



LAO PDR

Policies and Practices Concerning Acid Deposition

1. CURRENT SITUATION AND PROGRESS

General Evaluation

Lao PDR does not have heavy industries and mainly have only small scale industries. For that reason, the air quality of Lao PDR is mostly good and considered acceptable by the national standards. The observed yearly average concentration levels of PM₁₀ in 2014 and 2015 was 72 µg/m³, slightly higher than the National Ambient Air Quality Standards (NAAQS) and WHO guideline.

Main Pollution Sources and Trends

The increasing number of vehicles is a matter of concern, including the use of charcoal and wood for household cooking, which is deteriorating indoor air quality. The number of motor vehicles on the road has also grown over the last few years. Heavy reliance on wood and charcoal for cooking makes household air pollution a significant problem among the poor.

The primary source of air quality issues in Lao PDR results from the soil transport, stone, sand, building construction, land development for shelters, construction and road maintenance, dirty road. Besides this, in some areas, air pollution comes from vehicle exhaust, waste burning, agricultural clearance (rice field, garden), factories (steel, concrete, brick) and construction of shops, garages, and smoke from food processing in house.

Lao PDR has ambient air quality standards. However, the compilation of emissions inventories is not performed routinely. Emissions inventory data for common pollutants such as particulate matter (PM), Sulfur dioxide (SO₂), and Nitrogen dioxide (NO₂) are not currently available.

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

Air Pollutants	Average Time	NAAQS (µg/m ³)	WHO Guidelines (µg/m ³)
TSP	24-hr	330	-
	1-yr	100	-
PM ₁₀	24-hr	120	50
	1-yr	50	20
PM _{2.5}	24-hr	-	25
	1-yr	-	10
SO ₂	1-hr	780	-
	24-hr	300	20
	1-yr	100	-
NO ₂	1-hr	320	200
	1-yr	-	40
O ₃	1-hr	200	-
	8-hr	-	100

Participation in EANET

Lao PDR joined EANET in November 2002 and established National Center for Acid Deposition; nominated National Focal Point, Quality Control and Quality Assurance (QA/QC) Manager, and Scientific Advisory Committee Members; established acid deposition monitoring site, and developed a national plan for implementation of acid deposition monitoring activities.

Following is the framework of organization for implementation of EANET in Lao PDR:

- National Focal Point: Natural Resources and Environment Institute, Ministry of Natural Resources and Environment
- Scientific Advisory Committee Members: Natural Resources and Environment Institute, Ministry of Natural Resources and Environment
- National QA/QC Manager: Environment Quality Monitoring and Analysis Division, Natural Resources and Environment Institute, Ministry of Natural Resources and Environment
- National Center: Environment Quality Monitoring and Analysis Division, Natural Resources and Environment Institute, Ministry of Natural Resources and Environment

2. SITE INFORMATION

Monitoring Sites	Site Classification	Location		Parameters Measured		
		Latitude	Longitude	Wet Dep.	Dry Dep.	Inland water
Division of Environment Quality Monitoring and Analysis, MONRE, Vientiane	Urban	17°59'53"N	102°34'56"E	✓	✓	
Nam Houm lake, Vientiane	Rural	18°10'29"N	102°27'57"E			✓
Department of Meteorology and Hydrology, MONRE, Vientiane	Urban	17°58'12"N	102°34'14"E	Ambient Air Quality Monitoring (Station)		
National University of Laos	Urban	18°2'10"N	102°38'7"E	Ambient Air Quality Monitoring (Station)		
Anouvong Park	Urban	17°57'44"N	102°36'22"E	Ambient Air Quality Monitoring (Station)		
National Convention Centre	Urban	18° 0'14"N	102°38'41"E	Ambient Air Quality Monitoring (Station)		

Monitoring Parameters

Monitoring Type	Parameters	Frequency
Wet Deposition	pH, EC, SO_4^{2-} , NO_3^- , Cl^- , NH_4^+ , Na^+ , K^+ , Mg^{2+} , Ca^{2+}	Daily
Dry Deposition	Gas: HNO_3 , HCl , NH_3	2 Times / month
	Particle: SO_4^{2-} , NO_3^- , Cl^- , NH_4^+ , Na^+ , K^+ , Mg^{2+} , Ca^{2+}	
Inland Aquatic Environment	SO_4^{2-} , NO_3^- , Cl^- , NH_4^+ , Na^+ , K^+ , Mg^{2+} , Ca^{2+} Alkalinity, Temperature, Transparency, DO, COD, PO_4^{3-}	4 Times / year

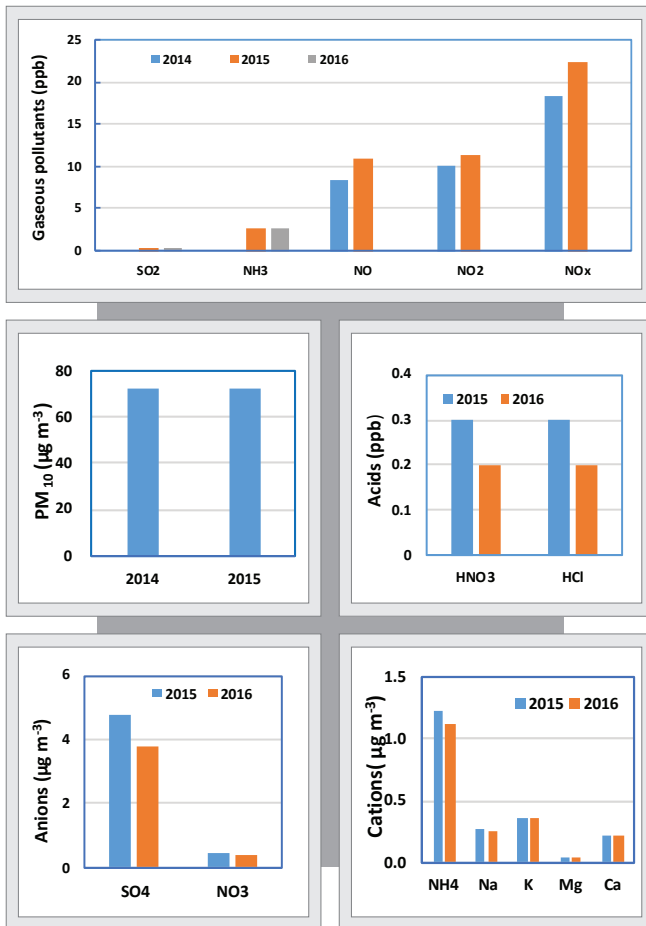




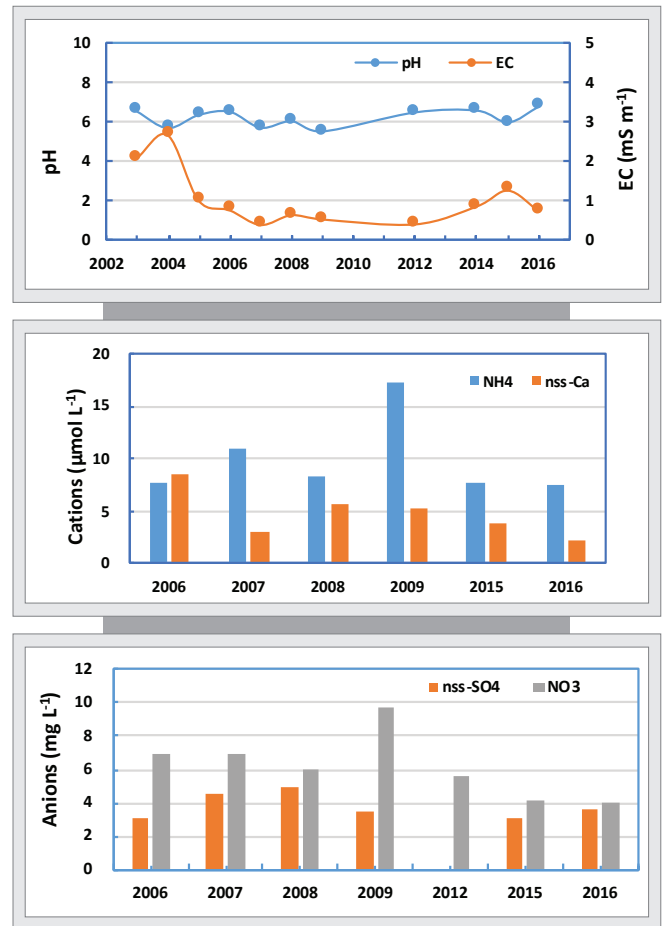
3. HIGHLIGHTS OF MONITORING RESULTS

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 water quality of Lao PDR.

Dry Deposition



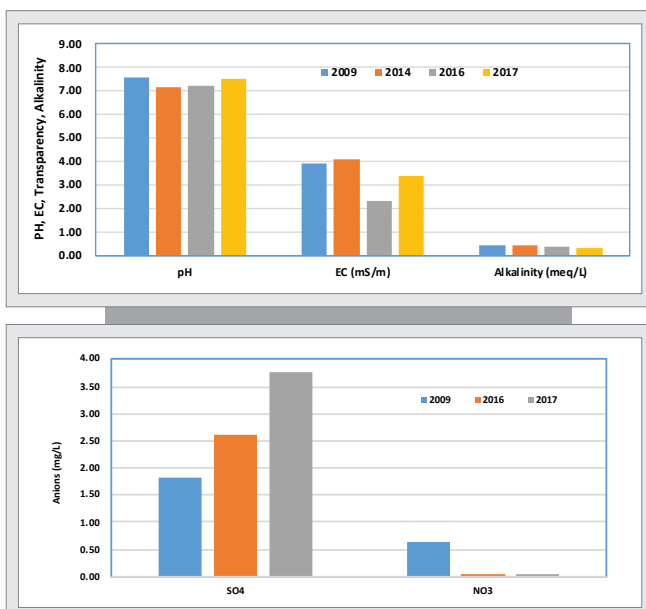
Wet Deposition



- Gaseous pollutants are showing increasing trend but meeting NAAQS.
- PM₁₀ is stable but exceeding NAAQS and WHO guideline.

- pH is slightly acidic.
- nss-SO₄²⁻ and NO₃⁻ is showing decreasing trend.

Inland Water



- pH is almost neutral with low alkalinity

4. AWARENESS ACTIVITIES, RELEVANT POLICIES AND FUTURE PLAN

- Conduct public awareness programmes on acid deposition activities.
- Continue Air Quality Monitoring in the whole country.
- Reduce traffic congestions and traffic accidents in Vientiane and improve the public transport sector for medium and long terms by ensuring efficient public bus service, increasing bus users, promoting public transportation.

Policies and Practices Concerning Air Pollution

Lao PDR has the following legislation and regulation concerning air pollution:

- Decree on the Vehicles Technical Standard and Vehicles Accessory, Permit, Import to register in Lao PDR No. 4312/MPWT, 2002.
- Decree on the Protection and Vehicles Facilitation No. 12302/ MPWT, 2009.
- Environmental Protection Law, revised in 2012.
- Decree on the National Environmental Standard No. 0832/MONRE, 2015.
- Action Plan for National Environment Pollution Control, National Pollution Control Strategy, and Action Plan 2018-2025, with a vision to 2030.

EANET Activities and Future Plan

- Continue monitoring wet, dry and inland aquatic environment.
- Continue to analyze samples of Inter-laboratory Comparison Project on Acid Deposition: Wet and Dry and Inland Aquatic Environment.
- Install PM_{2.5} monitors in 3 station in Vientiane and 1 station in Luang Prabang Province.
- Make the system data network of air quality monitoring from station to main system.
- Enhance training to staff of Natrual Resources and Environment Research Institute (NRERI) and Province about AQM and EANET Activities.

National Focal Point

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