

The Twenty-sixth Session of the Scientific Advisory Committee (SAC26)
on the Acid Deposition Monitoring Network in East Asia
20-22 October 2026, Kuala Lumpur, Malaysia

Consideration of the activities of the Task Force on Monitoring and Assessment of Atmospheric Environment (TFAE)

Chairperson of the Task Force
Secretariat of the Task Force

I. Introduction

1. The Task Force on Monitoring and Assessment of Atmospheric Environment (TFAE) was established by reforming the previous task forces in 2022. TFAE will assist the SAC to develop and improve the atmospheric monitoring methods and QA/QC of atmospheric monitoring, promote and review research activities on analysis and evaluation of atmospheric monitoring data of EANET sites, monitoring instrumentation and monitoring methodologies and provide recommendation on the future research direction of the EANET regarding atmospheric monitoring and evaluation in the scope of EANET.

II. Terms of reference (TOR) and the membership of the Task Force (TFAE)

2. The TFAE will conduct activities under the following revised Terms of Reference (TOR) of the Task Force adopted by SAC23 in 2023. The TFAE is promoting activities according to the TOR.
 - i) To develop and improve the atmospheric monitoring methods and QA/QC of atmospheric monitoring in the scope of EANET
 - ii) To elaborate the appropriate atmospheric EANET monitoring sites data evaluation methods (atmospheric deposition estimation, trend analysis, etc.) in the scope of EANET
 - iii) To promote and review research activities on analysis and evaluation of atmospheric monitoring data of EANET sites, monitoring instrumentation and monitoring methodologies in the EANET
 - iv) To provide recommendation on the future research direction of the EANET regarding atmospheric monitoring and evaluation in the scope of EANET

3. The SAC23 appointed Prof. Taehyoung Lee from Department of Environmental Science, Hankuk University of Foreign Studies, R. of Korea as the Chairperson of TFAE. Then, the NC requested the National Focal Points (NFPs) to nominate one member from each country. The current list of members shown below was approved by the Chair of TFAE.

1	Prof. Taehyoung Lee (Chairperson)	Department of Environmental Science, Hankuk University of Foreign Studies, R. of Korea
2	Dr. Nguyen Van Hong (Vice-Chairperson)	Sub-Institute of Hydrometeorology and Climate Change, Vietnam national Institute of Meteorology, Hydrology
3	Mr. Him Chandath	Department of Air Quality, Noise, and Vibration Management, Cambodia
4	Dr. Jingyu Tian	China National Environmental Monitoring Center, China
5	Prof. Puji Lestari	Air Quality Management & Head of Air & Waste Management Research Group, Faculty of Civil & Environmental Engineering
6	Prof. Kazuhide Matsuda	Field Science Center, Tokyo University of Agriculture and Technology, Japan
7	Mr. Sitthideth Nonthaxay	Natural Resources and Environment Research Institute, Ministry of Natural Resources and Environment
8	Dr. Ahmad Fairudz bin Jamaluddin	National Climate Center, Malaysian Meteorological Department, Malaysia
9	Ms. Bold Altantuya	Central Laboratory of Environment and Metrology, Mongolia
10	Ms. Wai Lwin Than	Department of Meterology and Hydrology, Myanmar
11	Prof. Mylene G. Cayetano	Institute of Environmental Science and Meteorology, University of the Philippines
12	Dr. Tamara Khodzher	The laboratory of hydrochemistry and atmospheric chemistry of the Limnological Institute of the Siberian Branch, Russian Academy of Sciences
13	Dr. Sarawut Thepanondh	Faculty of. Public Health, Mahidol University, Thailand

III. Results of the 3rd meeting of TFAE

4. The 3rd meeting of the TFAE (TFAE3) was held on 30 October 2025 at an online meeting. The Agenda and Minutes of the 3rd meeting is attached in Annex 1. The TFAE reviewed the

final draft of the EANET Medium-Term Plan (MTP) 2026-2030 and discussed priorities for the next Strategy Paper. Members confirmed that future activities should strengthen monitoring systems for air pollutants and atmospheric deposition in East Asia, with particular emphasis on PM_{2.5}, ozone, reactive nitrogen compounds, dry deposition, and the application of emerging monitoring technologies. Capacity building was also recognized as a core component of future EANET activities to enhance technical skills and knowledge among personnel engaged in monitoring programs.

5. The meeting further discussed the framework and key activities of the next Strategy Paper. Participants supported activities related to the sustainability and expansion of monitoring networks, improvement of dry deposition flux estimation methods, quality assurance and data management, technical training, and integration of air pollution monitoring with climate change initiatives. Members also agreed that all participating countries should be able to contribute to these activities through consensus-based implementation. In addition, the Network Center will conduct a questionnaire survey among participating countries to gather further input for preparation of the new Strategy Paper.
6. The TFAE reviewed progress reports on ongoing EANET projects. Members acknowledged the advancement of the VOCs-related capacity-building project, including field measurements conducted in Cambodia and development of technical guidance for VOC monitoring. The meeting also noted progress in the Hybrid Air Quality Monitoring Network (HAQMN) project, including the revision of technical guidelines and manuals integrating low-cost sensors with conventional monitoring systems. The Network Center will circulate updated drafts for further review by TFAE members.

IV. Results of the 4th meeting of TFAE

7. The 4th meeting of the TFAE (TFAE4) was held on 30 June 2026 at an online meeting. The Agenda and Minutes of the 4th meeting is attached in [Annex 2](#). The TFAE reviewed the draft Strategy Paper on the Future Direction of Monitoring and Data Evaluation for Air Pollutants and Atmospheric Deposition in East Asia (2027–2031). Members generally supported the proposed strategic direction and agreed that strengthening harmonized monitoring systems should remain a core priority of EANET. The discussion emphasized the importance of expanding and maintaining monitoring networks, improving data evaluation methodologies, and enhancing dry deposition estimation approaches. Participants also highlighted the need for greater harmonization of monitoring practices, including calibration procedures, quality

assurance and quality control (QA/QC), and data comparability among participating countries.

8. The meeting also exchanged views on emerging monitoring technologies and future analytical approaches. Members discussed the potential use of satellite observations and low cost sensors as complementary information sources for atmospheric monitoring and assessment, while recognizing that additional evaluation is required before their broader application within EANET activities. Clarification was sought regarding PM_{2.5} component measurements, including target chemical species and analytical methods. The implementation schedule of the Strategy Paper and the linkage between medium-term and long-term objectives were also considered, and the TFAE secretariat confirmed that further comments would be incorporated into a revised draft.
9. Progress reports on ongoing EANET projects were presented and discussed. Members acknowledged the completion of major activities under the VOC monitoring project, including the development of technical guidance covering sampling methods, analytical procedures, QA/QC, and data evaluation. Progress was also reported on the PM_{2.5} Source Identification Project, which included capacity-building activities in Cambodia and a regional workshop on source identification and policy applications. In addition, the comparative study of alternative filter pack equipment demonstrated generally good agreement for sulfur- and nitrogen-related species, although further validation is required before replacement of the current system. The meeting concluded with agreement to continue revising the Strategy Paper and to submit an updated version for review at the next TFAE meeting prior to consideration by SAC26.

V. Results of the 5th meeting of TFAE

10. The 5th meeting of the TFAE (TFAE5) was held on 28 August 2026 at an online meeting. The Agenda and Minutes of the 4th meeting is attached in [Annex 3](#). The TFAE reviewed the revised draft of the Strategy Paper on the Future Direction of Monitoring and Data Evaluation for Air Pollutants and Atmospheric Deposition in East Asia (2027–2031). Members confirmed that the document should provide a medium-term strategic framework for TFAE activities rather than prescribe detailed monitoring activities for individual countries. The meeting confirmed 5 key activity areas: atmospheric monitoring methodology and QA/QC, atmospheric deposition estimation and data evaluation, long-term trend and regional spatial analysis, high-time-resolution data analysis, and cross-cutting collaborative research. These activities are intended to strengthen and harmonize atmospheric monitoring, improve data

evaluation and assessment capabilities, and enhance the utilization of monitoring results to support policy development and regional cooperation.

11. The meeting held detailed discussions on the contents of the Strategy Paper. Participants emphasized the need to strengthen monitoring and evaluation of priority pollutants, including PM_{2.5}, ozone, NO_x, and ammonia. Members highlighted the importance of improving QA/QC systems, calibration practices, atmospheric deposition estimation methodologies, and long-term data analyses. The proposed activities also include analyses of long-term trends, regional spatial distributions, and high-time-resolution measurements to better understand temporal variations, atmospheric chemical processes, and deposition processes. In addition, the potential use of supplementary data sources, such as satellite observations and local sensor data, was recognized as a promising approach for future monitoring and assessment activities.
12. The meeting agreed on the process for finalizing the Strategy Paper and preparing documents for the 26th Meeting of the Scientific Advisory Committee (SAC26). The TFAE secretariat will revise the draft based on comments received during the meeting, circulate an updated version to TFAE members, and prepare the final draft for submission to SAC26. Members agreed that additional comments would be submitted through email correspondence.

VI. Outlines of the Strategy Paper on the Future Direction of Monitoring and Data Evaluation for Air Pollutants and Atmospheric Deposition in East Asia (2027–2031)

13. The Strategy Paper provides a medium-term framework to support the transition of EANET from a network primarily focused on acid deposition to a comprehensive platform for monitoring, assessment, and policy-relevant evaluation of air pollutants and atmospheric deposition in East Asia. The strategy aims to strengthen and harmonize monitoring systems, advance data evaluation methodologies, and enhance the use of monitoring results for scientific assessment, policy support, and regional cooperation. The Strategy includes 5 key activity areas. The final draft of the Strategy Paper is attached in [Annex 4](#).
14. The first activity is integrated enhancement of atmospheric observation methods and QA/QC, which focuses on improving the consistency, reliability, and comparability of monitoring data throughout the region. Major activities include:
 - Review and update Technical Manuals for priority pollutants (PM_{2.5} components, O₃, NO_x,

and NH_3);

- Harmonize monitoring methodologies, calibration procedures, and data reporting formats;
 - Strengthen QA/QC systems and ozone calibration practices;
 - Evaluate the applicability of satellite observations, model data, and low-cost sensors;
 - Review future priorities for $\text{PM}_{2.5}$ chemical component monitoring.
15. The second activity is advanced estimation and data evaluation methods for atmospheric deposition in EANET. This activity seeks to improve the estimation of dry deposition fluxes and reduce uncertainties in current methodologies. Major activities include:
- Integrating atmospheric pollutant and meteorological observations;
 - Assessing the use of reanalysis and model-derived meteorological datasets;
 - Improving inferential methods for deposition estimation, particularly for reactive nitrogen species;
 - Reviewing deposition velocity parameterizations and simplified estimation approaches;
 - Updating technical guidelines for dry deposition flux estimation.
16. The third and fourth activities focus on enhancing scientific understanding through data analysis. Review and update of methods for long-term trend analysis and regional comparison using EANET data will strengthen statistical approaches for evaluating long-term changes in $\text{PM}_{2.5}$ components, O_3 , NH_3 , NO_x , and atmospheric deposition, while also comparing pollution characteristics among urban, rural, remote, inland, coastal, and subregional areas. Promotion of atmospheric process understanding using high-time-resolution data will support analyses of diurnal and seasonal variability in $\text{PM}_{2.5}$ and O_3 , investigation of atmospheric chemical and deposition processes, and collaboration with modeling communities such as MICS-Asia through data sharing and joint studies.
17. The fifth activity is strengthening collaborative research through coordination with other Task Forces. This activity aims to promote integrated assessments that link atmospheric monitoring with ecosystem and health studies. Major activities include:
- Evaluating nitrogen deposition and its impacts on ecosystems;
 - Assessing health impacts associated with O_3 and $\text{PM}_{2.5}$ exposure;
 - Conducting joint research among EANET task forces;
 - Disseminating scientific findings through workshops, projects, and capacity-building activities.
18. Capacity building is a fundamental component of EANET activities to ensure the sustainable

implementation of high quality atmospheric monitoring and data evaluation in East Asia. The Strategy Paper promotes the enhancement of technical knowledge and practical skills through training workshops, expert meetings, on-site technical support, and collaborative research activities. The Strategy also encourages knowledge sharing among participating countries and supports the transfer of expertise on recent scientific and technical developments.

19. Collaboration with regional and global monitoring networks and scientific organizations will be further strengthened to enhance the scientific basis and international relevance of EANET activities. The Strategy Paper encourages cooperation with networks such as EMEP/CLRTAP, WMO/GAW, CASTNET, NADP, and other relevant international initiatives to exchange monitoring methodologies, QA/QC practices, analytical techniques, and scientific findings. Such cooperation will support the exchange of methodologies and data, joint assessments, capacity-building activities, and scientific collaboration on air pollution, atmospheric deposition, ecosystem impacts, and sustainable nitrogen management.

VII. Action required

20. The Twenty-sixth Session of the Scientific Advisory Committee (SAC24) is invited to review the report on the activities of the TFAE and consider for adoption of the Strategy Paper on the Future Direction of Monitoring and Data Evaluation for Air Pollutants and Atmospheric Deposition in East Asia (2027–2031).

Annex 1**Meeting Minutes****The third Meeting of
Task Force on Monitoring and Assessment of Atmospheric Environment (TFAE)
Scientific Advisory Committee (SAC)****(30 October 2025, online)****I. Welcome remarks (Agenda 1)**

1. The meeting was opened by Prof. Taehyoung Lee, the Chairperson of the Task Force on Monitoring and Assessment of Atmospheric Environment (TFAE) of the EANET Scientific Advisory Committee (SAC).
2. Dr. Fan Meng, Deputy Director General, Asia Center for Air Pollution Research, Network Center for Acid Deposition Monitoring Network in East Asia (NC, EANET) delivered the welcome remarks.

II. Adoption of agenda (Agenda 2)

3. The meeting agenda (EANET/ TFAE 3/1) was adopted as proposed.

III. Review of the next Mid-Term Plan of EANET (2026-2030) (Agenda 3)

4. The Secretariat of the TFAE presented preparation report of activities of Strategy Paper (EANET/ TFAE 3/2/1), report on the updated status of the next Mid Term Plan of EANET (2026-2030) (EANET/TFAE/3/2/2), which had been reported at the SAC25 in October 2025, and direction to prepare the next Strategy Paper, issues of monitoring and data assessment to be included in the next Strategy Paper (EANET/TFAE/3/2/3).

5. The presentation highlighted:

Report of activities of Strategy Paper (EANET/ TFAE 3/2/1)

- The reformation of Task Force and new Terms of Reference were shared among the members of TFAE. It was explained that the current Strategy Paper consists with 6 activities; Review of Technical Manual, Consideration on feasibility of developed

monitoring techniques, Further develop and elaborate dry deposition flux estimation method, Enhancement of special coverage for dry deposition flux estimation, Promote of an ozone monitoring network, Promote of a PM10/PM2.5 monitoring network, and Further elaborate QAQC.

Report on the updated status of the next Mid Term Plan of EANET (2026-2030)

(EANET/TFAE/3/2/2)

- The final draft of next MTP (2026-2030), discussed in SAC25 were explained. The next Medium-Term Plan (MTP) for EANET (2026–2030) is in its final drafting stage and is expected to be adopted at the upcoming IG27 meeting.
- The plan builds on the current term and reflects discussions held during SAC25. It aims to strengthen understanding of air pollution and atmospheric deposition in East Asia through expanded monitoring, improved data management, and enhanced technical capacity.
- Key scientific priorities include establishing a sustainable monitoring system, addressing the nitrogen cycle and its global impact, and linking air pollution monitoring with climate change countermeasures. Core activities will continue to focus on PM_{2.5}, ozone, NO_x, ammonia, and deposition measurements.

The plan also emphasizes capacity building, technical workshops, and the integration of emerging technologies. Final comments from SAC25 will guide the adoption of the MTP and its implementation strategy.

Direction to prepare the next Strategy Paper, issues of monitoring and data assessment to be included in the next Strategy Paper (EANET/TFAE/3/2/4)

- It was suggested that the scientific and technical priorities of next Strategy Paper will focus on 1) the expanding monitoring scope, 2) diversified monitoring method promoting the use of low-cost sensors and satellite observation, 3) advanced dry deposition flux estimation to improve the inferential method and incorporate direct measurements.
- The proposed key activities in next Strategy Paper were
 - Sustainability of Monitoring Systems and Expansion of Monitoring
 - Improvement of Dry Deposition Flux Estimation
 - Quality Assurance and Data Management
 - Capacity Building and Technical Training
 - Integration with Climate Change and Co-benefits

- The title, and covering term, schedule of drafting the next Strategy Paper were also suggested.
 - Title: Strategy Paper on Future Direction of Monitoring and Data Evaluation for Air Pollutants and Atmospheric Deposition in East Asia
 - Covering term: 5 years, 10 years, or not decided.
 - Schedule:
 - 1Q 2026: Define scope, title, and structure based on MTP outcomes
 - 2Q 2026: Prepare 1st draft by the NC and input by TFAE
 - 3Q 2026: Review of the revised draft by TFAE, SAC and NFPs; incorporate feedback
 - 4Q 2026: Final draft endorsement by IG; publication and dissemination

6. Major discussion on this topic included the following:

- i. It was confirmed the core activities of capacity building to enhance the skill, knowledge of a person involved in the monitoring activities, which will be newly incorporated in the core activities.
- ii. It was suggested that the farther survey to all EANET participating countries to review the suggestions of the new Strategy Papers. The NC will send the questionnaire form later.
- iii. It was confirmed whether selected countries will implement the activities according to selection criteria or all EANET participating counties can implement the activities. The NC answered all participating countries can implement the core activities, which should be discussed and reached the consensus among all EANET participating countries.
- iv. It was suggested that the covering term of the Strategy Paper should be deleted with the concern of the adoption of the Strategy Paper in 2026.
- v. The meaning of the word "the improvement of the dry deposition flux estimation" was confirmed whether the measurement or estimation will be improved. The NC will propose to improve the estimation of the dry deposition flux using the simplified model, chemical transport model etc.

IV. Reports of activities of EANET projects (Agenda 3)

7. The Secretariat of the TFAE reported Update status on Promoting VOCs-related Capacity Building in the EANET (EANET/TFAE/3/3/1) that is implemented by The Network Center for the EANET. The presentation highlighted

- The EANET VOCs Project, led by Japan's Ministry of the Environment and coordinated by ACAP, aims to strengthen regional capacity for monitoring volatile organic compounds (VOCs)—key precursors of ozone and PM_{2.5}. Pilot activities in Mongolia, the Philippines, Cambodia, and Viet Nam include training, field monitoring, and the development of standardized methodologies for VOC analysis.
- In August 2025, on-site measurements were conducted at two shoe factories in Cambodia to test sampling methods and understand levels of VOCs concentrations. Clear spatial differences were observed between the two factories depending on the process layout. Spatial mapping identified higher VOC levels near gluing and storage areas. VOC profiles differed markedly between the two shoe factories.
- NC reported on the drafting committee and preparation schedule for the technical training guidance for VOC monitoring in EANET. The guidance will be used for capacity building of VOC monitoring training in EANET to harmonize sampling, analysis, and QA/QC procedures. The Drafting Committee, composed of experts from Japan, China, Korea, Cambodia, and the Philippines, will compile best practices and align the guidance with international/national standards.

8. The Secretariat of the TFAE reported Update status on Methodology Study for Development of LCS Hybrid Air Quality Monitoring Network (HAQMN) (EANET/ TFAE/3/3/2) that is implemented by The Network Center for the EANET. The presentation highlighted

- The NC reported the concept and current status of HAQMN project, which seeks to enhance the air quality monitoring capacity with integrating the reliable low-cost sensor (LCS) and conventional monitors.
- It was reported that the revised Guidelines for Establishing Hybrid Air Quality Monitoring Network (HAQMN) in the EANET region (EANET/TFAE/3/3/3) and Technical Manual for Hybrid Air Quality Monitoring with Low-Cost Sensors: Implementation Guidelines in EANET (EANET/TFAE/3/3/4) was adopted in SAC25 with necessary modifications.
- It was confirmed the drafts were updated from SAC25. The technical documents had already been revised according to the comments from SAC25 and circulated in 3rd meeting of TFAE. The NC will circulate the drafts again and request comments from all experts of TFAE.

V. Next steps

9. The Secretariat of TFAE explained the Next steps including the schedule.

- The draft minutes of the 3rd TFAE meeting will be distributed in a few weeks for the review.
- The 4th TFAE meeting was tentatively scheduled for 2nd quarter of 2026.
- The provisional agenda of 4th TFAE meeting will the review and discussion of the draft Strategy Paper.

10. The meeting confirmed the next steps and schedule.

VI. Closing of the meeting (Agenda 4)

11. The meeting was officially closed by the Chairperson of TFAE.

AGENDA

UTC: 6:00-6:05 (5 minutes)

1. Welcome remarks

Dr. Fan Meng (DDG of the NC)

UTC: 6:05-6:10 (5 minutes)

2. Introductory remarks, Introduction of participants, Adoption of agenda

All Members and NC

UTC: 6:10-7:20 (70 minutes)

3. Report of the current Strategy Paper, next MTP (2026-2030) and discussions on the direction of the next Strategy Paper

All Members and NC

(The NC will report the activities of the current Strategy Paper and the updated status of the next Mid Term Plan of EANET (2026-2030). The NC will also introduce directions on the next Strategy Paper. Then, the participants will have an in-depth discussion and provide comments.)

1. Report of activities of Strategy Paper on Future Direction of Monitoring for Dry Deposition of the EANET (2021-2025) **(15 minutes)**
2. Report on the updated status of the next Mid Term Plan of EANET (2026-2030) **(15 minutes)**
3. Discussions focusing on the direction and issues regarding monitoring and data assessment in the next Strategy Paper **(40 minutes)**

UTC: 7:20-7:55 (35 minutes)

4. Reports of activities of EANET projects

All Members and NC

(The NC will report two EANET project activities related to atmosphere monitoring as follows. Then, the participants will have an in-depth discussion and provide comments.)

1. Update status on Promoting VOCs-related Capacity Building in the EANET **(10 minutes)**
2. Q&A and discussions for VOC Project **(5 minutes)**
3. Update status on Methodology Study for Development of LCS Hybrid Air Quality Monitoring Network (HAQMN) **(10 minutes)**
4. Q&A and discussions for HAQMN project **(10 minutes)**

UTC: 7:55-8:00 (5 minutes)

5. Closing

All Members and NC

List of Participants

Prof. Puji Lestari

Professor. in Air Quality Management & Head of Air & Waste Management Research Group
Faculty of Civil & Environmental Engineering
Bandung Institute of Technology
Indonesia

Ms. Bold Altantuya

Chemist engineer,
Central Laboratory of Environment and Metrology
Mongolia

Ms. Wai Lwin Than

Staff Officer,
Department of Meterology and Hydrology
Myanmar

Prof. Taehyoung Lee (as Chairperson)

Professor,
Department of Environmental Science, Hankuk University of Foreign Studies
Republic of Korea

Prof. Mylene G. Cayetano

Professor and UP Scientist,
Institute of Environmental Science and Meteorology, University of the Philippines
Philippines

Dr. Nguyen Van Hong (as Vice-Chairperson)

Deputy Director,
Sub-Institute of Hydrometeorology and Climate Change, Vietnam national Institute of
Meteorology, Hydrology and Climate Change
Viet Nam

Secretariat of the Task Force

Dr. Fan Meng, Deputy Director General, Asia Center for Air Pollution Research (ACAP)

Dr. Keiichi Sato, Head, Atmospheric Research Department

Dr. Mingqun Huo, Chief Senior Researcher, Atmospheric Research Department

Dr. Akie Yuba, Senior Researcher, Atmospheric Research Department

Meeting Minutes

The fourth Meeting of Task Force on Monitoring and Assessment of Atmospheric Environment (TFAE) Scientific Advisory Committee (SAC)

(30 June 2026, online)

VII. Welcome remarks (Agenda 1)

12. The meeting was opened by Dr. Nguyen Van Hong, Vice Chairperson of the Task Force on Monitoring and Assessment of Atmospheric Environment (TFAE). Due to technical difficulties, the scheduled opening remarks by the Deputy Director General of the Network Center (NC) were not delivered. The meeting proceeded directly to the next agenda item.

VIII. Adoption of agenda (Agenda 2)

13. The meeting agenda (EANET/ TFAE 4/1) was adopted as proposed.

IX. Discussions on the draft of the Strategy Paper on the Future Direction of Monitoring and Data Evaluation for Air Pollutants and Atmospheric Deposition in East Asia (2027-2031) (Agenda 3)

14. The Network Center presented the draft Strategy Paper on the future direction of monitoring and data evaluation for air pollutants and atmospheric deposition in East Asia (EANET/TFAE/4/1). The presentation introduced the overall structure of the draft, including the status of monitoring and data evaluation activities under EANET, objectives of the Strategy Paper, and proposed activities to be implemented during the next implementation period.
15. The draft identified three objectives: strengthening harmonized monitoring systems, advancing data evaluation methodologies and integrated analysis, and enhancing utilization of monitoring and assessment results for policy support and regional cooperation. Five proposed activities described in the draft Strategy Paper were presented, covering enhancement of atmospheric monitoring methodologies and QA/QC, update of atmospheric deposition estimation methodologies, establishment of long-term trend analysis and regional comparison methodologies, improvement of atmospheric process understanding using high-time-resolution data, and strengthening collaborative research with other task forces.

16. The Task Force members discussed on the presented draft Strategy Paper.
17. The members generally supported the proposed direction of the Strategy Paper and agreed that strengthening monitoring activities should remain a fundamental priority for EANET. It was pointed out that further development of data evaluation methodologies and dry deposition estimation approaches should be supported by sufficient monitoring data, and therefore expansion and maintenance of monitoring networks remain important.
18. Several members stressed the importance of harmonization of monitoring practices among participating countries, particularly regarding calibration procedures, QA/QC requirements, and data comparability. Clarification was also sought on PM_{2.5} component measurements, including target species and appropriate analytical methods.
19. The members discussed the potential role of satellite observations and low-cost sensors as supplementary data sources and recognized the need for further consideration regarding their practical use within EANET activities.
20. The implementation timeline, activity schedule, and relationship between medium-term and long-term objectives were also discussed. The NC informed participants that comments would continue to be collected and reflected in a revised draft of the Strategy Paper.

X. Reports of activities of EANET projects (Agenda 4)

21. The NC reported Update status on Technical Training Guidance for VOC monitoring in the EANET (EANET/TFAE/4/4/1). The presentation highlighted:
 - The presentation summarized the three-year project activities, including capacity-building efforts in participating countries and the development of guidance on VOC sampling, analytical methods, QA/QC procedures, and data evaluation.
 - Various monitoring approaches, including canister sampling, sorbent tube sampling, passive samplers, and online monitoring technologies, were introduced.
 - The presentation also described preliminary assessments of ozone formation potential (OFP) and secondary organic aerosol formation potential based on VOC measurements conducted within the project.
22. Major discussion points included:
 - It was clarified that regarding the datasets used for the preliminary analyses and the interpretation of ozone formation potential. The NC explained that the presented examples were based on sorbent

tube measurements and that the OFP analysis was intended to evaluate the relative contribution of different VOC species to ozone formation.

- It was noted that ozone formation is influenced not only by VOCs but also by NO_x and meteorological conditions.
- The members exchanged views on how future monitoring and data analysis could contribute to a better understanding of ozone formation processes and support air quality management in the region.

23. The NC reported Progress on the Methodological Study on PM_{2.5} Source Identification (EANET/TFAE/4/4/2). The presentation highlighted

- The NC reported on the implementation of capacity-building activities conducted in Cambodia under the PM_{2.5} Source Identification Project. The presentation introduced onsite training on PM_{2.5} chemical component analysis, ion chromatography measurements, ozone monitor calibration, and laboratory evaluations.
- The NC also reported on a joint workshop on air pollution policy based on PM_{2.5} source identification, where members from several countries shared experiences on source identification approaches, policy applications, and integration of monitoring, modeling, and satellite observations. The key outcomes and conclusions from the workshop were summarized.

24. Major discussion points included:

- It was emphasized that reliable monitoring data remains the foundation for source identification and evidence-based policy development.
- It was recognized that integration of ground-based monitoring, satellite observations, and other supplementary information can improve understanding of PM_{2.5} sources, particularly where monitoring resources are limited.
- The members also discussed the importance of considering country-specific emission sources and socioeconomic conditions when developing mitigation strategies.
- Challenges associated with open burning, biomass burning, and other traditional practices were noted, and it was recognized that policy measures need to be supported by robust scientific evidence and effective stakeholder engagement.

25. The NC reported Comparative study of different Filter Pack equipment (EANET/TFAE/4/4/3). The presentation highlighted

- This study was conducted because the existing filter pack holder and associated consumables will no longer be commercially available.
- Comparative measurements were conducted at the ACAP, and differences between the systems were evaluated for both gaseous and particulate components.

- The presentation showed that most sulfur- and nitrogen-related species were generally comparable between the systems, although larger differences were observed for sodium and chloride ions.

26. Major discussion points included:

- The members examined possible causes of the observed differences, including the influence of sea-salt particles, differences in filter holder structure, and particle sampling characteristics.
- It was suggested that the discrepancies observed for sodium and chloride may be related to sampling efficiencies for coarse particles or hygroscopic sea-salt components.
- The members generally agreed that the alternative system appeared promising for continued monitoring of sulfur and nitrogen compounds. However, further evaluation and validation were considered necessary before adoption as a replacement for the current system.
- The NC continues investigating other potential alternatives and requests the members to share additional information as it becomes available.

XI. Next steps

27. The NC explained that comments on the draft Strategy Paper would continue to be collected from TFAE members. Based on the comments received, a revised draft will be prepared and submitted at the next Task Force meeting for further review before final consideration at the upcoming SAC26 meeting.

28. The meeting confirmed the next steps and schedule.

XII. Closing of the meeting (Agenda 4)

29. The meeting was officially closed by the Vice Chairperson of TFAE.

AGENDA

UTC: 6:00-6:05 (5 minutes)

1. Welcome remarks

Ms. Siwaporn RUNGSIYANON (DDG of the NC)

UTC: 6:05-6:10 (5 minutes)

2. Introductory remarks, Introduction of participants, Adoption of agenda

All Members and NC

UTC: 6:10-7:10 (60 minutes)

3. Discussions on the draft of the Strategy Paper on the Future Direction of Monitoring and Data Evaluation for Air Pollutants and Atmospheric Deposition in East Asia (2027-2031)

All Members and NC

(The NC will introduce draft of the next Strategy Paper. Then, the participants will have an in-depth discussion and provide comments.)

4. Presentation of the draft of the next Strategy Paper **(20 minutes)**
5. Discussions focusing on the contents and activities of the next Strategy Paper **(40 minutes)**

UTC: 7:10-7:55 (45 minutes)

4. Reports of activities of EANET projects and others related to monitoring

All Members and NC

(The NC will report two EANET project activities and one study related to atmosphere monitoring as follows. Then, the participants will have an in-depth discussion and provide comments.)

5. Update status on Technical Training Guidance for VOC monitoring in the EANET **(10 minutes)**
6. Q&A and discussions for VOC Project **(5 minutes)**
7. Progress on the Methodological Study on PM_{2.5} Source Identification **(10 minutes)**
8. Q&A and discussions for Progress on EANET Project (2026-06): Methodological Study on PM_{2.5} Source Identification and Capacity Enhancement in EANET with Emphasis on Southeast Asia **(5 minutes)**
9. Comparative study of different Filter Pack equipment **(10 minutes)**
10. Q&A and discussion on comparison results **(5 minutes)**

UTC: 7:55-8:00 (5 minutes)

5. Closing

All Members and NC

List of Participants

Mr. Him Chandath

Deputy Director in Department of Air Quality, Noise, and Vibration Management
Cambodia

Prof. Puji Lestari

Professor. in Air Quality Management & Head of Air & Waste Management Research Group
Faculty of Civil & Environmental Engineering
Bandung Institute of Technology
Indonesia

Prof. Kazuhide Matsuda

Professor in Faculty of Agriculture Field Science Center, Tokyo University of Agriculture and
Technology
Japan

Mr. Sitthideth Nonthaxay

Acting director in Environmental Laboratory Natural Resources and Environment Research
Institute Ministry of Natural Resources and Environment
Lao P.D.R

Ms. Bold Altantuya

Chemist engineer,
Central Laboratory of Environment and Metrology
Mongolia

Ms. Wai Lwin Than

Staff Officer,
Department of Meterology and Hydrology
Myanmar

Prof. Mylene G. Cayetano

Professor and UP Scientist,
Institute of Environmental Science and Meteorology, University of the Philippines
Philippines

Prof. Tamara Khodzher

Professor in Head of the laboratory of hydrochemistry and atmospheric chemistry of the
Limnological Institute of the Siberian Branch, Russian Academy of Sciences
Russia

Dr. Nguyen Van Hong (as Vice-Chairperson)

Deputy Director,

Sub-Institute of Hydrometeorology and Climate Change, Vietnam national Institute of
Meteorology, Hydrology and Climate Change

Viet Nam

Secretariat of the Task Force

Dr. Keiichi Sato, Head, Atmospheric Research Department

Dr. Mingqun Huo, Chief Senior Researcher, Atmospheric Research Department

Dr. Akie Yuba, Senior Researcher, Atmospheric Research Department

Ms. Azusa Sakaue, Ecological Impact Research Department

Ms. Kumiko Nakamura, Data Management Department

Meeting Minutes

The fifth Meeting of Task Force on Monitoring and Assessment of Atmospheric Environment (TFAE) Scientific Advisory Committee (SAC)

Date: 28 August 2026

Time: 06:00–07:30 UTC

Venue: Web meeting

Chairperson: Prof. Taehyoung Lee, Hankuk University of Foreign Studies, Republic of Korea

Vice-Chairperson: Dr. Nguyen Van Hong, Viet Nam

Secretariat/Network Center: EANET Network Center (NC)

XIII. Welcome remarks (Agenda 1)

30. The Chairperson, Prof. Taehyoung Lee, requested the Vice-Chair, Dr. Nguyen Van Hong, to chair the meeting, which Dr. Nguyen Van Hong accepted.
31. The 5th meeting of the Task Force on Monitoring and Assessment of Atmospheric Environment (TFAE) was opened by the Chairperson. Ms. Siwaporn RUNGSIYANON, Deputy Director General of the EANET Network Center, delivered the welcome remarks and welcomed all participants to the fifth TFAE meeting. She noted that the meeting would be an important opportunity to finalize the discussions on the next Strategy Paper. The report and recommendations of TFAE will subsequently be submitted to the 26th meeting of the Scientific Advisory Committee (SAC26) for consideration and adoption.
32. The Chairperson thanked Ms. RUNGSIYANON for her remarks and welcomed all participants to the meeting.

XIV. Adoption of agenda (Agenda 2)

33. No substantive changes were proposed, and the agenda was adopted as presented.

XV. Discussions on the draft of the Strategy Paper on the Future Direction of Monitoring and Data Evaluation for Air Pollutants and Atmospheric Deposition in East Asia (2027-2031) (Agenda 3)

34. Dr. Keiichi Sato, Dr. Mingqun Huo and Dr. Akie Yuba from the Network Center introduced the revised draft of the Strategy Paper. The Network Center explained that the draft had been prepared based on discussions and comments from previous TFAE meetings and would be further revised based on the comments received at the present meeting. The revised Strategy Paper is intended to be submitted to SAC26 in October 2026 for consideration and adoption. The Network Center also noted that several

wording and structural issues identified during the presentation would be corrected in the next version of the document.

35. The Network Center explained that the Strategy Paper aims to provide the medium-term strategic direction of TFAE activities for 2027–2031, rather than specify detailed annual monitoring activities for individual participating countries.

The main strategic directions discussed include:

1. Strengthening and harmonizing atmospheric monitoring systems across participating regions;
2. Advancing data evaluation methodologies and integrated analysis, including atmospheric deposition estimation and long-term data analysis;
3. Enhancing the utilization of monitoring and assessment results to support policy development and regional cooperation;
4. Improving integrated data analysis and assessment capabilities; and
5. Promoting regional and international cooperation.

The Strategy Paper therefore provides a common strategic framework, while detailed implementation is expected to be addressed through annual EANET work plans, national monitoring plans and country-level activities. The Network Center presented five major activity areas forming the core framework of the Strategy Paper.

36. Activity 1: Atmospheric Monitoring Methodology and QA/QC

The first activity focuses on reviewing and enhancing atmospheric observation methodologies and QA/QC systems.

The discussion highlighted the need to:

- Review existing monitoring technologies for priority pollutants and PM_{2.5} chemical components;
- Improve the comparability of monitoring approaches among participating countries;
- Review existing QA/QC frameworks and calibration practices;
- Consider harmonized recommendations for monitoring and calibration;
- Enhance monitoring coverage for priority pollutants;
- Consider the potential use of supplementary data sources, including satellite observations and local sensor data; and
- Provide recommendations to support harmonized implementation among participating countries.

The discussion also emphasized the importance of considering ozone, NO_x and ammonia, in addition to PM_{2.5} chemical components.

37. Activity 2: Atmospheric Deposition Estimation and Data Evaluation

The second activity concerns improving atmospheric deposition estimation and data evaluation methodologies.

The Network Center explained that the current inferential method faces limitations because some monitoring sites do not have sufficient meteorological data. The activity therefore aims to:

- Review existing atmospheric deposition estimation methodologies;
- Explore approaches for improving deposition flux estimation;
- Evaluate the usefulness of supplementary meteorological datasets;
- Consider approaches for improving nitrogen deposition estimation, particularly for ammonia and related nitrogen species;
- Examine the use of monitoring data with limited temporal resolution; and
- Provide recommendations for future updates of relevant technical guidance.

The activity is intended to address uncertainties in atmospheric deposition estimation and improve the consistency and comparability of results across the EANET network.

38. Activity 3: Long-term Trend and Regional Spatial Analysis

Activity 3 focuses on reviewing and updating methodologies for long-term trend analysis and regional comparisons using EANET monitoring data.

The proposed work includes analysis of:

- Long-term trends of PM_{2.5} and its chemical components;
- Ozone;
- Ammonia;
- NO_x; and
- Regional spatial distributions.

The analysis may compare urban, rural and remote areas, as well as inland and coastal regions and different subregions of East Asia.

The results are expected to contribute to scientific understanding and future EANET periodic assessment activities.

39. Activity 4: High-Time-Resolution Data Analysis

Activity 4 focuses on the analysis and utilization of high-time-resolution data from automatic monitoring systems.

The proposed analysis will investigate the temporal dynamics of atmospheric pollutants, including PM_{2.5} and ozone, with particular attention to:

- Diurnal variation;
- Seasonal variation;
- Atmospheric chemical processes; and
- Atmospheric deposition processes.

The activity is also expected to strengthen collaboration with external modelling and emission-inventory research groups and contribute to integrated assessment activities.

40. Activity 5: Cross-cutting and Collaborative Research

Activity 5 aims to strengthen collaboration with other EANET task forces and relevant research organizations.

Potential topics include:

- Nitrogen deposition and ecosystem impacts;
- Sulfur, nitrate and ammonia;
- Integrated analysis of monitoring data and emission inventories; and
- Other cross-cutting environmental issues.

The results of collaborative research are expected to be shared through scientific workshops, projects and capacity-building activities.

41. 3.4 Capacity Building

The Network Center emphasized that capacity building is an important component of sustainable atmospheric monitoring.

The Network Center will continue to support participating countries through training and capacity-building activities related to:

- Atmospheric monitoring;
- QA/QC;
- Data evaluation; and
- Development of national expertise.

The Network Center will also consider utilizing training opportunities and resources provided by relevant international cooperation programmes and organizations.

42. Discussion points

- Dr. Nguyen Van Hong pointed out that NO_x should be explicitly considered in the relevant section of Activity 1, particularly Paragraph 19. The Network Center agreed that NO_x should be added to the description.
- During the discussion, Dr. Puji Lestari asked whether the Strategy Paper should explicitly specify which PM_{2.5} chemical components are to be measured. The Network Center explained that the relevant components are already specified in the supplementary annex to the EANET Instrument. It was therefore considered appropriate to refer to the annex in the Strategy Paper rather than reproduce the complete list in the main text.
- Prof. Taehyoung Lee asked whether the Strategy Paper should describe specific monitoring methods for newly emphasized pollutants, including ozone, NO_x and ammonia. The Network Center explained that the Strategy Paper is intended to describe strategic directions rather than detailed monitoring methods. Existing monitoring methods are described in the relevant EANET

technical manuals and guidance documents. It was agreed that the Strategy Paper should refer to the existing technical manuals/guidance where appropriate rather than duplicate detailed methodological descriptions.

- Prof. Taehyoung Lee raised the question of how the proposed activities for 2027–2031 would be implemented, particularly with respect to site selection, sampling and the timing of implementation. The Network Center clarified that the Strategy Paper is a strategic document intended to provide the overall direction for 2027–2031. It is not intended to specify detailed monitoring activities, sites or sampling schedules for each participating country. Detailed implementation will be determined through annual work plans, national monitoring plans and country-level activities. The participating countries will implement relevant activities according to their national circumstances, while the Network Center will provide coordination and support.
- Ms. Mylene raised the issue of annual targets and implementation timelines. She noted that participating countries may need clear implementation timelines in order to prepare and submit national budget proposals. In particular, procurement of high-time-resolution monitoring instruments may require advance planning and alignment with the fiscal year of each country. The Network Center acknowledged the importance of this consideration but explained that it does not have a budget to determine detailed monitoring activities for each participating country on an annual basis. It was explained that detailed activities and milestones can be reflected in the annual EANET work plan and budget, while participating countries are responsible for preparing their national monitoring plans and securing national budgets for country-specific activities. The concern regarding the need to consider national fiscal-year cycles was acknowledged and will be taken into consideration in future planning.

XVI. Discussion on the future schedule

43. Dr. Keiichi Sato presented the proposed schedule for finalizing the Strategy Paper and preparing the materials for SAC26. The following schedule was discussed and agreed:

Period	Action
31 August–1 September 2026	Network Center circulates the revised draft Strategy Paper
1–10 September 2026	TFAE members provide comments and feedback
10–20 September 2026	Network Center prepares the final draft Strategy Paper and SAC26 documents
Early October 2026	Network Center prepares the TFAE presentation slides for SAC26 and sends them to the Chairperson

The Network Center noted that the SAC26 documents are expected to be finalized approximately one month before the SAC26 meeting, with around 20 September 2026 being the target for finalization. It was also clarified that no further TFAE meeting is planned before SAC26; instead, final comments will be collected by email.

XVII. Closing of the meeting (Agenda 5)

44. There being no further questions or comments, the Chairperson thanked all participants for their active participation and cooperation. The Chairperson declared the 5th meeting of TFAE closed.

AGENDA

UTC: 6:00-6:05 (5 minutes)

1. Welcome remarks

Ms. Siwaporn RUNGSIYANON (DDG of the NC)

UTC: 6:05-6:10 (5 minutes)

2. Introductory remarks, Introduction of participants, Adoption of agenda

All Members and NC

UTC: 6:10-7:15 (65 minutes)

3. Discussions on the revised draft of the Strategy Paper on the Future Direction of Monitoring and Data Evaluation for Air Pollutants and Atmospheric Deposition in East Asia (2027-2031)

All Members and NC

(The NC will introduce draft of the next Strategy Paper. Then, the participants will have an in-depth discussion and provide comments.)

6. Presentation of the draft of the next Strategy Paper **(20 minutes)**
7. Discussions focusing on the contents and activities of the next Strategy Paper **(45 minutes)**

UTC: 7:15-7:25 (10 minutes)

4. Discussion on the future schedule

All Members and NC

UTC: 7:25-7:30 (5 minutes)

5. Closing

All Members and NC

List of Participants

Mr. Him Chandath
Deputy Director in Department of Air Quality, Noise, and Vibration Management
Cambodia

Prof. Puji Lestari
Professor. in Air Quality Management & Head of Air & Waste Management Research Group
Faculty of Civil & Environmental Engineering
Bandung Institute of Technology
Indonesia

Mr. Sitthideth Nonthaxay
Acting director in Environmental Laboratory Natural Resources and Environment Research Institute
Ministry of Natural Resources and Environment
Lao P.D.R

Ms. Bold Altantuya
Chemist engineer,
Central Laboratory of Environment and Metrology
Mongolia

Ms. Wai Lwin Than
Staff Officer,
Department of Meteorology and Hydrology
Myanmar

Prof. Mylene G. Cayetano
Professor and UP Scientist,
Institute of Environmental Science and Meteorology, University of the Philippines
Philippines

Dr. Nguyen Van Hong (as Vice-Chairperson)
Deputy Director,
Sub-Institute of Hydrometeorology and Climate Change, Vietnam national Institute of Meteorology,
Hydrology and Climate Change
Viet Nam

Prof. Taehyoung Lee (as Chairperson)
Professor,
Department of Environmental Science, Hankuk University of Foreign Studies
Republic of Korea

Secretariat of the Task Force

Dr. Keiichi Sato, Head, Atmospheric Research Department
Dr. Mingqun Huo, Chief Senior Researcher, Atmospheric Research Department
Dr. Akie Yuba, Senior Researcher, Atmospheric Research Department

**Strategy Paper on the Future Direction of Monitoring and Data
Evaluation for Air Pollutants and Atmospheric Deposition in
East Asia (2027-2032)**

[Final Draft]

Drafted by the Task Force on Monitoring And Assessment of Atmospheric
Environment of the EANET

**November 2026
Network Center for the EANET**

**Strategy Paper on the Future Direction of Monitoring and Data Evaluation for Air
Pollutants and Atmospheric Deposition in East Asia (2027-2032)**

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I. Introduction

1. The Acid Deposition Monitoring Network in East Asia (EANET) was established in 2001 as an intergovernmental initiative in response to growing concerns over acid deposition in the region during the 1990s, driven by rapid industrialization and increasing emissions of air pollutants. Its primary objectives have been to develop a common understanding of the state of acid deposition, support evidence-based decision making, and promote regional cooperation among participating countries.
2. Since its establishment, EANET has developed a coordinated regional monitoring network covering multiple countries in East Asia, supported by standardized monitoring methodologies, capacity building, and data sharing frameworks. Over more than two decades, these efforts have contributed significantly to improving the availability, comparability, and scientific reliability of air quality and deposition data, enabling regional assessments of atmospheric pollution and its impacts on ecosystems.
3. Within this framework, the Task Force on Monitoring for Dry Deposition (TFMDD, established in 2008 under the Scientific Advisory Committee of EANET) has played a central role in advancing monitoring and data evaluation methodologies. Its responsibilities have included the development of Quality Assurance and Quality Control (QA/QC) procedures, technical manuals, and strategic guidance for dry deposition monitoring and assessment.
4. TFMDD and EANET have progressively elaborated their approaches to monitoring and data evaluation. Key milestones include the development of Strategy Papers, which introduced stepwise approaches to dry deposition monitoring (1999, 2005, 2010, and 2015 editions). These approaches began with the identification and standardized monitoring of priority pollutants (e.g., SO₂, O₃, NO_x, NH₃, PM components), followed by the development of inferential methods for estimating dry deposition flux, and then the expansion of monitoring coverage, enhancement of QA/QC procedures, and integration of monitoring data with research activities.
5. In parallel, TFMDD and EANET have developed and implemented technical manuals, including the Technical Manual on Dry Deposition Flux Estimation (2013 and 2022) and the Technical Manual for Air Concentration Monitoring (2013 and

2022) (Technical Manual for Air Concentration Monitoring in East Asia (Second Edition)), which provide standardized methodologies for monitoring and data evaluation across participating countries. These tools have enabled routine estimation of dry deposition flux using the inferential method, combining air concentration data with meteorological observations, and have supported long-term trend analysis, model validation, and regional assessments.

6. Through these accumulated efforts, EANET has generated extensive datasets on air pollutants and atmospheric deposition. These datasets have been widely used for understanding atmospheric processes, assessing regional pollution trends, and supporting scientific and policy-related analyses. However, challenges remain, including limited spatial coverage, insufficient availability of high-time-resolution data, and uncertainties in deposition estimates due to methodological and data constraints.
7. In response to evolving challenges for atmospheric environment, EANET has expanded its scope beyond acid deposition. In 2021, participating countries agreed to include a broader range of atmospheric pollutants, such as fine particulate matter (PM_{2.5}), surface ozone (O₃), nitrogen oxides (NO_x), and ammonia (NH₃), reflecting increasing concerns about their impacts on human health, ecosystems, and meteorological change.

II. Current status

8. The Medium-Term Plan for the EANET (2026–2030) was adopted at the Twenty-seventh Session of the Intergovernmental Meeting in November 2025. This plan represents a major milestone in the development of EANET, and it formalizes the expansion of its scope from a primary focus on acid deposition to a broader framework addressing air pollution and atmospheric deposition as an integrated issue.
9. Under the MTP (2026–2030), priority pollutants for monitoring and assessment include PM_{2.5} and its components, surface ozone (O₃), nitrogen oxides (NO_x), ammonia (NH₃), and related substances, which is within the EANET scope. The plan also emphasizes strengthened monitoring networks, improved QA/QC systems, enhancement of data management and dissemination, and the integration

of emerging monitoring technologies such as satellite observations, low-cost sensors.

10. In parallel, the role of data evaluation within EANET is becoming increasingly important. Monitoring data are expected to be more effectively analyzed and integrated with emission inventories and atmospheric models to support scientific assessments and evidence-based policy making. This reflects a broader transition of EANET from a monitoring-focused network toward a comprehensive platform for integrated assessment and science–policy interface.
11. Viewing beyond the MTP implementation period, medium- and long-term directions for monitoring and data evaluation in East Asia are summarized as follows:
 - Achieving comprehensive and sustainable monitoring coverage of priority pollutants across the region;
 - Improving data quality and comparability through harmonized methodologies and enhanced QA/QC frameworks;
 - Advancing the understanding of atmospheric processes, including interactions among air pollution, atmospheric deposition, ecosystems, and climate;
 - Strengthening integrated data analysis and assessment capabilities to provide policy-relevant information;
 - Promoting usage of satellite based air pollutant estimation within the EANET framework to improve integration of air pollution data, and therefore enable better policy-relevant information; and
 - Promoting regional and international cooperation, including data sharing, capacity building, and collaboration with related networks and initiatives.
12. Thus, the current status represents a transitional stage in the evolution of EANET. While maintaining its established foundation in acid deposition monitoring, EANET is advancing toward a more integrated, adaptive, and policy-relevant system for monitoring and data evaluation of air pollutants and atmospheric deposition. The implementation of the MTP (2026–2030) provides a strategic framework for this transition and sets the direction for further development toward a sustainable and comprehensive regional monitoring and assessment system. The Task Force on Monitoring and Assessment of Atmospheric Environment (TFAE),

established in 2023, assists activities related to monitoring and assessment in EANET.

III. Objectives

13. Considering the evolving scope of EANET and the adoption of the Medium-Term Plan for the EANET (2026–2030), this Strategy Paper aims to provide a clear and strategic framework for guiding the future development of monitoring and data evaluation for air pollutants and atmospheric deposition in East Asia. In particular, it seeks to support the transition of EANET from a network primarily focused on acid deposition monitoring to a comprehensive system that integrates monitoring, data evaluation, and policy-relevant assessment of atmospheric environmental issues. Through this Strategy Paper, priority directions, methodologies, and collaborative approaches are defined to enhance the effectiveness, consistency, and sustainability of EANET activities in responding to current and emerging challenges. To achieve this purpose, the following objectives are shown:
 - i) To strengthen and harmonize monitoring systems for air pollutants and atmospheric deposition across the EANET region, including enhancement of spatial coverage via increment of monitoring sites and integration of satellite based estimations, expansion of monitored parameters, and improvement of QA/QC frameworks to ensure reliable and comparable data;
 - ii) To advance data evaluation methodologies and integrated analysis by improving approaches for atmospheric deposition estimation, long-term trend analysis, and the integration of monitoring data with other research analyses to deepen scientific understanding of atmospheric processes;
 - iii) To enhance the utilization of monitoring and assessment results for policy support and regional cooperation by improving data accessibility, promoting science–policy interfaces, and strengthening collaboration, capacity building, and information exchange among participating countries and relevant organizations, not limited merely to the observation network, but also model data.

IV Activities to be implemented to achieve the objectives from 2027 to 2032

14. The Network Center (NC) for the EANET has encouraged and assisted EANET participating countries to conduct air concentration monitoring at EANET monitoring sites. Moreover, the following items should be conducted in order to achieve the objectives shown in Chapter III. To provide a clear overview of the workflow before detailing each component, the integrated framework governing these activities is illustrated below (Figure 1):

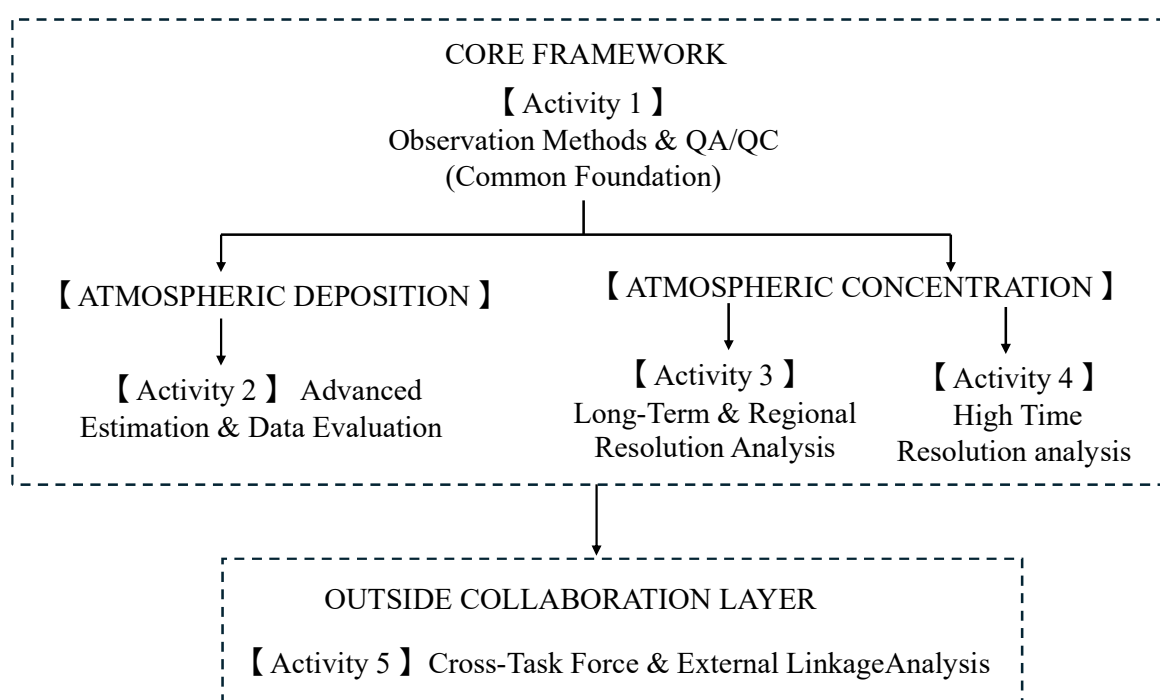


Figure 1. Conceptual framework illustrates the interrelationships among the five activities of the Task Force.

i) Integrated Enhancement of Atmospheric Observation Methods and QA/QC

17. The current Technical Manuals for air concentration monitoring in the EANET region provide a fundamental basis for standardized monitoring practices. However, they do not sufficiently address emerging priority pollutants identified under the Medium-Term Plan (MTP) 2026–2030, such as PM_{2.5} components withing the EANET scope details are shown in the ANNEX of the Supplementary Document to the Instrument (2021), ozone (O₃), nitrogen oxides (NO_x), and ammonia (NH₃), nor

do they explicitly incorporate the use of supplementary data sources such as satellite observations and low-cost sensors.

18. In addition, significant variations remain among participating countries in terms of monitoring instruments, measurement frequencies, analytical methods, and data evaluation approaches. For instance, differences in ozone metrics (e.g., hourly values versus maximum 8-hour averages), as well as disparities in PM_{2.5} component measurements and NH₃ monitoring techniques, may hinder the comparability and consistency of observational data across the region.
19. To address these challenges, the TFAE will review current practices, identify technical gaps, discuss future directions, and provide recommendations on the following topics:
 - Review and evaluate the existing Technical Manuals (Technical Manual for Air Concentration Monitoring in East Asia (Second Edition)) in accordance with priority pollutants under MTP 2026–2030, with particular attention to PM_{2.5} chemical components, O₃, NO_x, and NH₃, and identify area where future harmonization is needed.
 - Assess the comparability of monitoring approaches among participating countries, including measurement techniques, calibration procedures, data reporting formats, and temporal resolution. Based on the assessment results, the update of the detailed measurement methodologies described in the relevant technical manuals will be updated. Furthermore, provide recommendations for improving consistency of monitoring data within EANET.
 - Review the current QA/QC framework of EANET and discuss priorities for future updates of technical manuals and guidance documents, including ozone calibration, PM_{2.5} component measurements, NO_x and NH₃ monitoring.
 - Review existing calibration practices and establish harmonized recommendations for ozone monitoring and calibration within the EANET.
 - Discuss approaches for enhancing monitoring coverage of priority pollutants, including the applicability of simplified monitoring methods and their potential contribution to regional assessments.
 - Review the potential role of supplementary data sources, including satellite observation, model data and low-cost sensors, and discuss their possible use

for spatial assessment, data interpretation, and complementary analysis within EANET activities.

20. Review the current scope of PM_{2.5} component measurements within EANET, discuss future monitoring priorities and analytical approaches, and provide recommendations to support harmonized implementation among participating countries.
21. These activities will be undertaken in close collaboration with participating countries and expert groups through technical discussions and assessments. The outcomes will contribute to the future revision of the Technical Manuals and the development of harmonized recommendations and QA/QC guidelines for the EANET. As a result, improved comparability, reliability, and applicability of atmospheric monitoring data across East Asia are expected.

ii) Advanced Estimation and Data Evaluation Methods for Atmospheric Deposition in EANET

22. The estimation of atmospheric deposition fluxes in the EANET region has primarily relied on the inferential method, which combines air concentration data with meteorological parameters (Clarke et al., 1997, Hicks et al., 1991). However, the application of this method remains limited in many participating countries due to insufficient availability of high time-resolution meteorological data, constrained monitoring infrastructure, and uncertainties related to deposition velocity parameterizations, particularly for reactive nitrogen species.
23. Moreover, current methodologies are not fully suited for sites with limited temporal resolution data, such as those based on filter-pack sampling, and the existing Technical Manual on Dry Deposition Flux Estimation requires further refinement to reflect recent scientific developments and regional conditions in EANET.
24. To overcome these challenges, the Task Force will review existing estimation methodologies, assess emerging approaches, and provide recommendations on the following topics:
 - Review approaches for promoting integrated monitoring of atmospheric pollutants and meteorological parameters at EANET sites, recognizing that the

combined availability of concentration and meteorological data is essential for reliable deposition flux estimation.

- Assess the applicability and usefulness of supplementary meteorological datasets, including reanalysis and model-derived data, particularly for sites where in situ meteorological observations are limited.
- Review and discuss potential improvements to the inferential method, with particular emphasis on nitrogen deposition (e.g., NH_3 , HNO_3), and review key parameterizations such as deposition velocities based on recent scientific findings and regional characteristics.
- Examine potential approaches for utilizing monitoring data with limited temporal resolution data (e.g., weekly or biweekly measurements), including the simplified estimation approaches and the potential use of auxiliary datasets.

25. These activities will be conducted through technical discussion, experts consultation, workshop, and collaborative assessments involving EANET participating countries.
26. The outcomes will contribute to the revisions of the Technical Manual on Dry Deposition Flux Estimation in East Asia, related guidelines and technical documents.
27. As a result, broader spatial coverage, improved accuracy, and enhanced usability of atmospheric deposition data in East Asia are expected, supporting both scientific assessment and policy-relevant applications.

iii) Review and Update of Methods for Long-Term Trend Analysis and Regional Comparison Using EANET Data

28. EANET will review and update the methodologies for long-term trend analysis of air pollutants and atmospheric deposition. This includes statistical approaches and rigorous data screening criteria to ensure data consistency across the network. Special attention will be given to the long-term trends of $\text{PM}_{2.5}$ components, O_3 , NH_3 , and NO_x .
29. To overcome spatial data gaps and better understand regional characteristics, systematic evaluations will be conducted on the variations of key pollutants across

multiple dimensions. These comparisons will analyze data from urban vs. rural vs. remote areas, inland vs. coastal regions, and specific sub-regions such as Northeast Asia vs. Southeast Asia.

30. The outcomes and data derived from these trend analyses and regional comparisons will serve as core scientific contributions to the upcoming EANET Periodic Report covering the period from 2025 to 2029.

iv) Promotion of Atmospheric Process Understanding Using High-Time-Resolution Data

31. Utilizing high-resolution data from automated continuous monitoring systems, the Network Center (NC) and participating countries will analyze the dynamic behaviors of surface ozone (O₃) and fine particulate matter (PM_{2.5}).
32. Research efforts will focus on investigating atmospheric chemical mechanisms and dry/wet deposition processes. Particular emphasis will be placed on capturing and parameterizing the diurnal and seasonal variability of these processes, which is essential for reducing the uncertainties inherent in previous inferential models.
33. EANET will strengthen its collaboration with external modeling and emission inventory research communities, such as the Model Inter-Comparison Study for Asia (MICS-Asia). This will be achieved through active data sharing and joint numerical analyses, which will also directly support the synthesis of the EANET Periodic Report (2025–2029).

v) Strengthening Collaborative Research through Coordination with Other Task Forces

34. Define cross-cutting research themes (e.g., nitrogen deposition and ecosystem impacts; health impacts of O₃ and PM_{2.5}) Moving beyond isolated atmospheric monitoring, TFAE will collaborate with other EANET Task Forces to define and implement cross-cutting research themes. Key priority areas include evaluating the ecosystem impacts of nitrogen deposition (SO₄²⁻, NO₃⁻, NH₄⁺) and methodological study on the human health impacts of O₃ and PM_{2.5} exposure.

35. The scientific findings obtained from these collaborative research projects will be widely disseminated through EANET-sponsored projects, scientific workshops, and targeted capacity-building activities for participating countries.
36. This cross-cutting collaboration will foster integrated environmental analyses, combining monitoring data, emission inventories, and ecological impact models, providing a comprehensive foundation for the EANET Periodic Report (2025–2029).

V. Capacity building of atmospheric monitoring activities

37. The NC will continue to support participating countries to build capacity in atmospheric monitoring activities. For example, the NC will make an effort to hold on-site training courses/workshops/seminars for responsible persons of atmospheric monitoring and QA/QC. The NC should also make full use of training courses organized by international cooperation organizations such as Global Atmosphere Watch (GAW) programme of the World Meteorological Organization (WMO), Asia-Pacific Clean Air Partnership (APCAP) and Japan International Cooperation Agency (JICA).
38. The NC will maintain and further develop a roster of national experts in atmospheric monitoring, assessment, and related scientific fields across East Asia. This expert network will facilitate the exchange of information on recent scientific and technical developments, best practices, and research activities related to air concentration monitoring, atmospheric deposition assessment, data analysis, and emerging monitoring methodologies among EANET participating countries.

VI. Collaboration with relevant networks/organizations

39. Regional and international collaboration is essential for strengthening scientific understanding, enhancing monitoring and assessment capacities, promoting data utilization, and supporting evidence-based policy development on air pollution and atmospheric deposition. The cooperation with relevant regional and global networks, programmes, and organization will be actively promoted. The objectives of such collaboration are to:

- Enhance scientific and technical exchanges on monitoring methodologies, QA/QC systems, atmospheric deposition assessment, and data analysis;
 - Improve understanding of regional and inter-regional transport of air pollutants and their impacts on human health, ecosystems;
 - Promote the integration of monitoring data with emission inventories, atmospheric modelling, satellite observations, and other complementary information sources;
 - Facilitate joint research, capacity-building activities, and expert exchanges.
40. The NC and participating countries will continue to strengthen cooperation with existing partners, including the Cooperative Programme for Monitoring and Evaluation of the Long-range Transmission of Air Pollutants in Europe (EMEP) under the Convention on Long-range Transboundary Air Pollution (CLRTAP), the Global Atmosphere Watch (GAW) Programme of the World Meteorological Organization (WMO), the Clean Air Status and Trends Network (CASTNET), the National Atmospheric Deposition Program (NADP), and other relevant regional and international networks and initiatives. Such cooperation will support the exchange of methodologies and data, joint assessments, capacity-building activities, and scientific collaboration on air pollution, atmospheric deposition, ecosystem impacts, and sustainable nitrogen management.

Appendix

Members of the Task Force on Monitoring and Assessment of Atmospheric Environment (As of June, 2026)

1	Prof. Taehyoung Lee (Chairperson)	Department of Environmental Science, Hankuk University of Foreign Studies, R. of Korea
2	Dr. Nguyen Van Hong (Vice-Chairperson)	Sub-Institute of Hydrometeorology and Climate Change, Vietnam national Institute of Meteorology, Hydrology and
3	Mr. Him Chandath	Department of Air Quality, Noise, and Vibration Management, Cambodia
4	Dr. Jingyu Tian	China National Environmental Monitoring Center, China
5	Prof. Puji Lestari	Air Quality Management & Head of Air & Waste Management Research Group, Faculty of Civil & Environmental Engineering
6	Prof. Kazuhide Matsuda	Field Science Center, Tokyo University of Agriculture and Technology, Japan
7	Mr. Sitthideth Nonthaxay	Natural Resources and Environment Research Institute, Ministry of Natural Resources and Environment
8	Dr. Ahmad Fairudz bin Jamaluddin	National Climate Center, Malaysian Meteorological Department, Malaysia
9	Ms. Bold Altantuya	Central Laboratory of Environment and Metrology, Mongolia
10	Ms. Wai Lwin Than	Department of Meterology and Hydrology, Myanmar
11	Prof. Mylene G. Cayetano	Institute of Environmental Science and Meteorology, University of the Philippines
12	Dr. Tamara Khodzher	The laboratory of hydrochemistry and atmospheric chemistry of the Limnological Institute of the Siberian Branch, Russian Academy of Sciences
13	Dr. Sarawut Thepanondh	Faculty of. Public Health, Mahidol University, Thailand

Secretariat:

Dr. Keiichi Sato, Dr. Mingqun Huo, Dr. Akie Yuba

Network Center for the EANET

Atmospheric Research Department, Asia Center for Air Pollution Research

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Printed by
Network Center for EANET
Asia Center for Air Pollution Research
1182 Sowa Nishi-ku, Niigata-shi, 950-2144, Japan
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