FACTSHEET

EANET

ACID DEPOSITION MONITORING NETWORK IN EAST ASIA

MALAYSIA

Policies and Practices Concerning Acid Deposition

1. CURRENT SITUATION AND PROGRESS

General Evaluation

In Malaysia, most of the time, air quality is good to moderate in terms of Air Quality Index, except during the seasonal pollution episodes influenced by meteorology and transboundary impacts. It is commonly attributed to forest fires and agriculture waste burning in the Southeast Asian region. The rapid urbanization, economic development, and other socioeconomic activities are also significantly contributing to the air pollution problems in Malaysia.

Main Pollution Sources and Trends

Long-term trend and status of air quality suggest that the concentrations of CO, NO_2, and SO_2 were mainly influenced by heavy traffic while PM_{10} was by biomass burning. Major sources of air pollution in Malaysia include road transport, power generation, industrial activities, and others. Transport is responsible for about 70 percent of air pollution, in particular, rising particulate matters in urban areas. The emissions of NO_x contributed 70 percent by motor vehicles, 16 percent by power stations, 12 percent by industries, and 2 percent by other sources. Whereas, emissions of SO_2 contributed 41 percent by power plants, 23 percent by industries, 16 percent by motor vehicles, and 2 percent by other sources.

National Ambient Air Quality Standards (NAAQS) vs. WHO Guidelines

Air Pollutants	Average Time	NAAQS (μg/m³)			WHO Guidelines (μg/m³)
		IT*-1 (2015)	IT*-2 (2018)	Standard (2020)	
PM_{10}	24-hr	150	120	100	50
	1-yr	50	45	40	20
$PM_{2.5}$	24-hr	75	50	35	25
	1-yr	35	25	15	10
SO_2	1-hr	350	300	250	-
	24-hr	105	90	80	20
NO_2	1-hr	320	300	280	200
	24-hr	75	75	70	-
	1-yr	-	-	-	40
O_3	1-hr	200	200	180	-
	8-hr	120	120	100	100

**IT is the interim target*

EANET

UN environment programme

ACAP

Participation in EANET

Malaysia has been involved in EANET activities since 2001 and has four monitoring sites for monitoring wet and dry deposition at Tanah Rata, Petaling Jaya, Danum Valley, and Kuching, representing urban, rural, and remote stations. There are three sites for monitoring soil and vegetation at Sg. Lallang, Pasoh Forest Reserve and UPM Bintulu, and one site for inland aquatic environment monitoring sites, at Danum Valley.

Following is the framework of institutional arrangements for the implementation of EANET activities in Malaysia:

- National Focal Point: Environmental Management and Climate Change Division, Ministry of Energy, Science, Technology, Environment and Climate Change
- Scientific Advisory Committee Members: Atmospheric Sciences and Cloud Seeding Division, Malaysian Meteorological Department
- National QA/QC Manager: Malaysian Meteorological Department & Department of Chemistry
- National Center: Atmospheric Science and Cloud Seeding Division, Malaysian Meteorological Department

2. SITE INFORMATION

Malaysia has a well-developed air monitoring network. The monitoring of acid deposition was started in 1976 with 23 stations throughout the country. All these stations are equipped with automatic wet-only samplers to collect rainwater samples, which analyzed for major cations, anions, conductivity, and pH. Five acid deposition monitoring stations in Sabah & Sarawak will be added to the existing network in 2020, while the Semenyih Dam monitoring site has been stopped.

Monitoring Sites	Site Classification	Location			Parameters Measured			
		Latitude	Longitude	Altitude (m)	Wet Dep.	Dry Dep.	Soil & Veg.	Inland water
Petaling Jaya*	Urban	3°06′07″N	101°38′42″E	46	✓	✓		
Tanah Rata*	Rural	4°29′03″N	101°22′17″E	1545	✓	✓		
Danum Valley*	Remote	4°58′53″N	117°50′37″E	426	✓	✓		
Kuching*	Urban	1°29′25″N	110°21′09″E	22	✓			
Sg. Tembaling	Remote							✓
Semenyih Dam	Urban**							✓
Pasoh Forest Reserve	Rural						✓	
UPM Bintulu Campus Rehabilitation Forest	Rural						✓	

** EANET Monitoring Sites.*
** The Semenyih Dam monitoring site has been stopped since 2016.

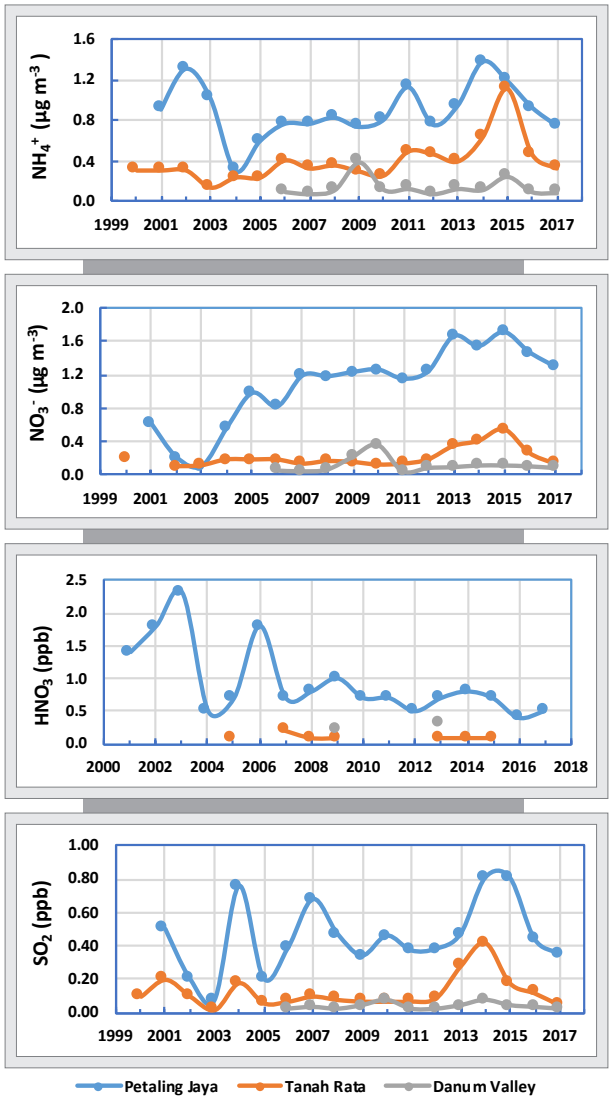
Monitoring Parameters

Monitoring Type	Parameters	Frequency
Wet Deposition	pH, conductivity, anions (SO_4^{2-}, NO_3^-, Cl^-, organic acids) and cations (Na^+, K^+, Mg^{2+}, Ca^{2+}, NH_4^+)	Weekly
Dry (Filter Pack)	SO_4^{2-}, NO_3^-, Cl^-, Na^+, K^+, Mg^{2+}, Ca^{2+}, NH_4^+ and gases (SO_2, HCl, HNO_3, NH_3, O_3)	Weekly
Inland Aquatic Environment	pH, conductivity, anions (SO_4^{2-}, NO_3^-, Cl^-, PO_4^{3-}), cations (Na^+, K^+, Mg^{2+}, Ca^{2+}, NH_4^+), alkalinity, TOC and TP	2 monthly
Soil and Vegetation	pH, cations (Na^+, K^+, Mg^{2+}, Ca^{2+}, Al^{3+}) and total carbon, phosphorus and nitrogen	3-5 years

3. HIGHLIGHTS OF MONITORING RESULTS

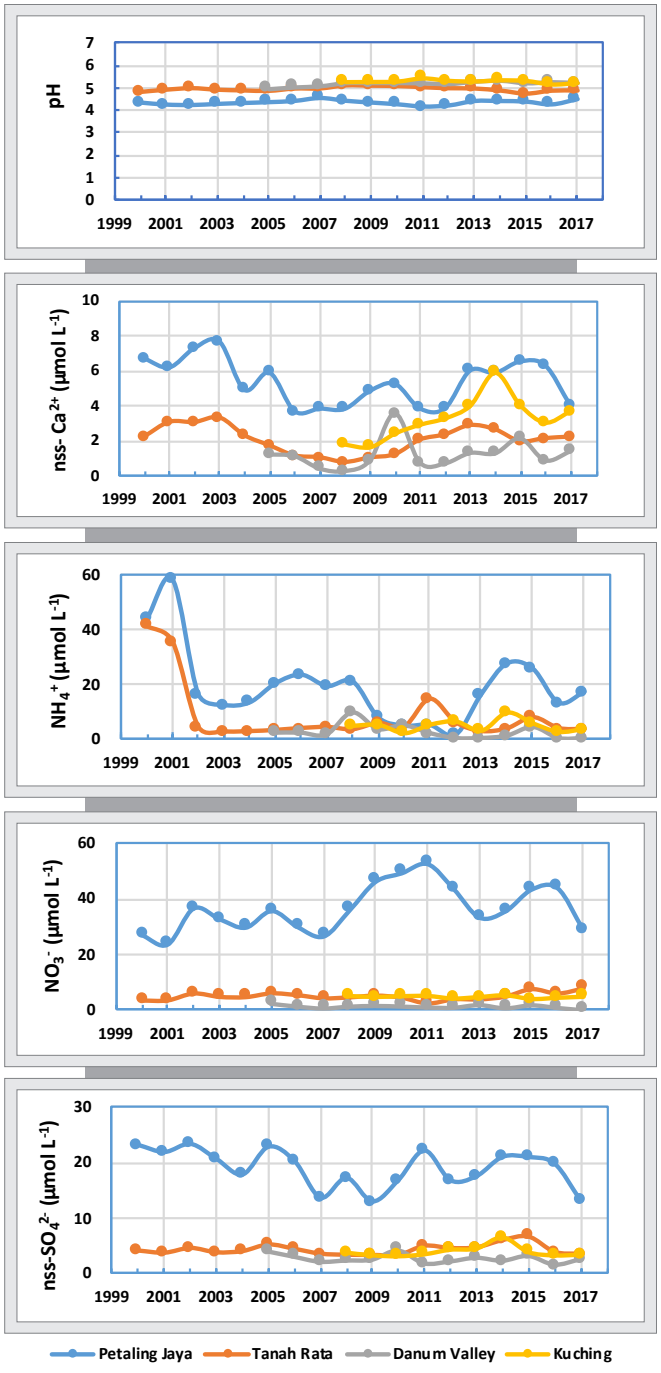
The following figures show the time-series trend of the annual average of important acid deposition parameters in the dry deposition, wet deposition, and inland aquatic environment of Malaysia.

Dry Deposition



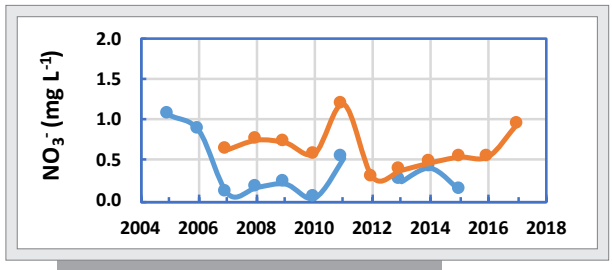
- SO_2 level is fluctuating.
- NO_3^- is showing an increasing trend while HNO_3 is decreasing.

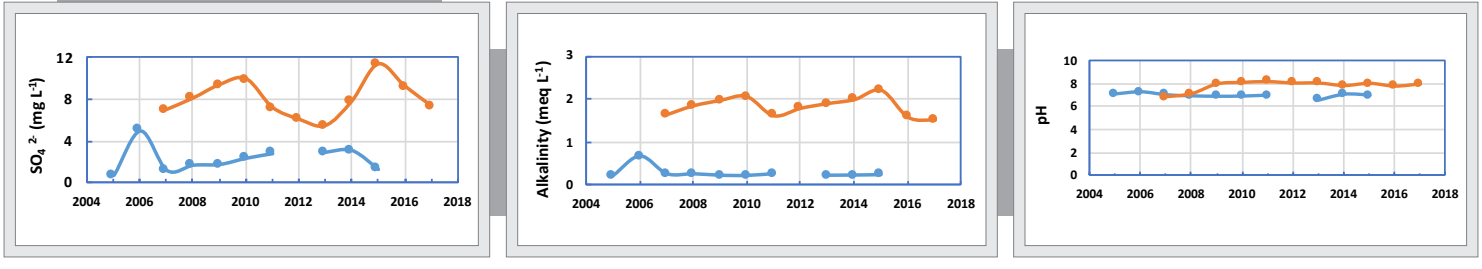
Wet Deposition



- pH in wet deposition is acidic.
- nss-SO_4^{2-} is showing a dereasing trend.

Inland Water





4. AWARENESS ACTIVITIES, RELEVANT POLICIES AND FUTURE PLAN

- The Environmental Strategic Plan for 2011-2020 has a requirement to maintain good air quality.
- Currently, several research projects are undertaken to study the physico-chemical properties of forest litter compost and use of co-composited forest to improve soil nutrient retention.
- The government is enforcing air pollution-related laws by implementing enforcement acts.
- Companies that installed pollution control equipment attract special capital incentives.
- Malaysia has taken some measures to address transboundary air pollution problems through several initiatives besides EANET, namely, ASEAN Working Groups on Sub-Regional Fire Fighting Arrangement for Sumatra and Borneo, ASEAN Agreement on Transboundary Haze Pollution, Sustainable Development Strategy for Seas of East Asia, and other multilateral and bilateral agreements.

Policies and Practices Concerning Air Pollution

Malaysia passed the following laws and legislations for prevention and control of air pollution:

- The Environmental Quality Act (EQA) 1974, a basic framework for environmental management in Malaysia.
- Environmental Quality (Clean Air) Regulations 1978 (revised in 2014), for controlling emissions from stationary sources.
- Environmental Quality (Control of Emissions from Diesel Engines) Regulations 1996.
- Environmental Quality (Control of Emissions from Petrol Engines) Regulations 1996.
- Environmental Quality (Declared Activities) (Open Burning) Order 2003, for controlling air pollution from forest fires and waste burning.
- Environmental Quality (Control of Petrol and Diesel Properties) Regulations 2007 for fuel used in a combustion engine (mobile and stationary) and in industrial plants.
- Renewable Energy Act 2011 for encouraging industries and individuals to employ renewable-energy-powered system.
- Ambient Air Quality Standard 2013.
- Malaysia's Environmental Strategic Plan 2011-2020 includes a requirement to maintain good air quality.
- Malaysia is also working with neighboring countries under the ASEAN Haze Agreement to address transboundary of air pollution.

EANET Activities and Future Plan

- Regular monitoring of EANET parameters on the dry deposition, wet deposition, and inland water at designated monitoring sites. There is a plan to expand the network from 3 sites to 7 sites (2021-2025 Plan).
- Participation in annual EANET Inter-Laboratory Comparison of WD, FP, IA, and Soil.
- Ministry of Environment to monitor ambient air quality and provide air quality index for air quality management.
- Monitoring of $PM_{2.5}$ instead of PM_{10} at 4 locations (2021-2025 Plan).
- Enhancement of local monitoring network cooperation.
- Review on National Monitoring Plan.
- Annual maintenance, calibration work, and visit to monitoring sites.
- Hands-on training on monitoring and analysis of acid deposition parameters.
- Suitability of new Inland Aquatic Site at Sungai Tembeling, Kuala Tahan, Pahang to replace the Semenyih Dam site is being investigated.

National Focal Point

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