

The Working Group Meeting in 2021 Session 1
Acid Deposition Monitoring Network in East Asia
20-22 April 2021, Virtual Meeting

FINDINGS FROM THE QUESTIONNAIRE: REVIEW OF EFFORTS OF EANET PARTICIPATING COUNTRIES IN TACKLING ACID DEPOSITION/AIR POLLUTION PROBLEMS

I. INTRODUCTION

1. This report summarizes findings from the Questionnaire: Review of Efforts for Acid Deposition/Air Pollution in the Participating Countries of EANET. It is prepared in line with the approved Questionnaire Survey to Formulate Non-core Activities of EANET (EANET/IG 22/9/2) at the Twenty-second Session of the Intergovernmental Meeting of EANET (IG22).
2. The Summary of the Questionnaire: Review of Efforts for Acid Deposition/Air Pollution in the Participating Countries of EANET (EANET/WG2021-1/5/1) is presented as an Attachment of this report.
3. In line with the approved "Proposed Next Steps After IG22" (EANET/IG 22/10), the NC implemented the Questionnaire survey and compiled the results as the Summary of the Questionnaire. In the agenda item 5, WG2021-1/5/3 Elements for Supplementary Document to the EANET Instrument: Addressing Air Pollution Within EANET Framework is discussed based on the discussion on WG2021-1/5/1 Findings from the Questionnaire: Review of Efforts of EANET Participating Countries in Tackling Acid Deposition/Air Pollution Problems and WG2021-1/5/2 Consideration of Activities in Line with Expansion of Scope of EANET so that the needs of countries for EANET (the document WG2021-1/5/1) and future activities in the expansion of the scope of EANET (the document WG2021-1/5/2) are firstly discussed, and then Supplementary Documents (1/5/3) can be discussed intensively.

II. ACTIONS REQUIRED

4. The Working Group Meeting in 2021 Session 1 (WG2021-1) is invited to review the Summary of the Questionnaire: Review of Efforts for Acid Deposition/Air Pollution in the Participating Countries of EANET and may wish to consider, discuss, provide comments, as appropriate.

Attachment**FINDINGS FROM THE QUESTIONNAIRE: REVIEW OF EFFORTS OF EANET PARTICIPATING COUNTRIES IN TACKLING ACID DEPOSITION/AIR POLLUTION PROBLEMS****I. BACKGROUND**

1. In the last 20 years, it is evident that there are significant differences among thirteen EANET Participating Countries in regard to their legal and operational arrangements of the atmospheric environment. In implementing all EANET activities, the Participating Countries are required to comply with their national legal and operational arrangements.
2. The Questionnaire intends to find information in each country regarding its national legal and operational arrangements of its atmospheric environment matters. The results would be used as a reference for appropriately selecting the activities to be carried out as consideration to select future Non-Core Activities of EANET by accommodating the Participating Countries' needs and situations.
3. Following the approval of the Twenty-second Session of the Intergovernmental Meeting (IG22) of EANET in November 2021, the Network Center (NC) circulated the Questionnaire to the National Focal Points (NFPs) from 4 December 2020 to 29 January 2021. After the deadline, the NC received responses from 12 Participating Countries. The responses were compiled and shared with the Participating Countries as references.

II. SUMMARY OF THE FINDINGS

4. Below is the summary of findings from the Questionnaire. Detailed findings can be found in section III.

1) The latest situation on law/regulation and policy for air pollution

Q1. Please describe the recent establishment/abolishment and implementation of the law/regulation for air pollution control (in these five years):

- Priority substances and progress of countermeasure are different from each country.
- Cambodia, Myanmar, Mongolia, and Lao are making efforts to improve their laws.
- China currently revises its law on air pollution control and management.
- Indonesia is taking measures in various sectors related to air pollution.
- Japan and the Republic of Korea have established their air pollution-related legislation, and amendments have been made to review the standards.
- Malaysia conducts amendment of the law emphasizing on emission control from industrial activities.
- The Philippines, Republic of Korea, and Thailand are currently focusing on PM measures.

Q2. Please describe policies for air pollution control developed and implemented recently (in these five years).

- Cambodia implements several industrial measures such as on construction sites, industrial areas, and agriculture, including the automobile sector.
- China implements a wide range of measures such as the adjustment of industrial and energy structure, transportation, and land use, which decreased PM2.5 concentration.
- Indonesia and the Philippines implement air pollution measures such as emission monitoring systems using online information systems have been implemented.
- Japan implements VOC measures targeting nitrogen oxides, photochemical oxidants, PM2.5, etc.
- Malaysia and Thailand are particularly focusing on regulations in the automobile sector, and Thailand is also implementing measures to incinerate agricultural residuals.
- Mongolia is developing legislation for air pollution countermeasure.
- There is no policy to directly implement air pollution control/measures in Myanmar.
- Republic of Korea implements measures by focusing on PM2.5.

2) Placement standard, classification, and attribute of ambient air quality monitoring stations:

Q1: Please describe the classification of monitoring stations by objectives and attributes for monitoring the atmospheric environment:

- Many countries, such as Indonesia, Mongolia, Myanmar, the Republic of Korea, and Thailand, prioritize measuring industrial areas.
- Measurement locations are different, depending on the jurisdiction (Malaysia, Myanmar).
- Cambodia and Indonesia conducted local measurements such as in the city center or near emission sources.
- Lao PDR implements monitoring in two types of monitoring stations: stationary and mobile stations.

Q2: Are there any placement criteria for monitoring stations? If yes, please describe. Q3: Do you utilize simple monitoring devices such as low-cost sensors for monitoring activities by public institutions as a supplement to high-spec equipment?

- US-EPA compliant countries (Philippines, Thailand).
- Other countries are shown in Table 3.2.3.

3) Quality Assurance/Quality Control (QA/QC) system of ambient air quality monitoring in your country:

Q1: Please describe programs and implementation structures for QA / QC activities (including calibration system for measuring equipment and flowmeter) (attached if

existing materials are available):

Many countries (China, Japan, Malaysia, Mongolia, Philippines, the Republic of Korea) consider the implementation of QA / QC activities as implementers or implementation programs, while other countries (Cambodia, Indonesia, Lao PDR, Myanmar, Thailand, Viet Nam) consider it as program items, especially calibration and maintenance inspection items.

Q2: What is the current QA / QC activities' challenges, and do you consider any improvement measures?

- Cambodia, Mongolia, and Vietnam: improving the quality and quantity of staff.
- Cambodia, Indonesia, Malaysia, Myanmar, Philippines, Thailand, and Viet Nam: improving equipment quality and quantity.

Q3: Are there any future plans, and cooperation with other ministries, local governments, universities, and research institutes?

- Some countries mentioned that they would cooperate with local governments (Cambodia, China, Lao PDR, Myanmar, Philippines), other stations (China, Malaysia, Myanmar, Thailand), universities, and research institutes (Philippines).
- Some countries mentioned that the contents of cooperation are monitoring (Cambodia, China, Myanmar, Thailand), QA/QC relations (China, Indonesia), and joint research (Malaysia)

4) The situation of establishment/ amendment/ abolishment of air quality standard:

Q1. Please describe ambient air quality standards in your country (standard values, measurement units, year of establishment, and recent (about five years) revision/abolition if any) (attached if existing materials are available)

- Myanmar is the only country that did not establish an air quality standard.
- Cambodia has no recent amendments to air quality standards.
- Except for Myanmar and Cambodia, revisions have been made in the last five years.

Q2. What are the current challenges to enforce/implement ambient air quality standards, and do you consider any improvement measures?

It includes internal systems such as budget and human resources (Myanmar), old-fashioned equipment and fuel (Malaysia, Mongolia, Myanmar, Thailand), specific substances such as PM2.5 (Japan, Mongolia, Philippines), and data systems (Myanmar, Philippines), etc.

5) The status of establishment of the standard monitoring method and the performance regulation of measurement equipment:

Q1: Do you define standard monitoring methods for air pollutants? If yes, please describe (for each substance of environmental standards) (attached if there is any existing

material)

- Most countries such as China, Indonesia, Japan, Mongolia, Philippines, the Republic of Korea, Thailand, Viet Nam use similar measurement methods.
- DOAS is used to measure gas concentrations such as SO₂ and O₃ (China, no answer but the Philippines).
- Regarding the PM measurement method, the light scattering method is used (Thailand) or under consideration.

Q2: Are there any performance regulations such as the minimum detection sensitivity of measuring equipment?

- There are many countries not having performance regulations.
- Malaysia and Thailand comply with US-EPA standards.

Q3: How often are certifications and maintenance carried out to maintain measuring instruments' performance, and are there any regulations on those frequencies?

- Maintenance frequency is regulated in most countries such as Cambodia, China, Indonesia, Japan, Malaysia, Mongolia, Myanmar, Philippines, Republic of Korea, Viet Nam.
- Japan and the Philippines conduct maintenance every two weeks, as the shortest maintenance frequency.

Q4: Do you define handling rules for measured values? If yes, please describe. (significant figures, units of measurement, measurement frequency, smoothing of measurement signals, regulation of effective measurement numbers, statistical processing of average values, statistical processing when comparing with reference values, other regulations/conditions, etc.) (attached if there is any existing material).

- Many countries such as Cambodia, Indonesia, Mongolia, Myanmar do not have handling regulations.
- Handling rules for measured values are described in detail in countries with handling regulations (China, Japan, Republic of Korea)

6) The high priority challenges for countermeasures against air pollution

Q1. What are high-priority challenges to tackle with air pollution?

- Cambodia: public awareness and education, automobile measures, waste measures, monitoring, and implementation of laws and regulations.
- China: high concentration measures and industrial/energy measures.
- Indonesia: public awareness/education.
- Japan: industrial/energy measures, automobile measures, monitoring, and research.
- Malaysia: international cooperation, industrial/energy measures, and automobile measures.
- Mongolia: implementation of laws and regulations.
- Myanmar: monitoring, technical/financial support, training/capacity building,

atmospheric environment management, implementation of laws and regulations, public awareness/education.

- Philippines and Thailand: automobile measures (Thailand includes waste measures).
- Republic of Korea: measures for mobile sources (other than automobiles) and industrial/energy.

Q2. What is the most difficult part in addressing the high-priority challenges of Q1 above?

- Cambodia: public awareness/education and implements laws and regulations.
- China: atmospheric environment management and automobile measures.
- Indonesia and Malaysia: industrial and energy measures (Malaysia includes international cooperation).
- Japan: research, implementation of various policies, monitoring, and implementation of laws and regulations.
- Mongolia and Thailand: technical and financial support (Thailand includes public awareness/education).
- Myanmar: monitoring, economic policy, implementation of laws and regulations, public awareness/education, training/capacity building, and atmospheric environment management.
- Philippines and Republic of Korea: measures for automobiles (the Republic of Korea includes measures for mobile sources (special vehicles) other than automobiles).

7) The needs for cooperation for EANET

Q1. How do you perceive the importance and benefits of participation in EANET?

- By evaluating and analyzing the EANET monitoring data, the EANET has created a common understanding of the state of acid deposition problems in East Asia.
- The periodic publications of the EANET, such as PRSAD, have provided useful information and scientific evidence to the participating countries of the EANET on how to deal with acid deposition and air pollution in 'one's countries.
- The EANET has contributed to capacity building in various aspects, such as monitoring and measurement, analysis, assessment, research, etc.
- The EANET has provided a platform for information sharing to prevent and mitigate adverse effects of acid deposition or air pollution.

Q2: What role do you expect EANET to play in improving the atmospheric environment in the region? What is the reason for your answer?

- Provide technical and financial support on air pollution researchers and regulations, guidelines, activities plan preparation, air quality monitor, and analyzer.
- Provide capacity building on the knowledge of air pollution, research capacity, and the implementation of air pollution reduction measures. The EANET is also expected to provide training such as air pollution modeling activities and short-term and long-term policy strategies.

- Promote public awareness on acid deposition and air pollution problems, a better understanding of the consequences of air pollution/ acid deposition and its impacts on human health and the natural environment in regional to global through the EANET.
- Enhancement of monitoring networks, such as ozone and PM2.5. Monitoring and quality control are also needed to conduct continuously.
- The EANET is expected to bridge communication and sharing platforms for countries from air pollution monitoring and control technology. Also, EANET could play a role in the information exchange of advanced monitoring technology among the countries. The EANET is also expected as a communication platform of East Asia for countries with diverse environmental techniques and experiences.

Q3. What kind of capacity-building activities do you expect to be conducted by EANET (e.g., subject, type, targeted audience)?

- Capacity-building in monitoring technology regarding acid deposition and air pollution and pollution control technology. VOCs monitoring technology is raised by one participating country.
- Training on Air Quality Monitoring (sampling and analysis), improvement, quality assurance and quality control (QA/QC) and best practices, Calibration and Preventive Maintenance (Field and Laboratory Equipment).
- Capacity building on research, air quality data analysis, air pollution inventory, and air quality modeling is expected.
- Training on data interpretation, policy development on air pollution, and acid deposition targeting participating countries' policymakers based on scientific monitoring data in collaboration with partners.
- The promotion of public awareness and public participation on acid deposition and air pollution, operating programs for the public and civil societies to increase their awareness of air pollution and encourage participation and voluntary actions are expected.

Q4. Does your country participate in other air-related frameworks and/or initiatives besides EANET?

See Table 3.7.7

III. DETAILED FINDINGS

(1) The latest situation on law/regulation and policy for air pollution

Q1. Please describe the recent establishment/abolishment and implementation of the law/regulation for air pollution control (during the last five years).

Table 3.1.1 Recent Establishment/ Abolishment and Implementation of Laws/Regulations

Countries	Recent Establishment/Abolishment and Implementation of Laws/Regulations
Cambodia	<ul style="list-style-type: none"> - Law on Environmental Protection and Natural Resources Management (1996) Sub-decree on Air Pollution Control and Noise Disturbance (2000) is emended. - Technical guideline on air pollution control from industries (2020) - Technical guideline on Noise and Vibration from blasting (2020) - Circular on the measure to Prevent and Reduce the Ambient Air Pollution (2020)
China	<ul style="list-style-type: none"> - The Environmental Protection Law of the People's Republic of China (1989) - Revised Environmental Protection Law of the People's Republic of China (2014), - The Law of the People's Republic of China on the Prevention and Control of Air Pollution (1987) (revised in 2015)
Indonesia	<p>Regulation of the ministry of environment and forestry 2020:</p> <ul style="list-style-type: none"> - Standard Index of Air Pollutants 2019: - Emission Quality Standards for the Fertilizer Industry and Ammonia Industry - Emission Standards for Thermal Power Plants - Noise Quality Standards for New Types of Motorized Vehicles and Motorized Vehicles that are being Produced Category M, Category N, and Category L <p>2018:</p> <ul style="list-style-type: none"> - Competency Standards and Certifications of Person in Charge for Operations of Air Pollution Control Installation and Person in Charge of Air Pollution Control <p>2017:</p> <ul style="list-style-type: none"> - Cement Industry Emission Quality Standards - Threshold for New Type Motor Vehicle Emissions for Category M, Category N, and Category O <p>2016:</p> <ul style="list-style-type: none"> - Quality Standards for Thermal Waste Processing Emissions <p>All the regulations were implemented.</p>
Japan	<ul style="list-style-type: none"> - Amendment of the Air Pollution Control Law concerning prevention of asbestos diffusion due to demolition work (2020) - Amendment of the Air Pollution Control Law on the allowable limit of automobile exhaust gas (2018) - Revision of air quality standards for trichloroethylene (2018) - Revision of the manual for measuring toxic air pollutants (2017) - Amendment of the Air Pollution Control Law concerning the regulation of mercury emission from mercury emission facilities and the measurement method of mercury (2016)
Lao PDR	<ul style="list-style-type: none"> - The national environmental standards were upgraded, and new parameters were added for air pollution.
Malaysia	<ul style="list-style-type: none"> - The most recent regulations to control air pollution are the Clean Air Regulations, 2014. <p>The regulations revoke and replace the Clean Air Regulation 1978 and the Environmental Quality Regulations (Dioxin and Furan) 2004 to regulate emissions from industrial activities and emphasize the major industries with specific technical and emission standards.</p>

	<ul style="list-style-type: none"> - The new industries established after the regulations were enacted in June 2014 have to comply immediately, while the industries before that period were given five years grace period to comply with the regulations fully. - Thus, in 2019, industries are fully subjected to comply with CAR 2014.
Mongolia	<ul style="list-style-type: none"> - National program on reducing air and environmental pollution (2017) - National Security Council Recommendation No.03-03 (2017) - Parliament resolution No.45 (2015), No.02 (2018) - Governmental resolution No.62 (2018), No.189 (2020) - Governmental resolution No.199 (2017), No.115 (2020)
Myanmar	<p>ECD</p> <ul style="list-style-type: none"> - Environmental Conservation Law - Environmental Conservation Rules - National Environment Policy, National Environmental Quality (Emissions) Guidelines - Myanmar Climate Change Strategy (2018-2030) - Myanmar National Waste Management Strategic and Master Plan (2018-2030) <p>Remark: There is still no only national air law/regulation in Myanmar.</p> <p>NPTDC</p> <p>Nay Po Taw Development Law (2016)</p> <p>DOA</p> <ul style="list-style-type: none"> - Reducing crop residue burning - Controlling shifting cultivation Practicing Agroforestry - Transferring technologies of making compost to farmers <p>DPH</p> <p>Public Health Law (1972) (under consultation to be updated)</p> <p>MCDC</p> <p>Mandalay City Development Committee Law (2014)</p> <p>YCDC</p> <p>update YCDC Law (2018)</p>
Philippines	<ul style="list-style-type: none"> - Policies are the same as Q2 below, except for the following abolishment repealing the previous policies:2020 - Establishing the Breakpoints for Particulate Matter 2.5 (PM2.5) Air Quality Index (AQI) and amending Establishing Air Quality Guideline Values for PM2.5 More stringent PM 2.5 Guideline values were provided. Air Quality Index (AQI) Breakpoints were also specified. <p>2019</p> <ul style="list-style-type: none"> - Memorandum from the Department of Environment and Natural Resources (DENR) Secretary to all Environmental Management Bureau (EMB) Regional Directors dated September 27, 2019 Revoking Memorandum from the Secretary dated 2 March 2009 on Sulfur Dioxide Ambient Air Monitoring to ensure public health protection dated September 27, 2019, was revoked. - The policy, which was understood to allow only Ambient SO₂ sampling for firms using Bunker Fuels Oil, was clarified and required both Ambient Air Quality and Stack Sampling for SO₂.
Republic of Korea	<p>Introduced stricter standard for PM_{2.5} (27 Mar 2018)</p> <p>Annual Average($\mu\text{g}/\text{m}^3$): 25 → 15</p> <p>24-hr($\mu\text{g}/\text{m}^3$): 50 → 35</p> <p>Special Act on Fine Dust Reduction and Management (2018)</p>

	Special Act on Air Quality Improvement of Air Quality Management Districts (2019)
Russia	Not submitted
Thailand	Action Plan for Driving National Agenda on Pollution Problem Management (Particulate Matter" (2019) Measure 1: Increasing efficiency in spatial management. Measure 2: Preventing and reducing pollution at the source Measure 3: Optimizing the management of pollution
Viet Nam	Not submitted

Q2. Please describe policies for air pollution control developed and implemented recently (in these five years).

Table 3.1.2 Policies for Air Pollution Control Developed and Implemented Recently

Countries	Policies for Air Pollution Control Developed and Implemented Recently
Cambodia	- Circular on Measures to Prevent and Reduce the Ambient Air Pollution was adopted in early 2020 - Including the fuel standard for use in the automotive sector, vehicle emission standards, and other measures like a construction site, industrial zone, open burning to reduce air pollution in Cambodia.
China	- Three-year Action Plan to Win the Battle for Blue Skies (hereinafter referred to as the Action Plan) was released on June 27, 2018. Aiming: 1. Adjusting and optimizing the industrial structure and promote the development of the green industry. 2. Speed up the energy structure adjustment and build a clean low carbon-efficient energy system. 3. Actively adjust the structure of transportation, develop a green transportation system. 4. Optimization adjustment of land use structure, promote the non-point source pollution control. 5. Action implementation of major projects, greatly reduce pollutant emission. 6. Strengthening zone from spreading, effectively cope with heavy pollution weather. Results: In 2020, the number of days with good air quality in 337 major cities reached 87%, an increase of 5% and 5.8% from that in 2019 and 2015, respectively. And the average concentration of PM2.5 in 337 major cities was 33 µg/m ³ , a drop of 8.3 % and 28.3% from that in 2019 and 2015, respectively.
Indonesia	- Continuous Industry Emission Monitoring Information System (SISPEK) (Online monitoring cement, Power Plant using CEMS and connect real-time to MoEF) - Air Pollution Standard Index (ISPU) - Industrial Sector Emission geospatial information (SIMPEL) - Inventory of Total Air Pollutant Emissions from Air Pollutant Sources (IE Online)
Japan	Measures related to nitrogen oxides, photochemical oxidants, PM2.5, etc.: - Implementing measures for stationary sources and mobile sources

	<ul style="list-style-type: none"> - Promoting measures for NO_x, PM_{2.5}, and VOCs, etc., - Keeping constant monitoring system - Simulation model for predicting PM_{2.5} concentration and grasping the effect of the measure (as domestic policy) - Information sharing on policies and technologies modeled in frameworks such as cooperation and cooperation between cities in Japan and China, policy dialogue between Japan, China, and R. of Korea, and the Asia-Pacific Clean Air Partnership (APCAP) (as transboundary air pollution policy) (1) Measures for stationary sources related to soot and smoke <ul style="list-style-type: none"> - Emission standards for each facility ensure a good air environment. In areas where it is difficult to secure a good air environment according to each facility's emission standards, the total amount of NO_x and SO_x is regulated on a factory or business site basis. (2) Measures for mobile sources <ul style="list-style-type: none"> Tightening exhaust gas regulations for each vehicle and implementing measures to reduce NO_x and PM emissions from vehicles. - Measures for individual automobiles and fuel - Measures against automobile exhaust gas in metropolitan areas - Promotion of the spread of low-emission vehicles - Traffic flow measures. <ul style="list-style-type: none"> (A) Measures to disperse and facilitate traffic flow (B) Measures to control and reduce traffic volume - Measures against exhaust gas from ships, aircraft, and construction machinery - Promotion and enlightenment measures, etc. (3) VOC measures. <ul style="list-style-type: none"> - VOC emission control measures based on the best mix of law/regulation and voluntary efforts - Total emissions in FY2018 were reduced by more than 50% compared to FY2000 - A certification system was established in February 2018 that the gas station where the refueling machine is installed is designated as an air environment-friendly SS.
Lao PDR	No answer
Malaysia	<ul style="list-style-type: none"> - Better fuel quality and Emission standards strategies were developed in Malaysia's Clean Air Action Plan (from 2010 to 2020). Malaysia has a road map for better fuel quality, which started implementing EURO 4 RON97 petrol in September 2015 and EURO 4 RON95 petrol standard since 1st January 2020. Malaysia has also planned the implementation of EURO 5 petrol fuel and diesel fuel. The implementation will be taken place on 1st April 2021 for diesel fuel and on 1st September 2025 for petrol fuel. Currently, in use, vehicle emission standards for petrol and diesel engines are at EURO 2. Malaysia has implemented the EURO 4 standard for petrol engines of new model vehicles since 1st January 2020 and targeted to implement EURO 4 diesel engines for new model vehicles on 1st September 2022. Department of Environment is also undergoing a revision of Clean Air Regulation 2014 to update the latest air emissions strategy from industries.
Mongolia	- Ministerial decree No.387 (2018.10.10) – Rule on assessment and reporting of Air quality.
Myanmar	ECD - National Environment Policy Remark: There is still no only national air policies in Myanmar

	<p>NPTDC</p> <ul style="list-style-type: none"> - Not available <p>DPH</p> <ul style="list-style-type: none"> - National Health Policy (Draft) of Ministry of Health and Sports: <ul style="list-style-type: none"> Current environmental health risk associated with public health problems is ambient and indoor air pollution, indiscriminate use of hazardous chemicals including pesticides, poor housing and unplanned settlements, improper management for various types of waste including municipal waste, industrial waste, and waste from health care facilities. - As such policy goal will be defined as: "Ensured a comprehensive environmental pollution and climate change". - The policy priority strategies include: Improve systems and capacities to mitigate potential health impact due to climate change and public health risks from development activities, poor housing, and unplanned settlements in the community; <p>YCDC</p> <ul style="list-style-type: none"> - Not available.
Philippines	<p>CY2020</p> <ul style="list-style-type: none"> - Establishing the Breakpoints for Particulate Matter 2.5 (PM2.5) Air Quality Index (AQI) and amending Establishing Air Quality Guideline Values for PM2.5 - Guidelines on the Issuance of Permit to Operate (PTO) for Air Pollution Source Installation or Equipment (APSI/APSE) through the Online Permitting and Monitoring System (OPMS) - Mandating all EMB Regional Offices (EMB-ROs) to establish an Air Quality Network Center using a Uniform Data Acquisition and Handling System (DAHS) <p>CY2019</p> <ul style="list-style-type: none"> - Memorandum from the Secretary to all EMB Regional Directors - Guidelines for the conduct of Isokinetic Sampling in Tapered Stacks <p>CY2018</p> <ul style="list-style-type: none"> - Implementing Guidelines for the Conduct of an Actual Inspection of New Motor Vehicles concerning the Issuance of a Certificate of Conformity (COC) <p>CY2016</p> <ul style="list-style-type: none"> - Providing for new fees and charges for various services of the Environmental Management Bureau - Clarificatory Guidelines on the conduct of Stack Emission Tests by DENR-EMB and Its Accredited Third-Party Source Emission Testing Firms (TPSETF) - Adoption of EURO 4/IV Emissions Limits/Standards
R. of Korea	<ul style="list-style-type: none"> - Implement Seasonal PM2.5 Management in the highly polluted season (from 1 Dec 2019) - For the period from December to March with frequent episodes occurring high PM2.5 concentration, the government implements actions for reduction and control stricter than other ordinary days (ex. Shorten operation hours of coal-fired power plants; restrict driving of old diesel vehicles in the Seoul Metropolitan Area; encourage voluntary reduction in large-sized business facilities; and control agricultural wastes, etc.) - Include more districts covered under the cap regulation system (from 3 Apr 2020) - In the past one district (Seoul Metropolitan Area, SMA) → Currently 4 districts (SMA, Middle, South, and South East Areas) - Substances: SO_x, NO_x, and TSP
Russia	Not submitted

Thailand	<p>1. The National Environment Board, at its meeting 4/2020 on July 20, 2020, approved the following issues;</p> <ul style="list-style-type: none"> - Remain unchanged the implementing date of the EURO5 fuel oil standard starting from January 1, 2024. - Postpone the implementing date of a EURO5 emission standard for a vehicle from within 2021 to 2024 <p>2. The cabinet, at its meeting on June 11, 2019, acknowledged and agreed with the Ministry of Industry's proposed measure to solve the burned sugarcane problem in Thailand by law enforcement. This will eliminate burned sugarcane and fine particles problems caused by burning sugarcane before harvesting within three years.</p> <p>3. National Energy Policy Council, at its meeting on August 13, 2015, approved measures to promote electric vehicles (EVs) in Thailand. The measures set a target to have 1.2 million EVs (PHEV and BEV) registered in Thailand within 2036.</p> <p>4. For an industrial sector, air pollution emission standards as per emission loading for area-based capacity will be established, and the Continuous Emission Monitoring System for industry type 3 will be enforced.</p>
Viet Nam	Not submitted

(2) Placement standard, classification, and attribute of ambient air quality monitoring stations

Q1: Please describe the classification of monitoring stations by objectives and attributes for monitoring the atmospheric environment

Table 3.2.1 Placement Standard, Classification, and Attribute of Ambient Air Quality Monitoring Stations

Countries	Urban	Rural	Remote	Industrial	Roadside	General
Cambodia					○	○
China	○	○	○	○	○	
Indonesia	○	○		○		Near emission source
Japan	○				○	
Lao PDR	○(Factsheet)	○(Factsheet)				
Malaysia	○	○	○	○		
Mongolia	○		○	○	○	
Myanmar	○	●		●	●	
Philippines	○				○	
R. of Korea	○	○	○	○	○	
Russia	○(Factsheet)	○(Factsheet)	○(Factsheet)			
Thailand	○			○	○	

Viet Nam	○	○	○			○
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● : *Although not mentioned in the Questionnaire, mobile measurement with a low-cost sensor is conducted*

Q2: Are there any placement criteria for monitoring stations? If yes, please describe.

Table 3.2.2 Monitoring Station Placement Criteria for EANET Participating Countries

Countries	Placement criteria	Remarks
Cambodia	- (refer to remarks)	Places unaffected by buildings and trees
China	✓	Described in HJ664-2013
Indonesia	✓	120° open space, sampling height >2m, >20m away from the emission source
Japan	✓	Described in the Environmental and Air Quality Monitoring Manual considering the inhabitant population and area
Lao PDR		No answer
Malaysia	(Different answer)	
Mongolia	✓	
Myanmar	-	
Philippines	✓	Compliant with US-EPA, reflecting population and economic activity, Described in EMB Manual for Siting Criteria for Ambient Air Quality Monitoring Stations (40 CFR Part 58 Appendix D and E)
R. of Korea	✓	Described in the guidelines
Russia	Not submitted	
Thailand	✓	Compliant with US-EPA
Viet Nam	✓	Regional representative points based on the environmental monitoring network

Q3: Do you utilize simple monitoring devices such as low-cost sensors for monitoring activities by public institutions as a supplement to high-spec equipment?

Table 3.2.3 Use of Simple Observation Equipment (such as low-cost sensors) in EANET Participating Countries

Countries	Utilization	Remarks
Cambodia	✓	High spec device is EANET site only

China	✓	Used in major road and building environments in some cities
Indonesia	✓	
Japan	-	
Lao PDR	- (refer to remarks)	If USEPA improved the low-cost sensors, we would consider using them.
Malaysia	- (refer to remarks)	Not used at a country level, but used for environmental assessment at the city level
Mongolia	✓	Considering a sensor that operates in a severe weather environment
Myanmar	✓	Use several types
Philippines	-	Considering the use and reviewing measurement technology guidelines
R. of Korea	-	
Russia	Not submitted	
Thailand	- (refer to the remarks)	Used by universities for environmental screening and research
Viet Nam	-	

(3) QA/QC system of ambient air quality monitoring in your country

Q1: Please describe programs and implementation structures for QA / QC activities (including calibration system for measuring equipment and flowmeter) (attached if existing materials are available)

Table 3.3.1 QA / QC Activity Implementation System of EANET Participating Countries.

Countries	QA / QC activity implementation systems and related programs
Cambodia	QA/QC activities are carried out by measuring Inter-laboratory Comparison survey samples using ICS-90 (Ion Chromatograph). QA/QC activities and SOPs in normal operations have not been established yet, so Cambodia would like to cooperate with related institutions.
China	-CNEMEC builds the QA / QC activity as the organization in charge. Persons in charge of the measurement station carry out daily QC/QC activities evaluate whether the QA/QC activities at the measurement station comply with the regulations.
Indonesia	-Indonesia calibrated monitors with the AQMS (Air Quality Monitoring System: Horiba), but their sensitivity dropped in the first calibration, so the parts were replaced. https://www.horiba.com/uk/process-environmental/products/system-engineering/air-quality-monitoring-system/
Japan	-Implementation per the manual for continuous monitoring of Air Pollution.

Countries	QA / QC activity implementation systems and related programs
Lao PDR	-For the PM _{2.5} monitoring station, the standard filter for the reference and the flowmeter to verify the flowrate were used.
Malaysia	-Calibration activities are carried out by the Department of Environment, the Meteorological Department, and private contractors. -QA / QC activities are conducted at Chemistry Department and Meteorological Department. (If possible, any help, such as some replacement parts and some training, is appreciated.)
Mongolia	-Calibration with CalGaz gas and QA/QC activities are carried out by CLEM, which has a limited staff. https://calgaz.com/
Myanmar	-There are places where calibration can be implemented or places where calibration is not carried out depending on measuring stations.
Philippines	-Calibration once a year at regular maintenance. NIST's FTS calibrates their PM monitors. https://www.nist.gov/ -QA / QC activities are conducted with reference to USEPA.
R of Korea	-The designated testing institution conducts QA/QC regularly. Operator in charge conducts regular procedures for QA/QC (Guideline for installation and operation of air pollution monitoring network).
Russia	Not submitted
Thailand	-Calibration of auto monitors (daily, every 15 days, every three months, twice a year) and flow meters (every year) regularly by the National Institute of Metrology (NIMT in Thailand). -Certification of ozone monitors by National Metrology Centre (Singapore) every year.
Viet Nam	Manufacturers conduct-Maintenance checks, calibration, and equipment tests using standard substances regularly. Also, to ensure independence and objectivity, the quality of the system is evaluated by a third party, mainly yearly.

Q2: What are the current challenges of QA / QC activities, and do you consider any improvement measures?

Table 3.3.2. Recent QA / QC Activities in EANET Participating Countries and Their Improvement Plans.

Countries	Recent issues related to QA / QC activities and their improvement plans
Cambodia	-Some auto monitors and devices are not functioning properly, but there is a lack of budget and staff skills to maintain them properly.
China	-Plan to manage a system online because the improvement of their standard gas traceability is needed.
Indonesia	-Limited QA/QC activities because a wide range of things and areas must be done with limited resources.
Japan	-Set-up of the detection limits and determination limit for component analysis of PM _{2.5}
Lao PDR	-For the PM 2.5 station, only one source standard was used. So, if possible, we need a training program for air activity.
Malaysia	-TEOM calibration is an issue, so training for staff to improve their skills is necessary.

Countries	Recent issues related to QA / QC activities and their improvement plans
	Their monitors and equipment are out of date, so they should be updated/replaced with long-term funding if possible.
Mongolia	-Improvement of their staff skills and capacity building is necessary. -Calibration of low-cost sensors and portable PM meters cannot be conducted in Mongolia. -Inter-comparison survey for common gases and particulate matters between analytical institutions will be needed, if possible.
Myanmar	-Expansion of PM2.5 monitoring stations and improvement of ozone observation. But, SKC Co., Ltd in the USA, which can calibrate those monitors, is far from Myanmar, so it takes time and cost. If the company extends the calibration services in South East Asia, it will be convenient because they can be calibrated every year.
Philippines	-Keeping completeness is a challenge because most devices and equipment are getting old.
R of Korea	-No discussion about improvement plans.
Russia	Not submitted
Thailand	-Expansion of QA / QC activities to domestic laboratories. -Planning for purchasing two sets of ozone transfer standard (Level 3) for routine field calibration.
Viet Nam	-Insufficient organizational structure, human resources, and budget.

Q3: Are there any future plans, and cooperation with other ministries, local governments, universities, and research institutes?

Table 3.3.3 Cooperation with Relevant Agencies on Monitoring of EANET Participating Countries.

Countries	Cooperation with related organizations
Cambodia	-Hope to expand monitoring widely in rural and remote areas. For that purpose, capacity building must be necessary to improve the technology through training.
China	-Establish a cooperation system for ambient air quality monitoring with local governments already. -Cooperate about the traceability of flowmeters and calibration of particle meters with the meteorological bureau recently.
Indonesia	-Discuss QA / QC activities related to sensors with related organizations.
Japan	Examine the Inter-laboratory comparison survey method for the component analysis of PM2.5 together with the Central Environment Council of the Ministry of the Environment.
Lao PDR	-There is a plan to expand the monitoring into northern provinces, and all monitoring data will be collected in NRESRI air sever.
Malaysia	Plan joint research with the Meteorological Bureau on the effects of transboundary acid deposition and air pollution sources' contribution using the CMAQ model.
Mongolia	-No plans at the moment. However, hopefully, plan to cooperate with other institutions.
Myanmar	-Cooperate with related ministries and local governments to share monitoring data

Countries	Cooperation with related organizations
	monthly.
Philippines	-Coordinate closely with local governments, national governments, universities, and research institutes.
R of Korea	No answer
Russia	Not submitted
Thailand	-Signed to cooperate with the Meteorological Bureau for the atmospheric environment and noise monitoring.
Viet Nam	-No cooperation so far.

(4) The situation of establishment/ amendment/ abolishment of air quality standard

Q1. Please describe ambient air quality standards in your country (standard values, measurement units, year of establishment, and recent (about five years) revision/abolition if any) (attached if existing materials are available)

See the attachment for details on the air quality standards of each country.

Table 3.4.1 Status of Revision and Abolition of Air Quality Standards in EANET Participating Countries.

Countries	Status of establishment, revision, and the abolition of air quality standards
Cambodia	-Since the air quality standard was established long ago, the Ministry of Environment has announced the revision of their standard values and the addition of new air pollution substances.
China	-Atmospheric environmental standards were established in 1982. In 2012, the purpose was changed from pollution control to air quality improvement. The latest amendment came into effect on September 1, 2018.
Indonesia	-Air quality standards were established in 1999, their air quality index as well.
Japan	-The air quality standard was established in 1973, and in recent years, the standard for trichloroethylene was revised in 2018.
Lao PDR	No answer
Malaysia	-Revised in 2020 most recently.
Mongolia	-Atmospheric environmental standards came into effect in 2016.
Myanmar	-No air quality standards have been established yet. Air quality is regulated with reference to WHO guidelines, and emission control is performed referring NEQEGs (National Environmental Quality (emission) Guideline) established in 2015 by National Resources and Environmental Conservation.
Philippines	-PM2.5 air quality index and guidelines have been established recently.
R of Korea	-Atmospheric environmental standards were established in 1991; afterward, some other air pollution substances were added, and PM2.5 standards were strengthened in 2018

Countries	Status of establishment, revision, and the abolition of air quality standards
	recently.
Russia	Not submitted
Thailand	No answer
Viet Nam	Not submitted

*National Ambient Air Quality Standards of EANET countries are summarized on the next page.

Q2. What are the current challenges to enforce/implement ambient air quality standards, and do you consider any improvement measures?

Table 3.4.3 Recent Issues and Improvement Plan for Strengthening or Implementing Air Quality Standards

Countries	Recent issues and improvement plan for strengthening or implementing air quality standards
Cambodia	-Budget and human resources are issues. Also, the legislation is inadequate.
China	-Research the air pollution mechanism and lay the foundation for accurate and scientific pollution control methods to tighten air quality standards.
Indonesia	-Proceed so that the air quality standard does not cause any disadvantage to other stations.
Japan	-Focus on high-concentration areas and study various emission regulations about PM _{2.5} and photochemical oxidants, which are based on the accumulated knowledge.
Lao PDR	No answer
Malaysia	-Older equipment is in operation in some industrial sectors and has failed to meet this regulation.
Mongolia	-As SO ₂ derived from solid fuels is increasing, reduction of SO ₂ and NO ₂ will be an important issue in the near future.
Myanmar	Challenges are to establish a national air quality database system and technical support and measures for low fuel quality and old technology vehicles.
Philippines	-Current challenges in ambient air quality monitoring are the Real-Time reporting in the website because of Internet connectivity problems, especially in stations located in Island Regions of the country. -Consider including PAH, VOC, metals, and Black Carbon in the ambient air quality guideline values.
R of Korea	-Due to poor compliance with PM _{2.5} , a series of measures against fine particles is established from 2020 to 2024.
Russia	Not submitted
Thailand	Future issues are the management of emission sources according to the PM _{2.5} compliance area, the application of EURO5 standards to fuels and automobiles, and electric vehicles' promotion.
Vietnam	Not submitted

(5) The status of establishment of the standard monitoring method and the performance regulation of measurement equipment

Q1. Do you define standard monitoring methods for air pollutants? If yes, please describe. (for each substance of environmental standards) (attached if there is any existing material)

Table 3.5.1 Standard Monitoring Law and Performance Regulation in EANET Participating Countries

Countries	CO	SO2	NO2	O3	PM10	PM2.5	Pb	C6H6
Cambodia	not specified							
China	IRA, ND-IR	UVF, DOAS	CL	UVF, DOAS	TEOM, β-RA	TEOM,β- RA		
Indonesia	Described in Ministry of Environment and Forestry Regulation Number P.14 of 2020							
Japan	ND-IR	UVF	CL	UVF		β-RA		GCMS
Lao PDR	No answer							
Malaysia	(Another matter was mentioned)							
Mongolia	The standard instrument is used but not specified							
Myanmar	not specified							
Philippines	Compliant with US-EPA 40 CFR Part 58, Appendix D and 40 CFR Part 58 Appendix E							
R. of Korea	ND-IR	UVF	CL	UVA	β-RA	β-RA	AAS	GCMS
Russia	Not submitted							
Thailand	ND-IR	UVF	CL, CAPS	UVF, UVA	TEOM, β-RA Grav, LS	TEOM,β- RA Grav, LS	AAS	GCMS (CS2, VOC)
Vietnam	GC, ND-IR	UVF	GS	CL	β-RA	β-RA	AAS	

Notes: IRA: Infrared absorption; ND-IR: Non-Dispersive Infrared; UVF: UV Fluorescence; UVA: UVV absorption; CL: Chemiluminescent; β-RA: Beta-ray absorption; CAPS: Cavity Attenuated Phase Shift Spectroscopy; Grav: Gravimetric; LS: light scattering; GC: Gas chromatography; GS: Griess-Saltzman

Q2. Are there any performance regulations, such as the minimum detection sensitivity of measuring equipment?

Table 3.5.2 Performance Regulations for Measuring Instruments in EANET Participating Countries

Countries	Regulations	Remarks
Cambodia	-	
China	✓	Described in HJ 653-2013 and HJ 654-2013
Indonesia	-	
Japan	✓	Sulfur dioxide: 1 ppb or less, Nitrogen oxide: 1 ppb or less, PM2.5: No specific specification, but zero particle concentration indication is $\pm 5 \mu\text{g}/\text{m}^3$ or less, oxidant: 1 ppb or less
Lao PDR		No answer

Malaysia	✓	Compliant with USEPA and WMO-GAW standards
Mongolia	-	
Myanmar	-	
Philippines	-	Depends on the instrument manufacturer
R. of Korea	✓	the guideline for installation and operation of air pollution monitoring network
Russia	Not submitted	
Thailand	-	Uses US-EPA performance-specified instruments
Viet Nam	-	

Q3. How often are certifications and maintenance carried out to maintain the performance of measuring instruments, and are there any regulations on those frequencies?

Table 3.5.3 Maintenance Cycle of Observation Equipment in EANET Participating Countries

Countries	Maintenance	Remarks
Cambodia	✓	Three months or less according to maintenance guidance
China	✓	The maintenance frequency of the gas concentration monitor is described in HJ 818-2018. The weather is less than a year.
Indonesia	- (refer to remarks)	No regulation, but maintenance frequency is every three months, and certification is every year.
Japan	✓	Guideline values are described in the Environmental and Air Quality Monitoring Manual, two weeks to 1 year depending on the item
Lao PDR	No answer	
Malaysia	✓	Calibrated and maintained based on US EPA standards by the Department of Environment, Calibrated every two weeks, and maintained every three months by the Malaysian Meteorological Department
Mongolia	✓	Every month
Myanmar	✓	Weekly to yearly according to ACAP guidelines for PM2.5
Philippines	✓	Every two weeks
R. of Korea	✓	Weekly to yearly frequency according to guidelines
Russia	Not submitted	
Thailand	Unknown	Measurement station audit is conducted once a year
Viet Nam	✓	Manufacturer's recommended frequency

Q4. Do you define handling rules for measured values? If yes, please describe. (significant figures, units of measurement, measurement frequency, smoothing of measurement signals,

regulation of effective measurement numbers, statistical processing of average values, statistical processing when comparing with reference values, and other regulations/conditions, etc.) (attached if there is any existing material)

Table 3.5.4 Regulations for Handling Measured Values in EANET Participating Countries

Countries	Regulation	Remarks
Cambodia	-	
China	✓	Described in HJ 817-2018 and HJ 818-2018 Replace zero / negative value with the positive value as below SO ₂ : 3µg/m ³ , NO ₂ & O ₃ & PM : 2µg/m ³ , CO: 0.3mg/m ³
Indonesia	-	
Japan	✓	Unit : gas (ppm), PM (µg/m ³), 1-hour value, data completeness of 20 hours or more except Ox, data exclusion rule of 2nd and 98th percentile of effective measurement date
Lao PDR		No answer
Malaysia	✓	Compliant with USEPA and WMO-GAW standards
Mongolia	-	
Myanmar	-	
Philippines	- (refer to remarks)	Compiling The guidelines/ manual for Data Handling Air Quality Data for Criteria Air Pollutants
R. of Korea	✓	Unit : gas (ppm), PM (µg/m ³), 1-hour value, data completeness of 18 hours or more, etc. described in detail in regulation
Russia		Not submitted
Thailand	✓	Described in the data verification SOP
Viet Nam	✓	Described in the Circular 24/2017TTBTNMT

(6) The high Priority Challenges for Countermeasure Against Air Pollution

Q1. What are high-priority challenges to tackle with air pollution?

Table 3.6.1 The High Priority Challenges for Countermeasure Against Air Pollution

Countries	High priority challenges for countermeasure against air pollution
Cambodia	<u>Public awareness and education</u> - The participation from citizens on air pollution reduction and prevention <u>Automobile measures</u> - Using old vehicles with improper maintenance <u>Waste measures</u> - Habit of burning ' household's waste and ' agriculture's waste <u>Monitoring</u>

	<ul style="list-style-type: none"> - Lack of technology/equipment to measure and monitor air quality and to solve the problem <p><u>Implementation of laws and regulations</u></p> <ul style="list-style-type: none"> - Limitation of laws/regulations implementation
China	<p><u>High concentration measures</u></p> <ul style="list-style-type: none"> - PM2.5 concentration of some cities is still high. - Concentration of ozone gradually increased <p><u>Industrial/energy measures</u></p> <ul style="list-style-type: none"> - Structural adjustment is difficult. At present, China's industrial structure is heavier; energy structure is more coal, transport structure is more highway, the land structure is more extensive, and other problems have not been fundamentally changed.
Indonesia	<p><u>Public awareness and education</u></p> <ul style="list-style-type: none"> - Human health, Public knowledge regarding air pollution
Japan	<p>Priority is given to measures related to photochemical oxidants, PM2.5 (nitrogen oxides), etc. (refer to (4) Q2 above)</p> <p><u>Industrial/energy measures</u></p> <p>(1) Measures for fixed sources related to soot and smoke</p> <p><u>Automobile measures</u></p> <p>(2) Measures for mobile sources</p> <ul style="list-style-type: none"> - Vehicle Information and Communication System (VICS) - ETC2.0 service - Advanced optical beacons, etc. to improve and enhance the content and accuracy of road traffic information - Improvement of traffic lights - Promotion of road information and communication system (ITS) such as public vehicle priority system (PTPS) <p>- Measures against traffic congestion around tourist spots</p> <ul style="list-style-type: none"> - Comprehensive parking measures - Public awareness of eco-driving - Low pollution and low carbon by switching to public transportation. <p>(3) VOC measures</p> <p><u>Monitoring, research</u></p> <p>(4) Monitoring/observation, research</p> <ul style="list-style-type: none"> - Continuous monitoring - Provision of information on the measurement data (preliminary figures) collected in real-time, photochemical oxidant warnings and PM 2.5 warning information through the "Air Pollutant Wide Area Monitoring System (Sora Mame-kun)" - Monitoring and radioactive material monitoring to understand the long-term effects of acid rain, yellow sand, and transboundary air pollution - Enhancing scientific knowledge for comprehensive measures of PM2.5 and ozone
Lao PDR	No answer
Malaysia	<p><u>International cooperation</u></p> <ul style="list-style-type: none"> - Cooperation at an international level with regards to transboundary pollution, particularly haze as a result of massive peatland fires <p><u>Industrial/energy measures</u></p> <ul style="list-style-type: none"> - Ensuring clean emission strategies <p><u>Automobile measures</u></p> <ul style="list-style-type: none"> - Adopting a large-scale policy at the national level reduces the direct application of petrol and diesel engines.

	<p>- Difficulty in conversion from internal combustion engines (ICE) vehicles, i.e., petrol/diesel engine vehicles in the long run (within the next two decades) to energy-efficient vehicles (EEV) such as electric vehicles or new generation vehicles (hydrogen cells vehicles).</p>
Mongolia	<p>Implementation of laws and regulations After establishing the National program to reduce air and environmental pollution in 2017, the action plan was developed and proceeded accordingly. - It consists of ~200 actions to reduce air pollution in Ulaanbaatar, the capital of Mongolia, by 80% in 2025 compared to 2016.</p>
Myanmar	<p>ECD <u>Monitoring</u> - Air Quality Monitoring Stations - National Ambient Air Quality Standards - Effective Air Quality Database System <u>Technical/financial support</u> - Technical and Financial Assistance <u>Training/capacity building</u> - Capacity-building Programme DICD <u>Atmospheric environment management</u> - Integrated Management of Air Pollution. - Modification Air Quality Management Plan - Management of air pollution caused by fine particles out of Urban. - Systematic planning. - Powerful local standards. - Strong monitoring capacity. - High public environmental awareness. <u>Implementation of laws and regulations</u> - Continually monitor the implementation of laws enacted. - Complete legislation and enforcement mechanism. <u>Technical/financial support</u> - Allocation Resources and funds to implement programs to reduce air pollution by the government. - Proper supervision on the implementation of programs by supervisor <u>Public awareness/education</u> - Promote education and culture. - Public participation in reducing air pollution (citizens and NGOs) - Implementing specific programs to reduce air pollution during warnings and emergencies. NPTCD <u>Implementation of laws and regulations</u> - Poor law enforcement SICD <u>Atmospheric environment management</u> - Integrated Management of Air Pollution. - Modification Air Quality Management Plan - Management of air pollution caused by fine particles out of Urban. Promote education and culture. - Complete legislation and enforcement mesh answer Systematic planning. - Powerful local standards.</p>

	<ul style="list-style-type: none"> - Strong monitoring capacity. <p><u>Implementation of laws and regulations</u></p> <ul style="list-style-type: none"> - Continually monitor the implementation of Laws enacted <p><u>Technical/financial support</u></p> <ul style="list-style-type: none"> - Allocation Resources and funds to implement programs to reduce air pollution by the government. - Proper supervision on the implementation of programs. <p><u>Public awareness/education</u></p> <ul style="list-style-type: none"> - Public participation in reducing air pollution (citizens and NGOs) Implementing specific programs to reduce air pollution during warnings and emergencies. - High public environmental awareness. <p>MCDC</p> <p><u>Technical/financial support</u></p> <ul style="list-style-type: none"> - Well-trained staff and technical assistants are needed for systematic monitoring and data analysis. Occupational safety also requires 24 hours air quality monitoring. <p>YCDC</p> <p><u>Atmospheric environment management</u></p> <ul style="list-style-type: none"> - Public Cleansing Boundary and Clean Development Mechanism
Philippines	<p><u>Automobile measures</u></p> <ul style="list-style-type: none"> - Mobile Sources (Transport Sector) such as Old Jeepneys - Dilapidated Utility Vehicles such as trucks, buses in which are running without any emission control devices - Non-Appearance in Private Emission Testing Centers (PETCS)
R. of Korea	<p><u>Measures for mobile sources and sources other than automobiles</u></p> <ul style="list-style-type: none"> - Control of sources that have attracted relatively low attention, compared to non-road (shipment and ports) transportation - Road transportation sources, etc. <p><u>Industrial/energy measures</u></p> <ul style="list-style-type: none"> - Industrial sectors, including agriculture
Russia	Not submitted
Thailand	<p><u>Waste measures</u></p> <ul style="list-style-type: none"> - Control of open burning, particularly on agricultural burning, <p><u>Automobile measures</u></p> <ul style="list-style-type: none"> - Law enforcement of EURO 5 standard both for fuel oil and automobile - Promotion of Electric Vehicles (EV).
Viet Nam	Not submitted

Q2. What is the most difficult part in addressing the high-priority challenges of Q1 above?

Table 3.6.2 The Most Difficult Part in Addressing High Priority Challenges of Q1 Above

Countries	The most difficult part in addressing high priority challenges of Q1 above
Cambodia	<p><u>Public awareness/education</u></p> <ul style="list-style-type: none"> - Engage the public to involve in the implementation of air pollution reduction measures - Time and financing needed to spread the knowledge and information broadly on sources of air pollution and the health impact <p><u>Implementation of laws and regulations</u></p> <ul style="list-style-type: none"> - Limited implementation of laws/regulations

China	<p><u>Atmospheric environment management</u></p> <ul style="list-style-type: none"> - promotion of PM2.5 and O3 collaborative management implementation of summer - In the fall and winter of volatile organic compounds control for engines - actively respond to heavy pollution weather. <p><u>Automobile measures</u></p> <ul style="list-style-type: none"> - comprehensive control of atmospheric pollution
Indonesia	<p><u>Industrial/energy measures</u></p> <ul style="list-style-type: none"> - The use of cheap and dirty fuel that is not good for air quality - People prefer cheaper fuel because of the financial capacity of their economic ability - Policies for clean fuels
Japan	<p><u>Research</u></p> <p>It is necessary to elucidate the complicated production process of both ozone and PM2.5 as secondary products and take measures against each precursor's emission sources.</p> <p><u>Implementation of various policies</u></p> <ul style="list-style-type: none"> - The emission sources of precursors are diverse, and a wide range of policies are required. <p><u>Monitoring</u></p> <ul style="list-style-type: none"> - There is also the impact of transboundary pollution, so it is important to understand the impact and implementation of monitoring activities. <p><u>Implementation of laws and regulations</u></p> <ul style="list-style-type: none"> - The implementation of these comprehensive policies requires effective and efficient enforcement.
Lao PDR	No answer
Malaysia	<p><u>International cooperation</u></p> <ul style="list-style-type: none"> - International and effective regional actions to the reduction of prolonging transboundary haze pollution. <p><u>Industrial and energy measures</u></p> <ul style="list-style-type: none"> - Readiness of industries to balance between economy and environmental protection for the sake of sustainable development. - Pursuing potentially expensive clean technology-based applications (industry, vehicle, and household) may not be compatible with the gross household income.
Mongolia	<p><u>Technical and financial support</u></p> <p>The total cost for conducting all actions in the National program is estimated ~10 trillion MNT, which is nearly the country's annual budget.</p>
Myanmar	<p>ECD</p> <p><u>Monitoring</u></p> <ul style="list-style-type: none"> - Enough air quality monitoring stations to know about the current air quality station and capacity building programs are the most difficult parts in addressing the high priority challenges of Q1 above. <p>DICD</p> <p><u>Economic policy</u></p> <ul style="list-style-type: none"> - Air Emissions discharge permits and higher fees for emissions. - Significant financial incentives to reduce emissions. <p><u>Implementation of laws and regulations</u></p> <ul style="list-style-type: none"> - Prosecutions and financial penalties for breaching air quality standards. <p>NPTCD</p> <p><u>Public awareness/education</u></p> <ul style="list-style-type: none"> - There is no public participation. <p>SICD</p>

	<p><u>Economic policy</u></p> <ul style="list-style-type: none"> - Air emission discharge permits and higher fee - Significant financial incentives to reduce emissions <p><u>Implementation of laws and regulations</u></p> <ul style="list-style-type: none"> - Prosecutions and financial penalties for breaching air quality standards. <p>MCDC</p> <p><u>Training/capacity building</u></p> <ul style="list-style-type: none"> - Well-trained staff for air quality monitoring and data analysis. <p>YCDC</p> <p><u>Atmospheric environment management</u></p> <ul style="list-style-type: none"> - Identify Air Quality Index - Need to get Base Line data/ Data Inventory <p><u>Monitoring</u></p> <ul style="list-style-type: none"> - Need to fix and install Air Quality Monitoring Stations <p><u>Public awareness/education</u></p> <ul style="list-style-type: none"> - Proper Announcement of current Air Quality status to public
Philippines	<p><u>Measures for automobiles</u></p> <ul style="list-style-type: none"> - The second-hand engine and vehicle industry - The resistance of Jeepney Owners to modernize their dilapidated vehicle - Massive Traffic due to Poor Urban Planning and Mass Transport Systems
R. of Korea	<p><u>Measures for automobile sources (special vehicles) and car</u></p> <ul style="list-style-type: none"> - Improve accuracy of air pollutant inventory for agricultural machinery, port load/unload equipment, military vehicles, etc. <p>The development of emissions reduction units is attached to agricultural machinery, military vehicles, port load/unload equipment, and its economic feasibility considering the cost to develop versus small demands.</p>
Russia	Not submitted
Thailand	<p><u>Public awareness/education</u></p> <ul style="list-style-type: none"> - Less Public awareness and participation program <p><u>Technical/financial support</u></p> <ul style="list-style-type: none"> - Local culture, livelihood, limited budget allocation or incentive for supporting the program, political issues.
Viet Nam	Not submitted

The results of Q1 and Q2 above are summarized in the table below.

(7) The needs for cooperation for EANET**Q1. How do you perceive the importance and benefits of participation in EANET?**

Table 3.7.1 The Benefits of Participating in the EANET

Countries	Creation of common understanding of the state of acid deposition problems	Provided the cooperation platform for information sharing among PCs	Provided capacity building in various aspects to PCs	provided useful information and scientific evidence to PCs	Remarks
Cambodia					Mismatched answer*
China	✓	✓	✓	✓	
Indonesia		✓			
Japan		✓	✓	✓	
Lao PDR	No answer				
Malaysia	✓		✓		
Mongolia	✓	✓	✓		
Myanmar	✓		✓	✓	
Philippines				✓	
Korea	✓	✓			
Russia	Not submitted				
Thailand	✓	✓	✓	✓	
Vietnam	✓	✓		✓	

*Cambodia: Through the participation with EANET, Cambodia, especially MoE

Table 3.7.2 The evaluation of benefits on participation in the EANET

Countries	Creation of common understanding of the state of acid deposition problems	Provided the cooperation platform for information sharing among PCs	Provided capacity building in various aspects to PCs	Provided useful information and scientific evidence to PCs	Remarks
Cambodia					Through the participation with EANET, Cambodia, especially MoE
China	Gave periodic assessment on the state of acid deposition of the region	Made great achievements in the cooperation on the acid deposition issues and has grown into the most important cooperation mechanism in East Asia	Help PCs to improve the abilities	Sharing air pollution monitoring and control tech	
Indonesia		Be able to compare the policies between member countries in terms of policies for ambient air quality standards			
Japan		Shared high-quality monitoring data among PCs	Implemented regular quality control activities among PCs	Developed common manuals and guidelines. Accumulated high-quality data	
Lao PDR	No answer				
Malaysia	Improvement in monitoring strategies of air pollution and acid deposition		Importance in long term planning towards upgrading monitoring equipment Human capacity building		
Mongolia	Created a common understanding of the	promoting cooperation and research in acid	active participation in scientific activity,		

Countries	Creation of common understanding of the state of acid deposition problems	Provided the cooperation platform for information sharing among PCs	Provided capacity building in various aspects to PCs	Provided useful information and scientific evidence to PCs	Remarks
	state of acid deposition problems	deposition and air pollution problems	including research fellowship, is beneficial.		
Myanmar	public awareness events, and dissemination of information.		the capacity of relevant ministries, stakeholders, policymakers, public and education sectors through monitoring activities, training, and research activities	Increase knowledge and understanding of issues related to the consequences of air pollution and acid deposition on human health and the natural environment	
Philippines				Monitoring results are used for the design and development of actions plans	
Korea	Promote understanding and exchange among countries with different backgrounds and encourage their amity				
Russia	Not submitted				
Thailand	Public awareness activities	Established as an important initiative for regional cooperation	Capacity building and research activities, emission inventory, develop policy-relevant reports	Monitoring result which shows the state of acid deposition and its effect	
Viet Nam	Creating a common understanding of the state of acid deposition problems in East Asia	Contributing to cooperation in solving acid deposition problem among member countries		Providing useful inputs for decision-makers at regional, national and local levels to prevent and mitigate adverse effects of	

Countries	Creation of common understanding of the state of acid deposition problems	Provided the cooperation platform for information sharing among PCs	Provided capacity building in various aspects to PCs	Provided useful information and scientific evidence to PCs	Remarks
				acid deposition on the environment	

Q2: What role do you expect EANET to play in improving the atmospheric environment in the region? What is the reason for your answer?

Table 3.7.3 Expectations for the EANET (Overview)

Countries	Provide technical and financial support	Provide capacity building	Promote public awareness	Enhancement of monitoring network	Provide the platform for international collaboration, communication, and information sharing
Cambodia	✓	✓			
China					✓
Indonesia					✓
Japan				✓	✓
Lao PDR	No answer				
Malaysia		✓			✓
Mongolia		✓	✓	✓	
Myanmar			✓		
Philippines	✓	✓			
Korea					✓
Russia	Not submitted				
Thailand			✓	✓	✓
Viet Nam			✓		✓

Table 3.7.4 Expectations for the EANET (Detailed information)

Countries	Provide technical and financial support	Provide capacity building	Promote public awareness	Enhancement of monitoring network	Provide the platform for international collaboration, communication, and information sharing
Cambodia	Support focusing on air pollution researches, regulations, guidelines, and activities plan preparation, air quality monitor and analyzer	The knowledge of air pollution, research capacity, and the implementation of air pollution reduction measures			
China					Play a positive role in the technology exchange of advanced monitoring technology
Indonesia					In terms of resources and science/research that are useful for maintaining ambient air quality
Japan				Promote monitoring and quality control, which is its specialty, with the overall scope of air pollution.	Strengthen cooperation with other regions such as Europe
Lao PDR	No answer				

Countries	Provide technical and financial support	Provide capacity building	Promote public awareness	Enhancement of monitoring network	Provide the platform for international collaboration, communication, and information sharing
Malaysia		<p>Training in technical know-how and quality maintaining strategies concerning air pollution monitoring</p> <p>Training with air pollution modeling activity and short-term and long-term policy strategies</p>			The platform for international collaboration in the field of air pollution on a regional scale
Mongolia		Research on analysis on the relation of air pollution and acid deposition, including related chemical substances	Public awareness on acid deposition and air pollution	Enhancement of monitoring network	
Myanmar			A better understanding of the consequences of air pollution/acid deposition and its impact on human health and the natural environment in regional to global through EANET		

Countries	Provide technical and financial support	Provide capacity building	Promote public awareness	Enhancement of monitoring network	Provide the platform for international collaboration, communication, and information sharing
Philippines	Provision of monitoring equipment (e.g., Ozone generator and the corresponding calibrator)	Training/capacity-building activities			
Korea					As a communication platform of East Asia for the countries with diverse environmental techniques and experiences
Russia	Not submitted				
Thailand			Put more effort in broadening public awareness and public participation in EANET activities	Other emerging air pollutants, particularly PM2.5, ozone, VOCs, and climate change-related air pollutants, should also be included under EANET	Leading initiative for regional cooperation, not only EANET but also with other initiatives and international agencies Providing understandable, useful inputs to policymakers and encourage them to play an increasingly important role in promoting EANET at international fora as well as in their countries
Viet Nam			Raising awareness		Joining hands in solving acid deposition problem

Q3. What kind of capacity-building activities do you expect to be conducted by EANET (e.g., subject, type, targeted audience)?

Table 3.7.5 Expected Capacity Building for the EANET (Overview)

Countries	Monitoring	Data collection/ QA/QC	Research/ analysis	Policymaking	Others
Cambodia		✓	✓	✓	
China	✓				Pollution control technology
Indonesia					Information sharing
Japan	✓	✓	✓	✓	
Lao PDR			✓	✓	
Malaysia	✓		✓	✓	
Mongolia	✓	✓	✓		
Myanmar		✓	✓		
Philippines	✓	✓	✓		
Korea		✓		✓	public awareness
Russia	Not submitted				
Thailand	✓	✓	✓	✓	public awareness
Viet Nam			✓		Clean air tech promotion

Table 3.7.6. Expected Capacity Building for the EANET (Detailed information)

Countries	Monitoring	Data collection/ QA/QC	Research/ analysis	Policymaking	Others
Cambodia			Air quality data analysis, air pollution inventory, air quality modeling	Laws, regulations, guideline developing	
China	Monitoring technology, Especially VOC				Pollution control technology
Indonesia					Mutual exchange of information, knowledge, and technology between member countries in terms of ambient air quality
Japan	Conduct necessary training for newcomers		Organize workshops/seminars regarding emission inventory and modeling for researchers and policymakers		
Lao PDR		Training on data interpretation		Use the data for further implementation	
Malaysia	Air pollution and acid deposition monitoring quality strategies		Air pollution modeling and analysis	Relating analysis to the national policy via policy reports and workshops	
Mongolia	Measurement traceability	Inter Comparison project	Research fellowship,		

Countries	Monitoring	Data collection/ QA/QC	Research/ analysis	Policymaking	Others
Myanmar		Data quality checking and Research activities on air quality and acid deposition impacts on the environment and related with climate change using observation data and satellite data.			Individual training
Philippines	Series of training with regards to Air Quality Monitoring improvement	QA/QC and best practices, calibration and preventive maintenance	Development of Country-specific Emission Factors for Emission Inventory		
Korea		Operate programs for QA/QC managers of PCs to exchange information		Share status and trends of air quality in the region, implementing policy and technology exchange programs for air pollution prevention, etc.	Operate programs for the public and civil societies to increase their awareness
Russia	Not submitted				
Thailand	Individual Training for monitoring	Air quality management on PM2.5, Ozone, and VOCs	Individual training for emission inventory and data analysis	policy development on air pollution and acid deposition based on scientific monitoring data	Promote public awareness
Viet Nam			Air pollutant emission inventory, mapping pollutants		Clean air tech promotion

Q4. Does your country participate in other air-related frameworks and/or initiatives besides EANET?

Table 3.7.7 Participation in Atmospheric International Framework Other than the EANET

Countries	Climate & Clean Air Coalition (CCAC)	Asia Pacific Clean Air Partnership (APCAP)	The Tripartite Environment Ministers Meeting (TEMM)	North-East Asia Clean Air Partnership (NEACAP)	ASEAN Agreement on Transboundary Haze Pollution (AATHP)	Environmental Persistent Organic Pollutants Monitoring Project in East Asian Countries (POPSEA)	Asia Co-benefits Partnership (ACP)	Others
Cambodia	✓	✓			✓	✓		
China			✓	✓			✓	
Indonesia					✓	✓	✓	
Japan	✓	✓	✓	✓		✓	✓	
Lao PDR		✓			✓	✓		
Malaysia		✓			✓	✓		World Meteorological Organization Global Atmospheric Watch (WMO GAW).
Mongolia	✓	✓		✓		✓		
Myanmar					✓			

Countries	Climate & Clean Air Coalition (CCAC)	Asia Pacific Clean Air Partnership (APCAP)	The Tripartite Environment Ministers Meeting (TEMM)	North-East Asia Clean Air Partnership (NEACAP)	ASEAN Agreement on Transboundary Haze Pollution (AATHP)	Environmental Persistent Organic Pollutants Monitoring Project in East Asian Countries (POPsEA)	Asia Co-benefits Partnership (ACP)	Others
Philippines	✓	✓			✓	✓		Asia Pacific Mercury Monitoring Network (APMMN)
Korea	✓	✓	✓	✓				Korea-Japan bilateral channel, Korea-China bilateral channel, NEASPEC, IMPROVE
Russia				✓				
Thailand	✓	✓			✓	✓	✓	
Viet Nam	✓				✓	✓		

Reference: The red "✓" is supplementary information based on the following HP.

CCAC : <https://ccacoalition.org/en/partners>

APCAP : <https://www.unep.org/asia-and-pacific/asia-pacific-clean-air-partnership/what-we-do>

AATHP : <https://haze.asean.org/asean-agreement-on-transboundary-haze-pollution-2/>

POPsEA: https://wedocs.unep.org/bitstream/handle/20.500.11822/31005/5-CStu1_EAJapan.pdf?sequence=1&isAllowed=y

ACP: <https://www.cobenefit.org/about/>