis</p> <p>Session 3: Exercise of training programme development: Priority, target setting</p> <p>Session 4: Exercise of training programme development: Agenda and exercises</p> <p>Session 5: Promoting mercury mass flow in national context</p>
Participants	<p>Ministry/agency responsible for management of mercury emissions and releases to air, water, and soil. University, research institute or consulting company which is engaged in development of mercury inventory. National Focal Points of the Minamata Convention. Particularly, the individuals who will be directly involved in organizing and facilitating the local training programmes are encouraged to participate.</p> <p>Participants: 15 from 8 countries (Indonesia, Malaysia, Maldives, Mongolia, Nepal, Palau (online), Sri Lanka, and Vietnam)</p> <p>Local host: 1 from MOEF, Indonesia</p> <p>Resource persons: 3 (including one online)</p> <p>Organizer: 2 from UNEP (including one online)</p> <p>Secretariat: 4 from BCRC SEA</p>



## *Summary of the results*

### Opening session

The welcome speech was delivered by Mr. Mushtaq Memon from UNEP through Webex platform and Mr. Mick Saito from UNEP ROAP who present in-person. In his remarks, Mr. Mick Saito appreciated the Ministry of Environment and Forestry of Indonesia for facilitating this training programme. Mr. Mick Saito explained that mercury naturally exists in nature, but recently it has been released more and more as a result of human activities, such as mining, burning coal, and adding mercury to products, so that a lot of mercury has accumulated in the soil and sea and has the potential to harm humans and the environment.

Mr. Anton Purnomo, Director of BCRC-SEA and SCRC Indonesia, welcomed all participants and expressed appreciation to UNEP ROAP and Ministry of the Environment of Japan for approval and financial support and to the Ministry of Environment and Forestry of Indonesia for hosting this training event.

The training was opened by Ms. Yunik Kuncaraning as the Head of Sub-Directorate for Determination of Hazardous Substances Management, representing Director Substances Management, Ministry of Environment and Forestry of Indonesia. Ms. Yunik thanked everyone who attended the mercury flow analysis training event, and UNEP and BCRC-SEA as organizers and facilitators. It is hoped that all participants can benefit from this mercury training.

The opening session was followed by Introduction: Explanation of mercury training activities and activity agenda for the next 3 days, and continued with self-introduction of all training participants, facilitators and event organizers.

### Proceedings of the workshop

On the first day, the first session featured a video presentation about mercury issues and how to do mercury flow analysis, as well as an outline of training package for mercury flow analysis that can be composed (editable ppt and user's manual) which participants can later use when they become

trainers. Then it was continued with presentations made by the trainees based on the outline of the training package for mercury flow analysis training materials that had been described previously. Next was a video presentation about mass balance principles, mercury mass flow development and in the last presentation, Mr. Eisaku Toda from the Secretariat of the Minamata Convention presented Mercury Mass Flow in the context of the Minamata Convention which explained mercury in the context of the Minamata Convention, release of mercury to the environment and inventory of mercury based on the perspective of the Minamata Convention.

On the second day, the training was filled with Exercise of training program development: Priority, target setting, which began with a presentation on Developing a training program and then continued with training by dividing participants into 3 groups, each group consisting of 2 countries. At the end of the second day of the training, there was an explanation of the MIRO application by setting up the video.

On the third day, Mr. Kyaw Nyunt Maung as the training facilitator explained "Mercury Material Flow in the Context of the National Policy" with the example of the case of Myanmar in carrying out an inventory with the UNEP Toolkit and how to move from the inventory to a mercury mass flow together with its advantages because current UNEP toolkit could estimate only mercury emissions and releases from the identified sources. Participants were asked to prepare their training proposals for local MFA training in each country by developing training according to conditions and situations each country and then present their concept notes of the training. Each country presented their training notes and received comments and questions from the resource persons and the other participants. The last is the summary of the training.

### Result of discussion

Each country prepared and shared the situation of mercury management among the participants. The items included national mercury situation, mercury inventory/mass flow development, legal framework on mercury, needs/challenges on mercury management, etc.

#### Indonesia

- Needs: Establish the centralized information system related to mercury research and monitoring of mercury; capacity building for laboratory officer; determine the estimation of the use of mercury in ASGM sector; establish mercury treatment technology; and establish the guideline for hazardous substance or mercury storage.
- Challenges: Coordination between Ministry/Institution for Mercury management; control the circulation of mercury; raise public awareness of the dangers of mercury; and substitute mercury with other substances.

#### Malaysia

- Needs: For mercury inventory, establish a mercury inventory platform, enhance technical capability & competency of analytical laboratories, determine mercury presence in primary sources, and monitor mercury substance flow. For legislative measures, enhance existing import control mechanism, finalize and enforce regulation which are under development (EHS, Contaminated Land), review existing legislation (e.g., Schedule Waste & IER regulation), and develop BAT for effluent discharge.
- Challenges: No main legal framework; lack of awareness among stakeholders on managing mercury; inadequacy of technical expertise and trained personnel; and involving number of ministries and agencies for mercury management in Malaysia.

## Maldives

- Needs and challenges: Identification and quantification of mercury present in products is difficult – need to improve imports data; lack of waste handling and recycling data – need to improve recordkeeping; need better regulation of imports (esp. from cosmetic sector); need for comprehensive law on mercury management; Institutional capacity for research, monitoring and reporting, and education, awareness, training and capacity building; and infrastructure for interim storage and disposal of mercury waste.

## Nepal

- Needs and challenges: Ratification of Minamata Convention and implementation of its provisions; reduction of the use; emission and release of mercury from mercury-added products, manufacturing processes, point and releases sources; control and reduce mercury emissions and releases, where feasible; improvement of the interim storage of mercury, management of mercury wastes and contaminated sites; protection of public health, and health of exposed populations; promotion of information exchange and awareness raising; preparation of Mercury Inventory in specific sector; development of infrastructure and human resources for mercury analysis; and develop guidelines and enhance capacity building on the environmentally sound management of mercury and mercury compounds and wastes.

## Sri Lanka

- Needs and challenges: Existing national policies are adequate for management of mercury, but laws and regulations need to be further strengthened; more capacity building programs on mercury management should be carried out for Health, Industry and Education sectors and public awareness also be increased; and due to the Covid -19 pandemic situation and the prevailing economic crisis, it has become difficult to implement the process of phasing out of mercury added products and introducing non mercury alternative products.

## Vietnam

- Needs and challenges: Mercury management legislation system is incomplete creating some gaps: business avoid their responsibility in environmental protection, not comply with chemicals/ mercury safety management principles according to their lifecycle; the provisions of the Convention have not been fully internalized in the chemical law; chemicals (including mercury) are managed by various organizations/departments (07 Ministries). Weakness in close coordination among organizations involved in mercury management; lack of mechanism to report and update information from the relevant stakeholders; database on chemicals and hazardous waste is still limited and not been updated regularly by the departments; environmental monitoring: Network of national environmental monitoring managed by VEA, MONRE via the fixed/automatically air monitoring stations operated by central government and some local government. However, these monitoring networks currently are focused on basic parameters, mercury is not regularly monitored, so the environmental pollution control is still limited; and complicated procedures for application projects and limitation of technical and financial support from the international organizations for the implementation of the Convention.

Six countries have developed a draft concept note for organizing a local training programme based on its priorities and needs. It can be the basis of the actual proposal to UNEP for undertaking such programme at national/sub-national level.

## Indonesia

- Training title: Mercury mass flow training for the energy and ASGM sectors.
- Objectives: To provide information to local government about mercury mass flow; to exchange /share information related to energy and ASGM data for each region; and to increase local government awareness and understanding related to mercury emission/release and the potential emission/release.
- Participants: Ministry of Energy and Mineral resources, Ministry of Environment and Forestry; Energy and Mineral Resources services (local government); Environment services (local government); Expert.

## Malaysia

- Training title: Malaysia's training package for mercury flow analysis to identify and monitor national mercury situation in its entire life cycle.
- Objectives: To identify national mercury challenges and the extent to which the current legal, policy and regulatory framework is capable of enabling Malaysia to implement future obligations under the Minamata Convention on Mercury.
- Participants: Key Agencies for the Implementation of Minamata Convention in Malaysia: Ministry of Water and Environment, Ministry of International Trade and Industry (MITI), Ministry of Health (MOH), Ministry of Domestic Trade and Consumer Affairs (KPDNHEP), Department of Environment (DOE), Department of Occupational Safety and Health (DOSH), Department of Agriculture (DOA), Department of Mineral and Geoscience (JMG), Royal Malaysian Customs Department (CUSTOMS).

## Maldives

- Training title: Workshop for improving knowledge management within national stakeholders and frontline agencies, using mercury mass flow model.
- Objectives: To improve knowledge management for developing a more comprehensive mercury inventory and ultimately develop a National Action plan for the ratification process for the Minamata Convention.
- Participants: Maldives Customs Services, WAMCO (Waste Management Corporation), National Health Laboratory (NHL) – division of Maldives Food and Drug Authority (MFDA), Environmental Protection Agency (EPA), Ministry of Environment – POPs project, Ministry of Environment – Waste management department, Ministry of Fisheries, Marine Resources and Agriculture (MoFMRA), Ministry of Defence.

## Mongolia

- Training title: Project for improvement and strengthening of national mercury inventories by compiling various types of information.
- Objectives: To support the improvement of national mercury inventories by compiling various types of information; to introduce a comprehensive mass flow concept to outline the national mercury situation throughout its life cycle.
- Participants: Ministries/agencies, local administration office responsible for monitoring/ management of mercury emissions and releases to air, water and soil. Universities, research institutes, consulting companies, primary metal production companies, thermal power plants that are engaged in development of mercury inventories. The National Focal Points of the Minamata Convention.

## Nepal



- Training title: Awareness training programme on reduction of adverse effect of mercury on gold plating sector.
- Objectives: To protect public health and health of population associated with gold plating; to raise awareness among the workers and their occupational health and safety; to inform various stakeholders; to promote alternative and safer technology; and to develop technical guidelines for the environment sound management of mercury in the gold plating.
- Participants: Ministry of Forests and Environment (Focal Ministry), Ministry of Health and Population, Ministry of Education, Science and Technology/Tribhuban University/Federation of handicraft Association of Nepal/workers working in gold plating workshop.

#### Sri Lanka

- Training title: Training programme on mercury mass flow development.
- Objectives: To identify inflows / outflows of mercury on relevant sectors and develop national mercury mass flow; to improve the existing national mercury releases inventory; and to support implementation of the Minamata Convention in Sri Lanka.
- Participants: Relevant officials of the institutions involved and responsible for the management of mercury emissions and releases will participated in this programme.

#### Summary of the training

This mercury flow analysis training activity provided benefits such as information exchange, sharing knowledge based on cases in Minamata, and supporting the country to conduct the project. The programme identified the priorities and needs of the countries promoting mercury mass flow development, including:

- Ratification of the Minamata Convention.
- Sub-national level engagement (provinces/municipalities).
- Addressing sector not regulated by the Convention (gold plating, fisheries, etc.).
- Data collection (analysis) capacities.
- Bringing key stakeholders on board.

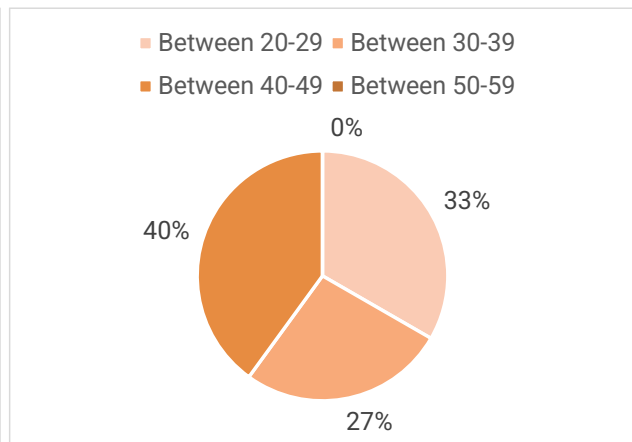
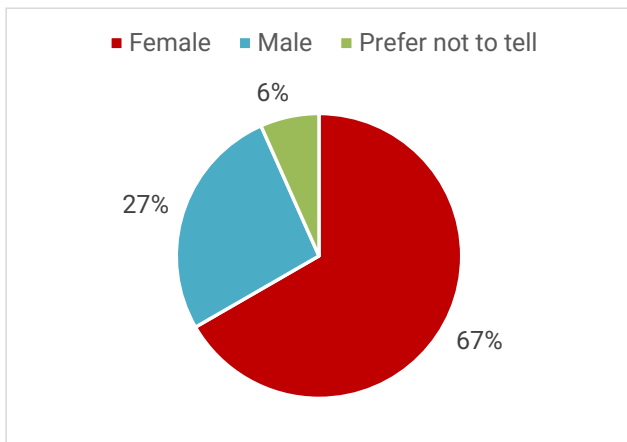
The next activity will be the national capacity to utilize mercury data by conducting local training in each country that participated in the training. Focusing on one sector is advantageous to simplify the flow diagram and to reduce the extent of the invitation. A short introductory session is also useful for raise general awareness/attention in various stakeholders. The Project could support translating the contents into local languages to improve the understanding. Also, local experts could be engaged to compile and develop mass flows. In terms of the organizing the local training programme, the integration with the monitoring training is also possible.

#### Closing remarks

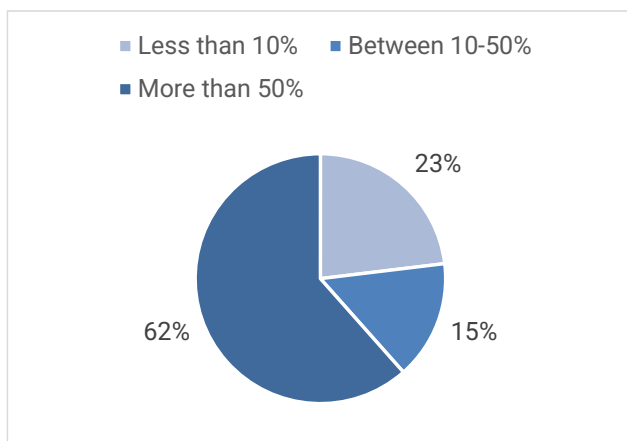
Mr. Anton Purnomo extended his deepest thanks to MOEF Indonesia and MOEJ, especially to the Government of Japan for their initiative and support for mercury flow analysis training activities. He also thanked the facilitators and all the participants who had actively participated in the training and shared information.

#### *Results analysis*

After the training programme, the participants were asked to fill the questionnaire to evaluate the programme. Out of the 15 participants, 13 have submitted the questionnaire. Regarding the gender proportions, 67 % were female and 27 % were male among the entire participants. The age was relatively distributed in 3 groups, i.e., between 20-29, between 30-39, and between 40-49.



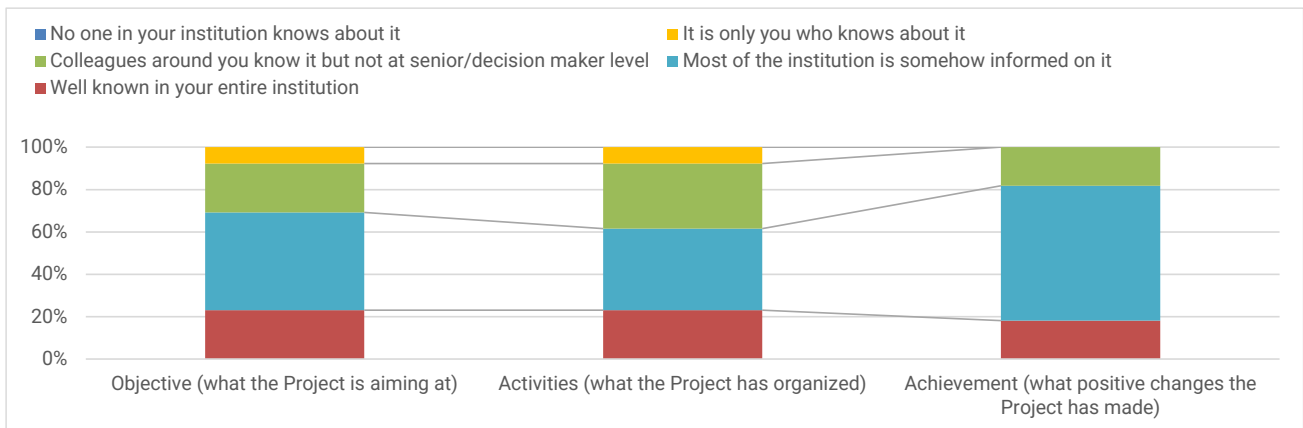
Responding to the question on how much of the routine work relates to mercury, the largest group (62 % of the respondents) of the participants answered more than 50 %, followed by less than 10 % (23 % of the respondents).



Then a question was asked on the level of the knowledge about the Project in terms of its objective, activities and the achievements.

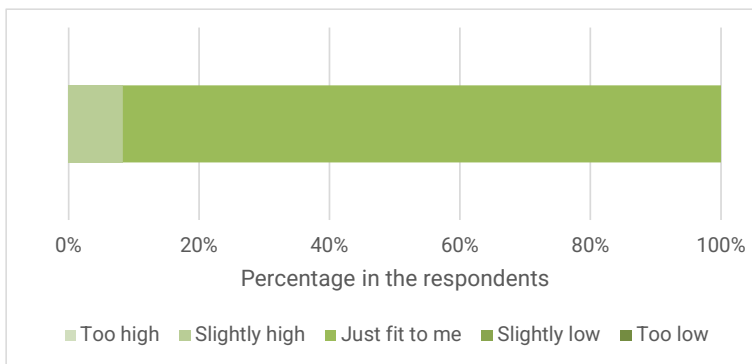
Q: Is the Project well known in your institution?

There is some level of knowledge within the institutions, but the visibility of the Project seemed to not to be very strong.



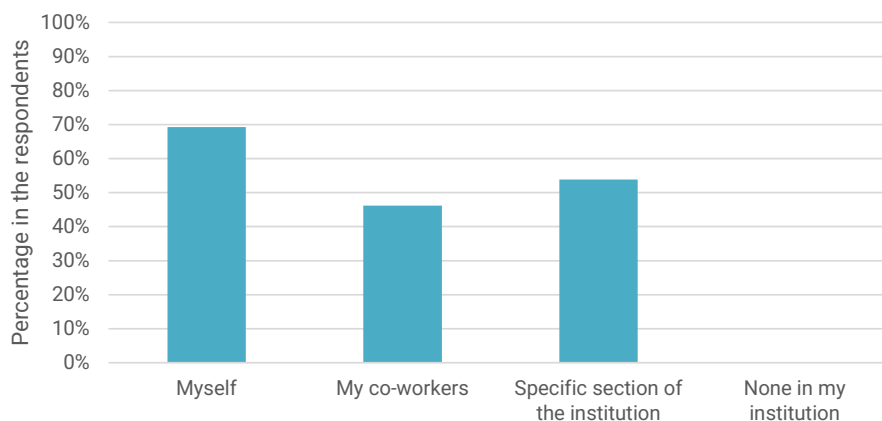
Q: Could you rate overall level of the presentations that you received in comparison with your personal competency?

Most of the respondent felt that the level of the presentations just fitted to them.



Q: Who in your institution do you think is the most benefitted from participating in this training programmes?

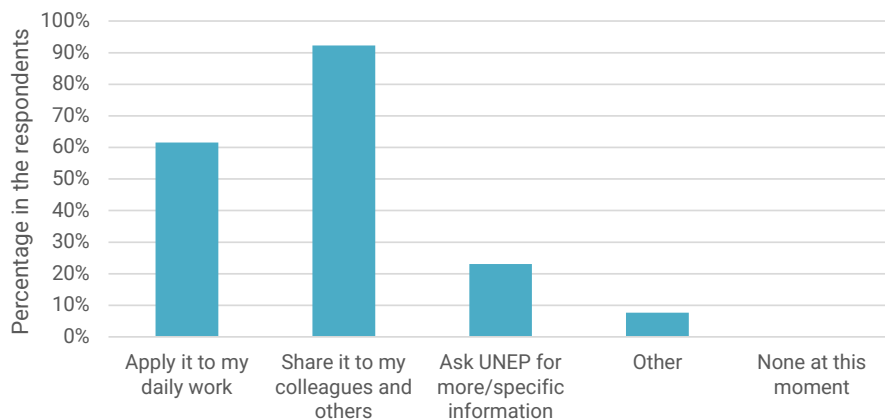
The question about the most suitable people/section in the participants' institution to participate in this programme could be answered more than once (multiple answers). Approx. 70 % of the respondents believed that the webinar was suitable for themselves, and almost half of them recommended it to their co-workers.



Q: What will you do yourself after obtaining the information in the training programmes?

The question about what the participants would do themselves about the information received at this webinar could be answered from multiple choices. Over 90 % of the respondents answered that

they would share it with their colleagues and others, whereas approx. 60 % would apply it to their daily work.



## 5.3 Trainers' training for mercury monitoring

### *Outlines of the online workshop*

Date & venue	6-8 December 2022, Asian Institute of Technology, Pathumthani, Thailand
Title	Organizing a Training Programme on National Mercury Monitoring
Objective	To familiarise the training package and develop local training programmes by the participants as the organizers and/or facilitators. It introduces templates and examples for preparing a training programme, and supplemental technical information to deepen the understanding of the topic.
Programme	<p>The trainers' training programme is composed of 5 sessions (3 and a half hours each) in 3 days. As the smaller size of the participants, more discussions and exchange of view are arranged during the sessions.</p> <p>Session 1: Outlines of Training Package</p> <p>Session 2: Technical brief of sampling and analytical skills</p> <p>Session 3: Exercise of training programme development</p> <p>Session 4: Visit to mercury laboratory and demonstration</p> <p>Session 5: For generating internationally comparable monitoring data</p>
Participants	<p>Public laboratories and laboratories in universities that undertake mercury analysis (or will undertake near future) for monitoring, survey, or research purposes. National Focal Points of the Minamata Convention. Particularly, the individuals who will be directly involved in organizing and facilitating the local training programmes are encouraged to participate.</p> <p>Participants: 21 from 10 countries (Indonesia, Malaysia, Maldives, Mongolia, Nepal, Palau, Philippines, Sri Lanka, Thailand, and Vietnam)</p> <p>Resource persons: 5 (including one online)</p> <p>Organizer: 1 from UNEP</p> <p>Secretariat: 7 from AIT</p>



## *Programme detail*

### Opening session

Dr. Guilberto Borongan, Director, AIT Regional Resource Center for Asia and the Pacific, highlighted the issue with mercury, stating that mercury is a major public concern despite its global use in industrial processes and products. He emphasized the need to be able to accurately measure and monitor mercury levels in the environment. The participants that have gathered were from relevant monitoring organizations and would need to demonstrate high proficiency levels on monitoring and measuring mercury level. He also asserted that through the project collaborations, capacity building and knowledge transfer would be strengthened and the effectiveness of national mercury monitoring by relevant institutions would be enhanced, as prescribed by Articles 17, 18, and 19 of the Minamata Convention.

Dr. Borongan expressed his gratitude towards the Government of Japan for taking the lead in the project and providing their experience and expertise in mercury monitoring. He also expressed his thanks to Dr. Mitsugu Saito for leading and facilitating the training programme. He noted that RRC.AP is playing a significant role in the implementation of mercury-related activities in the region and that the centre will continue to facilitate this important project. He wished participants a fruitful training session and thanked them for their time.

On behalf Dr. Mushtaq Memon, Dr. Mitsugu Saito welcomed all participants to the training programme and briefed them on the objectives of the training programme. Expressing his gratitude to the Government of Japan for funding this project, he noted that it is the intension of the Government of Japan to enhance the knowledge and skills and knowledge of science informed mercury monitoring and management in the region. He highlighted the needs of the project to work with key experts and focal points concerned with the management and monitoring of mercury in the respective countries of the region. Dr. Saito further hinted that; the training material that will be presented in the training will provide hands-on practical approaches for mercury analyses in multimedia format. UNEP hopes that once the participants complete this programme, they can disseminate the knowledge and materials and the project is willing to support such endeavours in

your country. He thanked all participants, resource persons for their participation and hoped that there will be active engagement in discussions and knowledge sharing.

### Session 1: Outlines of Training Package

#### Lecture 1: Mercury Science and Use

The training programme commenced with a lecture on mercury science and use. The lecture, formatted through a video, introduced mercury to the participants, covering basic information such as its physical and chemical properties. It also touched upon the effects of mercury on the human body, the types of exposure and their associated risks. The video lecture also gave a brief history on the usage of mercury in products as well as the development of mercury mining. Lastly, it touched upon the many forms and uses of mercury, from skin products to batteries.

#### Lecture 2: Outlines of the Training Package

The next lecture outlines the Training Package. The training package was made up of the user's manual as well as the PowerPoint slides that contained the lecture. The different chapters contained in the user's manual, starting with the executive summary that summarized the entire package. Chapters 3 to 5 were the most substantive and relevant to the trainers, as they gave the trainers guidance, supplementary information, and all the narration from the lecture. The material covered general knowledge, the regulatory frameworks including the Minamata Convention, management skills, the operational factors, and preparatory works needed to create a training programme. The PowerPoint slides were divided into sections to clearly indicate what the topics were about. Also, the slides could be exported to create videos, and that it was possible to translate them into the local languages by re-recording the voice-overs that accompany the videos.

#### Country Presentations: National/Laboratory Context and Challenges

Participants from each the nine participating countries (Indonesia, Sri Lanka, Palau, Philippines, Vietnam, Malaysia, Maldives, Mongolia, and Nepal) presented on the national situation of mercury monitoring, their needs, challenges, and opportunities. The laboratory profile of the Mercury and Environmental Metrology Laboratory of **Indonesia** was presented. Indonesia ratified the Minamata Convention on the 20th of September 2017. The new Mercury and Environmental Metrology Laboratory established in 2021 will support the implementation of the Minamata Convention and to understand mercury release in the environment.

- Q: When was the laboratory completed?                      A: The construction of the laboratory began in 2020 and was completed in 2021. There was an old laboratory, but the country has switched to a new laboratory.
- Q: The participants mentioned testing over 100 samples. What kind of samples are being tested? Are they regular or requested testing?                      A: The participants were not the officers at the laboratory so they were unable to answer the question and would send these questions to the laboratory personnel.
- Q: What is the quality management like and what is the schedule of testing?                      A: Similar to the prior response, the participants did not work in the laboratory and hence did not have answers to the question. Instead, they would send these inquiries to the laboratory.

The participants from **Sri Lanka** shared their laboratory presentation. They noted that there was no government laboratory, thus they were reliant on the University of Peradeniya to collect data. A wet deposition sampler was installed in the university, with the samples collected and shipped to National Taiwan University for analysis.

- Q: Does the government not have a laboratory? A: The government does have a laboratory but does not conduct mercury analysis. The universities support the analysis of mercury.

The participants from **Palau** presented their current situation, noting that they were not doing mercury testing at the moment. Instead, their focus was on the 3R movement. They noted that the Environmental Quality Protection Board (EQPB) had a laboratory that was only equipped to conduct public water analysis. They also acknowledged that the country did not have good facilities, so importance was placed on circular economy and monitoring waste. The resource persons panel noted that national situations were very diverse. They suggested some connections to be made between countries.

The participant from the **Philippines** also introduced their laboratory profile. They noted that the Environmental Management Bureau (EMB) was mandated to implement several environmental laws that included waste control. The EMB ensured that the industries operating in the country were following those standards. The resource persons noted that this lab in the Philippines was one of the top-ranking labs in the region and had recently conducted a lab.

- Q: Is this laboratory owned by the government? Do you have a specific mercury laboratory? A: There is only one laboratory for metals, but there is equipment for analysing mercury.

The **Malaysian** participants also presented their national situation. They noted that there were four different types of laboratories in the country due to the monitoring regulations of different industries. Each laboratory had their own methods and procedures depending on the type.

- Q: There are many different standards of methodology. Is there no national standard that can be set-up? A: The country does not specify which standard is to be followed. Instead, the policy controls the laboratory itself, ensuring that they fulfil the national requirements. The government regulates the accreditation of the laboratories rather than the methods.
- Q: Who is allowed to do environmental monitoring? A: The government does allow for environmental monitoring; however private laboratories tend not to do so as there is no funding for that type of analysis. They instead work on environmental impact assessments due to industrial requirements. There is no need to apply to do monitoring, laboratories are allowed to do so at their own discretion.

The participants from the **Maldives** guided the audience through their country presentations. They noted that they faced a lot of problems when implementing the Minamata Convention as there were land shortage and financial challenges when building infrastructure. Mercury testing was only carried out in the National Health Laboratory. The participants noted that there was an issue in disposing mercury waste from the tests.

- Q: What are possible solutions from the laboratory in disposing waste? A: Traditional waste and most of the laboratory waste can be treated in internal procedures. Chemical wastes can also be treated internally.

The **Mongolian** participant presented their laboratory profile, noting that plans for a new laboratory was delayed by the pandemic. They noted that Mongolia has a national programme for environmental monitoring, but mercury monitoring was not included. Thus, they have not recently taken any samples for mercury analysis.

Participants from **Nepal** noted that the Ministry of Forests and Environment was at the forefront of the Minamata Convention and that the country was in the process of ratifying the Convention. They highlighted that the Department of Environment had a laboratory for analysis and monitoring of environmental pollutants, capable of sampling 150 samples a year.



## Session 2: Technical Brief of Sampling and Analytical Skills

### Lecture 3: Mercury monitoring in the context of the Minamata Convention

Mr. Eisaku Toda, Senior Programme Management Officer, Minamata Convention Secretariat, joined the participants from an online platform to give the participants a briefing on the importance of mercury monitoring. As noted by Mr. Toda, the objective of the convention is to protect human health and the environment from the release of mercury and mercury compounds, with the convention controlling the life cycle of mercury. Mercury is a chemical of global concern due to its long-range atmospheric transport and persistence in the environment, among other things. He notes that the Convention was born out of a scientific understanding, as indicated by the number of scientific conventions and publications. Some important documents highlighted were the four Global Mercury Assessments published, with the first published in 2002 and the latest in 2018.

From the latest Global Mercury Assessment, it is noted that anthropogenic emissions of mercury are at 2,500 tons per year and makes the mercury levels in the air 4.5 times higher than at the natural level. Mr. Toda also noted some monitoring data, with a temporal trend in some developed countries as analysed in northern European monitoring stations. However, global data is missing in some parts of the world. The Global Mercury Assessment detected the north-south gradient; however, the data was not sufficient to come up with a global assessment, especially for temporal or geographical trends. Mr. Toda also commented that biota monitoring data was scarcer. One of the other undertakings of the Global Mercury Assessment is the estimation of global emissions of mercury and atmospheric concentration were modelled based on this data. He noted that the Minamata Convention provided provisions on mercury monitoring and controlled the life cycle of mercury, with the key provision being Article 19 as it provides the parties cooperation in research development and monitoring. The Convention specifies the type of monitoring in article 19 is on geographically representative monitoring and on monitoring emissions and releases. Mr. Toda further outlined the different articles in the Minamata Convention.

He also touched upon the effectiveness evaluation of the Convention as stated in Article 22. During the Conference of the Parties 4th meeting (COP4), the members agreed to begin the first effectiveness evaluation 6 years after the implementation of the convention, although it has yet to be implemented. They however, established an open-ended scientific group (OESG). The OESG was preparing summaries on monitoring data, data analysis, and emissions and releases data in preparation for the upcoming COP. Lastly, Mr. Toda identifies 6 areas of guiding questions for the monitoring guidelines.

- Q: Participants asked what the best strategy was for small islands to contribute to the effectiveness evaluation as they currently had no existing mercury data, or they were just starting to collect data. A: Mr. Toda noted that effectiveness evaluation was a knowledge undertaking, and that the agreement with the parties was to use existing data instead of spending resources on monitoring. There was no specific project for smaller countries to conduct monitoring, as most of the data was limited to developed countries. For mercury science, he noted that the monitoring data was just limited to developed countries and there was no data from small islands. The data is needed, and the effort is appreciated from these island countries in enhancing the monitoring capacity in these countries. He commented that for island countries, the more important aspects would be monitoring the environmental emission releases or the food measurement, as island countries rely on fish for nutrients.
- Q: There was a need for clarification from the participants on what the process was for the effectiveness evaluation, whether it was up to the national submission to format the findings, or the scientific body would review the formatting. A: Mr. Toda responded that this was the current topic of discussion with the OESG. The emerging idea is that the format for

collecting existing data will be provided. With their experience in international reporting, the parties are busy, and it would be difficult to collect all the necessary data in this format. There is a format, and they would talk to data managers and request them to convert their data into the format.

#### Lecture 4: Sampling of multiple media

The lectures were videos taken from the training package PowerPoint slides. Participants studied the step-by-step procedures on how to take air, soil, sediment, biota, and human biological samples. The PowerPoint slides were accompanied by videos that showed the process visually, with accompanying narration.

#### Demonstration 1: Field sampling

After participants studied how to collect samples, they were given the opportunity to do so themselves with Demonstration 1. Mr. Tatsuya Hattori and Mr. Toshihiro Iizuka, IDEA Consultants, led the participants through the atmospheric data collection. They demonstrated how to use the equipment that participants were introduced to in the video lectures. Mr. Hattori also demonstrated how to do collect hair samples to test for mercury. Some participants joined the hair sampling, with their results sent to them later after analysis. Participants asked the demonstrators questions to clarify their understanding of how to perform field sampling.

### Session 3: Exercise of Training Programme Development

#### Lecture 5: Developing a training programme

Dr. Kyaw Nyunt Maung, Expert, Environmental Compliance Consultancy Co., Ltd., started with a brief introduction to the overall picture of the future plan for capacity strengthening at national level, specifically after this trainers' training programme #2. He also highlighted that participating countries were necessary to send their proposals to UNEP if they were interested in holding local trainings in their countries. He also stated that the project was ready to support in implementing the local trainings to strengthen capacity of the national monitoring laboratories. Then, Dr. Kyaw Nyunt Maung explained how to develop a training program. He summarized the training package that was distributed to the participants, specifically Chapter 3, highlighting the content on course design and sample concept note. The concept note was key in capturing the whole idea in a short format and is a part of the proposal. He noted that the training materials cover science and technology as well as the global regulatory frameworks on mercury. Dr. Kyaw Nyunt Maung discussed the team structure and the many responsibilities required to effectively finish a training program, such as organizers, facilitators, and resource persons. He also highlighted the programme agenda, noting that organizers would need to break down the programme into sections, with lectures and demonstrations.

- Q: When we create the concept note for our training programme, is it possible to target for more awareness or for a very basic concept of mercury, as there are not many places in our country that do monitoring work? A: It depends on the resources that are available to you. If there is a chapter in the training package that is relevant to your needs, then you are free to use it. You can utilize the materials that were given and expand upon it.
- Q: We really want to have an implementable plan by the middle of next year and have a training programme in our country. A: The target can be the general public, scientists, or lab practitioners. If the idea for your programme is very diverse, then it can reach a large group of people. We do not restrict the target audience of your training programme.

- Q: What is the capacity of the training programme? A: There are no such restrictions, as you can develop the training as you see fit. Be creative.
- Q: Do we need to cover all the steps from the beginning up to the monitoring stage of mercury? A: You can create the training programme based on the materials you received and expand it to fit your purpose. There are no restrictions on the scope or the target.

This was then followed by group discussions, with participants discussing among themselves per country to begin developing their training concept notes. Participants were given free rein to discuss and create their training concept notes to be presented the following day

#### Session 4: Visit to Mercury Laboratory and Demonstration

##### Lecture 6: Laboratory Analysis

The lectures were videos taken from the training package PowerPoint slides. The PowerPoint slides were accompanied by videos that showed the process visually, with accompanying narration. Participants studied the step-by-step procedures on how to process the air, soil, sediment, biota, and human biological samples in the lab once they have been processed.

##### Visit: Mercury Laboratory in AIT

Ms. Dulyarat Sathainthammanee, Research Assistant, IDEA EEM, gave a presentation on the IDEA R&D Center. She outlined her work at the laboratory, which included taking care of the equipment as well as training AIT students to use it for their research. She also gave a brief introduction to the different equipment at the laboratory including those related to analysing mercury. Following her presentation, Ms. Dulyarat Sathainthammanee took the participants to the IDEA EEM R&D Laboratory. There, the participants viewed the equipment and had the opportunity to ask questions. Mr. Alvin Chua, General Manager, NIC Japan, demonstrated the mercury analysing equipment in the lab.

##### Demonstration 2: Ambient air and hair sample analysis

While at the laboratory, the samples that had been collected from the previous day were analysed in the mercury analyser machine as part of the demonstration.

#### Session 5: For generation internationally comparable monitoring data

##### Lecture 7: Quality control and quality assurance

The lecture also used the video taken from the training package that discussed quality control and assurance. The lecture was very in-depth and explained the theoretical procedure. The goal with this lecture was to make the data reliable.

##### Presentation: Training concepts

The participants were given time to present their training concepts and concept notes that were developed during the training. Each country presented their training notes and received comments and questions from the resource persons and the other participants. The countries that presented, in chronological order, were Sri Lanka, Indonesia, Mongolia, Philippines, Malaysia, Maldives, Nepal, and Palau.

Dr. Anurudda Kumara Karunaratna from the University of Peradeniya, **Sri Lanka**, presented the concept note. The objective of the training was to raise awareness of the Minamata Convention, as the intended participants were government officials who are not familiar with the risk of mercury.

The other objective was to provide technical support for organizations that are involved in mercury related activities.

- Q: The logistics of travel as the training programme would not be held in the main city  
A: They placed the training in the university as it is the only place with a mercury monitoring system. They also expect generous funding to attract more participants from other organizations.
- Q: They inquired as to why the objective of the training programme was raising awareness.  
A: Currently, the information and practices on mercury were scattered depending on the institution and the source of mercury they were monitoring, be it from the jewellery industry or from a recent coastal shipwreck that impacted the coastal environment. The training would allow for data sharing and knowledge transfer under the Minamata Convention among the different institutions even if they decided to work independently.
- Recommendation: The training note was rather generic and not specific to the interests of the country.

Ms. Widyaningrum Permata Siwi from the Ministry of Environment and Forestry, **Indonesia**, presented their concept note for a training programme in mercury monitoring in alignment with their National Action Plan of Reduction and Elimination of Mercury. The main objective of their training was to increase capacity for mercury monitoring in government and academic institutions by providing support and methodologies in various environmental media.

- Q: Dr. Lynwill Garth Martin noted that policy always moves fast, but practical work always lags behind. They noted that there is a need to strengthen the relationship between scientists and policy makers.  
A: The participants responded that they have already gathered the scientists before COP4. However, they would invite the scientists back during the training, as well as invite students from universities to support and attend the programme as well.
- Recommendation: The participants translate some of the video lectures into the local language and insert some in-person interactions as their plan indicated almost two full days of mostly lectures in English. It was best to maximize the opportunity presented in the training by setting aside some time during the first day to highlight the focal point and to give updates about the country's current status. It would be good to hear in-person the expectations of the different government agencies.

Mr. Barkhasragchaa Baldorj from the Central Laboratory of Environment and Meteorology, **Mongolia**, presented the concept note for a training plan to develop the national mercury monitoring programme and include it in the national environmental monitoring programme. They noted that there was a need for additional budget to monitor mercury. The proposed programme will invite government officials from agencies and ministries responsible for monitoring mercury emissions as well as universities that are engaged in the development of mercury monitoring. The proposed project would be held virtually.

- Q: Dr. Saito questioned how long each session would take over the course of two days.  
A: Mr. Baldorj responded that on the first day, there would be four, two-hour long sessions, with the second day consisting of another two sessions of the same length.
- Recommendation: When developing a training programme, certain item lines such as the objective and background needed to be interconnected to get the expected outcome.

Mr. Joel Michael Tugano from the Environmental Management Bureau, **Philippines** described the proposed training programme focused on increasing capacity in ambient air mercury monitoring and analysis. He noted that the focus was on ambient air as it was the current need of the country. The programme was designed for personnel who conduct the sampling and analysis in the

Environmental Monitoring and Enforcement Division and the Laboratory Division of EMB Regional Offices.

Dr. Goh Choo Ta from the National University of Malaysia, **Malaysia**, presented to the workshop with a short one-day online programme. The main objective of their proposed programme was to enhance awareness of the invited government stakeholders on mercury monitoring techniques. It was noted that Malaysia had signed the Minamata convention but has not yet ratified it. The programme would not be too technical as it was aimed at government officials.

Ms. Rayya Hussain from the Ministry of Environment, Climate Change, and Technology, **Maldives**, described their concept note as well, indicating their initiative to educate sample collectors from each atoll to determine the extent of mercury exposure in their country. She noted that the Maldives had no mercury monitoring initiatives, but the National Health Laboratory has the potential to do so.

- Recommendation: Samples had to be collected before any analysis could be done, which is what the training programme aimed to do. He noted that the next steps would be to find a way to analyse the collected data and suggested engaging with external institutions for the analysis.

Mr. Keshab Raj Joshi from the Ministry of Forests and Environment, **Nepal**, also presented their programme aimed to enhance capacity on mercury monitoring in their country. The training programme aimed to develop laboratory skills of the participants as well as enhance the mercury research capacity of the attending government and academic institutions. They noted that the slides and presentations would be in English, but the delivery would be in Nepali.

- Recommendation: The technical aspect of the training should be enhanced, if possible. There were also suggestions to bring universities and research personnel on board once the lab is running.

Mr. Ngirbechat Arsenio from **Palau** shared their concept note to be implemented by their institution, the Environmental Quality Protection Board. The aim of the training programme is to provide support in monitoring mercury levels by providing the necessary methodologies and skills, as there is a growing need for capacity building in the country. He noted that would be an in-person meeting, but with experts invited online.

- Q: How many participants are expected for the training? A: The audience that the exact number is unknown at the moment, but the number was not expected to be very high due to the small population of Palau.

## Closing Session

### Take-home messages

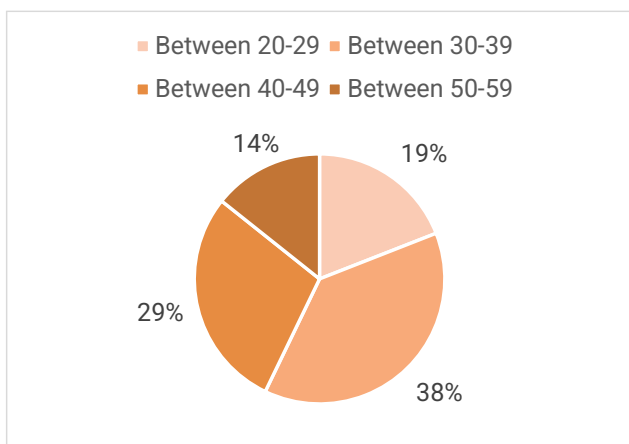
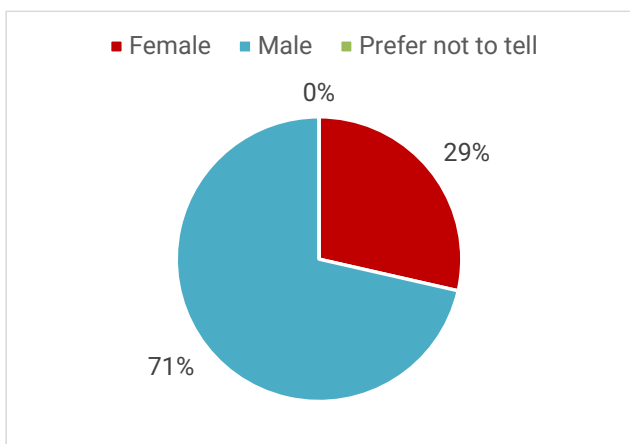
Dr. Mitsugu Saito summarized the three-day training in his message, beginning with a recap of the Japan Mercury Project. He noted its key features, including its contribution to the Minamata Convention, and noted that the training was conducted in the middle of the overall workplan. The training package that was handed out to participants, commenting that all the information was very practical and focused on the technical level. The PowerPoint slides that came with the training package were all editable and could be edited to better fit the training programmes as deemed necessary. The local trainings in the project plan for capacity strengthening and some key tips for developing their own local training programmes, noting that there were key questions that participants had to think about, including the country's priority, options, and opportunities.

### Closing Remark

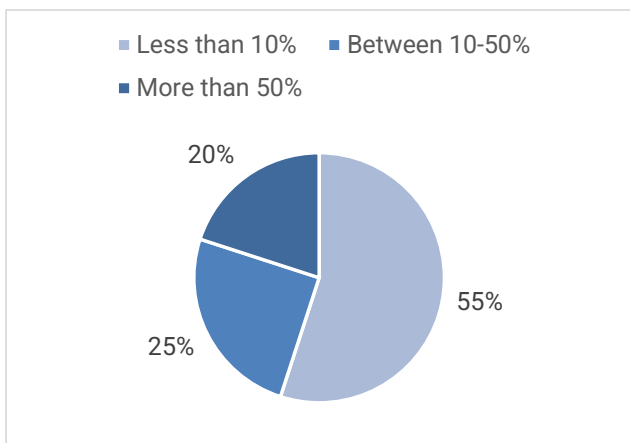
Dr. Guilberto Borongan, Director and Head of the Waste and Resource Management Cluster, AIT RRC.AP, gave the closing remarks. He conveyed his gratitude to the participants in the training programme and expressed hope for the participants to go back to their respective countries equipped with the tools learnt at the training programme. Dr. Guilberto Borongan also thanked the Government of Japan for providing their technical and financial support. Lastly, he wished for all participants to be ambassadors for the greater good in preserving the environment.

*Results analysis*

After the training programme, the participants were asked to fill the questionnaire to evaluate the programme. Out of the 21 participants, 20 have submitted the questionnaire. Regarding the gender proportions, 71 % were male and 29 % were female among the entire participants. The age was relatively distributed in all groups, but the age between 30-39 and between 40-49 combined occupied two thirds of the.



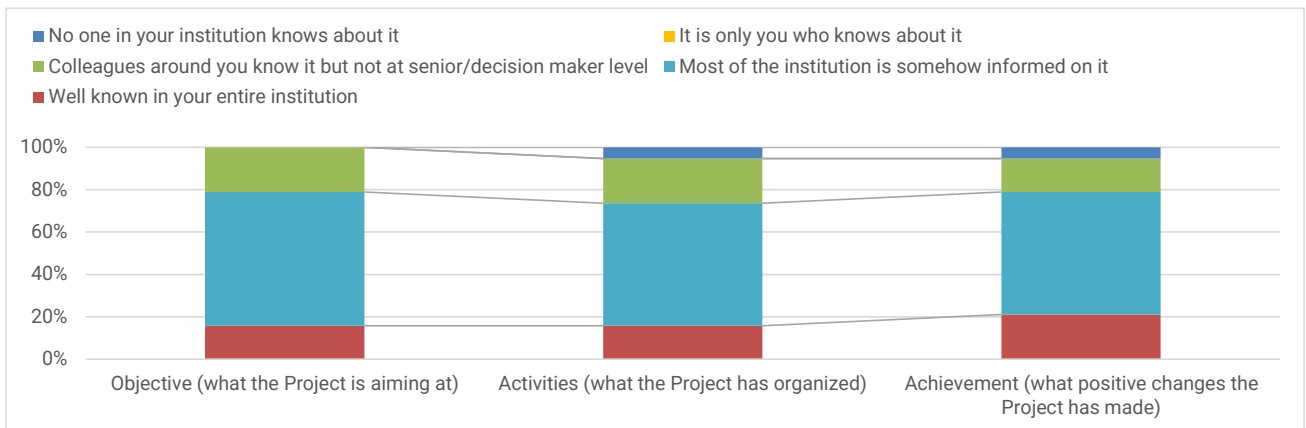
Responding to the question on how much of the routine work relates to mercury, the largest group (55 % of the respondents) of the participants answered less than 50 %.



Then a question was asked on the level of the knowledge about the Project in terms of its objective, activities and the achievements.

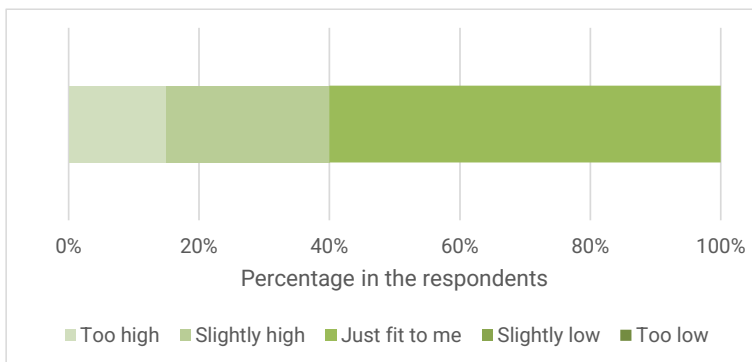
Q: Is the Project well known in your institution?

There is some level of knowledge within the institutions, but the visibility of the Project seemed to not to be very strong.



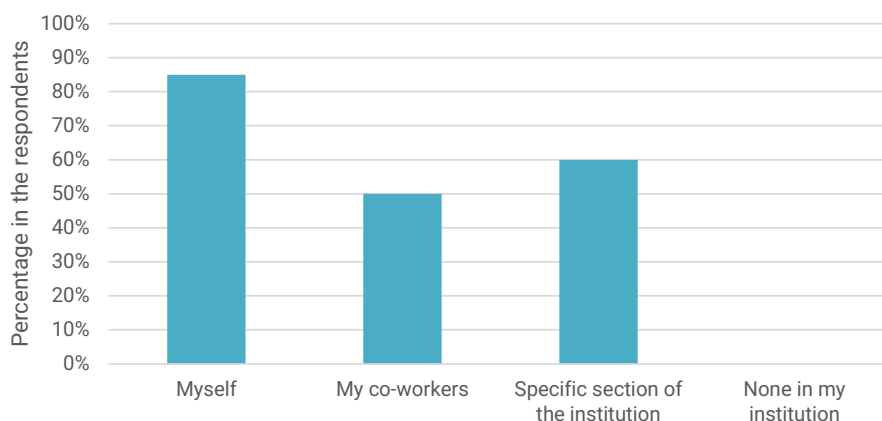
Q: Could you rate overall level of the presentations that you received in comparison with your personal competency?

Approx. 50 % of the respondents felt that the level of the presentations just fitted to them. Remaining respondents felt that the presentations were higher than their competency. It may be related to the type of the participants who are less involved on mercury issues.



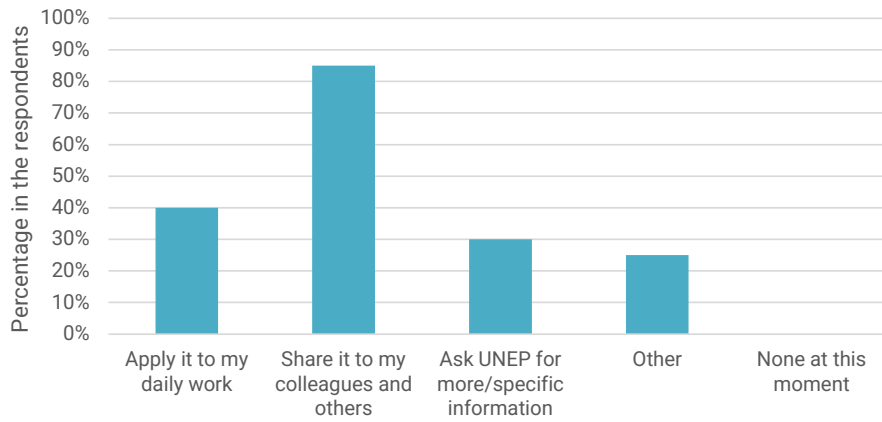
Q: Who in your institution do you think is the most benefitted from participating in this training programmes?

The question about the most suitable people/section in the participants' institution to participate in this programme could be answered more than once (multiple answers). Over 80 % of the respondents believed that the webinar was suitable for themselves, and almost half of them recommended it to their co-workers.



Q: What will you do yourself after obtaining the information in the training programmes?

The question about what the participants would do themselves about the information received at this webinar could be answered from multiple choices. Over 80 % of the respondents answered that they would share it with their colleagues and others, whereas approx. 40 % would apply it to their daily work.





## 5.4 Capacity assessment of existing monitoring laboratories (Vietnam)

### *Objective of the assessment*

This work aims at evaluating the current mercury monitoring capacity of the analytical institutions that were monitoring mercury levels in the country in order to clarify the areas in need of intensive assistance in the coming years to set a clear direction for future assistance. The identified needs and gaps will serve as the basis of technical assistance under the project.

### *Laboratories subject to assessment*

Vietnam was selected as the third survey country and Analytical Laboratory for Environment, Dioxin and Toxins - Northern Center for Environmental Monitoring (NCEM) in Vietnam Environment Administration (VEA) was identified as the analytical laboratory for this assessment. The assessment applied virtual form as was established by the Project.

Country	Monitoring facility	Organization
Vietnam	Analytical Laboratory for Environment, Dioxin and Toxins (Northern Center for Environmental Monitoring)	Vietnam Environment Administration

### *Survey methods*

The survey team, which composed of four international experts (team leader, project management, assessment of lab quality management, and assessment of lab instrumental analysis) and a coordinator, exchanged information and discussed with managers/staff/technicians of the facility on the issues regarding the research and monitoring activities taking into account the national status. The international experts were the knowledgeable in lab operation and chemical analysis particularly on mercury. They collaboratively assessed the local settings and consolidated their views in the assessment report. The coordinator worked with international experts and established relation to the laboratories subject to the survey.

The current situation of laboratories was assessed from following perspectives:

- Media subject to survey and analysis
- Forms of mercury surveyed and analysed
- Personnel and organization
- Methods and procedures for survey (sampling)
- Methods and procedures for analysis
- ISO accreditation, etc.
- Quality management system
- Samples
- Facilities
- Apparatus

- Reagents
- Measuring instruments
- Exhaust and water discharge

### Workplan and progress

The survey involves 4 steps starting from questionnaire survey, which laboratory staff filled the form as much as possible. Then, two-way real-time communication was conducted together with the collection existing lab management documents. Some follow up Q & A were also conducted. Assessment report of the laboratory situation captures the issues and challenges and include suggestions for the laboratory advancement and its support.

Activity	Sept.	Oct.	Nov.	Dec.
Questionnaire for the status of laboratory	Already done			
(Response from laboratory)	Already done			
Request for the document of laboratory (e.g., rules, manuals, SOPs and records)	●————●			
Online interview for laboratory staff		●——●		
(Acquisition of the image of laboratory by filming, photographing or video calling)		●——●		
Q & A (via email)			●————●	
Drafting assessment report			●————●	

### Questionnaire for laboratory situation

The questionnaire to the laboratories has already done when the laboratory participated in the 1<sup>st</sup> Proficiency Testing (PT) in 2021-22 period. The information was shared with the survey team and examined. This questionnaire included the items regarding current survey and analysis activities, personnel, facility and equipment, quality management, laboratory safety and environmental management. The questionnaire was sent to target laboratories, and answers were sent back prior to the online laboratory survey.

### Online laboratory survey

Two (2) types of online lab surveys were conducted: interviews with laboratory staff using a web meeting system and a virtual laboratory video surveys using a web meeting system with video. The online survey of the target laboratories was conducted at the following schedule:

- Online interview: 5 October 2022
- Virtual laboratory video survey: 12 October 2022

### Survey results

#### Current situation of the laboratory

1. Media subject to survey and analysis

NCEM laboratory has conducted mercury survey and monitoring for water (ambient water and wastewater), sediment, soil and atmosphere. Other than mercury, NCEM laboratory also conducts the survey and monitoring for targets such as general parameters, nutrients, heavy metals and organic pollutants in water (ambient water and wastewater), soil, sediment, ambient air and stack gas.

## 2. Forms of mercury surveyed and analysed

NCEM laboratory conducts total mercury analysis. Analysis for certain chemical forms of mercury such as methylmercury have not been conducted.

## 3. Personnel and organization

At the time of the survey (October 2022), there were 22 laboratory staff. The most experienced personnel had over 15 years of experience for chemical analysis, but average of the experience of laboratory staff was around 6-8 years. Training for laboratory staff is performed along with the documented training program.

## 4. Methods and procedures for survey (sampling)

The laboratory section of NCEM that was surveyed in this project has not conducted collection of the samples (Sample collection is usually conducted by another section of the institution.). However, laboratory section conducts the monitoring of ambient air and rainwater from the sample collection to the laboratory analysis.

## 5. Methods and procedures for analysis

Mercury analyses are conducted based on the international standard methods and the national methods (TCVN). The international standard methods are referred such as USEPA method, American Public Health Association (APHA), Standard Methods for Examination of Water and Wastewater (SMEWW) and Japanese Industrial Standard (JIS). For the analytical operations, the standard operating procedures (SOPs) are prepared.

## 6. ISO accreditation, etc.

NCEM is accredited the certification of ISO 9001 standard for administrative office activities and the laboratory is accredited the certification of the ISO/IEC 17025 for various media and parameters. Mercury analysis is accredited the certification for water samples (surface water, groundwater, wastewater, and seawater), soil, sediment, and solid waste sample (certificate code: VILAS 545).

NCEM is also accredited and has the certificate from Vietnam MONRE for eligibility to operate environmental monitoring services (certificate code: VIMCERTs 027).

## 7. Quality management system

Quality management system of the laboratory is prepared based on ISO/IEC 17025 requirement. To ensure analysis accuracy, this laboratory performs analyses of operation blank and certified reference material (CRM) by 10 samples. NCEM laboratory periodically participates in interlaboratory study or proficiency test for various environmental parameters include mercury analysis. The PT for mercury analyses in 1 wastewater and 1 soil sample are annually participated.

## 8. Samples

Collected water for mercury samples are stored in refrigerators (4 °C) in acidic condition (pH2). Soil/sediment sample are handled in the plastic box or zip bag and stored in the refrigerators at 4 °C. The samples are labelled with their unique IDs and managed by a quality system following with

ISO/IEC17025. SOPs for sample management and storage are prepared. The target parameter and condition (such as “acidic”) of the sample is clearly indicated by the colour of the label.

Collected water samples are stored in refrigerators (4 °C), and solid (e.g., soil, sediment) samples are stored in freezers (-20 °C). The samples are labelled with their unique ID and managed by a quality system following (but not accredited yet) with ISO/IEC17025. SOPs for sample management and storage are prepared.

## 9 Facilities

Laboratory room for heavy metal analysis including mercury is approximately 70 m<sup>2</sup>, which is separated from other analytical parameters which may interfere the trace element analysis.

To protect the damage from the fluctuation of voltage of power supply source, uninterruptible power supplies (UPS) are connected to the vulnerable instruments.

Deionized water is used for analysis, and there are no problems for mercury (and other heavy metal) analysis (it is confirmed by the routine operation blank test).

## 10 Apparatus

Apparatus used for heavy metal analysis and mercury analysis is first cleaned with acid, then with detergent, after that cleaned with deionized water. After drying, the apparatus is packed in a plastic bag to protect it from airborne dust. The number of apparatuses used for heavy metal analysis is ready to analyse maximum 30 samples per analysis operation batch (excluding the required apparatus for calibration and QA/QC).

## 11 Reagents

Pure grade or ultrapure grade reagents are mainly used for mercury analysis. In some cases, the ultrapure chemical reagent is difficult to purchase because of few suppliers. Reagents are stored in a locked room, and standard solutions are stored in a refrigerator. Reagent management procedure is described in the SOPs for sample analysis, and precise records of usage of reagents have been kept.

## 12 Measuring instruments

The following measuring instruments are used for mercury analysis:

- RA-5A (Nippon Instruments): Reduction Aeration Cold Vapor Atomic Absorption Spectrometer (CVAAS)
- WA-5F (Nippon Instruments): Thermal Desorption Cold Vapor Atomic Fluorescence Spectrometer (CVAFS) for atmospheric sample.
- iCAP-Q (Thermo Scientific): Inductively Coupled Plasma Mass Spectrometer (ICP-MS)

Although ICP-MS can be used for mercury analysis, CVAAS is mainly used for mercury analysis in NCEM. The instrument maintenance and the operation status are well organized. The status of the support of instrument provider is good, and annual maintenance is conducted by the local service provider. However, there is a case that it takes a long time to repair the instrument because of the lack of the parts in the country when it is broken.

## 13 Exhaust and water discharge

Analytical procedure that emits acid gas is performed in a fume hood to minimize impacts on the operators and the facility. Exhaust air is treated by acid scrubber to remove acid from the air. The procedures for safety management are described in the analysis SOPs.

General wastewater from the laboratory is treated by the water treatment equipment in the facility. Wastewater is treated by pH adjustment, aeration, sand filtration, UF filtration, and activated carbon treatment. Drain water after the wastewater treatment equipment is monitored for the hazardous chemicals. The residual sludge from wastewater treatment, highly hazardous laboratory wastewater such as strong acid and solid waste from the laboratory is also collected by the accredited waste disposer.

### *Discussion for future support for establishment or advance of mercury survey and monitoring*

#### 1. Summary of the current situation of mercury survey/monitoring

##### 1-a) Media and parameters

NCEM laboratory conducts mercury analysis for water, sediment, soil and atmosphere samples. Regarding water sample, NCEM conducts analysis both of ambient water and wastewater sample. Biota and human biological sample are not conducted in NCEM laboratory now. However, analytical method and measuring instruments are almost the same as for the solid samples that the analysis is performed in NCEM such as sediment, thus it seems to be easy to obtain the capability of the analysis for biota or human hair sample when it is required. However, handling of other media of human biological samples such as blood and urine will require training and experience because of the hygienic issues and characteristics of the samples when the analysis is required. NCEM laboratory also conduct analyses of other parameters than mercury in the water, soil, sediment, ambient air and stack gas samples (e.g., general parameters, nutrients and heavy metals), therefore the relative information of the samples can be obtained.

NCEM laboratory conducts analysis of total amount of mercury. Mercury analyses by its chemical forms such as methylmercury have not been conducted.

##### 1-b) Sample collection

Because there is another section for the field survey and sample collection in the institution, the laboratory section surveyed in this project usually does not collect samples. However, laboratory section conducts the survey and sampling of atmosphere and rainwater by itself.

##### 1-c) Laboratory staff

It is considered that there are enough number of laboratory staff to maintain the activity of mercury (and other environmental parameter) analysis. The range of the experience of the personnel was various. The experienced personnel are able to guide the less experienced staff with the documented training program. Even though there is a wide range of experience of the analysis among the laboratory staff, inexperienced staff will be trained by the documented periodical training program.

##### 1-d) Measuring instruments

For mercury analysis, reduction aeration cold vapor atomic absorption spectrometer (CVAAS) and thermal desorption cold vapor atomic fluorescence spectrometer (CVAFS) for atmosphere (gold amalgamation scavenger trap) are equipped. Reduction aeration CVAAS equipped in NCEM is focused on water sample, but it can be used for solid (soil, sediment) sample after digestion, so NCEM measured these digested solid sample by this instrument. NCEM is also equipped with ICP-MS which can measure mercury, but NCEM usually measure mercury by CVAAS.

The conditions of the instruments are good, and they can be kept the condition by the operation under the documented SOPs and service provider support including annual maintenance.

### 1-e) Quality management

NCEM is accredited the certification of ISO 9001 and the laboratory is accredited of the certification of ISO/IEC 17025. Documents for quality management such as quality manual, rules and SOPs for analytical operation are prepared. Analysis is performed under the quality management (QM) system and evidence (records) of the procedure are complied. Quality assurance samples such as operation blank, reference material and certified reference material (CRM) analysis are periodically conducted to ensure the result of analysis.

Well documented SOPs are prepared for proper analysis and records for each procedure such as usage of reagent, sample preparation and measurement.

### 1-f) Safety and environmental management

Safety managements for analytical operations are described in the SOPs of analysis. To deal with the accident in the laboratory, emergency shower and eye washer are equipped in the laboratory room. To protect the health of staff (and facility), analytical operations that generates toxic (acid) gases are performed in a fume food. In the fume hood, rusty point was detected. Although it may be due to the long-term use, sometimes the hood can be inadvertently used without the exhaust or acid scrubber in operation. For the sound maintenance of the facility, it is better to keep a record of the use of exhaust machine and acid scrubber.

Exhaust gas from the fume hood is treated by the gas scrubber and released into the ambient air after detoxified. General wastewater from the laboratory is treated in the treatment facility and discharged. Highly hazardous wastewater and solid waste are collected and handed over to the licensed disposer.

## 2. Suggestions for the future development of the laboratory

The following items are suggested for the future improvement of the NCEM laboratory. These suggestions are not only for mercury analysis, but also for all analysis in the laboratory.

### 2-a) Enhancement of the training program for quality management

NCEM conducts trainings to the staff according to the training program. QA/QC procedures are included in the program, but in many cases, the time for the understanding of total quality management to the staff is not taken much. QA/QC training with the operation procedure tends to relate the work and criteria based. For good quality management, understanding of "quality of analysis data" is important. For example, the principles of quality management (relating the ISO 9000 standard), error of the data (bias and uncertainty), evaluation of each procedure. The knowledge of quality management is valuable not only for administrative person but also for the person in charge of actual analytical works. The knowledge helps to find the problem (source of error) of the analysis procedure and its improvement. These knowledges are valuable not only for internal quality management but also for the support of local laboratories. Measures such as periodical lectures on total quality management can be effective. Also, the discussions among the staff about the analysis procedure are recommendable.

### 2-b) Statistical analysis of monitoring data.

NCEM collects the monitoring data in the country. These data are very valuable for understanding the situation of the environment in the country. In addition, these data can provide information about the quality of the analysis.

Quality assurance of the analysis is usually done on its operating procedure such as the confirmation of reagent blank. It is necessary, but compiled analytical data, including metadata, also can provide additional knowledge. Statistical analysis of data may reveal possible trends related to the method of analysis. For example, if it is difficult to explain the relationship between the target parameter (such as mercury) and other parameters due to environmental conditions, the related parameters may interfere with the analysis results. Such information may provide clues for improving analytical procedures. Also, if the laboratory information such as the institution, laboratory room, personnel, and laboratory conditions such as temperature and humidity is collected and compiled so that conditions of each analysis can easily be compared, which provides information about biases in analysis data. Fortunately, general PCs used in laboratories can be used for statistical analysis including multivariate analysis with free software, so not only the experts of statistics but also the analysis staff can perform statistical analysis of aggregated data (on the principal component analysis, small components that are difficult to estimate the reason is sometimes detected. There is a case that these components can indicate bias from the analytical procedure.) These data analysis for quality management does not need to be conducted on a regular basis, but the opportunity of these analysis can be valid. Also, this statistical analysis is operated to the determined data, and it cannot be available for quality control of ongoing analyses. However, it will be useful for future improvement of the analysis procedure.

## 5.5 Second-round Laboratory proficiency testing (preliminary results)

### Objective of the laboratory proficiency testing (PT)

The Proficiency Testing (PT) aims at evaluating the performance of mercury analyses conducted by the laboratories. It provides their individual proficiency levels and collective mercury monitoring capacity relative to the participating laboratories. Public laboratories and laboratories in universities that undertake mercury for monitoring, survey, or research purposes in anywhere in the world are welcomed to participate in the PT.

### Timeframe

2022			2023									
Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct
Registration			Distribution of specimen		Mercury analysis			Statistical evaluation			Report back PT	

### Outlines

**Target parameter:** total mercury and/or methylmercury (participating laboratory can choose preferred option)

**Specimen:** biota media

**Institutional arrangement:**

- NIMD: responsible for overall PT design and compiles and prepares the report.
- UNEP ROAP: supervises project implementation.
- AIT RRCAP: organises laboratory engagement and sample distribution.

### Participant profiles

Out of the laboratories identified an invited to participate in the second round of the Laboratory Proficiency Testing (PT2), 55 registered and confirmed participation increasing from 34 for the first round as the invitation was extended from Asia Pacific to global. Specimens of fish sample was prepared and shipped to registered laboratories for the PT Lab exercise scheduled for the first quarter of 2023. However, only 52 samples were successfully delivered due to logistical challenges. A total of 48 participating institutions successfully conducted their analysis and submitted their results. Among the registered laboratories, 19 were governmental institutions, 26 were universities and academic institutions, and 10 were NPOs.

Number of participating laboratories

	2nd	1st
Registered	55	34
Sample received	52	31
Result submitted	48	26



As for the regional profile, Asia and the Pacific region still keeps the largest share, but the number of participations from other regions are significantly improved. This is largely due to the global announcement made through the Global Mercury Partnership and by the Minamata Secretariat.

#### Regional profiles (total mercury)

	Registered	Sample received	Result submitted	
			2nd	1st
Africa	6	6	6	(2)
Asia and the Pacific	27	27	26	(21)
Central and Eastern Europe	4	3	1	(0)
Latin America and Caribbeans	9	8	7	(2)
Western Europe and other groups	9	8	8	(1)
<b>Total</b>	<b>55</b>	<b>52</b>	<b>48</b>	<b>26</b>

The 2<sup>nd</sup> round PT has extended the analytical parameter to methylmercury. Less laboratories are able to analyse mercury but altogether 17 laboratories submitted the results.

#### Regional profiles (methylmercury)

	Registered	Sample received	Result submitted	
			2nd	1st
Africa	3	3	2	-
Asia and the Pacific	9	9	9	-
Central and Eastern Europe	1	1	1	-
Latin America and Caribbeans	2	2	2	-
Western Europe and other groups	4	3	3	-
<b>Total</b>	<b>19</b>	<b>18</b>	<b>17</b>	<b>-</b>

#### *Planned activities*

The analytical results and other information will be compiled and statistically analysed, which will be publicly available. Individual laboratories will receive advisory notes, which will not be publicized, for further improving their analytical skills and encouraging the mercury-related activities. Some part of the results will be used for academic study.

## 5.6 Project mid-term workshop

### Outlines of the mid-term workshop

Date & venue	20-22 February 2023, Minamata Environmental Academia, Minamata, Japan
Title	Project Mid-term workshop (MTW), Project for Promoting Minamata Convention on Mercury by making the most of Japan's knowledge and experiences
Objective	To inform the progress of the Project and the mid-term results to the partner countries, and to list the necessary realignment of the activities, if any, for better addressing the needs and priorities of the countries.
Programme	<p>The workshop is composed of 4 sessions in 2 days. The third day is dedicated for the site visits in Minamata city. A Technical advisory meeting is also convened on the first day.</p> <p>Session 1: Report and review of project implementation</p> <p>Session 2: National priorities, challenges and opportunities</p> <p>Session 3: Discussions on priority setting (Small group discussions)</p> <p>Session 4: Recommendations to align Project outcome</p>
Participants	<p>National Focal Points of the Minamata Convention or ministry/agency responsible for management of mercury, and Project Advisors.</p> <p>Participants: 10 from 9 countries (Indonesia, Japan (including one online participant), Malaysia, Maldives, Mongolia, Nepal, Sri Lanka, Thailand, and Vietnam)</p> <p>Technical Advisors: 6 (including one online)</p> <p>Resource persons: 3 from the collaborating international programmes (all online)</p> <p>Observers: 2 from PUK</p> <p>Local hosts: 5 (Mayor and high school students in Minamata)</p> <p>Organizer: 1 from UNEP</p> <p>Secretariat: 4 (3 from OECC and an interpreter)</p>



### *Programme detail*

On Feb 20, Day 1, the Mid-term workshop (MTW) began with the opening remarks by Mr. Toshiharu Takaoka, the Minamata City Mayor. He welcomed the participants to the MTW and expected fruitful results in his opening speech. In his statement, it is expressed that it is an honour to be able to contribute to the efforts to solve mercury pollution related problems throughout the world.

Dr. Mushtaq Memon, Sub-programme Coordinator of UNEP ROAP, sent his congratulation. Addressing that the Project funded by the Ministry of the Environment, Japan (MOEJ) is built upon the resources in and around the Minamata area, he expressed his gratitude to Minamata City for welcoming participants. UNEP's science-based policy implementation harmonises with Minamata where various expertise relevant to mercury science belongs to. The statement closed with calls for valuable input from the participants.

Mr. Hitoshi Yoshizaki, Director of Mercury Countermeasures Promotion Bureau, MOEJ, also sent his opening statement to welcome the participants. In his statement, the importance of global measures on mercury management and the commitment of Japan to play a leading role was reconfirmed. Recalling the Project activities which had been implemented in the first term including the laboratory proficiency assessment, development of training materials, etc., the statement concluded with an expectation to identify the effective activities towards the implementation of the Minamata Convention beyond the Asia Pacific region.

Four students from Minamata High School presented their mercury study programmes, through which the students illustrated their re-learning experiences about the Minamata disease, and introduced their expected study results, which will include a production of a video clip to raise awareness among the international and domestic young generations on the mercury risks that still need to be addressed today.

### Session 1: Report and review of project implementation

The Project outline, implementation progress and deliverables of the Project were presented by Dr Mick Saito, UNEP as follows:

The project aims to contribute to the Minamata Convention on Mercury. The networking with Minamata City and the institutions in and around Minamata is a unique feature of the Project, especially access to analytical institutions is one of the highlights, aiming to enable the partner countries to reach the primary data set for their own use. The Project provides 3 outputs; Output 1 Capacity-building programme based in Minamata, Output 2 Monitoring institution network in Asia-Pacific and Output 3 Outreach of qualified information to support the Convention. Output 3 is slightly behind schedule due to the COVID-19 pandemic.

Training package was presented by Dr Kyaw Nyunt Maung:

Two (2) Training packages were introduced in the presentation; a 'training package for mercury flow analysis to identify and monitor the national mercury situation in its entire life cycle' and a 'training package for mercury monitoring to enhance national capacity to generate internationally comparable scientific data'. The packages consist of editable PowerPoint slides templates and user's manuals, covering general knowledge, international regulatory frameworks and special skills for mass flow analysis. The local context and cross-cutting topics are not included in the packages. The purpose and expected usage of the packages are to support parties and stakeholders in planning, implementing and evaluating mercury as control measures.

Virtual laboratory assessment was presented by Dr Minoru Koga:

The objective is to evaluate the current mercury monitoring capacity of the laboratory in target countries or regions in Asia and the Pacific and to clarify the areas in need of intensive assistance to set a clear direction. The identified needs and gaps will serve as the basis of technical assistance under the project for promoting Minamata Convention on Mercury. The laboratory assessment is online based. 90-120 minutes long real-time video shootings among the expert team and target laboratories are conducted based on the questionnaire sent in advance to confirm the laboratory conditions, instruments, documents and records. An email-based expert discussion is held to complete the final assessment report.

Laboratory proficiency testing programme was presented by Dr Koichi Haraguchi:

Laboratory Proficiency Testing (PT) is an effective tool to identify areas for improving laboratory testing procedures. PT enables laboratories to gauge their capabilities, to enhance their testing procedures, and to maintain a high-quality assurance standard. Data accuracy and consistency are important for policy makers to make science-based decisions. The number of government-oriented laboratories which score “satisfactory” in their performance is greater than that of academic and NGO based laboratories. The first round of PT has been completed and the second round is now underway.

## Session 2: National priorities, challenges and opportunities

The overall picture of the Mid-Term Review was explained. The purpose of the review is to assess the Project performance, to determine the likelihood of the Project and to analyse the Project progress. 3 methods (questionnaire, individual interview and desk review) are employed for the review with 8 criteria (Strategic relevance, quality of the Project design, effectiveness, financial management, efficiency, monitoring and reporting, sustainability and factors affecting performance and crosscutting issues). The result of the review will be shortly concluded. Key findings of the review were introduced according to each 8 criteria.

A. Strategic Relevance: From the UNEP side, the project is relevant to the intended targets to support the articles of the Convention From the donor side, the project is also relevant to the donated initiatives such as Moyai Initiatives by the MOEJ.

B. Quality of the project design: The project design was developed at the inception workshop to meet the needs. Resource mobilization was done smoothly as the Japanese government were fully committed.

C. Effectiveness: It is identified that the Project is in the sufficient status of the output level. Outcome indicators are not clear, and this brings different interpretations. Continuous work and the consistency on the assessment are needed.

D. Financial management: The Project finance is properly managed.

E. Efficiency: COVID-19 pandemic has made the efficiency of the Project challenging. The coordination and cooperation between the Project Management Unit (PMU) and the MOEJ have been done efficiently through the Project Steering Committee (PSC).

F. Monitoring and reporting: Periodical reports are prepared on a regular basis and are available on the website.

G. Sustainability: The Project itself and its legally binding instrument ensure sustainability by internalising activities in the mandate. The newly established mercury laboratory of the Asian

Institute of Technology will function as a regional research hub to strengthen the sustainability of the Project.

H. Factors affecting performance and crosscutting issues: COVID-19 has adversely affected the work plan of the Project. Gender equality is one of the cross-cutting issues not properly addressed in the Project. Some activities are, however, unintentionally contributed to the promotion of gender equality, which has not been incorporated into the Project with clear direction.

The review concludes that the logical framework needs to be realigned to a new Medium-Term Strategy (MTS) and addresses 6 recommendations.

- 1) Revisit the TOC and result framework to ensure the alignment to the new UNEP MTS, delivery model and evaluation framework.
- 2) Examine the remaining Project activities and adjust the duration, as appropriate, to achieve the intended results.
- 3) Prepare an exit strategy with relevant stakeholders to sustain the Project results beyond the Project period.
- 4) Strengthen Project communications and improve the visibility to demonstrate the Project results.
- 5) Identify key local stakeholders and explore the collaboration and joint implementation with them, and
- 6) Examine the Project beneficiaries in different population groups.

The country profiles were presented by each participant as the introductory part of Session 2.

**Indonesia:**

Indonesia ratified Minamata Convention on Mercury in 2017. National Action Plan and legal framework on mercury management as well as the mercury inventory and relevant standards have been developed. Documents are under preparation for the submission of Minamata Initial Assessment to the UNEP secretariat by 2023.

**Malaysia:**

Malaysia signed the convention in 2014 but has yet to ratify it. The inventory has been developed and the responsibilities for management fall under the jurisdictions of different entities. Minamata Initial Assessment has been published in 2021. The problem is that there is no regulation for mercury products and the focal point does not exist.

**Maldives:**

Ratification is in the process of legal approval in Maldives. No specific legal framework and no designated government institutions/agencies have been established, specifically for mercury management whereas general laws and regulations are existing. Minamata Initial Assessment has been developed in 2019. Import is the only source of mercury in the Maldives. Customs keep import records of product details of mercury-containing compounds.

**Mongolia:**

Mongolia ratified on Minamata Convention on Mercury in 2015. Relevant laws, regulations and National Action Plan have been developed. Minamata Initial Assessment improves the national mercury management capacity by conducting a national inventory of mercury and incorporating it into the action plan for further implementation.

**Nepal:**

Nepal expects to ratify Minamata Convention on Mercury in early 2023. Relevant laws, regulations and standards are under revision to harmonise with multilateral environmental agreements. National Action Plan for Mercury Monitoring has been developed. Data on mercury-added products may need further study for better estimation.

**Sri Lanka:**

Sri Lanka ratified Minamata Convention on Mercury in 2017. Minamata Initial Assessment has been developed. Relevant laws and regulations will be enacted in future. The Ministry of Environment of Sri Lanka has initiated National Mercury Release Inventory with the aim of identifying mercury sources and quantifying mercury releases.

**Thailand:**

New project is in the process of approval by competent authorities. Within this year 2023, a Working Group on technical support will be launched to improve New National Invention and Emission & Release Inventory using UNEP Toolkit Level 2, and Remediation Action Plan Checklist to manage and remedy contaminated sites.

**Vietnam:**

Vietnam ratified the Convention in 2017, and recent regulations relevant to mercury management are underway for amendment. Capacity building and technical support for policymakers and core technical staff are needed to improve the monitoring of compliance with the relevant regulations and the monitoring of mercury in the environment.

In the second half of Session 2, the resource persons introduced their programmes respectively as follows.

**MOYAI Initiatives of MOEJ:**

MOYAI Initiatives launched by MOEJ in 2014 were explained. MOYAI initiative consists of 2 pillars: supporting developing countries in mercury management and leading voices from Minamata. In his presentation, he elaborates on the first pillar. The pillar of supporting developing countries is a multipurpose programme called Moyai Initiatives for Networking, Assessment and Strengthening (MINAS). As it is named so, the programme consists of 3 segments; “Networking” is to build networks of mercury-related activities and information between Japan and partner countries, “Assessment” to accelerate developing countries’ efforts by supporting their situation assessments and “Strengthening” to strengthen Government to Government (G-to-G) Collaboration for Strengthening Legal Framework and the Enforcement.

**Global Mercury Partnership:**

Global Mercury Partnership was established in 2006 before the negotiation for the Convention started. The network aims to support the implementation of the Convention, to provide knowledge and science on mercury and to deliver outreach and awareness raising towards global action. Over 240 governments and entities from different sectors have participated in this network. Meetings on various topics and cross-cutting topics are organized on a regular basis. As one of the outreach activities, study reports on mercury from various sectors are released respectively on the website that is open to the public.

**Asia Pacific Mercury Monitoring Network (APMMN):**

APMMN is a cooperative network to systematically monitor mercury in air and rainwater throughout the Asia-Pacific Region since 2016. The network involves various voluntary groups including environmental ministries and federal government agencies, academic institutions and scientific

research and monitoring organizations. APMMN has 15 monitoring sites in the Asia Pacific area and 2 inter-comparison sites. The analysis of received wet deposition samples is conducted annually. Total mercury concentration has been recorded below 100 ng L<sup>-1</sup> each year which indicates a good pollution level. An inter-comparison study is conducted to study the influences of sampler types on rainwater mercury measurement. Workshops and training are annually held for capacity building.

Prefectural University of Kumamoto:

Based on the background of the declaration "Mercury-Free Kumamoto Declaration" proclaimed by Governor of Kumamoto Prefecture at the opening ceremony of the Diplomatic Conference on the Convention, the Prefectural University of Kumamoto has been engaging in mercury research. A scholarship for overseas students started in 2014, and 10 scholarship students have obtained doctoral degrees in research on mercury. The commissioned research from UNEP is composed of 2 activities; Activity 1 is to collect and compile existing mercury monitoring data in various media and make them available for scientific research, policymaking and evaluation, and Activity 2 is to enhance mercury research in partner countries to obtain relevant scientific data with due consideration of national contexts and priorities.

Minamata Secretariat:

The Convention was first illustrated in his presentation including control measures and guidance throughout the mercury lifecycle inventory and measurements written in the Articles and mercury inventory under the Convention. Activities under the Convention are reported by each member state complying with Article 21 "Reporting". COP is to periodically evaluate the effectiveness of the Convention, using monitoring and other information. COP4 established an Open-Ended Scientific Group (OESG) and mandated it to develop three plans by the coming COP5; monitoring data collection and summary, emissions and releases data summary and data analysis. Global Environment Facility, one of the elements of the Convention's financial mechanism, supports projects such as Minamata Convention Initial Assessments, ASGM National Implementation Plans, planetGOLD, medical devices, skin-lightening products and dental amalgam.

### Session 3: Discussions on priority setting

Day 2 started with session 3 to discuss the recommendations for the Project activities for the remaining period. The strategic questions for the discussion were presented as follows:

1 Implementing activities for the rest of the Project period	
Q1.1	Are there planned activities that need more time for implementation? What are the activities that should continue until the very end of the Project?
Q1.2	Should we strengthen the Project communications and improve the visibility to demonstrate the Project results? To whom should the Project reach out to disseminate its results?
Q1.3	Are there any population groups marginalised from the Project? Should the Project adjust the target audiences/beneficiaries in particular attributes being included?
2 Project result structures and monitoring indicators	
Q2.1	Is the Outcome statement clear enough to describe the Project objective? Is the alignment to the UNEP MTS appropriate?
Q2.2	Are the Outcome targets clear and achievable? Can the countries easily report the results with the means of verification and assumption proposed?
3 Ensuring Sustainability after the Project Closure	

Q3.1	Are there any local stakeholders to be potential implementing partners to the Project? Do their expertise and geographical coverage fit the Project scope?
Q3.2	How could the Project results be maintained for a longer period? Who could be possible partners to take over such roles?
Q3.3	Is there any needs for priority setting among different topics? Are there any areas of results that are not addressed? (Not included the activities that are out of the Project scope.)

The technical advisors then provided supplementary comments on the discussion points:

Dr. Bhupendra Devkota

In Nepal, institutional networking has been developed. Trainers' training is practical for the identification of the target population. Scientific data collection is needed for the integrated explanation to related institutions, media and the public especially for the targeted groups. Whatever available resources and data should be collected and shared nationally and internationally as these data and resources might be applicable for future activities. Mercury issues are fundamentally country-based, for example, target groups might differ from country to county, but the aspects of the solutions are usually common among countries.

Dr. Minoru Koga

Mercury is still used in small-scale gold mining in Southeast Asia. Assessments in laboratory capacity have been conducted for 4 laboratories. It is needed to accelerate assessment activities, targeting more laboratories in Asia Pacific area. The evaluation team is happy to visit laboratories for face-to-face assessments and discussions if the COVID-19 situation calms down.

Dr. Yasuhiro Ishibashi

Improvement of competency and skills in onsite sample collection, handling them, pre-treatment and instrumental analysis is required for high-quality research on mercury. Scholarship Graduates of the Prefectural University of Kumamoto with PhD in mercury research have returned to their countries to contribute to the field of mercury issues. These graduates are there to support their own countries for the activity implementations. The Prefectural University of Kumamoto is also happy to visit sites to assist in the enhancement of laboratory capacity in Asia.

Dr. Koichi Haraguchi

It can be difficult to provide support in mercury analysis if data is not sufficiently collected. More data is needed to identify potential gaps between the Project goals and the actual situations. The problem of lack of data is pointed out in one study of the global mercury assessment published by the United Nations in 2018, which examined over 2,000 scientific literatures on mercury. NIMD is happy to help find data and information related to partner countries if needed.

Dr. Kyaw Nyunt Maung

The remaining activities require some more time for the completion of implementation, especially in the stages of developing national inventory and monitoring as these processes must take adequate time. Most of the partner countries do not have sufficient data and data accessibility. Communication with technical advisory and other related institutions could help solve the problem of data collection. In the Project work plan, it is the time to start working on national inventory development in respective countries including the processes such as identifying the source category, collecting data, forming working groups and specifying the national needs.

Mr. Osamu Sakamoto (non-attendance to MTW, received comments below)



Feedback from those who have used the training package improves the training package. Training contents in the package need to be adjusted to the local context. EX Research Institute had identified the key area of possible future adjustments for the package and reported to UNEP. Regarding the mercury flow analysis, enough experts engage in the field of mercury in the air and water while few experts in mercury emissions and releases do. Training participants also tend to have less experience in developing material flows. This is not a critical issue. Although a wide range of mercury consultation is needed, it does not necessarily require many experts on a practical level but needs a few skilled experts with an entire understanding of mercury analysis and practitioners such as compiling the mercury flow analysis data and handling the data and information, respectively. UNEP should format the training package according to the target audience in each stage of the mercury flow development. Regarding "sustainability", political commitment would be a key to successful project implementation. It takes time to involve the related local governments, not only the Ministry of Environment but also the ministry related to trade, products and health matters. The robust explanation, for example, how material flow and national reporting under Article 21 of the Convention must be integrated into the policies, can be persuasive facts when coordinating with these government bodies. Without such coordination, the taring ends up with just a learning experience.

After the supplementary comments on the discussion points from the technical advisors, the national participants were divided into two groups to make recommendations for the Project to improve project performance for the remaining project period.

At the end of the session, each discussion group reported back to the main floor about the findings and recommendations.

#### Group A:

Regarding the remaining projects, at least Activity 1.5 to 3.2 should be completed by the end of the Project period while Activity 3.3.1 and 3.3.2 require more time and resources to be fielded. 6-month-long is not sufficient for the Activity completion. For the strategic question of Q1.2, it is proposed that promotional materials should be disseminated by social media as it is a way to raise public awareness of the adverse impacts and how to handle mercury in an environmentally friendly manner to strengthen the Project communication with ensuring visibility. For Q1.3, it is recommended that the population group should be decided by types and goals to be achieved for each activity under the Project to save time and resources. For Q3.1, potential implementing partners vary from country to country, the local authorities, however, are the most likely to be partners in the first instance. It is recommended that recognising the roles of each local authority and its units could help identify potential implementing partners. This is a general identification and further discussion is needed to identify specific authorities/units and to name them as the implementing partners.

#### Group B:

For Q1.1, The proposal by Group A was agreed upon. For Q1.2, It is important that institutional memories of efforts should be kept in a shared record in the situation where frequent personnel shifts happen. For Q2.1, the Outcome statement is clear enough and the alignment to the NNEP MTS appropriate. For Q2.2, the Outcome targets and indicators are clear and achievable at both country and regional levels. Setting a limit on the thresholds in a policy was an example of Outcome Indicator 1: The number of countries that embed scientific data collection in their mercury management policies. For Q3s, for example, after the activities under the Project were completed, organizations in Nepal are involved in some activities such as monitoring under APMMN in

succession and the consecutive involvement could keep the Project effects on for a longer period. This leads to the local sustainability of mercury measures.

#### Session 4: Recommendations to align Project outcome

The wrap up session was led by Dr Mick Saito UNEP. He summarized the national needs/challenges and points discussed during the MTW with the national participants and technical advisors, followed by the set of strategic questions and respective recommendations as follows.

Strategic questions 1) regarding the activities for the rest of the Project period e.g., the need for extending the Project period, for outreaching the Project results and for integrating any population groups which have possibly been marginalised from the Project.

Recommendations 1) includes an extension of the Project period for 12 months, focusing mainly on mercury monitoring for the Project and gold plating practices for Nepal, a dissemination of the Project progress/results to high-level officers, a training focus on the younger generation, and a periodic updating of the training package according to the users of the package.

Strategic questions 2) regarding the Project results and outcome indicators, e.g., the national mercury management policies embed scientific data collection, the mercury monitoring data are regularly published, and any new/adequate legislation is in effect on mercury management.

Recommendations 2) include a reassessment/adjustment of outcome indicators according to the situations of the countries, a website other than the national government to be identified to upload information on mercury, and a necessity for support for the countries to submit reporting.

Strategic questions 3) regarding how to ensure sustainability after the Project completion, e.g., potential implementing partners at the national level, and potential partners to take over the roles of maintaining the Project results.

Recommendations 3) includes potential partners after the Project completion, e.g., APMMN being a platform for atmospheric monitoring, PUK providing research opportunities for PhD candidates, NIMD providing proficiency testing programme continuing to support the laboratories overseas, AIT providing a regional monitoring hub for training and research for national staff, Minamata Academia for general support. Regarding local implementing partners to be identified, the situation is different in each country.

#### Site Visit

One-day field trip to historical sites and institutions relevant to mercury management and restoration was organized on Day 3.

##### JNC Corporation

JNC Corporation Minamata Factory complex manufactures liquid crystals, electronic materials and fine ceramics today. It was the source of methylmercury discharged into Minamata River and spread to Minamata Bay resulting in the Minamata disease incident. The company continues to compensate the victims according to the lawsuits and political reconciliation.

##### Eco Park Minamata

Eco Park Minamata is built on the reclaimed land of Minamata Bay, once polluted by methylmercury. The Minamata disease memorial is situated on the waterfront. The entire area of reclaimed land is developed to be botanical parks and sports fields today.

## Minamata Disease Municipal Museum

Minamata Disease Municipal Museum collects and archives valuable materials about Minamata disease for the purpose of handing down the lessons of Minamata disease to future generations. Historical displays and storytelling are available. Students from primary schools and junior high schools in Kumamoto prefecture visit the museum for pollution studies.

## Kumamoto Prefectural Center of Environmental Education

Kumamoto Prefectural Center of Environmental Education and Information is a knowledge hub for environmental learning for the public.

## RBS Co., Ltd

RBS Co., Ltd is an organic fertilizer manufacturer made of human waste with bioreactor systems. The facility is privately owned but operates for the public sector, i.e., RBS's unique business model. The bioreactor systems contribute to clean water and improved hygiene for the remote areas without sewage systems, at the same time as income generation from sales of fertilizer.

## Act-B Recycling Co., Ltd.

Act-B Recycling Co., Ltd. is one of the designated dismantling facilities for refrigerators, air conditioning, washing machines and television sets. These 4 items of home appliances are collected from Kyushu region to be brought to this facility for shredding with appropriate management of CFCs and other hazardous substances.

## National Institute for Minamata Disease (NIMD)

National Institute for Minamata Disease (NIMD) was established in 1978 in Minamata City to conduct comprehensive medical research to improve medical treatment for the victims of Minamata Disease. NIMD carries out international, social and natural scientific research and has experienced a number of cooperation projects with developing countries. The results of the hair sampling analysis were reported to those who had submitted their hair samples.

## *Technical Advisory meeting*

The object of the TA meeting is to exchange the views from multiple angles for better Project planning for the rest of the implementation period as well as to share the views in the TA meeting with the participants as supplements for their discussion before and during the discussion session.

## List of Technical Advisory

	Expertise	Name	Position	Organization
1	Ecotoxicology	Dr. Bhupendra Devkota	Founder Principal	College of Applied Sciences, Nepal
2	Analytical chemistry	Dr. Koichi Haraguchi	Chief	National Institute for Minamata Disease, Minamata
3	Environmental science	Dr. Kyaw Nyunt Maung	Environmental Impact Assessment Expert	Environmental Compliance Consultancy Co., Ltd., Myanmar
4	Environmental science	Dr. Yasuhiro Ishibashi	Professor	Prefectural University of Kumamoto, Kumamoto

5	Analytical chemistry	Dr. Minoru Koga	Director General	Minamata Environmental Academia, Minamata
6	International relations	Mr. Osamu Sakamoto	Senior Consultant	EX Research Institute Ltd., Tokyo

#### Dr. Bhupendra Devkota

For strategic question Q1s, some activities should complete within the given time in terms of linkage with other activities. Other activities, however, might need 6-12 months extension due to technical difficulties. For Q1.3, moral culture system should be developed and released for the occupationally exposed groups. For Q3.1, In Nepal, some organizations initially work together as the implementing partners but also there could be potential implementing partners in terms of visibility and feasibility. This would be applicable in other countries with some adjustment of technologies to be used according to their needs. Scientific organizations and laboratories could be implementing partners but, in his opinion, congress and government agencies should also get involved as they work closely with exposed population groups. For Q3.2, sufficient capacity building and accountability would lead to a longer effect of the Project.

#### Dr. Minoru Koga Koga

Nepal could be a model country. In one of the projects which Dr. Koga participated, 2 laboratories were visited (for biological sample analysis and medial sample analysis, respectively). Those case studies should be incorporated to the laboratories evaluated from the aspects of occupational health exposure and environmental circumstances. The treatment of mercury waste and its recycling system should be established in Nepal as well as confirming the general understanding of mercury.

#### Dr. Yasuhiro Ishibashi

Some comments on collaborating activities with Nepal could be given according to Strategic Questions. Time to go through the Discussion Points is needed. Some comments on collaborating activities with Nepal could be given according to Strategic Questions during the TA meeting but more comments throughout the Discussion Points were to be given on Day 2 at MTW.

#### Dr. Koichi Haraguchi

NIMD implemented Laboratory Proficiency Testing last year. Testing items and samples were produced. Networking between laboratories would help the overall data quality at an ensured level. AIT would be a platform for such networking.

#### Dr. Kyaw Nyunt Maung

Comments on Q1 and 3 could be provided but time to go through the Discussion Points is needed. Some brief comments throughout the Discussion Points were to be given on Day 2 at MTW.

#### Mr. Osamu Sakamoto

Regarding the remaining activities, it is important to obtain feedback from user countries who have completed training in line with the provided materials of the package. In fact, a training package was used for activities in Nepal, and it is found that the materials were very useful. At the same time some adjustments, however, were made to suit to the local context. The training package should be modified on a regular basis from a sustainability perspective. It is requested that UNEP asks user countries to give any feedback and share them with other experts. The calculation could be demonstrated by a group of 2-3 experts in a laboratory. Rather, the skills for data collection and

analysis should be developed for effective country improvement. In the initial stage, it is important to implement activities to obtain a general understanding of exposure and material flow if targeting a large audience. For the further implementation of the activities, 2 recommendations are provided. One is that more technical steps for data collection and calculation should be considered in the Project. This means the targeting groups should be narrowed down to discuss more specific topics. The other is that coordination should be embedded into the work plans. The Project would end up with limited exercise without coordination to build facilitated communication. In his experience, getting the key ministries and agencies involved in the Project was not straightforward, therefore adequate explanation would be required such as how useful the material flow is and how it can be used for the national reporting under Article 21 of the Convention in order to obtain the understanding of the Project from the related organisations and communication including sharing information.

### Results analysis

To extract merits and shortcomings of the MTW, a questionnaire survey was conducted at the end of the MTW programme. The survey items included as follows, besides the participants' background such as nationality, gender and work-related information.

- Visibility of the Project i.e., whether the Project is well known in the participants' institution;
- Alignment of the Project i.e., how far the Project is aligned with the national priorities/strategies of the participants, relevance of the focus of the Project to the national context and clarity and achievability of the Project Outcome; and
- MTW i.e., the most interesting presentation of the MTW, how to make use of the information obtained from the MTW in the participants' countries (Indonesia, Japan, Malaysia, Maldives, Mongolia, Nepal, Sri Lanka, Thailand and Vietnam)

#### Gender

Male	Female
3	6

#### Age range

19 or below	0
Between 20-29	2
Between 30-39	3
Between 40-49	2
Between 50-59	2
60 or above	0

#### How much of your routine work related to mercury?

Less than 10%	3
Between 10-50%	3
More than 50%	3

Is the project well known in your institution?

	Objective	Activities	Achievement
Well known in your entire institution	4	2	3
Most of the institutions are somehow informed on it	3	5	4
Colleagues around you know it but not at senior/decision maker level	2	2	2
It is only you who knows about it	0	0	0
No one in your institution knows about it	0	0	0

Could you provide your view on how far the project is aligned with national priorities and/or strategies of your country?

Project is well aligned with national proprieties and/or strategies	1
Project well considers the national priorities and/or strategies to address as appropriate	4
Project considers national priorities and/or strategies and somehow (but not fully) tries to align with them	3
Project understands national priorities and/or strategies somehow but the alignment is limited	1
Project does not consider national priorities and/or strategies at all	0

The project particularly focusing on scientific data collection by mercury flow analysis and monitoring.

Project focus is valid and fully aligned with your national context	0
Project focus is valid and takes your national context into account	4
Project focus is valid and takes your national context somehow (but not fully) into account	3
Some (but not all) project focus is valid for your national context	2
Project focus does not consider you national context at all	0

Are the outcome targets clear and achievable? Can your countries report the results with the means of verification and assumption proposed?

	Number of countries that embed scientific data collection in their mercury management policies.	Number of countries that regularly put information on mercury monitoring available via the information portal.	Number of new, adequate policies and legislation in effect on mercury management.
Yes/maybe	4	5	6
Not sure/rather difficult	4	2	1
No/not possible	1	2	2

What will you do yourself after obtaining the information in the workshop?

Apply it to my daily work	6
Share it to my colleagues and others	8
Ask UNEP for more/specific information	3
None at this moment	0
Other	6

## 5.7 Minamata Online Season 2 seminar

### *Outlines of the online seminar programme*

Date & venue	30 June 2022, virtual meeting
Title	Strengthening mercury research capacity in developing countries for science-based policy making
Objective	To Introduce ongoing activities implemented by UNEP to assist scientists, researchers and policy makers towards science-based policy making on mercury management.
Programme	The online seminar is organized by the Minamata Convention Secretariat. Online registration is provided at Minamata Convention Secretariat website. The presentation is based on the results of the Project activities that contribute the purpose of this seminar.  Four (4) topics are presented by relevant experts.
Participants	National Focal Points of the Minamata Convention. Ministries/agencies responsible for monitoring/management of mercury emissions and releases to air, water and soil. Universities, research institutes or consulting companies working on mercury science such as monitoring and inventory.  Participants: 80 (female 43, male 36, other 1)  Resource persons: 3  Organizer: 7 (4 from Secretariat of the Minamata Convention, 3 from ROAP)  Secretariat: 3 from OECC



### *Summary of the results*

The online seminar “Strengthening mercury research capacity in developing countries for science-based policy making” was organized by the Secretariat of the Minamata Convention as part of the Minamata Online Season 2. For sound mercury management, scientific knowledge is essential to develop and implement national policy. Capacity building for comparable data collection, more accurate emission inventory, and planning and execution of mercury research that addresses national needs and priorities helps developing countries to figure out the mercury issues of its own context.



The webinar introduced ongoing activities implemented by UNEP ROAP to assist scientists, researchers and policy makers towards science-based policy making. It was announced by the Minamata Secretariat and each participant registered the online platform provided by the Secretariat. The registration data and the questionnaire's answers were analysed for evaluation purposes.

The webinar began with the opening remarks given by Mr. Eisaku Toda from the Secretariat. The Minamata Online consists of three (3) parts, of which the science part will be co-organized with ICMGP. Following four (4) topics were presented:

- 1. Laboratory proficiency testing for mercury – strengthening mercury analytical capacity meeting international standard
- 2. Virtual laboratory assessment methodology – Innovative approach under COVID-19 setting
- 3. Mercury inventory and mass flow analysis – Improving national mercury inventory in Indonesia
- 4. Comprehensive mercury survey for solid waste disposal facilities – Results and challenges

A post-training questionnaire survey using the online meeting platform was conducted.

### *Presentations and Q&A*

#### Introduction (Dr. Mitsugu Saito, UNEP ROAP)

The presentation provided a brief introduction of the Project for “Promoting the Minamata Convention on Mercury by making the most of Japan’s Knowledge and Experience.” It is a 5-year project (2019-2024) sponsored by the Ministry of the Environment, Japan, and implemented by UNEP ROAP.

The Project features to contribute to the implementation of the Minamata Convention (particularly, Articles 17-19), connect the Minamata Convention and Minamata City, and network analytical institutions.

There are a number of partner countries and organizations including the Minamata Environmental Academia in Minamata City, the National Institute for Minamata Disease of the Ministry of Environment, Japan, and the Asia Pacific Mercury Monitoring Network.

The Project is underway in the middle of the workplan, which is composed of three (3) Outputs, with good progress of more than halfway done for Output 1 of capacity building. Output 2 is on monitoring institutions including lab assessments and proficiency testing. Output 3 is for outreach.

#### Laboratory proficiency testing for mercury – strengthening mercury analytical capacity meeting international standards (Dr. Koichi Haraguchi, National Institute for Minamata Disease, Japan)

Proficiency testing (PT) is to examine laboratories’ competencies by inter-lab comparison using sub-samples of homogenized reference materials.

The monitoring guidance prepared by the Minamata Convention recommends that the Parties should conduct quality practices and participate in inter-lab comparison programmes.

The 1st round of mercury laboratory PT provided by UNEP ROAP was conducted for the public and university labs between February 2022 and August 2022.

- The human hair samples were used in the PT and 26 labs delivered the test results out of 34 registered labs.

- The data from 18 labs, 69% of the 26 labs, obtained satisfactory data for the evaluation. External PTs can lead to corrective actions for internal quality controls such as preventing human errors, minimising systematic errors, and minimising random errors). Regular participation in PTs is necessary for lab competence.

#### Q&A

- Q: For the hair samples, can they be used in future lab intercomparison? Human hair samples will be useful in the future QC? A: The next test samples should be environmental samples. The samples will be very useful to the lab QC. Comment: UNEP ROAP and NIMD are considering the 2nd round of the PT lab experiment to improve the results. Regular participation in the PTs is useful for QC.
- Q: What is the procedure for laboratory participation in PT? A: Participants send an email to express their interest. Most public labs such as local governments and universities are granted the PT participation free of charge. Please contact the Project to express the interest.
- Q: Can we have air samples for PT in the future? A: The Project is planning to rotate the media, but air samples are not planned at this moment.
- Q: I'm working for a Libyan petroleum institute, and we are interested in participating in the PT. I would like to know how to communicate with you and what you would advise me. A: The Project will circulate an online questionnaire at the end of this session. You can reply to it including your intention in a free text box. The Project will reach out to you then.
- Q: Besides UNEP initiatives, is PT for mercury is conducting by any other organization? A: This is the first PT in the Asia Pacific region.
- Q: It is a great initiative for making the mercury research results more authentic. A: This PT is focused on the public laboratories and academia to strengthen their capacity. There was another PT conducted by UNEP Geneva globally, but it is mainly focusing on the private laboratories and laboratories in developed countries.
- Q: What PT was conducted in which year? A: Please find the following link. It is reported in 2018.  
<https://wedocs.unep.org/bitstream/handle/20.500.11822/28381/LabAssess.pdf?sequence=1&isAllowed=y>; UNEP in Geneva conducted PT in 2018. Comment: Just as information, IAEA is organising regular PTs on marine samples (biota and sediment) free of charge.

#### Virtual laboratory assessment methodology – Innovative approach under COVID-19 setting (Dr. Minoru Koga, Minamata Environmental Academia, Japan)

The survey aims to evaluate the current status and monitoring ability for mercury in national analytical laboratories, which have been affected by COVID-19.

For the targeted counties and labs selected by UNEP ROAP, questionnaires and real-time video shooting were used for the evaluation.

Surveys were conducted in laboratories in Nepal and in the Philippines.

- The survey teams consisted of experts in mercury analysis, lab quality management, instrumental analysis, and local coordinators, as well as secretariats and video shooting supporters.
- The questionnaires contain 47 questions including quality management, etc.
- The video shooting composes of 7 sections including the state of lab analysis, etc.

- The Project will publish the results shortly including the current monitoring capacities and future monitoring demands for mercury.

The advantages of online survey are in saving time and costs. The disadvantages are that the survey is highly affected by the internet environment as well as by the coordinators.

#### Q&A

- Comment: Different from the PT tests, this assessment can conduct for laboratories without mercury analysis capacity and should be very useful.
- Q: After the establishment of these labs in Nepal, will it be available for NGOs and the public to get access to test samples? We have measured mercury contamination in Nepal such as dental treatments and gold plating works on a small domestic scale with traditional technology. Some workers in gold plating craft factories worry about exposure and want to know the evaluation method of the contamination. A: Hair sample concentration should be a biomarker of exposure. Two lab evaluations are good for clinical samples and environmental samples such as heavy metals, and their ability seems okay; Nepal had the potential for the assessment but has not actually undertaken monitoring or inter-lab competency yet. The Project still do not know if they will establish such a lab in the future. Comment: We have done biomonitoring of 30 Gold Plating Workers in BRI USA lab earlier.

#### Mercury Inventory and Mass Flow Analysis Improving National Mercury Inventory in Indonesia (Dr. Kania Dewi, Institut Teknologi Bandung, Indonesia)

The UNEP toolkits quantify 2 types of the anthropogenic sources of 1. Hg impurities in raw materials and 2. Hg used intentionally in products/processes.

The calculation method of the estimated mercury releases is the multipliers of the activity rate, the input factor, and the output distribution factor.

- The quantification has two levels along with the more revised input factors and the more revised distribution factors.
- Indonesia conducted the mercury inventory in the years of 2010 (level 1), 2017 (level 1), and 2020 (levels 1 and 2).

In the inventory, some challenges were in developing specific input and distribution factors.

- In Inventory level 2 in 2020, many specific input factors were updated and determined. For example, in mining sectors, such as small-scale gold mining, the factors were estimated through community practices.
- Primary metal production had the highest contribution in the input factors to society.

We have developed Indonesia's Mercury Mass Flow Diagram in the UNEP project.

- The difficulty is how to connect between sub-categories and organize the diagram.
- The categories are fossil fuel and mining industries, energy users such as plants and transportation, primary industries, consumer products, and waste facilities.

Some challenges exist in collecting data, and Indonesia is currently accommodating the action plans to improve the mercury inventory such as:

- Developing a roadmap for data collection, taking an intensive approach with communication with relevant sectors and local governments, strengthening analytical laboratory capacities, etc.

#### Q&A

- Q: In Indonesia, a lot of temples, monasteries, and mosques might have gold-plated art crafts including metal idols in these places. Have you found any Mercury-based gold plating process ongoing in Indonesia during your mercury inventory? A: We do not have any information yet. A lot of temples and monasteries are surely existing in Indonesia, and we can include those in our inventory category.
- Q: How about Mercury-based gold plating practices in Sri Lanka, as I have seen a lot of gold-plated items in your monasteries? Comment: In Sri Lanka, we have developed the mercury inventory for health, industry, and education sectors, established a mercury monitoring facility in rainwater, alternatives for mercury have been tested, and bio-monitoring study has been initiated in small scale jewellery sector. Mercury phasing out and phase down activities are practices. Mercury bulb recycling factory established. Mercury waste disposers identified.
- Q: Can we cooperate and assist me in applying your methodology in Libya for oil and gas Hg emission inventory? I'm looking for transferring any useful knowledge and practices that can assist us in quantifying oil-related Hg emissions and improve our emission estimates. I will also welcome the opportunity to discuss this issue with any who is interested. A: The Project may connect you to Global Mercury Partnership, which is starting to work on the oil and gas industry. We can keep in touch; We can give you further information related to the methodology applied in oil and gas companies in Indonesia for capturing Hg. Comment: It is the major source of mercury releases in case of Nepal. Gold plating might be happening in India, Bhutan, Thailand, Malaysia, Indonesia, and China, in addition to Nepal. Gold plating might be happening in Sri Lanka as well as some of the Arabian countries too. A: Unfortunately, the information on mercury releases from gold plating in monasteries or mosques are not available yet, however, this could be the source category that can be added to the inventory. Comment: See the Nepal MIA report 2019 with the highest sources of mercury releases from mercury-based gold plating practices in Nepal. [https://www.mercuryconvention.org/sites/default/files/documents/minamata\\_initial\\_assessment/Nepal\\_MIA\\_2019.pdf](https://www.mercuryconvention.org/sites/default/files/documents/minamata_initial_assessment/Nepal_MIA_2019.pdf); Gold plating is happening in monasteries, but the majority are gold colour paintings.
- Q: Pakistan has submitted the MIA report to the Minamata Secretariat. When this report will be published on the website? This report contains data on mercury inventory in the country.
- Q: How to control Hg from stack gas? A: As additional information, in Indonesia, we are still facing the problem with ASGM which is responsible for more than 300 tons of mercury emissions and releases, and this become our first priority in overcoming the environmental problem due to hg emissions and releases; Emission control technologies are described in BAT/BEP guidance in the Minamata Convention.

Comprehensive mercury survey for solid waste disposal facilities – Results and challenges – (Dr. Mitsugu Saito, UNEP ROAP)

In the global mercury circulation, the final sink is in the deep seabed in general, but there can be other sinks if any artificial mercury inputs happen. Monitoring this flow is necessary for mercury waste management.

It is important to find where the final sink goes, for which you need to monitor the behaviour of mercury use and waste.

UNEP mercury inventory toolkits have developed mercury emission factors.

In the mercury survey,

- At five landfill sites in five developing countries, the ambient mercury concentrations much fluctuate but are still within the health concerning level.

- Most human hair samples of workers do not show significant health-hazardous signals.

For good management, the open burning in open dumping sites is a serious concern due to its large uncertainty. The report will be available on the UNEP site.

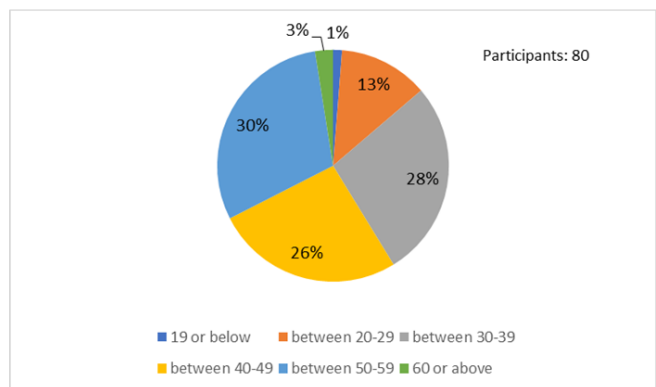
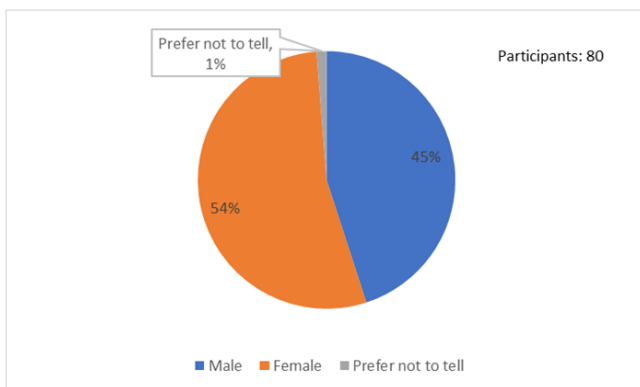
**Q&A**

- Q: Very important monitoring data. Important to have such data in scientific literature. A: It is published in a peer-reviewed journal.
- Q: What is the percentage of mercury exposure among the waste workers at landfill sites from mercury released into the air from landfill sites? A: If we compare the levels, approx. 90% comes from food and the rest may come from other sources such as the atmosphere or mercury-added products.

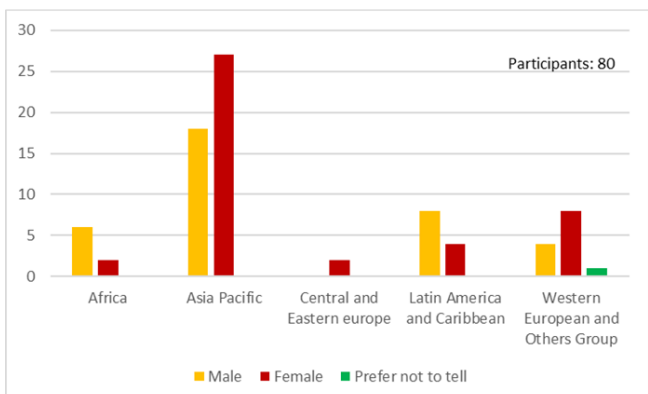
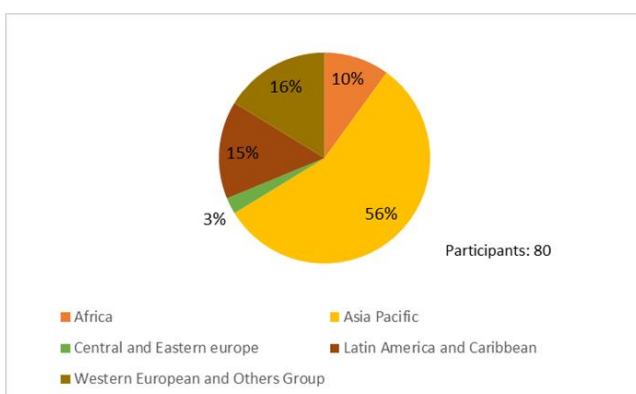
**Results analysis**

The webinar required registration for all the participants and analysing the registration data found that there were 80 participants in total for the webinar from 36 countries in 5 regions of the world. A questionnaire was conducted after the webinar, which 36 participants (45 %) answered.

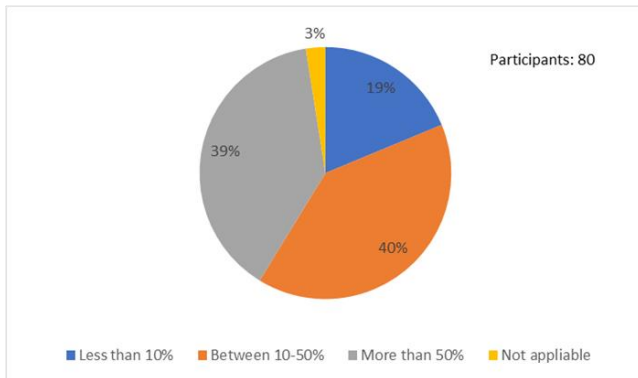
The largest age group of the participants was between 50-59 (30 %), followed by the age group 30-39 (28 %). Regarding the gender proportions, 45% were male and 54 % were female among the entire participants.



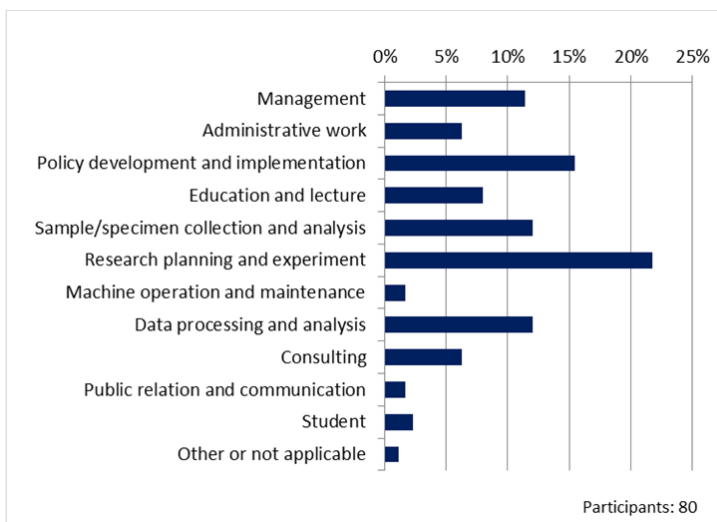
More than 50 % of the entire participants were from the Asia Pacific region, followed by Western European and others group (16 %) and Latin America and Caribbean (15 %). A very small number of participants were from the Central and Eastern Europe region (3 %). Having the largest number of participants, the Asia Pacific region has a greater female participation while the Latin America and Caribbean and the Africa regions have more male participants. The Western European and Others group also has more female participants.



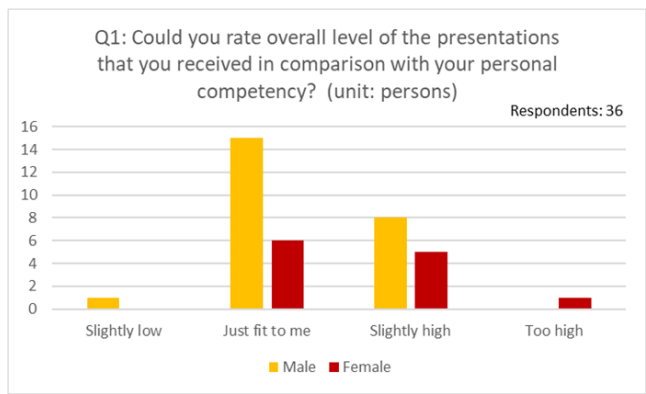
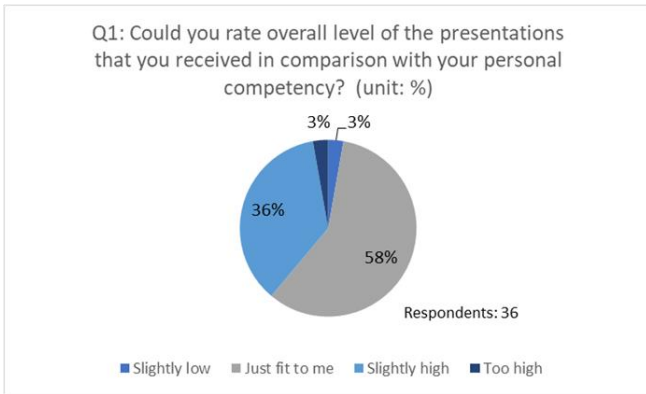
Responding to the question on how much of the routine work relates to mercury, the groups of the participants answered between 10 – 50 % and more than 50 % are the majority with the almost same number (40 % and 39 % of the participants, respectively), followed by the group of less than 10 % (19 % of the participants). This result indicates that the webinar intrigued the field professionals with various depths of commitment to mercury issues.



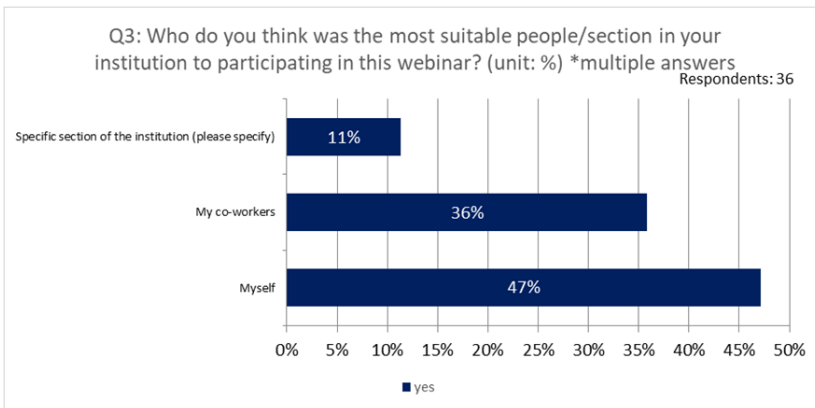
For the question of the roles of the participants in their institutions, they could choose more than one that applied to their roles (multiple answers). The answers showed that approximately 20 % of the respondents were engaged in Research planning and experiment.



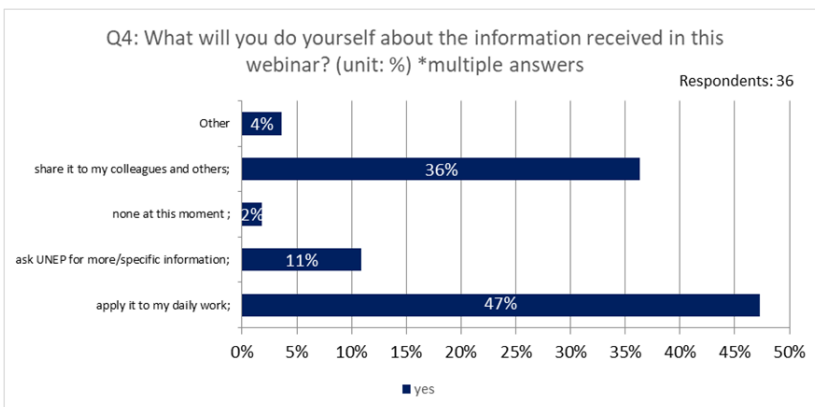
Almost two third of the 36 respondents to the questionnaire suggested the level of presentations just fitted to them. However, the impression of the webinar was different between males and females. In other words, male participants who answered the level as “just fit” doubled those females. Among the female participants, those who answered the level as “just fit” and the others as “slightly high” were almost the same numbers. This may suggest the gender discrepancies in access to human resource development. It could be also the case that there were younger participants among the female group, and they were more motivated to learn new knowledge with fewer experiences compared to male group.



The question about the most suitable people/ section in participants' institution to participate in this webinar could be answered more than once (multiple answers). Nearly half (47 %) of the respondents believed that the webinar was suitable for themselves, and 36 % of the respondents believed that it was suitable for their co-workers.



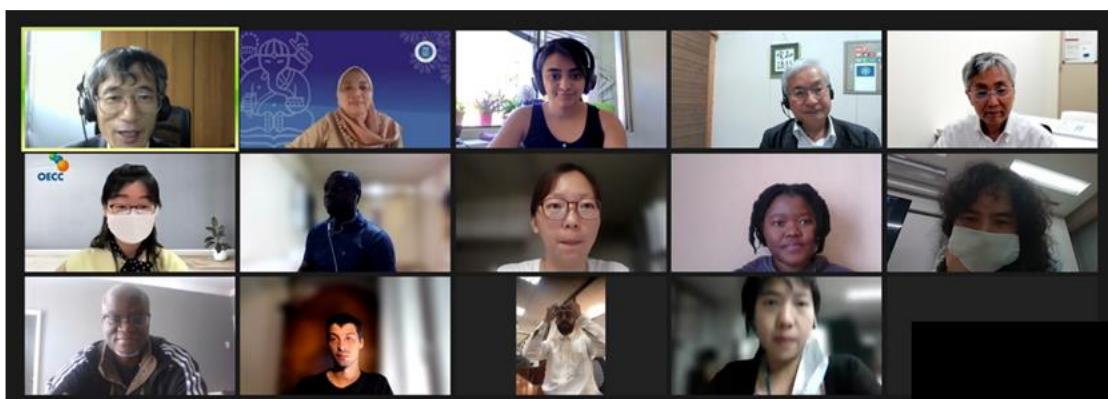
The question about what the participants would do themselves about the information received at this webinar could be answered from multiple choices. 36 % of the respondents answered that they would share it with their colleagues and others, and 47 % would apply it to their daily work. These results are consistent with the answers to the previous question about the webinar's suitable participants as mostly one-self and co-workers.



## 5.8 ICMGP 2022 mini-workshop

### *Outlines of the online workshop*

Date & venue	19 July 2022, virtual meeting
Title	Strengthening mercury research capacity in developing countries for science-based policy making
Objective	To provide the information on the project and disseminate the achievements for wider audiences. It will provide replicative information to non-partners countries especially peers in other regions.
Programme	The workshop is composed of a series of presentations and open discussions. The discussions will be arranged to improve the understandings and to explore any future opportunities that mutually benefit in the context of the workshop.  Four topics were presented by relevant experts and two training packages are introduced.
Participants	The mini workshop of the ICMGP is open for the participants to the ICMGP registrants. The ICMGP Secretariat compiled the registration and provided the name list to the Project.  Participants: 20 (female 7, male 13)  Resource persons: 3  Organizer: 2 from UNEP  Secretariat: 2 from OECC



### *Summary of the results*

A mini workshop “Strengthening mercury research capacity in developing countries for science-based policy making” was co-organized by UNEP ROAP and NIMD, Japan as a part of the academic conference “The 15th International Conference on Mercury as a Global Pollutant (ICMGP).” The Project is creating qualified information particularly in the context of developing countries. This workshop provides replicative information to non-partners countries especially peers in other regions. The workshop also serves as the annual stakeholders’ forum of the said Project, which is embedded into the Project workplan.



UNEP ROAP and NIMD provided opening remarks at the beginning of the workshop. Four (4) topics are selected based on the meaningful progress to be anticipated by the time for the sessions. They are:

1. Laboratory proficiency testing for mercury – strengthening mercury analytical capacity meeting international standard
2. Virtual laboratory assessment methodology – Innovative approach under COVID-19 setting
3. Mercury inventory and mass flow analysis – Improving national mercury inventory in Indonesia
4. Comprehensive mercury survey for solid waste disposal facilities – Results and challenges

### *Presentations and Q&A*

#### Opening remarks

Dr. Mushtaq Memon, Regional Coordinator, UNEP ROAP: This workshop is a collaborative effort between UNEP and the Japanese government. Developing countries need more scientific information to adverse environmental harm and this project's objective itself is the dissemination of information (the project is funded by Japan's MINAS programme). Thus, the workshop aims for information sharing, finding how to implement, especially for justification of the implementation of the Minamata Convention, sharing capacity-building materials including the UNEP training packages, and an interactive discussion platform.

Dr. Akira Harita, Director General, NIMD, Ministry of the Environment Japan: It has been 66 years since the Minamata Disease was officially confirmed. In 1978 NIMD was established to undertake various such activities as medical research to improve medical treatment and mercury monitoring. In 1986 NIMD was designated as a WHO collaborating centre to find health effect solutions and conduct communications with various countries. In collaboration with UNEP, we have conducted analytical practices and training on mercury. We hope the workshop will strengthen mercury research capacity and science-based policy making.

#### Introduction (Dr. Mitsugu Saito, UNEP ROAP)

The presentation provided a brief introduction of the Project for "Promoting the Minamata Convention on Mercury by making the most of Japan's Knowledge and Experience." It is a 5-year project (2019-2024) sponsored by the Ministry of the Environment, Japan, and implemented by UNEP ROAP.

The Project features to contribute to the implementation of the Minamata Convention (particularly, Articles 17-19), connect the Minamata Convention and Minamata City, and network analytical institutions.

There are a number of partner countries and organizations including Minamata Environmental Academia in Minamata City, the National Institute for Minamata Disease of the Ministry of Environment, Japan, and the Asia Pacific Mercury Monitoring Network.

The Project is underway in the middle of the workplan, which is composed of three (3) Outputs, with good progress of more than halfway done for Output 1 of capacity building. Output 2 is on monitoring institutions including lab assessments and proficiency testing. Output 3 is for outreach.

Presentation 1: Laboratory proficiency testing for mercury – strengthening mercury analytical capacity meeting international standards (Dr. Koichi Haraguchi, National Institute for Minamata Disease, Japan)

Proficiency testing (PT) is to examine laboratories' competencies by inter-lab comparison using sub-samples of homogenized reference materials.

The monitoring guidance prepared by the Minamata Convention recommends that the Parties should conduct quality practices and participate in inter-lab comparison programmes.

The 1st round of mercury laboratory PT provided by UNEP ROAP was conducted for the public and university labs between February 2022 and August 2022.

- The human hair samples were used in the PT and 26 labs delivered the test results out of 34 registered labs.
- The data from 18 labs, 69% of the 26 labs, obtained satisfactory data for the evaluation.

External PTs can lead to corrective actions for internal quality controls such as preventing human errors, minimising systematic errors, and minimising random errors). Regular participation in PTs is necessary for lab competence.

Our study suggests how to complete the QC analysis step by step. NIMD provides human hair samples free of charge and apply through our website.

Training package 1

Dr. Saito briefly introduced the UNEP users' training manuals and editable PowerPoint slides on mercury monitoring. He showed a video titled 'Measurement, Data Processing, QA/QC'.

Discussion 1

The leading questions are: 1. What are the challenges of mercury laboratories in developing countries to produce comparable data? and 2. How will the training package be used effectively to strengthen mercury monitoring capacity in developing countries by Enhancing QA/QC practice?

- Q: Supporting laboratories is necessary. Does UNEP have any idea? A: We have different types of resources. Human resources are lacking in developing countries. Particular needs should be examined.
- Q: I am from Council for Geoscience in South Africa, and we are preparing to enter into airborne mercury research. It is important to identify labs or know local or regional labs that have participated in the proficiency testing. South African situation is much more severe due to the close proximity of human settlement to major sources such as coal mines and coal-fired stations. Training, access to measuring technology and technical advice to new newcomers in this field will add value.
- Q: In South Africa, the mining sector deals with hazardous elements, but few laboratories can be available in our countries. Identifying experts and labs is available? And, sponsoring? A: Training is one of the workshop purposes. If you have external parties, it would be difficult to get them. Exchanging various labs is also appreciated.
- Q: Two questions. We have two labs in our country (gov, and academic). Training and finances are challenges. We have to send samples to other counties like the USA but being closer to labs would be better. Sending frozen samples to US customs is difficult. Any support will be appreciated.

- Q: Exporting/importing samples is especially important. Any suggestions? Distributing samples is different among countries. A: Challenging for us too. In our testing, three countries did not allow the import and the other countries were okay.
- Comment: Most labs have limitations to being analysed and shipped. Capacity is different. To get results, we have to find the labs that can accept samples.
- Comment: It is just for information. NIMD, Japan supports hair mercury measurement. We collect hair samples from residents living in areas of developing countries with potential mercury contamination. Anyone can request hair analysis. Look for "call for hair samples" and "NIMD" on the web.

### Presentation 2: Virtual laboratory assessment methodology – Innovative approach under COVID-19 setting (Dr. Minoru Koga, Minamata Environmental Academia, Japan)

The survey aims to evaluate the current status and monitoring ability for mercury in national analytical laboratories, which have been affected by COVID-19.

For the targeted countries and labs selected by UNEP ROAP, questionnaires and real-time video shooting were used for the evaluation.

Surveys were conducted in laboratories in Nepal and in the Philippines.

- The survey team consists of experts in mercury analysis, lab quality management, instrumental analysis, and local coordinators, as well as secretariats and video shooting supporters.
- The questionnaires contain 47 questions including quality management, etc.
- The video shooting composes of Seven (7) sections including the state of lab analysis, etc.
- The Project will publish the results shortly including the current monitoring capacities and future monitoring demands for mercury.

The advantages of online survey are in saving time and costs. The disadvantages are that the survey is highly affected by the internet environment as well as by the coordinators.

### Discussion 2

The leading question is 'how could mercury monitoring and research activities be progressed under the pandemic/crisis setting?'

- Q: In this unusual setting, how have our activities been affected and what are the solutions?  
A: Restrictions have been slightly eased and in the near future, I hope I can visit labs in person and improve their skills. Among Asian countries, the time difference is not that large. African and Pacific countries might be a little harder for us. International conflicts have been limiting the number of flights. Special materials such as pure gases are harder to obtain by the shipping difficulty.
- Q: Any innovative approaches? Any negative impact in Indonesia? A: 2020-2022 we stopped mercury research activities, but we have started again now. Students had to change the research themes e.g., modelling, without lab work.
- Comment: National and private labs have been business as usual but academic labs must have been very unusual settings.
- Comment: Also, due to offline classes, students are difficult to concentrate on their studies. Turning off the camera makes lectures hard to check what students are actually doing.

### Presentation3: Mercury Inventory and Mass Flow Analysis Improving National Mercury Inventory in Indonesia (Dr. Kania Dewi, Institut Teknologi Bandung, Indonesia)

The UNEP toolkits quantify 2 types of the anthropogenic sources of 1. Hg impurities in raw materials and 2. Hg used intentionally in products/processes.

The calculation method of the estimated mercury releases is the multipliers of the activity rate, the input factor, and the output distribution factor.

- The quantification has two levels along with the more revised input factors and the more revised distribution factors.
- Indonesia conducted the mercury inventory in the years of 2010 (level 1), 2017 (level 1), and 2020 (levels 1 & 2).

In the inventory, some challenges were developing specific input and distribution factors.

- In Inventory level 2 in 2020, many specific input factors were updated and determined. For example, in mining sectors, such as small-scale gold mining, the factors were estimated through community practices.
- Primary metal production had the highest contribution in the input factors to society.

We have developed Indonesia's Mercury Mass Flow Diagram in the UNEP project.

- The difficulty is how to connect between sub-categories and organise the diagram.
- The categories are fossil fuel and mining industries, energy users such as plants and transportation, primary industries, consumer products, and waste facilities.

Some challenges exist in collecting data and Indonesia is currently accommodating the action plans to improve the mercury inventory such as:

- Developing a roadmap for data collection, taking an intensive approach with communication with relevant sectors and local governments, strengthening analytical laboratory capacities, etc.

### Training package 2

Dr. Saito briefly introduced the UNEP users' training manuals and editable PowerPoint slides on mercury mass flow analysis. He showed a video titled 'Mass Balance Principle'.

### Discussion 3

The leading questions are 1. how can different types of mercury inventory methodologies be combined to make the inventory more versatile and comprehensive? 2. How will the training package be used effectively to strengthen mercury mass flow development in developing countries?

- Comment: For the 1st question on the mass flow analysis, we easily found it, but it's not really in detail for every sector. Sub-categories need to be confirmed more. For the 2nd Q, we only use the UNEP toolkit since it is easy to get and apply, but for mercury mass flow, you really have to think about one sector to another. Participating through UNEP is really needed.
- Comment: For the mercury, identification is one challenge. Quantification is another challenge. Practices are necessary for your country. The toolkit is the more simplified version. You can

also capture the values that are not captured by the UNEP toolkit like trade data or products. You can extend the information, which could be used by the policy side.

- Comment: Sources of information have challenges. Knowing the problems is the first step on the way forward.
- Q: For Toolkit, input data are secondary data from the database. Are such data accurate? It is useful for the QC measures. A: In theory, the mass flow relies on the secondary data to identify. The accuracy is not equal, but the mass flow is for capturing general profiles. Available data tend to have uncertainties. Management of uncertainties is needed to utilise important information. This is the concept for the mass flow and inventory practices. The accuracy is not necessarily needed for the mass flow analysis in this context.
- Comment: In developing inventories, we have active communications with local stakeholders, which help to ensure the quality. All activity data are needed at level 1. In Level 2 preparation, more accurate data is needed. Talking with ministries is important.
- Comment: This step-by-step process is important to develop the inventory in developing countries. There is no goal. 'Keep improving' undergoes even in Japan. Time series information is also needed for the evaluation of the inventory. Slightly different from academic work, but we still try to improve the data accuracy.

#### Presentation 4: Comprehensive mercury survey for solid waste disposal facilities – Results and challenges – (Dr. Mitsugu Saito, UNEP ROAP)

In the global mercury circulation, the final sink is in the deep seabed in general, but there can be other sinks if any artificial mercury inputs happen. Monitoring this flow is necessary for mercury waste management.

It is important to find where the final sink goes, for which you need to monitor the behaviour of mercury use and waste.

UNEP mercury inventory toolkits have developed mercury emission factors.

In the mercury survey,

- At five landfill sites in five developing countries, the ambient mercury concentrations much fluctuate but are still within the health concerning level.
- Most human hair samples of workers do not show significant health-hazardous signals.

For good management, the open burning in open dumping sites is a serious concern due to its large uncertainty. The report will be available on the UNEP site.

#### Discussion 4

The leading question is 'What are the data gaps in developing countries that might be filled by enhanced mercury studies and research?'

- Q: How to enhance the mercury research and field of data gaps? This survey was conducted by the Ministry of the Environment Japan. Do you know any findings from this survey? A: I am involved in this study. This is a pilot survey with limited info and the site number. There is large uncertainty. Targeted dumping sites are managed by governments; however, most dumping sites are not official and illegal. Management conditions are poor in such sites, but very challenging.
- This could be another survey topic. It will never end for this kind of topic.

### Meeting adjournment (Dr. Mitsugu Saito, UNEP ROAP)

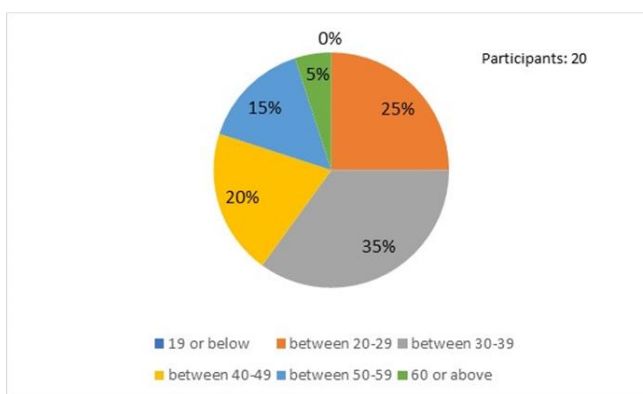
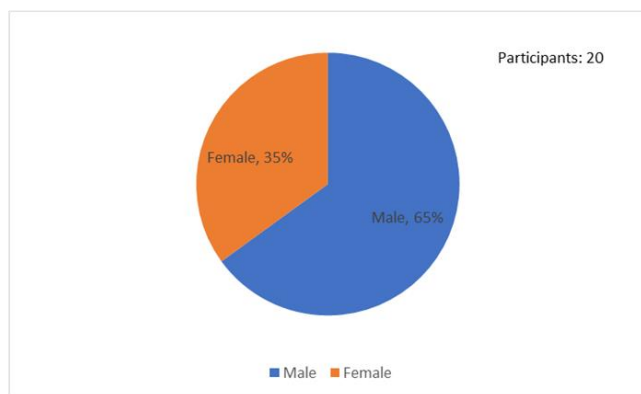
Dr. Saito mentioned that the Project was still underway. The Project covers the Asia Pacific region, but the results can be used in any part of the world. He stressed that any collaborations were welcome and that he called for an approach to their project.

- Comment: While he appreciates the depth of the information shared by our colleagues from the Asian region, the workshop theme is broad as it refers to developing countries and not Asia. Secondly, since Africa is a host continent, he expected to hear case studies from different regions, including Africa, which is a shortcoming of this workshop.

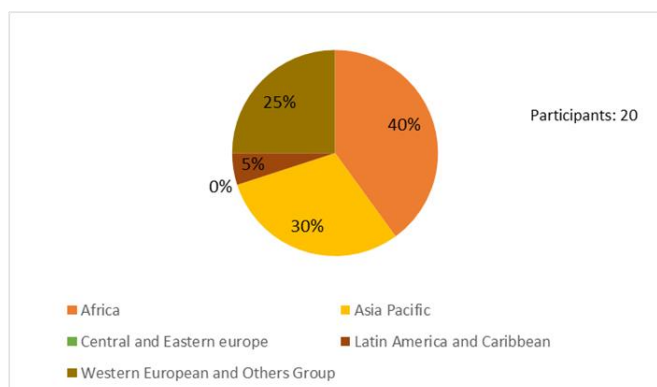
### Results analysis

The webinar required registration for all the participants (20 persons) and analysing the registration data found that the 20 participants were from 12 countries in 4 regions of the world. A questionnaire was conducted after the webinar, which 13 participants (65 %) answered.

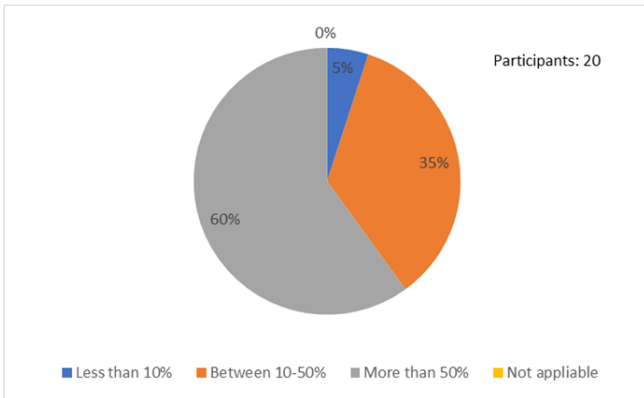
Regarding the gender proportions, 65 % were male and 35 % were female among the entire participants. The largest age group of the participants was between 30-39 (35 %), followed by the age group 20-29 (25 %) and the age group 40-49 (20 %).



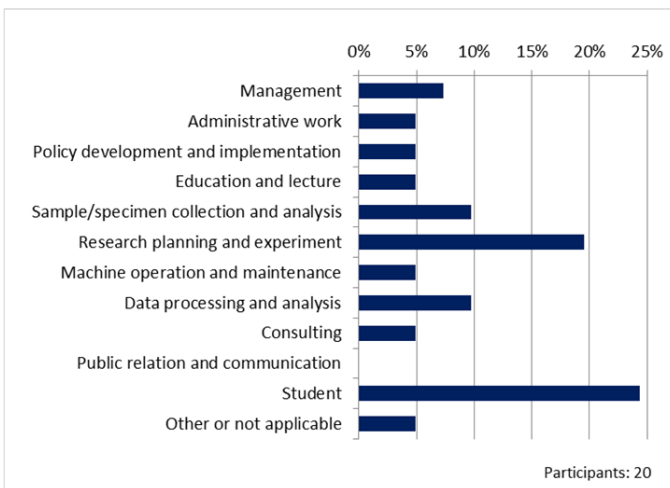
40 % of the entire participants were from the Africa region, followed by the Asia Pacific region (30 %) and the Western European and Others Group region (25 %).



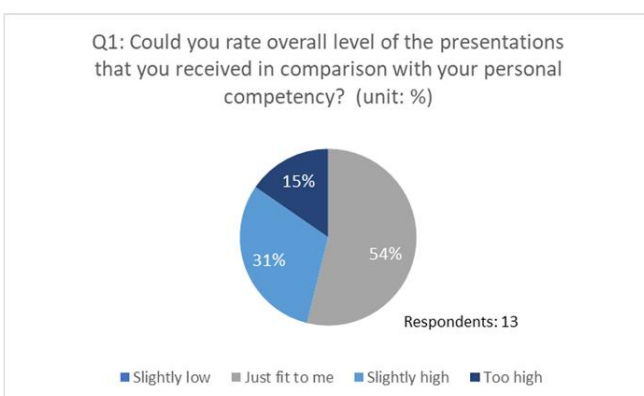
Responding to the question on how much of the routine work relates to mercury, the largest group (60 % of the participants) of the participants answered more than 50 %, followed by between 10 and 50 % (35 % of the participants).



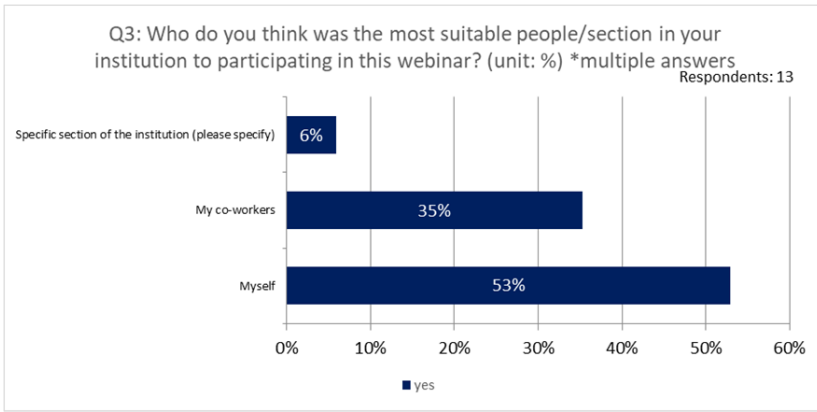
For the question of the roles of the participants in their institutions, they could choose more than one that applied to their roles (multiple answers). The answers showed that approximately 20 % of the respondents were engaged in research planning and experiment and that approximately 25 % were students.



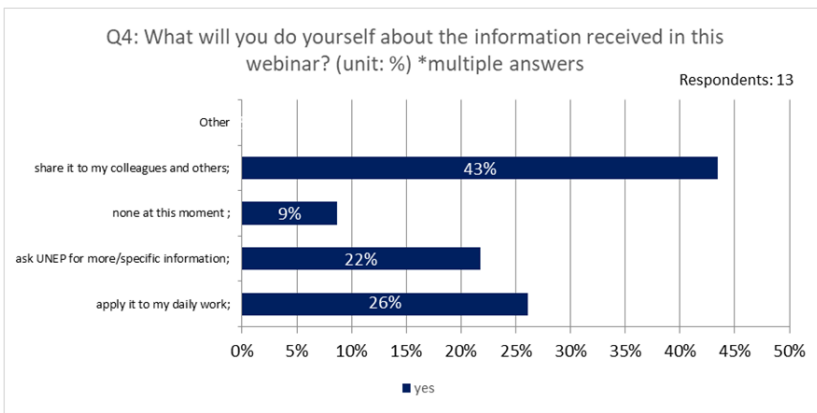
More than half of the 13 respondents to the questionnaire suggested that the level of presentations just fitted them.



The question about the most suitable people/section in the participants' institution to participate in this webinar could be answered more than once (multiple answers). 53 % of the respondents believed that the webinar was suitable for themselves, and 35 % recommended it to their co-workers.



The question about what the participants would do themselves about the information received at this webinar could be answered from multiple choices. 43 % of the respondents answered that they would share it with their colleagues and others, whereas only 26 % would apply it to their daily work.





## 5.9 Mini symposium at Air Quality Action Week

### *Outlines of the mini symposium*

Date & venue	30 May 2023, UN Conference Centre, Bangkok, Thailand
Title	AIT-UNEP collaboration on pollution action and circular economy
Objective	To network academic sector and other sectors such as policy makers and private sector to showcase the successful partnership between AIT and UNEP.
Programme	Participants to the Air Quality Action Week (part of Climate and Clean Air Coalition’s annual meeting 2023) are informed the UNEP’s engagement in academic sector to promote science-policy interface.  Two topics were presented by relevant experts and the other collaboration were briefly introduced.
Participants	All participants to Air Quality Action Week are invited to the mini symposium. No advanced registration is required.  Participants: 32 (female 14, male 17, NA 1) from 15 countries.  Resource persons: 3  Organizer: 2 from UNEP and AIT



### *Summary of the results*

A mini symposium on “AIT-UNEP collaboration on pollution action and circular economy” focuses on chemicals and pollution action, one of the triple planetary crises that UNEP put in place in its medium-term strategy 2022-2025. In the margin of Air Quality Action Week on 29 May – 2 June 2023, the participants with shared interest came together to discuss the collaboration with academia for chemicals and pollution area.

1. Introduction – AIT-UNEP partnership on pollution action and circularity.
2. Air quality – AIT-UNEP partnership: a key to tackle transboundary air pollution, a case study in Bangkok.
3. Circularity – AIT-UNEP partnership on circular economy.

### *Presentations and discussions*

### Opening address

Dr. Guilberto Borongan, Director of AIT Regional Resource Center for Asia the Pacific, gave his opening remarks on behalf of Dr. Naveed Anwar, Vice President, AIT. He briefly discussed how AIT added value to UNEP activities over the past 5 years. He noted that one way AIT supported UNEP is through combining AIT's extensive knowledge and experience in environmental sciences and sustainable development with UNEP's global reach and influence. This allowed both parties to be able to develop effective strategies, methodologies, and guidelines to address the unique challenges faced by communities in the region. Dr. Borongan also highlighted AIT's regional presence as one that provides a strong foundation for successful project implementation. He also noted that both organizations were working towards a future where communities thrive in a healthier and more sustainable environment.

### Introduction

Dr. Mushtaq Memon, Regional Sub-programme Coordinator, UNEP ROAP, highlighted the different forms of collaboration with AIT, beginning with a holistic waste management master's program, now called the Professional Masters in Plastic or Marine Abatement. Another area of collaboration was through combining research and advisory services to combat inaction, such as with air pollution in Thailand, with more collaboration through trainings. The partnership also addresses the human resource gap for green jobs, as AIT as an educational institution supplies these resources and UNEP opens doors for both parties to meet. Dr. Memon lastly highlighted the vast network that AIT has built in the region that brings in projects.

### Air quality

Dr. Ekbordin Winijkul, Associate Professor, AIT, presented a case study that was supported through AIT-UNEP collaboration. This case study was on solving the air pollution problem within the region. In this project, an emission inventory was developed for Bangkok and its surrounding areas. The project aimed to determine the sources of PM 2.5 pollution in Bangkok by running a model and comparing scenarios. He highlighted that approximately 50% of the PM 2.5 pollution during high-concentration periods originated from local sources within Bangkok. The study focused on high PM 2.5 concentration months and indicated that Bangkok City had some control over emissions during those periods. Scientific evidence was generated through emission inventory, modelling, and data analysis. The next step, Dr. Winijkul summarized, was translating these findings into policies to reduce PM 2.5 concentrations in Bangkok.

Previous projects in partnership with the UNEP involved comprehensive emission inventories, cost-benefit analyses, and assessing the cost of inaction. He highlighted that these projects aimed to provide data, evaluate cleaner technologies, and highlight the consequences of inaction regarding air pollution. Dr. Winijkul ended his presentation by noting that the partnership between the Asian Institute of Technology (AIT) and UNEP facilitates regional air quality studies and knowledge transfer to effectively tackle transboundary air pollution in the region.

### Circular economy

AIT-UNEP Partnership for Circular Economy was presented by Ms. Young Ran Hur, Regional Coordinator for Global Opportunities for Sustainable Development Goals (GO4SDGs). The project was an initiative that connected global initiatives with regional needs to accelerate the

implementation of the 2030 agenda, focusing on sustainable consumption and production and decent work. She highlighted the collaboration with governments, small and medium-sized enterprises (SMEs), and youth to promote circularity in key sectors such as agrifood, fashion, textiles, tourism, and plastics. Collaboration is vital to their work partnering with organizations to address important questions. This included enabling policies for transitioning to a circular economy, scaling up sustainable innovation and finance for SMEs, transforming high-impact sectors to be more sustainable, empowering youth for sustainable lifestyles, and building green job skills. With AIT, she highlighted their collaboration on the global rollout of the #mysustainablelivingchallenge, an online module that educates youth about sustainable lifestyles.

Additionally, she noted that the partnership would organize an event on Green Jobs for the Future, contributing to the Green Jobs for Youth Pact. AIT's involvement would include hosting an academic intern post and organizing subregional intergenerational dialogues on sustainable living and green jobs. Ms. Hur saw potential for further collaboration with AIT in areas such as employment and entrepreneurship, green skills building in education, and empowerment and engagement.

## 5.10 Annual workplan

Output	Activity	Sub activity	Timeline <sup>4</sup>								Deliverables	Progress and Planning
			2022		2023				2024			
			3	4	1	2	3	4	1	2		
1	1.1 Assess and compile available resources and facilities in and around Minamata and establish partnerships to implement project activities.	Planned									A list of local partners in Minamata, Japan providing support for the project.	Completed.
		1.1.1 Assess local human resources, facilities, programmes, and activities that may benefit the project implementation.					Completed					
		1.1.2 Establish partnership/collaboration for implementing project activities.					Completed					
1	1.2 Develop relevant capacity building programmes under the Minamata Convention.	Planned									Sets of training materials (agenda, presentations, reference materials), data books, and technical handbooks, etc.	Completed (Two training modules developed).
		1.2.1 Develop standard training materials and menus for scientists and technicians that are available for training courses and self-studying.					Completed					
		1.2.2 Develop data books or technical handbooks that compile assessed information for government officers and practitioners.					Completed					
1	1.3 Formulate and implement trainings based on regional priorities and identified needs.	Planned									2 face-to-face trainings and series of online trainings implemented per year <sup>5</sup> .	Two trainers' training held in Q4 2022. A special training to be planned.
		1.3.1 Formulate and implement skill up training/visit programmes based on the needs and regional priorities.					Completed					
		1.3.2 Formulate and implement training/visit programmes upon the special requests from network partners.					.....➔					
1	1.4 Undertake follow-up assessment of the effectiveness of the training programmes and publish annual reports.	Planned									Annual reports published.	Progress by 2023 to be assessed.
							.....					
1	1.5 Develop institutional coordination structure to sustain capacity building programme based in Minamata.	Planned									Agreement on local coordinating structure beyond the project implementation.	Long term engagement with institutions in Minamata area is discussed.
									.....➔			
2		Planned										

<sup>4</sup> Solid lines are implemented, dotted lines are planned timelines.

<sup>5</sup> Frequency will be adjusted depending on the COVID-19 situation.

Output	Activity	Sub activity	Timeline <sup>4</sup>								Deliverables	Progress and Planning	
			2022		2023				2024				
			3	4	1	2	3	4	1	2			
	2.1 Develop in-country capacity for sampling and analysing mercury and mercury compounds from multiple media.	2.1.1 Capacity assessment of existing laboratories in the region on the basis of technical assistance menus.	■		■	■	■	■	■	■	▶	Laboratory assessment reports for all partner countries.	Capacity strengthening support to Nepal under implementation.
		2.1.2 Provide advice to improve sampling design and field sample collection capacities and skills.			■	■	■	■	■	■	▶		
		2.1.3 Provide advice to improve sample handling, pre-treatment and instrumental analysis capacities and skills.						■	■	■	▶		
2	2.2 Undertake continuous data collection and analysis based on national/regional monitoring plans.	Planned	■	■	■	■	■	■	■	■		Mercury monitoring plans in participating partners that are harmonized.	A continuous data collection site developed in accordance with regional methodologies.
		2.2.1 Develop and/or harmonize methodologies and standard operating procedures of mercury monitoring among network partners.					■	■	■	■	▶		
2	2.3 Provide technical advice and tools to strengthen a harmonized system for data processing and quality assurance for the regional institution network.	2.2.2 Undertake continuous data collection and analysis based on national/regional monitoring plans.	■		■	■	■	■	■	■	▶	A QC/QA guidebook published; inter-laboratory quality assessment conducted.	2 <sup>nd</sup> round laboratory proficiency testing implemented. 3 <sup>rd</sup> round to be implemented in late 2023
		Planned	■	■	■	■	■	■	■	■			
		2.3.1 Establish a technical advisory body for backstopping the regional institution network partners.						Completed					
		2.3.2 Develop a QC/QA guidebook for mercury monitoring customized for the network.					■	■	■	■	▶		
2	2.4 Undertake partnership activities/ collaborations with other monitoring programmes to promote science-based policy making.	2.3.3 Undertake inter-laboratory data quality assessment for continual improvement among network partners.	■		■	■	■	■	■	■	▶	Collaborative activities with other monitoring networks.	Participated in APMMN annual workshop. Mercury survey undertaken in Palau and Maldives.
		2.3.4 Develop a start-up assistance menu for inviting new network partners for its expansion.											
		Planned	■	■	■	■	■	■	■	■			
3	3.1 Convene stakeholders' meetings on project planning and result dissemination.	2.4.1 Participate in the activities of other programmes and invite other programme parties for collaborative activities.	■		■	■	■	■	■	■	▶	Meeting reports; increasing list of partners joining.	Stakeholder consultation conducted at the midpoint of the project implementation.
		2.4.2 Conduct mathematical modelling, research, and environmental studies for enhancing science-policy interaction.			■	■	■	■	■	■	▶		
3		3.1.1 Convene an inception workshop for project launch.					Completed						
		3.1.2 Convene periodic stakeholders' meeting to share project results.	■		■				■	■			
3		Planned	■	■	■	■	■	■	■	■			

Output	Activity	Sub activity	Timeline <sup>4</sup>								Deliverables	Progress and Planning
			2022		2023				2024			
			3	4	1	2	3	4	1	2		
	3.2 Accumulate and compile technical data and make it publicly available online.										A dedicated web page of the project serving as an information portal.	Technical information is collected and uploaded.
3	3.3 Strengthen national capacities to utilize mercury data for risk assessment and policy development through the provision of technical advice and knowledge exchange.	Planned									List of services provided, web stories on impact.	Local workshops held in Indonesia, Palau and Maldives. Training and other supports to be undertaken upon request.
		3.3.1 Provide technical advice to partners to include national mercury monitoring plan into national development plans.										
		3.3.2 Conduct country level technical workshops for scientists and practitioners.										
	3.3.3 Prepare national inventories and national report with the mercury data obtained by national monitoring plan.											
3	3.4 Promote the visibility of the achievements to wider audiences such as high-level officials, local and global stakeholders, etc.	Planned									Promotion materials, leaflets, seminars, lectures, exhibitions, etc.	Side event to be convened and exhibition booth to be set up in related events.
		3.4.1 Convene promotion activities in the margin of existing events in collaboration with other institutions, programmes, and/or projects.										
		3.4.2 Develop promotion materials to enhance outreach to the wider audiences for effective communications.										

## 5.11 Result framework

<b>Intended Project Outcome:</b> Countries increasingly generate and apply information on how to monitor and reduce mercury emissions and releases in their legislations, policies or action plans.			
<b>Outcome indicator</b>	<b>Baseline and target</b>	<b>Means of verification and assumption<sup>6</sup></b>	<b>Updated Result Status</b>
Indicator 1: Number of countries that embed scientific data collection in their mercury management policies.	Baseline: 0, Target: 6	Communication notes with the Project partner countries.  Type of scientific data collection includes environmental and emission monitoring, trade and industrial statistics, holding regular scientific expert committee.	Status: Not available  <b>Preliminary:</b> Project mid-term workshop undertook the national consultation and updated expectation of the participating countries. The target numbers are adjusted accordingly.
Indicator 2: Number of countries that regularly put information on mercury monitoring available via the information portal.	Baseline: 0, Target: 6	Availability of monitoring data in Project website.  Countries may choose other platform to upload the data.	Status: 0  <b>In progress:</b> Project mid-term workshop undertook the national consultation and updated expectation of the participating countries. The target numbers are adjusted accordingly.  Evidence: Currently no countries has confirmed.
Indicator 3: Number of new, adequate policies and legislation in effect on mercury management.	Baseline: 0, Target: 3	Instrument of ratification of the Minamata Convention, Official gazette on relevant law, regulation, management and monitoring plan, etc. by the Project partner countries.  As the Project activity was low in 2019-2020, the results after 2021 are considered.	Status: (1)  <b>In Progress:</b> Project mid-term workshop undertook the national consultation and updated expectation of the participating countries. A few countries indicated their plan for ratification of the Minamata Convention. The target numbers are adjusted accordingly.

<sup>6</sup> Means of verification and assumption are suggested as they were not included in the initial result framework.

Result	Result (Output) Indicator	Baseline and target	Means of verification and assumption	Updated Result Status
				Evidence: Due to sensitive nature, the availability of the concrete evidence may be delayed.
Output 1: Comprehensive capacity building programme based in Minamata developed and implemented.	Number of capacity building programme package for specific subjects developed and implemented.	Baseline: 0, Targets: 2	Availability of material in Project website, progress record in Annual Project Reports.	Status: 2 <b>Achieved:</b> Project has published two (2) capacity building programmes on mercury mass flow and monitoring. Trainers' trainings have been conducted to partner countries, which has started local training programmes utilising the materials.  Evidence: Uploaded training packages on the Project web.
	Local coordination structure in Minamata developed.	Baseline: 0, Target: 1	Progress record in Annual Project Reports.	Status: 2 <b>Achieved:</b> Local coordination structure with Minamata City and National Institute for Minamata Disease established.  Evidence: Annual Progress Report #2
	% of trained participants who successfully apply the knowledge and skills on mercury management in their work disaggregated by gender and age range.	Baseline: 0, Target: 50%	Follow-up assessment of the effectiveness of the training programmes under Activity 1.4.	Status: Total 47%, Female 53%, Male 41% in 2022 <b>On target:</b> A questionnaire survey indicated that approx. half of the respondents have used the information for themselves. Female participants applied the obtained knowledge more than male participants.  Evidence: Mid-term review report.
Output 2: A regional monitoring institution network in Asia	Number of countries with national institutions on the network that meet international standards on mercury analysis.	Baseline: 0, Targets: 3	Qualified as 'satisfactory' multiple times in participating PTs.	Status: 4 as of 2022 <b>On target:</b> The first round PT (2021-2022 period) result indicated that national laboratories from four (4) partner countries demonstrated satisfactory performance.



and the Pacific established.			Name of individual institutions will not be disclosed.	Evidence: Annual progress report #4.
	Number of existing regional networks establishing partnership with this programme.	Baseline: 0, Target: 2	Progress record of collaboration activities in Annual Progress Reports.	Status: 2 as of 2023 <b>On target:</b> Collaboration with Asia Pacific Mercury Monitoring Network is undertaken. Another network among analytical laboratories is under discussion. Evidence: Annual progress report #4.
Output 3: Outreach of qualified information in support of early implementation of the Convention implemented.	Number of countries submitting information to the information portal.	Baseline: 0, Targets: 6	Availability of materials in Project website.  Submission from partner countries and other stakeholders in the region.	Status: 1 <b>Preliminary:</b> Engagement of Project partner countries has been progressed and numbers of countries are currently preparing/undertaking data collection and analysis. Such results will be reported in due course.
	Number of countries outside of the project partners that received information through project activities.	Baseline: 0, Target: 30	Progress record of dissemination events in Annual Progress Reports.	Status: 25 in 2021, 35 in 2022 <b>Achieved:</b> The dissemination events were announced through global platform such as the Minamata Convention Secretariat, Global Mercury Partnership, International Conference on Mercury as a Global Pollutant. It resulted in more participation from countries other than the Project partner countries. Evidence: To be provided in following Annual Progress Report.

## 5.12 Project budget

Item		Budget (USD)
Output 1: Comprehensive capacity building programme based in Minamata developed and implemented.		594,400
1.1 Assess and compile available resources and facilities in and around Minamata and establish partnerships to implement project activities.	5,000	
1.2 Develop relevant capacity building programmes under the Minamata Convention.	120,000	
1.3 Formulate and implement training based on regional priorities and identified needs.	439,400	
1.4 Undertake follow-up assessment of the effectiveness of the training programmes and publish annual reports.	-	
1.5 Develop institutional coordination structure to sustain capacity building programme based in Minamata.	30,000	
Output 2: A regional monitoring institution network in Asia and the Pacific established.		509,000
2.1 Develop in-country capacity for sampling and analysing mercury and mercury compounds from multiple media.	293,000	
2.2 Undertake continuous data collection and analysis based on national/regional monitoring plans.	158,000	
2.3 Provide technical advice and tools to strengthen a harmonized system for data processing and quality assurance for the regional institution network.	52,000	
2.4 Undertake partnership activities/ collaborations with other monitoring programmes to promote science-based policy making.	6,000	
Output 3: Outreach of qualified information in support of early implementation of the Convention implemented.		451,244
3.1 Convene stakeholders' meetings on project planning and result dissemination.	308,244	
3.2 Accumulate and compile technical data and make it publicly available online.	42,800	
3.3 Strengthen national capacities to utilize mercury data for risk assessment and policy development through the provision of technical advice and knowledge exchange.	100,200	
Project Coordination		1,082,699
Project staff personnel	972,025	

Item		Budget (USD)
Project M&E	28,636	
Office rent and common costs	82,038	
<b>Sub-Total Project Cost</b>		<b>2,637,343</b>
PSC (13%)		342,855
<b>Total Project Cost</b>		<b>2,980,198</b>
UN Levy (1%)		19,802
<b>TOTAL</b>		<b>3,000,000</b>

### 5.13 Financial report (preliminary sum<sup>7</sup>)

Income Category	Pledged (USD)	Received (USD)	Status	Expenditure Category	Budget <sup>8</sup> (USD)	Expenditure by June 2023 (USD)			Delivery Rate (%)
						Committed	Actual	Total	
2019 Contribution	1,000,000	1,000,000	Received	010 Staff Personnel	1,012,525	8,000	643,901	651,901	64.4
2020 Contribution	1,000,000	1,000,000	Received	160 Travel	287,374	0	96,328	96,328	33.5
2021 Contribution	1,000,000	999,990	Received	120 Contractual Service	140,186	0	13,442	13,442	9.6
				135 Equipment and Furniture	15,158	0	5,826	5,826	38.4
				125 Operational Costs and 130 Supplies	99,740	0	38,980	38,980	39.5
						0	462	462	
				140 Grant to IP	1,082,000	305,025	589,576	894,601	82.7
				<b>Sub-Total Project Cost</b>	<b>2,637,343</b>	<b>313,025</b>	<b>1,388,515</b>	<b>1,701,540</b>	<b>64.5</b>
				155 UN PSC (13%) and 150 IP PSC	342,855	0	216,734	216,734	64.0
						0	2,617	2,617	
				<b>Total Project Cost</b>	<b>2,980,198</b>	<b>313,025</b>	<b>1,607,866</b>	<b>1,920,891</b>	<b>64.5</b>
				Exchange loss/gain	-	-	-	1,788	-
				UN Levy (1%)	19,802	-	-	19,792	99.9
<b>TOTAL</b>	<b>3,000,000</b>	<b>2,999,990</b>		<b>TOTAL</b>	<b>3,000,000</b>	<b>313,025</b>	<b>1,607,866</b>	<b>1,942,471</b>	<b>64.7</b>

Note: Amounts are rounded at one dollar.

<sup>7</sup> Certified financial statement is issued separately by UNON.

<sup>8</sup> Budget after the revision done in December 2022.

## 5.14 Risk log

Risk Description/ Analysis		Category	(I) Impact Severity 1-5	(L) Likelihood 1-5	I x L Overall Risk rating	Risk Management Strategy & Actions	By When/ Whom?
1	Insufficient funding and human resources.	Economic	4	1	4	<p>As this project is formulated under the contribution agreement already signed, the shortcoming of fund is unlikely.</p> <p>On 22 March 2021, the third instalment (USD999,990) was posted, which account for the total amount of the project budget. The funding enables proceeding the activities, so this risk has been resolved.</p>	Closed.
2	Attention on chemicals and waste decreases.	Political	4	2	8	<p>The engagement with partner countries through this project and other opportunities to show the relevance of the issue.</p> <p>New UNEP Medium-term Strategy 2022-2025 highlighted the 'chemicals and pollution' as one of three (3) pillars. UNEA5 also discusses the needs to strengthen science-policy interface on chemicals sector. Such global trends should be promoted at regional and national levels.</p> <p>The establishment of a science-policy panel on chemicals and waste was decided at UNEA 5.2. This will boost the</p>	On regular basis/ Programme Officer, ROAP SP5.

Risk Description/ Analysis		Category	(I) Impact Severity 1-5	(L) Likelihood 1-5	I x L Overall Risk rating	Risk Management Strategy & Actions	By When/ Whom?
						awareness of the chemicals management issues.	
3	The supporting group does not provide quality input or sufficient support.	Organization	4	2	8	<p>Cooperation and engagement of local partner in Minamata will be confirmed at the initiation stage of project implementation.</p> <p>Cooperation from Minamata City reduces when focal persons of Minamata are replaced.</p> <p>Partnership between Minamata City and UNEP is maintained basically by the mutual trust at individual level. There is uncertainty if such trust is maintained when the Director General is replaced. The project sent a letter as the tangible evidence to demonstrate the benefit of this partnership. Thus, this risk has been resolved.</p>	Closed
4	Low interest from decision makers at national level.	Organization	4	1	4	All partner countries are ratified or implemented MIA projects towards ratification, which indicates high interest at national level.	On regular basis/ Programme Officer, ROAP SP5
5	Covid-19 pandemic persists for many years.	Social	5	5	25	UN policy to cope with COVID-19 pandemic is still active. Implementation modality without international travel is prepared as an alternative plan, which can be switch to normal mode when	On regular basis/ ROAP senior management

Risk Description/ Analysis		Category	(I) Impact Severity 1-5	(L) Likelihood 1-5	I x L Overall Risk rating	Risk Management Strategy & Actions	By When/ Whom?
						<p>travel restriction is lifted. Project will monitor the resumption of physical/face-to-face activities accordingly.</p> <p>Minamata COP4 is divided into 2 parts and the face-to-face segment also limits physical representation at the venue, which reduces the opportunity to disseminate project information.</p> <p>Security phase of UN office in Bangkok returned to Phase III (low risk) in June 2022 and some in-person activities have resumed.</p> <p>The impact and likelihood are re-classified as the initial rating was too optimistic.</p>	
6	Pro-democracy protest in Thailand leads social unrest.	Social	3	2	6	<p>Pro-democracy protest against current military regime is put on pause. Local security situation is carefully assessed to evade demonstration campaign.</p> <p>General election in May 2023 resulted in the landslide victory of the opposition parties. The risks of the political transition should be carefully assessed.</p>	On regular basis/ ROAP senior management
7	Political instability in	Political	3	5	15	Political instability in Myanmar limits the engagement of the project. The Project Management Unit will continue to monitor the situation as well as guidance	On regular basis/ Programme Officer, ROAP SP5

Risk Description/ Analysis		Category	(I) Impact Severity 1-5	(L) Likelihood 1-5	I x L Overall Risk rating	Risk Management Strategy & Actions	By When/ Whom?
	Myanmar continues.					provided by the UN for engagement with the Government of Myanmar.  The likelihood is re-classified as no positive sign in current government.	
8	(Merged with item 3)						
9	State bankruptcy in Sri Lanka slows down the implementation of mercury policy.	Political	2	3	6	Unprecedented economic crisis in Sri Lanka forces the country reshuffle the government. The mercury policy under new administration will be closely monitored.	On regular basis/ Programme Officer, ROAP SP5
10	Nepali coalition government may increase frequent turnover of high-level officers.	Political	2	3	6	Following the general election, Nepal formed a coalition government. Ministers and high-level government official have been appointed/replaced in short cycle, which may interrupt the continuous engagement to the Project activities.	On regular basis/ Programme Officer, ROAP Pollution Team



## 5.15 Lessons learned log

	Date	Description	Recommendation/ Action
1	2 September 2019	Local media (in Minamata and Kumamoto) valued this mercury project and published news articles in local newspapers. They asked more information on the project and requested participation to the workshop.	The project implemented by international organization such as UNEP has high news value to the local media so that it could increase visibility of the project. Press releases or other information may help more media coverage on this project.
2	2-4 December 2020	Online activities have limitation but could also provide opportunities to make tangible contribution to the project. Online programmes are open to more participants than that of face-to-face ones.	Online meeting tools such as Webex, Microsoft Team etc. are versatile applications, thus maximising their utility should be explored.
3	29 April 2021	Considering rapid development of new and emerging online technologies that enables real-time two-way communications, surveys without physical travel could be a prospective future methodology, not just an ad hoc measure but more effective and efficient survey technique.	But at the same time, such methodology cannot replace the traditional physical survey completely and still has some vulnerability in severe COVID settings that is beyond the control. Finding capable local coordinators and securing Internet connection are the key for such remote operation.
4	7-9 December 2021	Project activities attracted more attention to agencies beyond Asia-Pacific region and collaboration extended to other regions, which increased the impacts of the project.	Activity-based joint implementation and collaboration will be explored with organizations/agencies that interest the planned project activities. This approach is mutually beneficial and increase the visibility of the UNEP project.
5	21-25 March 2022	The second segment of Minamata COP4 completed successfully in hybrid modality. Good web platform is available to formulate events that involves both in-person and online participants. One disadvantage of online participation, however, is unavailability of side meetings with project partners participated in the COP on project-related discussions.	In-person meeting will be held more regularly to benefit the effectiveness of face-to-face communications. Online platform supplements and adds value of the meeting that can invite more participants and contributors who are not able to travel.

	Date	Description	Recommendation/ Action
6	29 November – 1 December 2022.	A joint promotion among 6 projects (including mercury) run by UNEP ROAP was arranged in collaboration of the Asian Institute of Technology. It is a new approach that different projects prepare information materials and disseminate altogether.	Most of the projects have outreach/promotion components but they have done so far individually. Development of a common promotion material that can be used by all projects will increase the opportunities for disseminating project information.
7	27 January 2023.	The Project has engaged Asian Institute of Technology (AIT) to implement mercury monitoring programme for support the Project partners. AIT decided to upgrade their own laboratory to extend the mercury monitoring capacity.	Private sectors, two manufacturer of mercury analysers and a monitoring consultant company, decided to invest AIT laboratory to strengthen the mercury monitoring capacity. It enables UNEP to utilise this capacity to undertake cooperative activities more effectively with Asian countries. Engagement with private sectors will be a good strategy for the sustainability of the Project results.