

Progress of Water Environment Governance in (Lao PDR)

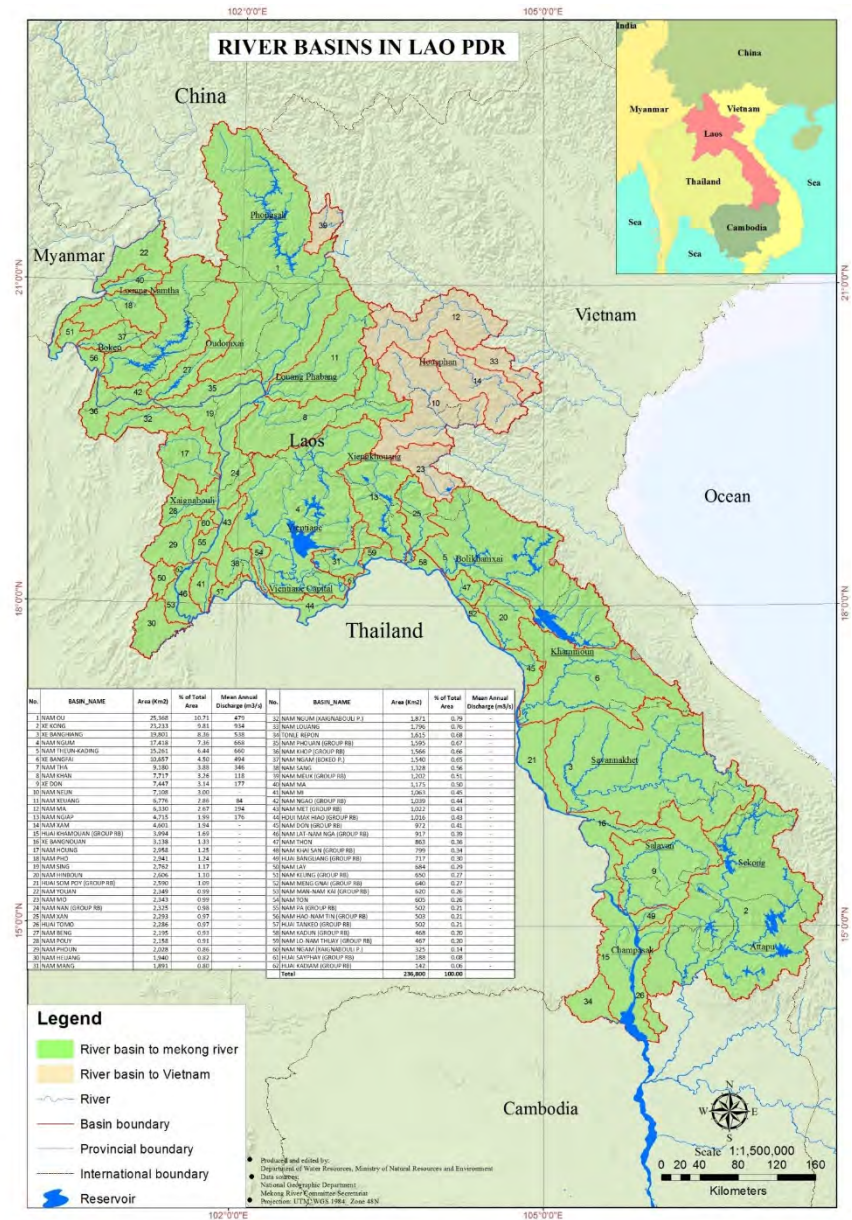
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I. Overview-Water Resources in Lao PDR

- Lao PDR is located in South-East Asia with total land area of 236,800 km², approx. population 6.49 mill. (2015);
- 90% of the country territory is located in the Mekong Basin
- Water resources per capita is around 55,000 m³ per year;
- 35% of annual flow (or equal 270,000 mil. m³) in Mekong flow is from tributaries in Laos;
- The monthly rivers flow by the pattern of rainfall is around 80% (flood season) during the rainy season and 20% (drought season) in the dry season.

Lao PDR has abundance of water resources which there are total 62 river basins.



Data of Water Quality Monitoring in Vientiane Capital



2nd Year

No	Canal	Detailed Location
1	Hong Xeng	Bridge for Route 13
2	Hong Kai Keo	Downstream of Hong Kai Keo
3	Hong Pasak	Bridge for Chao Anou Road
4	Hong Wattay	Downstream of Hong Wattay
5	Downstream of Hong Ke	Bridge for Kamphengmeuang Road
6	Upstream of Hong Ke	Bridge for Dongpalane Road
7	Hong Quay Louay	Downstream of Hong Quay Louay
8	Hong Phone Thanh	Downstream of Hong Phone Thanh
9	Mak Hiao River	Downstream of That Luang Marsh

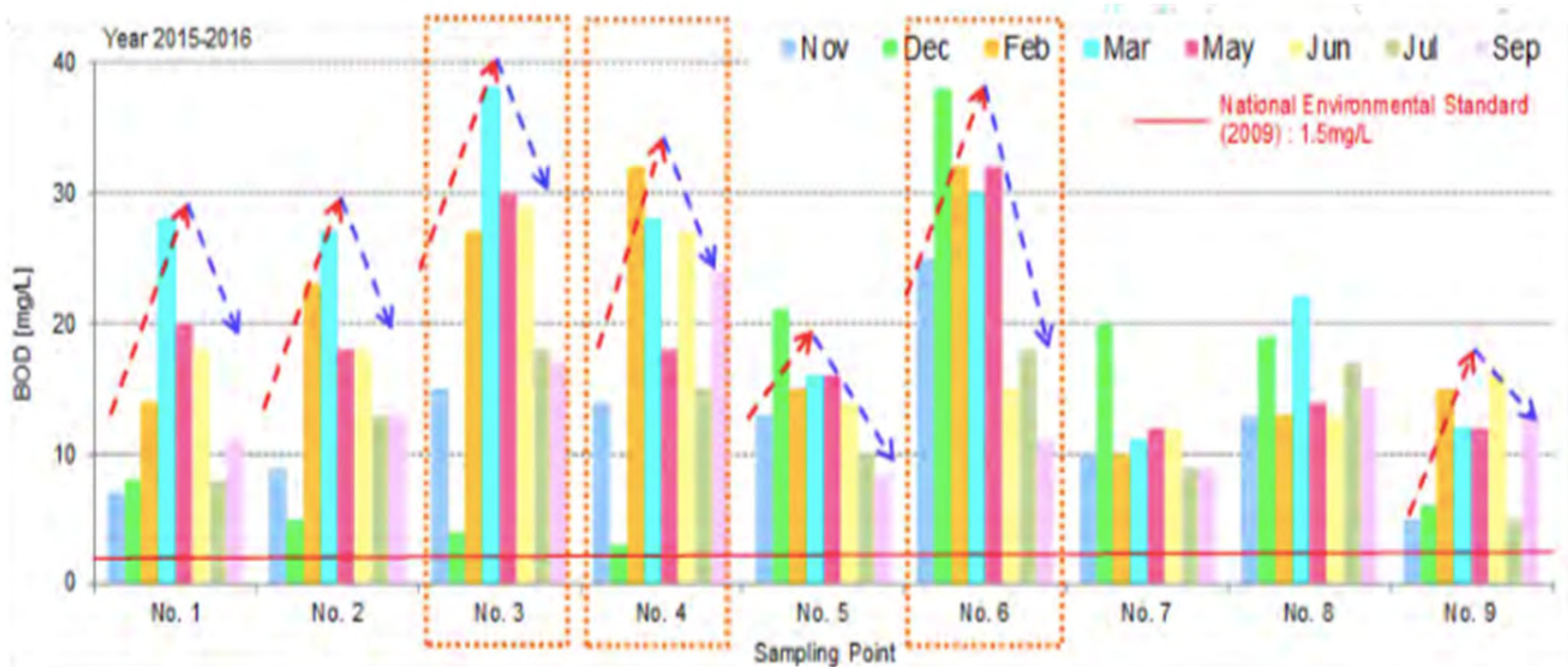
3rd Year

No	Canal	Detailed Location
1	Hong Xeng	Bridge for Route 13
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3	Hong Pasak	Bridge for Chao Anou Road
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5	Downstream of Hong Ke	Bridge for Kamphengmeuang Road
6	Upstream of Hong Ke	Bridge for Dongpalane Road
7	Hong Quay Louay	Downstream of Hong Quay Louay
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9	Mak Hiao River	Downstream of That Luang Marsh

Result of WQM “BOD”

- The Value of BOD in upstream of Hong Ke and Hong Xeng (No. 3.3 and 6) is higher than that in other points.
- It is found that upstream of Hong Ke and Hong Xeng are heavily polluted due to discharge of wastewater from households, factories and commerce facilities.
- The value of BOD in every point doesn't meet the National Environmental Standard of Lao PDR.
- The value of BOD in the end of dry season is higher than that in the beginning of dry season, The water quality has deteriorated as dry season goes by.

Description of BOD in Monitoring Report



Legislation of Wastewater Management

1. National Environmental Standard, 2017;
2. Water and Water Resources Management, 2017;
3. Natural Resources and Environment Sector Vision towards 2030 and Ten-Year Strategy (2016-2025) and Natural Resources and Environment Sector Five year Action Plan (2016-2020) 22 September 2015;
4. Industry Processing Law, 2013;
5. Environment Protection Law, 2012;
6. Environment Impact Assessment Decree; 2010 and EIA instruction 2014;
7. Waste from Industry Processing Management Regulation 2012; and
8. Industry Wastewater Discharge Regulation 2005.

Institutional Responsibility:

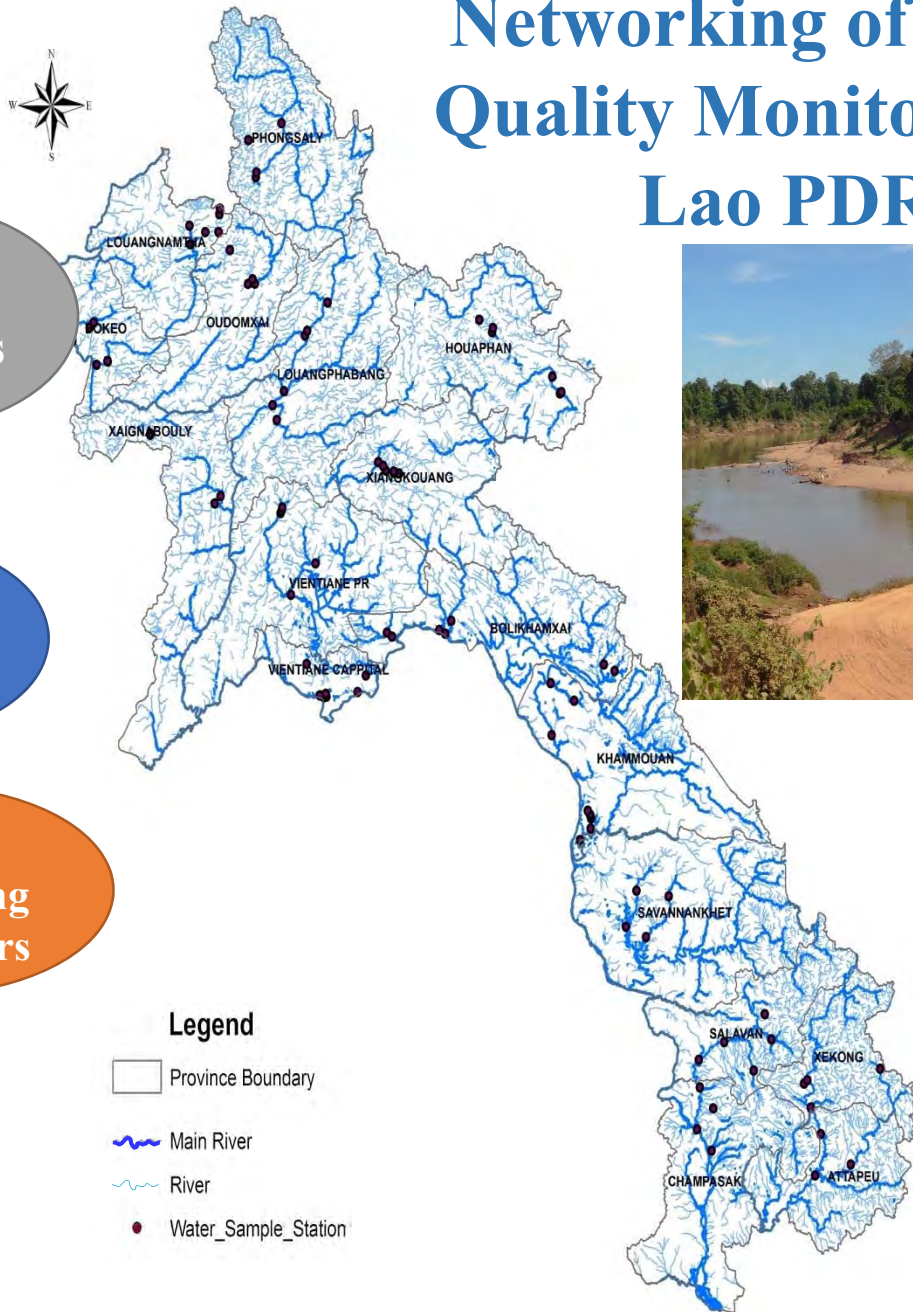
1. Project proponents have to submit the industrial proposal to Ministry of Industry and Commerce (MOIC) for issue the industries operating permit. MOIC is monitoring for wastewater management and treatment process before discharge to nature environment) *monitoring every month*;
2. Project proponents have to submit Environmental Management and Monitoring Plan (EMMP) to the Environment Impact Assessment (EIA) Ministry of Natural Resources and Environment (MONRE) *monitoring two time per years*; and
3. There are three levels of government in Lao PDR (Ministry at National, Department at Province and Office at District levels).

Networking of Water Quality Monitoring in Lao PDR

17 (+1)
provinces

93
Stations

>30
Monitoring
Parameters



Monitoring Parameters

15	Formaldehyde	CHO	mg/L	Spectrophotometry	Requires Newly Installed	Distillation Apparatus
16	Perchlorate	ClO_4^-	mg/L	Perchloric Acid Spectroscopy Method	Need to buy consumable items but possible within existing facilities	
20	Ammonium Ion	NH_4^+	mg/L	Nessler	Requires Newly Installed	Digestion Apparatus + Distillation Apparatus
21	Nitrate Nitrogen	NO_3-N	mg/L	Cadmium Reduction	Need to buy consumable items but possible within existing facilities	
22	Ammonia Nitrogen	NH_3-N	mg/L	Distillation Nesslerization	Requires Newly Installed	Distillation Apparatus
23	Total Nitrogen	TKN	mg/L	Kjeldahl	Requires Newly Installed	Digestion Apparatus + Distillation Apparatus
24	Phenol	O=C ₆ H ₅	mg/L	Distillation, 4-Amino Antipyrine	Requires Newly Installed	Distillation Apparatus
30	Chromium Hexavalent	Cr ⁶⁺	mg/L	Diphenylpicrylhydrazyl method	Need to buy consumable items but possible within existing facilities	
33	Barium	Ba	mg/L	AA-Diox Agitation	Need to buy consumable items but possible within existing facilities	
34	Mercury	Hg	mg/L	AA Cold Vapor Technique	Requires Newly Installed	Cold Vapor Atomic Absorption Apparatus
35	Arsenic	As	mg/L	AA Hydride Generation or ICP	Requires Newly Installed	AA Hydride Generation Apparatus
36	Selenium	Se	mg/L	AA Hydride Generation or ICP	Requires Newly Installed	AA Hydride Generation Apparatus
37	Cyanide	CN ⁻	mg/L	Pyridine Barbituric Acid	Requires Newly Installed	Distillation Apparatus
38	Radioactive (Alpha)	α	Bequerel/L	OC	Requires Newly Installed	Geiger Muller Counter
39	Radioactive (Beta)	β	Bequerel/L	OC	Requires Newly Installed	Geiger Muller Counter
40	Organochlorine pesticides		mg/L	OC	Requires Newly Installed	GC/MS
41	Dichlorodiphenylchloroethane	DDT	mg/L	OC	Requires Newly Installed	GC/MS
42	alpha-Benzo hexachloride	α -BHC (O=C ₆ H ₄) ₂	mg/L	OC	Requires Newly Installed	GC/MS
43	Dieldrin	O=C ₆ H ₄ C ₁₀	mg/L	OC	Requires Newly Installed	GC/MS
44	Aldrin	O=C ₆ H ₄ C ₉	mg/L	OC	Requires Newly Installed	GC/MS
45	heptachlor and heptachlor epoxide	O=C ₆ H ₄ C ₇ and O=C ₆ H ₄ C ₇ O	mg/L	OC	Requires Newly Installed	GC/MS
46	Endrin	O=C ₆ H ₄ C ₉	mg/L	OC	Requires Newly Installed	GC/MS

The Strategy and Action Plan for Wastewater Treatment-2030

Our Vision is that:

“Hygienic lives ensured for the urban population by 2030, every households can able to connect to wastewater treatment services to be more effective in health, promoted economic growth, social security and sustainable environment”

Our **Goal** is:

“Supporting increased access to sustainable wastewater facilities and services in urban areas for every districts level with appropriated technology that energy saving, less in cost (construction, operation and maintenance), supported local materials and labors”

Challenges of water environment governance

1. Policy and legislation:

- Lack of National Planning Policy Framework, Monitoring and Enforcement;
- Lack of specific Law and Regulation to control of waster pollution control and
- Lack of criminal laws for pollution control.

2. Institutional Framework:

- The absence of power leads to serious lack of compliance and major pollution issues;
- Lack of technical skills and inadequate resources to support monitoring and enforcement;
- Lack of cooperation and coordination of pollution control among the Center , Local government and agencies concern.

3. Financial support:

- Lack of financial collection charges of pollutants released into the environment is still not able to perform as no specific legislation in force; and
- National government's annual budget is not sufficient.

Expectation from WEPA to address identified challenges

1. Human Resources Development;
2. Technical support for water environment in Lao PDR;
3. Pilot project/program on water environment in Lao PDR; and
4. Study exchange on water environment among WEPA countries.

Thank you for your attention

