The Eighteenth Scientific Advisory Committee's Meeting
of the Acid Deposition Monitoring Network in East Asia
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National Monitoring Plans (NMPs) of the Participating Countries

Network Center for EANET

I. Background

1. National Monitoring Plan (NMP) includes the information on monitoring sites, monitoring methods, monitoring frequency etc. in participating countries. This information is crucial for QA/QC activities in the EANET. First summarization of the NMP was prepared in November 2001. The NMP is required to be submitted when the participating countries submit its annual monitoring data to the Network Center (NC). Additionally, when the participating countries make some revision, the revised NMP shall be submitted to the NC as soon as possible. The NMP has been prepared using the template which was provided in the Preparatory phase of the EANET monitoring.

2. The NMP shall be reviewed every year and shall be revised by each participating country, if necessary, because

   i) The EANET activities shall be carried out according to the NMP; and
   ii) Suitability of the completed activities to the NMP needs to be checked every year. Even if there is no point of revision, the existing state of the EANET activities can be re-confirmed periodically and this state should be reported to the NC.

3. However, the former NMP template had the following issues.

   i) Description of the relationship between monitoring site, analytical laboratory and meteorological observatory is obscure.
   ii) There are many improper options in many tables, such as the sampling intervals, analytical methodology etc.
   iii) The specifying of the site location might be impossible only by referring to the site location map, latitude and longitude described in the NMP.
   iv) Existing format of the NMP is difficult to be utilized for the site and laboratory audit.

II. Preparation of NMP based on the revised template

4. Considering the above mentioned background, the electronic template of the NMP were newly prepared and distributed to the National QA/QC managers in March 2013. The NMP needs to be reviewed and/or revised for the implementation of monitoring by the National QA/QC manager in each participating country. The NC has prepared the final draft template of the NMP as the part of the QA/QC Guidebook.

5. The outcome of the STM19 meeting should be reflected to the secondary revision process for the draft with communication between the NC and the National QA/QC managers in the participating countries. After report at the SAC18, the NC prepares the compiled NMPs submitted by the participating countries, and site information will be updated on the EANET website as appropriate. The participating countries implement their EANET monitoring activities in accordance with their own NMP for each year.

III. Development of NMP in 2018

6. Based on the discussion and confirmation in and after STM19 held in Niigata, Japan, NMPs in 2018 were finalized. Overview of the NMP in 2018 is shown in Attachment 1, and list of sites and monitoring items are shown in Attachment 2. The monitoring data 2018 will be validated referring the NMP 2018 of each participating country. Recent topics of NMPs in participating countries are shown below.

1) Cambodia
   - Wet deposition monitoring in Siem Reap is included in the NMP.
   - PM2.5 monitoring started in Phnon Penh from April 2017. Seasonal variation of PM2.5 mass concentration was evaluated in 2017.

2) China
   - The monitoring in last year has been continued.
   - Wet and Dry deposition monitoring will be started in two sites, Wuzhishan in Hainan province and Lijiang in Yunnan province from 2019.
   - Increasing trend of precipitation pH and decreasing trend of SO2 concentration were introduced.

3) Indonesia
   - The monitoring in last year has been continued.
   - It was introduced that MoEF established air quality monitoring sites for PM10, PM2.5, SO2, NO2, O3, HC, and CO in several capital cities in Sumatra & Kalimantan island to improve air quality.
   - Focal points hold annual technical meeting of EANET activities on Oct 31, 2017.

4) Japan
   - The monitoring in last year has been continued.
   - Continuous monitoring of PM2.5 components was started at 10 sites in 2017.
   - Low data completeness occurred sometime because of longer time of repair arrangement.
   - In catchment scale monitoring site (Ijira), total deposition was estimated according to Technical Manuals.
   - Periodic report and long-term plan on domestic monitoring will be published and revised in 2018.

5) Lao PDR
   - Wet and dry deposition monitoring site was moved to the roof of new laboratory.
   - PM2.5 motoring will be started from 2018 supporting by PMTT project of ACAP.

- Automatic ambient air quality monitoring by new station and mobile was introduced.

6) Malaysia
   - The monitoring other than IAE has been continued in the same manner as last year.
   - Due to safety issues, IAE monitoring is put on hold. The monitoring is proposed to start again within 1-2 years.

7) Mongolia
   - The monitoring in last year has been continued.
   - It was introduced that CLEM (Central Laboratory of Environment and Metrology) has operated eleven air monitoring stations in Ulaanbaatar.

8) Myanmar
   - PM2.5 monitoring was started in 2015 supporting by PMTT project of ACAP.
   - Inland aquatic environment and soil & vegetation are under consideration.
   - As the National Center for EANET, DMH is expected to enhance domestic cooperation with some governmental agencies such as Yangon/Mandalay City Development Committee, Environmental Conservation Department, Department of Health, Department of Atomic Energy, Irrigation Department, Water Resources Utilization Department etc., which have monitored water and air qualities

9) Philippines
   - The monitoring in last year has been continued. But there were some troubles on dry deposition monitoring.
   - Catchment monitoring in La Mesa Watershed has started and some monitoring data were obtained.
   - Training and site & laboratory audit were implemented in 2017 by National Center.

10) R. of Korea
   - The monitoring in last year has been continued.
   - Precipitation pH has increased over Korea recently.
   - It was introduced that nitrate concentration increased dominantly with increase of the PM2.5 concentration.

11) Russia
   - Passive monitoring for ozone concentration will be started in Primorskaya in 2018.
   - Phosphate in rain sample will be analyzed newly from 2018 as an additional parameter.
   - National training activities including monitoring methodology, technical aspects of data report preparation, data quality control and improvement performance in environmental analysis were implemented.

12) Thailand
   - The monitoring in last year has been continued.
   - Chang Mai site was divided into three sites on dry deposition monitoring (Mae Hia, Chang Phueak, Si Phum) in 2016.
   - Nakhon Ratchasima site was also divided into two site (Sakaerat and Nai Mueang) on dry deposition monitoring.
   - PM2.5 monitoring will be extended.

13) Viet Nam
- The monitoring in last year has been continued.
- The training course "Introduction on EANET's activities, Technical Guidelines on acid deposition monitoring" was organized on 27th–28th of September, 2017, Ha Noi.

Attachment 1

Overview of the National Monitoring Plan 2018

Country	Items	Monitoring sites	Classification	Monitoring interval	Measurement Parameters	Remarks (Nomination time)	Available Data (2017)
<Cambodia>	Wet	Phnom Penh	Urban	weekly	All required items	JAN 2005	✓
		Siem Reap	Urban	weekly	All required items	OCT 2011	✓
	Dry	Phnom Penh	Urban	AT(hourly) FP(biweekly)	$PM_{2.5}$ SO_2,HNO_3,HCl,NH_3,PMC	FEB 2010	✓
	Inland	Sras Srang Lake	Remote	2 times/y	Water quality	2012	✓
<China>	Wet	Chongqing -Haifu	Urban	daily	All required items + F^-	JAN 2008	✓
		Chongqing -Jinyunshan	Rural	daily	All required items + F^-	APR 1999	✓
		Xi'an -Shizhan	Urban	daily	All required items	APR 1999	✓
		Xi'an-Jiwozi	Remote	daily	All required items	APR 1999	✓
		Xiamen-Hongwen	Urban	daily	All required items + F^-	APR 1999	✓
		Xiamen-Xiaoping	Remote	daily	All required items + F^-	APR 1999	✓
		Zhuhai-Xiang Zhou	Urban	daily	All required items + F^-	APR 1999	✓
		Zhuhai-Zhuxiandong	Urban	daily	All required items + F^-	DEC 1999	✓
	Dry	Chongqing -Jinyunshan	Rural	AT(Daily)	SO_2, NO, NO_x, PM_{10}	JAN 2001	✓
		Xiamen-Hongwen	Urban	AT(Daily) FP	SO_2,NO_2,PM_{10}, HNO_3,HCl,NH_3,PMC	JAN 2000	✓
		Zhuhai-Haibin-Park	Urban	AT(Daily)	SO_2,NO_2, PM_{10}	2014	✓
	Soil & vegetation	Chongqing -Jinyunshan	Rural	Every 3 years	Tree decline, Abnormalities of leaves and branches(Ions		✓
		Xi'an-Jiwozi	Remote	Every 3 years	Tree decline, Abnormalities of leaves and branches(Ions etc.in soil)		✓
		Xiamen-Xiaoping	Remote	Every 3 years	Tree decline, Abnormalities of leaves and branches(Ions etc.in soil)		✓
		Zhuhai-Zhuxiandong	Urban	Every 3 years	Tree decline, Abnormalities of leaves and branches(Ions etc.in soil)		✓
	Inland	Chongqing-Jinyunshan Lake	Rural	4 times/y	Water quality	2001	✓
		Xi'an-Jiwozi River	Remote	4 times/y	Water quality	2001	✓
		Xiamen-Xiaoping Dam	Remote	4 times/y	Water quality	2001	✓
		Zhuhai-Zhuxiandong Stream	Urban	4 times/y	Water quality	2004	✓
<Indonesia>	Wet	Jakarta	Urban	weekly	All required items	APR 1998	✓
		Serpong	Rural	daily	All required items	APR 1998	✓
		Kototabang	Remote	weekly	All required items	APR 1998	✓
		Bandung	Urban	daily	All required items	JAN 1999	✓
		Maros	Rural	weekly	All required items	JAN 2008	✓
	Dry	Serpong	Rural	FP (bi-weekly)	SO_2,HNO_3,HCl,NH_3,PMC	JUL 2001	✓
		Kototabang	Remote	PS	SO_2,NO_2	JAN 2007	✓
		Jakarta	Urban	FP (bi-weekly)	SO_2,HNO_3,HCl,NH_3,PMC	2014	✓
		Jakarta	Urban	PS	SO2,NO_2	2007	✓
		Jakarta	Urban	AT(hourly)	$PM_{2.5}$	2017	
		Bandung	Urban	FP (bi-weekly)	SO_2,HNO_3,HCl,NH_3,PMC	2014	✓
		Bandung	Urban	PS	NO_2	2008	✓
	Soil and vegetation	Darmaga-Bogor	Rural	once/5 years	Decline, K etc. in leaves & ions in soil	2002	✓
	Inland	Patenggang Lake	Rural	4 times/y	Water quality	2001	✓
		Gunung Lake	Rural	4 times/y	Water quality	2007	✓

<Japan>	Wet	Rishiri	Remote	daily	All required items	APR 1998	✓
		Ochiishi	Remote	daily	All required items	APR 2003	✓
		Tappi	Remote	daily	All required items	APR 1998	✓
		Ogasawara	Remote	daily	All required items	MAY 1999	✓
		Sado-seki	Remote	daily	All required items + HCO_3^-	APR 1999	✓
		Happo	Remote	daily	All required items	APR 1998	✓
		Oki	Remote	daily	All required items	APR 1998	✓
		Yusuhara	Remote	daily	All required items + F^-, NO_2^-, PO_4^{3-}	DEC 1999	✓
		Hedo	Remote	daily	All required items	DEC 1999	✓
		Ijira	Rural	weekly	All required items	JUN 1999	✓
		Banryu	Urban	weekly	All required items +F^-, NO_2^-	MAY 1999	✓
		Tokyo	Urban	daily	All required items F^-, NO_2^-	APR 2007	✓
	Dry	Rishiri	Remote	AT(hourly) FP(biweekly)	SO_2,NO,NO_{x^*},O_3,$PM_{10/2.5}$ HNO_3, HCl,NH_3,PMC	AT FP JAN 2002	✓
		Ochiishi	Remote	AT(hourly) FP(biweekly)	SO_2,NO,NO_{x^*},O_3,$PM_{10/2.5}$ HNO_3,HCl,NH_3,PMC	FP: 2008	✓
		Tappi	Remote	AT(hourly) FP(biweekly)	SO_2,NO,NO_{x^*},O_3,$PM_{10/2.5}$ HNO_3,HCl,NH_3,PMC	FP: 2003	✓
		Ogasawara	Remote	AT(hourly) FP(biweekly)	SO_2,NO,NO_{x^*},O_3,$PM_{10/2.5}$ HNO_3,HCl,NH_3,PMC	FP: 2003	✓
		Sado-seki	Remote	AT(hourly) FP(biweekly)	SO_2,NO,NO_{x^*},O_3,$PM_{10/2.5}$ HNO_3, HCl,NH_3,PMC	FP: 2003	✓
		Happo	Remote	AT(hourly) FP(biweekly)	SO_2,NO,NO_{x^*},O_3,$PM_{10/2.5}$ HNO_3,HCl,NH_3,PMC	FP: 2003	✓
		Oki	Remote	AT(hourly) FP(biweekly)	SO_2,NO,NO_{x^*},O_3,$PM_{10/2.5}$ HNO_3, HCl,NH_3,PMC	FP: 2002	✓
		Yusuhara	Remote	AT(hourly) FP(biweekly)	SO_2,NO,NO_{x^*},O_3,$PM_{10/2.5}$ HNO_3,HCl,NH_3,PMC	FP: 2003	✓
		Hedo	Remote	AT(hourly) FP(biweekly)	SO_2,NO,NO_{x^*},O_3,$PM_{10/2.5}$ HNO_3,HCl,NH_3,PMC	FP: 2003	✓
		Ijira	Rural	AT(hourly) FP(biweekly)	SO_2,NO,NO_{x^*},O_3,$PM_{10/2.5}$ HNO_3,HCl,NH_3,PMC	FP: 2003	✓
		Banryu	Urban	AT(hourly) FP(biweekly)	SO_2,NO,NO_x,O_3,$PM_{10/2.5}$ HNO_3,HCl,NH_3,PMC	FP: 2003	✓
		Tokyo	Urban	FP(biweekly)	SO_2,HNO_3,NH_3, PMC	FP: 2007	✓
	Soil and vegetation	Ijira	Rural	Once in 5 years	All required items		✓
		Banryu	Urban	Once in 5 years	All required items		✓
	Inland	Ijira Lake	Rural	4 times/y	Water quality	2001	✓
		Banryu Lake	Urban	4 times/y	Water quality	2001	✓
	Catchment-scale	Ijira	Rural	1 times/y	Input, output, biochemical process		✓
<Lao PDR>	Wet	Vientiane	Urban	daily	All required items	OCT 2003	✓
	Dry	Vientiane	Urban	FP(weekly) AT(hourly)	SO_2,HNO_3,HCl,NH_3, PMC NO,NO_2,PM_{10}		✓
	Inland	Nam Houm Lake	Urban	4 times/y	Water quality	SEP 2009	✓
<Malaysia>	Wet	Petaling Jaya	Urban	weekly	All required items+Organic acid	APR 1998	✓
		Tanah Rata	Remote	weekly	All required items+Organic acid	JAN 1999	✓
		Danum Valley	Remote	weekly	All required items+Organic acid	JAN 2006	✓
		Kuching	Urban	weekly	All required items+Organic acid		✓
	Dry	Petaling Jaya	Urban	FP (weekly)	SO_2,HNO_3,HCl,NH_3, PMC		✓
		Tanah Rata	Remote	FP (weekly)	SO_2,HNO_3,HCl,NH_3, PMC	FP: 2001	✓
		Danum Valley	Remote	FP (biweekly)	SO_2,HNO_3,HCl,NH_3, PMC	FP: 2006	✓
	Soil and vegetation	Pasoh Reserve Forest	Urban	Every 3-5 years	Tree decline, description tree & ions in soil etc.	2014	✓
		Universiti Putra Malaysia Rehabilitated Forest	Urban	Every 3-5 years	Tree decline, description tree & ions in soil etc.	2009	✓
	Inland	Semenyih Dam	Urban	4 times/y	Water quality	FEB 2005	✓
		Tembaling River	Remote	4 times/y	Water quality	MAR 2007	✓

<Mongolia>	Wet	Ulaanbaatar	Urban	daily	All required items	AUG 1998	✓
		Terelj	Remote	daily	All required items	SEP 1998	✓
	Dry	Ulaanbaatar	Urban	AT+ FP (biweekly)	SO_2,NO,NO_2,O_3,$PM_{10/2.5}$ HNO_3,HCl,NH_3,PMC	2014	
		Terelj	Remote	FP (biweekly)	SO_2,HNO_3,HCl,NH_3,PMC		✓
	Soil and vegetation	Ulaanbaatar (Bogdkhan mountain)	Urban/Ecolog	Every 3-5 years	PH(H_2O),pH(KCl),Exchangeable acidity, Tree decline, description tree	2002	✓
	Inland	Terelj River	Remote	4-5 times/y	Water quality	2002	✓
<Myanmar>	Wet	Yangon	Urban	weekly	All required items	JUN 2007	✓
	Dry	Yangon	Urban	FP (biweekly)	SO_2,HNO_3,HCl,NH_3, PMC	NOV 2011	✓
		Mandalay	Urban	AT (hourly)	PM2.5	APR 2015	✓
<Philippines>	Wet	Metro Manila	Urban	weekly	All required items	APR 1999	
		Los Banos	Rural	weekly	All required items	APR 1999	
		Mt. St. Tomas	Remote	weekly	All required items	OCT 2006	
	Dry	Metro Manila	Urban	AT+ FP (Weekly)	SO_2,NO,NO_2,O_3,$PM_{10/2.5}$ SO_2,HNO_3,HCl,NH_3,PMC	2015	
		Los Banos	Rural	FP (Weekly)	SO_2,HNO_3,HCl,NH_3,PMC		
		Mt. St. Tomas	Remote	FP (Weekly)	SO_2,HNO_3,HCl,NH_3,PMC	OCT 2006	
	Soil and vegetation	Los Banos	Rural	Once in 3 years	(Tree decline, description tree & ions in soil etc.)	2001	
		UP Quezon- Laguna Land Grant	Rural	Once in 3 years	(Tree decline, description tree & ions in soil etc.)		
		Metro Manila(La Mesa Dam Watershed)	Urban	Once in 3 years	(Tree decline, description tree & ions in soil etc.)	NOV 2007	
		Boneco Long Term Ecological Research Site	Remote	Once in 3 years	(Tree decline, description tree & ions in soil etc.)	APR 2008	
	Inland	Pandin Lake	Rural	4 times/y	Water quality	2004	
		Ambulalakao Lake	Remote	4 times/y	Water quality	2005	
	Catchment-scale	La Mesa Watershed	Urban	1 times/y	Input, output, biochemical process		
<Republic of Korea>	Wet	Kanghwa	Rural	daily	All required items	MAR 1999	✓
		Cheju(Kosan)	Remote	daily	All required items	APR 1999	✓
		Imsil	Rural	daily	All required items	JAN 2001	✓
	Dry	Kanghwa	Rural	AT + FP(5 days a month)	SO_2, NO_2, O_3, $PM_{10/2.5}$, Ions in $PM_{2.5}$	2001	✓
		Cheju(Kosan)	Remote	AT + FP(5 days a month)	SO_2, NO_2, O_3, $PM_{10/2.5}$, Ions in $PM_{2.5}$	2001	✓
		Imsil	Rural	AT + FP(5 days a month)	SO_2, O_3, PM_{10}, Ions in $PM_{2.5}$	2001	✓
<Russia>	Wet	Mondy	Remote	daily	All required items (+F^-, NO_2^-, Br^-, HCO_3^-)	MAY 1999	✓
		Listvyanka	Rural	daily	All required items (+F^-, NO_2^-, Br^-, HCO_3^-)	JAN 2000	✓
		Primorskaya	Rural	daily	All required items	FEB 2002	✓
		Irkutsk	Urban	daily	All required items (+F^-, NO_2^-, Br^-, HCO_3^-)	JAN 2001	✓
	Dry	Mondy	Remote	AT(hourly)+ FP(biweekly) +PS	SO_2,HNO_3,HCl,NH_3,PMC O_3	2001 2016	✓
		Listvyanka	Rural	FP(biweekly) +PS	SO_2,HNO_3,HCl,NH_3,PMC O_3, SO_2, No_x	2001	✓
		Primorskaya	Rural	FP(biweekly)	SO_2,HNO_3,HCl,NH_3,PMC	2001	✓
		Irkutsk	Urban	FP(biweekly) + PS	SO_2,HNO_3,HCl,NH_3,PMC O_3	2001 2016	✓
	Soil and vegetation	Mondy	Remote	Once/3-5 years	Tree decline, description tree & ions in soil	2001	✓
		Listvyanka (Bolshie Koty)	Rural	Once/3-5 years	Tree decline, description tree & ions in soil	2001	✓
		Irkutsk	Urban	Once/3-5 years	Tree decline, description tree & ions in soil	2001	✓
		Primorskaya	Rural	Once/3-5 years	Tree decline, description tree & ions in soil	2002	✓
	Inland	Pereemnaya River	Rural	4 times/y	Water quality	2004	✓
		Komarovka River	Rural	5 times/y	Water quality	2005	✓

<Thailand>	Wet	Bangkok	Urban	daily	All required items+Organic acid, Phosphate	APR 1999	✓
		Samutprakarn	Urban	daily	All required items+Organic acid, Phosphate	JAN 2000	✓
		Patumthani	Rural	daily	All required items+Organic acid, Phosphate	MAR 1999	✓
		Khanchnaburi (Vachiralongkorn Dam)	Remote	daily	All required items+Organic acid, Phosphate	APR 1999	✓
		Chiang Mai(Mae Hia)	Rural	daily	All required items+Organic acid, Phosphate	JAN 2001	✓
		Sakaerat(Nakhon Ratchasima)	Rural	daily	All required items+Organic acid, Phosphate	JAN 2006	✓
	Dry	Bangkok	Urban	AT(hourly,Daily)+ FP(10 days)	SO_2,NO,NO_2,O_3,PM_{10},$PM_{2.5}$, HNO_3,HCl,NH_3,PMC		✓
		Samutprakarn	Urban	AT	SO_2,NO,NO_2,O_3,PM_{10},$PM_{2.5}$		✓
		Pathumthani	Rural	FP	SO_2,HNO_3,HCl,NH_3,PMC		✓
		Khanchnaburi (Vachiralongkorn Dam)	Remote	AT+ FP(10 days)	SO_2,NO,NO_2,O_3,PM_{10}, HNO_3,HCl,NH_3,PMC		✓
		Chiang Mai (Mae Hia)	Rural	FP(10 days)	SO_2,HNO_3,HCl, NH_3,PMC		✓
		Chiang Mai (Chang Phueak)	Urban	AT(hourly,Daily)	SO_2,NO,NO_2,PM_{10},$PM_{2.5}$,O_3		✓
		Chiang Mai (Si Phum)	Urban	AT(hourly,Daily)	SO_2,NO,NO_2,PM_{10},$PM_{2.5}$,O_3		✓
		Sakaerat	Rural	FP(10 days)	SO_2,HNO_3,HCl,NH_3,PMC	JAN 2006	✓
		Nai Mueang	Urban	AT	SO2,NO,NO2,O_3,PM_{10}	JAN 2006	✓
	Soil and vegetation	Vachiralongkorn Dam	Remote	Once/3-5 years	Tree decline, description of trees, pH & ions in soil		
		Vachiralongkorn Puye	Remote	Once/3-5 years	Tree decline, description of trees, pH & ions in soil		
	Inland	Vachiralongkorn Dam	Remote	4 times/y	Water quality		✓
<Viet Nam>	Wet	Hanoi	Urban	weekly	All required items + F^-	AUG 1999	✓
		Hoa Binh	Rural	weekly	All required items + F^-	AUG 1999	✓
		Cuc Phuong	Remote	weekly	All required items + F^-, HCO_3^-	JAN 2010	✓
		Da Nang	Urban	weekly	All required items+HCO_3^-	JAN 2010	✓
		Can Tho	Rural	weekly	All required items + F^-	APR 2014	✓
		Ho Chi Minh	Urban	weekly	All required items + F^-	JAN 2014	✓
		Yen Bai	Rural	weekly	All required items + F^-	MAY 2015	✓
	Dry	Hanoi	Urban	FP(weekly)	SO_2,HNO_3,HCl,NH_3,PMC		✓
		Hoa Binh	Rural	AT(hourly) FP(weekly)	PM2.5 SO_2,HNO_3,HCl,NH_3,PMC	FEB 2015	✓
		Can Tho	Rural	FP	SO_2,HNO_3,HCl,NH_3,PMC		✓
		Ho Chi Minh	Urban	FP	SO2,HNO3,HCl,NH3,PMC		✓
		Yen Bai	Rural	FP	SO2,HNO3,HCl,NH3,PMC	MAY 2015	✓
	Soil and vegetation	Cuc Phuong	Rural	Once/3-5 years	Tree decline, description tree & ions in soil		✓
	Inland	Hoa Binh Reservoir	Rural	4 times/y	Water quality	1999	✓

PMC; Particulate matter components
PS; Passive sampler

Attachment 2

List of sites and monitoring items

Table 1. Wet Deposition Monitoring

Country	Monitoring sites	Classification	Monitoring interval	Mandatory items:										Optional items:	Meteorology
				pH	EC	SO_4^{2-}	NO_3^-	Cl^-	Na^+	K^+	Ca^{2+}	Mg^{2+}	NH_4^+		
<Cambodia>	Phnom Penh	Urban	Weekly	x	x	x	x	x	x	x	x	x	x		
	Siem Reap	Urban	Weekly	x	x	x	x	x	x	x	x	x	x		
<China>	[Chongqing]														
	Haifu	Urban	Daily	x	x	x	x	x	x	x	x	x	x	F^-	x
	Jinyunshan	Rural	Daily	x	x	x	x	x	x	x	x	x	x	F^-	x
	[Xi'an]														
	Shizhan	Urban	Daily	x	x	x	x	x	x	x	x	x	x		x
	Jiwozi	Remote	Daily	x	x	x	x	x	x	x	x	x	x		x
	[Xiamen]														
	Hongwen	Urban	Daily	x	x	x	x	x	x	x	x	x	x	F^-	x
	Xiaoping	Remote	Daily	x	x	x	x	x	x	x	x	x	x	F^-	x
	[Zhuhai]														
	Xiang Zhou	Urban	Daily	x	x	x	x	x	x	x	x	x	x	F^-	x
	Zhuxiandong	Urban	Daily	x	x	x	x	x	x	x	x	x	x	F^-	x
<Indonesia>	Jakarta	Urban	Weekly	x	x	x	x	x	x	x	x	x	x		x
	Serpong	Rural	Daily	x	x	x	x	x	x	x	x	x	x		x
	Kototabang	Remote	Weekly	x	x	x	x	x	x	x	x	x	x		
	Bandung	Urban	Daily	x	x	x	x	x	x	x	x	x	x		
	Maros	Rural	Weekly	x	x	x	x	x	x	x	x	x	x		
<Japan>	Rishiri	Remote	Daily	x	x	x	x	x	x	x	x	x	x		x
	Ochiishi	Remote	Daily	x	x	x	x	x	x	x	x	x	x		x
	Tappi	Remote	Daily	x	x	x	x	x	x	x	x	x	x		x
	Ogasawara	Remote	Daily	x	x	x	x	x	x	x	x	x	x		x
	Sado-seki	Remote	Daily	x	x	x	x	x	x	x	x	x	x	HCO_3^-	x
	Happo	Remote	Daily	x	x	x	x	x	x	x	x	x	x		x
	Oki	Remote	Daily	x	x	x	x	x	x	x	x	x	x		x
	Yusuhara	Remote	Daily	x	x	x	x	x	x	x	x	x	x	F^-, NO_2^-, PO_4^{3-}	x
	Hedo	Remote	Daily	x	x	x	x	x	x	x	x	x	x		x
	Ijira	Rural	Weekly	x	x	x	x	x	x	x	x	x	x		x
	Banryu	Urban	Weekly	x	x	x	x	x	x	x	x	x	x	F^-, NO_2^-	x
	Tokyo	Urban	Daily	x	x	x	x	x	x	x	x	x	x	F^-, NO_2^-	
<Lao PDR>	Vientiane	Urban	Daily	x	x	x	x	x	x	x	x	x	x		
<Malaysia>	Petaling Jaya	Urban	Weekly	x	x	x	x	x	x	x	x	x	x	Formic,Acetic, and Oxalic acids	x
	Tanah Rata	Rural	Weekly	x	x	x	x	x	x	x	x	x	x		x
	Danum Valley	Remote	Weekly	x	x	x	x	x	x	x	x	x	x		
	Kuching	Urban	Weekly	x	x	x	x	x	x	x	x	x	x		
<Mongolia>	Ulaanbaatar	Urban	Daily	x	x	x	x	x	x	x	x	x	x	HCO_3^-	x
	Terelj	Remote	Daily	x	x	x	x	x	x	x	x	x	x	HCO_3^-	x
<Myanmar>	Kaha-Aya, Yangon	Urban	Daily	x	x	x	x	x	x	x	x	x	x		x
<Philippines>	Metro Manila	Urban	Weekly	x	x	x	x	x	x	x	x	x	x	PO_4^{3-}	x
	Los Banos	Rural	Weekly	x	x	x	x	x	x	x	x	x	x	PO_4^{3-}	x
	Mt. Sto. Tomas	Rural	Weekly	x	x	x	x	x	x	x	x	x	x		x
<Republic of Korea>	Kanghwa	Rural	Daily	x	x	x	x	x	x	x	x	x	x		x
	Cheju(Kosan)	Remote	Daily	x	x	x	x	x	x	x	x	x	x		x
	Imsil	Rural	Daily	x	x	x	x	x	x	x	x	x	x		x
<Russia>	Mondy	Remote	Daily	x	x	x	x	x	x	x	x	x	x	F^-, NO_2^-, Br^-, HCO_3^-	x
	Listvyanka	Rural	Daily	x	x	x	x	x	x	x	x	x	x	F^-, NO_2^-, Br^-, HCO_3^-	x
	Irkutsk	Urban	Daily	x	x	x	x	x	x	x	x	x	x	F^-, NO_2^-, Br^-, HCO_3^-	x
	Primorskaya	Rural	Daily	x	x	x	x	x	x	x	x	x	x	F^-, NO_2^-, Br^-, HCO_3^-	x
<Thailand>	Bangkok	Urban	Daily	x	x	x	x	x	x	x	x	x	x	Formic, Acetic, and Phosphoric acids	x
	Samuyprakan	Urban	Daily	x	x	x	x	x	x	x	x	x	x		x
	Patumthani	Rural	Daily	x	x	x	x	x	x	x	x	x	x		x
	Khanchanaburi (Vachralongkorn Dam)	Remote	Daily	x	x	x	x	x	x	x	x	x	x		x
	Chiang Mai(Mae-Hia)	Rural	Daily	x	x	x	x	x	x	x	x	x	x		x
	Sakaerat	Remote	Daily	x	x	x	x	x	x	x	x	x	x		x
<Viet Nam>	Hanoi	Urban	Weekly	x	x	x	x	x	x	x	x	x	x	F^-	x
	Hoa Binh	Rural	Weekly	x	x	x	x	x	x	x	x	x	x	F^-	x
	Cuc Phuong	Remote	Weekly	x	x	x	x	x	x	x	x	x	x	HCO_3^-	x
	Da Nang	Urban	Weekly	x	x	x	x	x	x	x	x	x	x	HCO_3^-	x
	Can Tho	Rural	Weekly	x	x	x	x	x	x	x	x	x	x	F^-	x
	Ho Chi Minh	Urban	Weekly	x	x	x	x	x	x	x	x	x	x	F-	
	Yen Bai	Rural	Weekly	x	x	x	x	x	x	x	x	x	x	F-	

Table 2. Dry Deposition Monitoring

Country	Monitoring sites	Classification	Monitoring method	Priority of the chemical species												
				SO_2	O_3	NO	NO_2, NOx	PM_{10}	$PM_{2.5}$	HNO_3	HCl	NH_3	SO_4^{2-}	NO_3^-	NH_4^+	Ca^{2+}
<Cambodia>	Phnom Penh	Urban	AT, FP	x					x	x	x	x	x	x	x	x
<China>	[Chongqing]															
	Jinyunshan	Rural	AT	x		x	x	x								
	[Xiamen]															
	Hongwen	Urban	AT, FP	x			x	x		x	x	x	x	x	x	x
	[Zhuhai]															
	Haibin Park	Urban	AT	x			x	x								
<Indonesia>	Jakarta	Urban	AT, FP, PS	x			x		x	x	x	x	x	x	x	x
	Serpong(EMC)	Rural	FP, PS	x			x			x	x	x	x	x	x	x
	Kototabang	Remote	PS	x			x									
	Bandung	Urban	FP, PS	x			x			x	x	x	x	x	x	x
<Japan>	Rishiri	Remote	AT,FP	x	x	x	x	x	x	x	x	x	x	x	x	x
	Ochiishi	Remote	AT,FP	x	x	x	x	x	x	x	x	x	x	x	x	x
	Tappi	Remote	AT,FP	x	x	x	x	x	x	x	x	x	x	x	x	x
	Ogasawara	Remote	AT,FP	x	x	x	x	x	x	x	x	x	x	x	x	x
	Sado-seki	Remote	AT,FP	x	x	x	x	x	x	x	x	x	x	x	x	x
	Happo	Remote	AT,FP	x	x	x	x	x	x	x	x	x	x	x	x	x
	Oki	Remote	AT,FP	x	x	x	x	x	x	x	x	x	x	x	x	x
	Yusuhara	Remote	AT,FP	x	x	x	x	x	x	x	x	x	x	x	x	x
	Hedo	Remote	AT,FP	x	x	x	x	x	x	x	x	x	x	x	x	x
	Ijira	Rural	AT,FP	x	x	x	x	x	x	x	x	x	x	x	x	x
	Banryu	Urban	AT,FP	x	x	x	x	x	x	x	x	x	x	x	x	x
	Tokyo	Urban	FP	x						x	x	x	x	x	x	x
<Lao PDR>	Vientiane	Urban	AT, FP	x		x	x	x		x	x	x	x	x	x	x
<Malaysia>	Petaling Jaya	Urban	FP	x						x	x	x	x	x	x	x
	Tanah Rata	Remote	FP	x						x	x	x	x	x	x	x
	Danum Valley	Remote	FP	x						x	x	x	x	x	x	x
<Mongolia>	Ulaanbaatar	Urban	AT, FP	x	x	x	x	x	x	x	x	x	x	x	x	x
	Terelj	Remote	FP	x						x	x	x	x	x	x	x
<Myanmar>	Yangon	Urban	FP	x						x	x	x	x	x	x	x
	Mandalay	Urban	AT						x							
<Philippines>	Metro Manila	Urban	AT, FP	x	x	x	x	x	x	x	x	x	x	x	x	x
	Los Banos	Rural	FP	x						x	x	x	x	x	x	x
	Mt. Sto. Tomas	Remote	FP	x						x	x	x	x	x	x	x
<Republic	Kanghwa	Rural	AT,FP	x	x		x	x	x	x	x	x	x	x	x	x
of Korea>	Cheju(Kosan)	Remote	AT,FP	x	x		x	x	x	x	x	x	x	x	x	x
	Imsil	Rural	AT,FP	x	x		x	x		x	x	x	x	x	x	x
<Russia>	Mondy	Remote	AT, FP, (PS)	x	x					x	x	x	x	x	x	x
	Listvyanka	Rural	AT, FP, PS	x	x	x	x			x	x	x	x	x	x	x
	Irkutsk	Urban	FP, PS	x	x					x	x	x	x	x	x	x
	Primorskaya	Rural	FP	x						x	x	x	x	x	x	x
<Thailand>	Bangkok	Urban	AT, FP	x	x	x	x	x	x	x	x	x	x	x	x	x
	Samutprakarn	Urban	AT	x	x	x	x	x	x							
	Pathumthani	Rural	FP	x						x	x	x	x	x	x	x
	Khanchanaburi	Remote	AT,FP	x	x	x	x	x		x	x	x	x	x	x	x
	(Vachralongkorn Dam)															
	Chiang Mai (Mae-Hia)	Rural	FP	x						x	x	x	x	x	x	x
	Chiang Mai	Urban	AT	x	x	x	x	x	x							
	(Chang Phueak)															
	Chiang Mai (Si Phum)	Urban	AT	x	x	x	x	x	x							
	Sakaerat	Rural	FP	x						x	x	x	x	x	x	x
	Nai Mueang	Rural	AT	x	x	x	x	x								
<Viet Nam>	Hanoi	Urban	FP	x						x	x	x	x	x	x	x
	Hoa Binh	Rural	AT, FP	x					x	x	x	x	x	x	x	x
	Can Tho	Rural	FP	x						x	x	x	x	x	x	x
	Ho Chi Minh	Urban	FP	x						x	x	x	x	x	x	x
	Yen Bai	Rural	FP	x						x	x	x	x	x	x	x

AT: Automatic Monitor, FP: Filterpack, PS: Passive Sampler

Table 3. Soil & Vegetation monitoring

Country/items	Monitoring sites	Classifi-cation	Monitoring interval (Soil)	Monitoring interval (Forest)	Soil											Forest monitoring				
					Mandatory items:							Opetinal items			Voluntary item	mandatory item(3-5years)		Every year	Optional items	
					Moisture contents	pH (H_2O)	pH (KCl)	Ex-base cations (Ca, Mg, K, and Mg)	Ex-Acidity	Effective cation ex-capacity (ECEC)	Carbonate contents	Ex-acid cations (AL, H)	TC	TN	Available Phosphate/ Sulfate	Description of trees	Understory vegetation survey	Observation of tree decline	Photographic record of tree decline	Estimation of decline causes
<China>	[Chongqing] Jinyunshan	Rural	Once/3years	Once/3years	x	x	x	x	x	x	x	x				x	x	x		
	[Xi'an] Jiwozi	Remote	Once/3years	Once/3years	x	x	x	x	x	x	x	x	x	x	x	x				
	[Xiamen] Xiaoping	Remote	Once/3years	Once/3years	x	x	x	x	x	x	x	x	x	x	x	x				
	[Zhuhai] Zhuxiandong	Urban	Once/3years	Once/3years	x	x	x	x	x	x	x	x	x	x	x	x	x	x		
<Indonesia>	Bogor Research Forest (Darmage Experimental Forest)	Rural	Once/5years	Once/5years		x	x	x		x	x	x	x	x	x	x		x		
<Japan>	Ijira	Rural	Once/5years	Once/5year	x	x	x	x	x	x		x				x	x	x	x	x
	Banryu	Urban	Once/5years	Once/5year	x	x	x	x	x	x		x	x	x	Phosphate	x	x	x	x	x
<Malaysia>	Pasoh Reserve Forest	Urban	Once/3years		x	x	x	x	x			x	x	x	x	x		x		x
	Universiti Putra Malaysia Rehabilitated Forest	Urban	Once/3years		x	x	x	x	x							x		x		
<Mongolia>	Ulaanbaatar (Bogdkhan mountain)	Urban	Once/3-5years	Once/3-5years	x	x	x	x	x	x	x	x	x	x	Phosphate	x		x		
<Philippines>	Los Banos Laguna (Makiling Forest Reserve)	Rural	Once/3years	Once/3years	x	x	x	x	x	x		x	x	x		x	x	x	x	
	UP Quezon-Laguna Land Grant	Rural	Once/3years	Once/3years	x	x	x	x	x	x		x	x	x		x	x	x	x	
	Metro Manila (La Mesa Dam Watershed)	Urban	Once/3years	Once/3years	x	x	x	x	x	x		x	x	x		x	x	x	x	
	Mt. Sto. Tomas (ERDS Research Station)	Remote	Once/3years	Once/3years	x	x	x	x	x	x		x	x	x		x	x	x	x	
<Russia>	Mondy	Remote	Once/5years	Once/3-5years	x	x	x	x	x	x	x	x	x	x		x		x		
	Listvyanka	Rural	Once/5years	Once/3-5years	x	x	x	x	x	x	x	x	x	x		x		x		
	Primorskaya	Rural	Once/5years	Once/3-5years	x	x	x	x	x	x	x	x	x	x		x		x		
	Irkutsk	Urban	Once/5years	Once/3-5years	x	x	x	x	x	x	x	x	x	x		x		x		
<Thailand>	Vachiralongkorn Dam	Remote	Once/3-5years	Once/3-5years	x	x	x	x	x	x						x		x		
	Vachiralongkorn Puye	Remote	Once/3-5years	Once/3-5years	x	x	x	x	x	x						x		x		
<Viet Nam>	Cuc Phuong	Rural	Once/3-5years	Once/3-5years		x	x	x		x								x		

Table 4. Inland aquatic environment monitoring

Country	Monitoring sites	Classification	Monitoring interval	Mondatory items(4times/year)												Mondatory items(Once/year)					Optional								
				W.T	pH	EC	Alkalinity	SO_4^{2-}	NO_3^-	Cl^-	Na^+	K^+	Ca^{2+}	Mg^{2+}	NH_4^+	Transparency	water color	DOC (COD)	NO^{2-}	PO_4^{3-}	T-N	T-P	TOC	diss-Al	Si	Fe	Mn	Chlorophyll a	DO
<China>	[Chongqing]																												
	Jinyunshan Lake	Rural	4 times/year	x	x	x	x	x	x	x	x	x	x	x	x	x		x	x	x									
	[Xi'an]																												
	Jiwozi River	Remote	4 times/year	x	x	x	x	x	x	x	x	x	x	x	x	x		x	x	x									
	[Xiamen]																												
	Xiaoping Dam	Remote	4 times/year	x	x	x	x	x	x	x	x	x	x	x	x	x		x	x	x									
	[Zhuhai]																												
	Zhuxiandong Stream	Urban	4 times/year	x	x	x	x	x	x	x	x	x	x	x	x	x		x	x	x									
<Indonesia>	Patenggang Lake	Rural	4 times/year	x	x	x	x	x	x	x	x	x	x	x	x														
	Gunung Lake	Rural	4 times/year	x	x	x	x	x	x	x	x	x	x	x	x														
<Japan>	Ijira Lake	Rural	4 times/year	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x					x			x	x
	Banryu Lake	Urban	4 times/year	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x		
<Lao-PDR>	Nam Houm Lake	Urban	4 times/year	x	x	x	x	x	x	x	x	x	x	x	x	x		x											x
<Malaysia>	Semenyih Dam	Urban	4 times/year	x	x	x	x	x	x	x	x	x	x	x	x			x		x									
	Tembaling River	Remote	4 times/year	x	x	x	x	x	x	x	x	x	x	x	x			x		x									
<Mongolia>	Terelj River	Remote	4-5 times/year	x	x	x	x	x	x	x	x	x	x	x	x				x	x									
<Philippines>	Pandin Lake	Rural	4 times/year	x	x	x	x	x	x	x	x	x	x	x	x	x		BOD5	x	x									x
	Ambulalakao River	Remote	4 times/year	x	x	x	x	x	x	x	x	x	x	x	x	x		BOD5	x	x									x
<Russia>	Pereemnaya River	Rural	4 times/year	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x					x				
	Komarovka River	Rural	5 times/year	x	x	x	x	x	x	x	x	x	x	x	x		x		x	x					x	x			x
<Thailand>	Vachiralongkorn Dam	Remote	4 times/year	x	x	x	x	x	x	x	x	x	x	x	x														
<Viet Nam>	Hoa Binh Reservoir	Rural	4 times/year	x	x	x	x	x	x	x	x	x	x	x	x	x			x	x									