

Lancang-Mekong Round table Dialogue on Water Governance and Water Quality Monitoring Technical Solution, in 21-24 March 2018 in Kunming, China



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I. Overview

- Lao People's Democratic Republic (Lao PDR) is a **landlink country** and covered by high mountainous ranges but criss-crossed by many rivers and stream. Lao PDR shared border with China to the north, Cambodia to the south, Vietnam to the east, Thailand to the west and Myanmar to the northwest.
- **Area:** 236,800 square kilometers, three-quarter of which is mountains and plateaus.
- **Mekong flow over Lao 3835 Km**
- **35% Lao contribute to Mekong river**
- **Population:** About 6,492,400 (Lao Census, 2015).
- **Density:** 28 person/km²
- **Capital city:** Vientiane.



II. Legislations for water pollution prevention and control

- **Laws and regulations**
 1. Industry Wastewater Discharge Regulation 2005.
 2. Environment Protection Law, 2012;
 3. Industry Processing Law, 2013;
 4. Environment Impact Assessment Decree; 2010 and EIA instruction 2014;
 5. Waste from Industry Processing Management Regulation 2012; and
 6. National Environmental Standard, 2017;
 7. Water Resource Law 2017

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”

III. Concerned sectors for water pollution prevention and control

- Central Government
 - Ministry of Natural Resources and Environment;
 - Ministry of Public Work Transport;
 - Ministry of Health
 - Ministry of industry and Commerce
 - Ministry of Agriculture and Forestry
 - Ministry of Energy and Mine
- Provincials and district level
 - Department of Natural Resources and Environment (Provincial level)
 - Office of Natural Resources and Environment (District level)

National environment standards (Standards for Water Pollution Control from General Industries)

Parameters	Symbols	Standards values that allows	Unit	Analysis methodology
potential of Hydrogen	pH	6-8.5	-	pH Meter
Total Dissolved Solid	TDS	≤2,500	mg/L	Dry evaporation at temperature 103-105 ° C, 1 hour
Total Suspended Solid	TSS	≤50	mg/L	Glass Fiber Filter Disc
Temperature	t	≤40	° C	Temperature Meter
Color and Odor	-	None	-	General
Hydrogen Sulfide	H ₂ S	≤1.0	mg/L	Titration
Cyanide	CN ⁻	≤0.2	mg/L	Distillation and Pyridine Barbituric Acid
Fat, Oil and Grease	FOG	≤5.0	mg/L	Solvent Extraction by Weight
Formaldehyde	CH ₂ O	≤1.0	mg/L	Spectrophotometry
Phenol	C ₆ H ₅ OH	≤1.0	mg/L	Distillation and Aminoantipyrine Method 4
Chlorine	Cl ⁻	≤1.0	mg/L	Lodometric Method
Pesticide	-	None	mg/L	GC
Biological Oxygen Demand 5 Days	BOD ₅	≤30	mg/L	Azide Modification at 20 ° C, 5 days
Total Nitrogen	TKN	≤ 100	mg/L	Kjeldahl
Chemical Oxygen Demand	COD	≤120	mg/L	Potassium Dichromate Digestion ; Open Reflux or Closed Reflux
Heavy metals				
Zinc	Zn	≤5.0	mg/L	AA/AES; ICP
Chromium Hexavalent	Cr ⁺⁶	≤0.25	mg/L	
Chromium Trivalent	Cr ⁺³	≤0.75	mg/L	
Copper	Cu	≤2.0	mg/L	AA/AES; ICP
Cadmium	Cd	≤0.03	mg/L	
Barium	Ba	≤1.0	mg/L	
Lead	Pb	≤0.2	mg/L	
Nickel	Ni	≤1.0	mg/L	
Manganese	Mn	≤5.0	mg/L	
Arsenic	As	≤0.25	mg/L	AA-Hydride Generation or ICP
Selenium	Se	≤0.02	mg/L	
Mercury	Hg	≤0.005	mg/L	AA - Cold Vapour Techique

Monitoring and inspection for water pollution control

Monitoring system

- For water quality inspection and monitoring:
 - PCD is compliance inspection with the end of the pipe;
 - ESIA is regular monitoring of project development;
 - NREI is researches and Lab service;
 - WRD is regular monitoring of surface and ground water quality monitoring in whole country.

IV. Urban Water Pollution/Wastewater

Urban areas in Lao PDR a rapidly increasing of population contributes to a fast increasing water demand it's concerned incidence of water pollution by inappropriate wastewater discharge from human activities, households, SME, Industrial sectors direct discharge into roadside drainages (or public areas) without treatment

- Current wastewater handling in **most urban areas** in Lao PDR entails an **on-site disposal system** (latrines and **septic tanks**) without treatment or tend to be **poorly functioning treatment and maintained**, with **an insufficient drainage system**;
- Untreated** black/grey water from domestic areas(households , hospitals, markets, schools etc.,) industrial operation are often emptied directly **into public drainages** or the **urban environment**;
- Drainage system at present is insufficient capacity to cater for all storm flows and frequent flooding occurs during the wet season.



Water Supply in Urban area

Year	Improved drinking water	Unimproved drinking water	Total
2011	83%	17%	100%
2000	72%	28%	100%
Comparison	11% increasing		

Water Supply in Rural area

Year	Improved drinking water	Unimproved drinking water	Total
2011	63%	37%	100%
2000	38%	62%	100%
Comparison	25% increasing		

Sanitation in Urban area

Year	Improved sanitation	Unimproved sanitation	Total
2011	87%	13%	100%
2000	65%	35%	100%
Comparison	22% increasing		

Sanitation in Rural area

Year	Improved sanitation	Unimproved sanitation	Total
2011	48%	52%	100%
2000	17%	83%	100%
Comparison	31% increasing		

V. Problems solving

- Current situation industry wastewater and technologies
 - Many factories in Lao PDR their industrial waste water direct discharged in to the pond , however, such pond does not to have sheeting to prevent infiltration of untreated water to the ground;
 - The small factories in Lao PDR have ponds for their industrial effluent disposal;
 - The larger scale of industries their have waste water treatment plant (Anaerobic+ Aerobic) such as Beer Lao company, Coca-Cola company , mining sector and other industries.
- **Other place to solved for waste water problems**

Ponds in many factories of Vientiane Capital

Paint factory



Lao's Metal Resources Co. LTD



Waste Water Treatment Plant in Beer Lao Company



Cocacola Company



VI. Challenges for water pollution prevention and control

- Human resources (Lack of human resource)
- Technical and equipment
 - No specific specialist
 - Lack of equipment for the site analysis
- Financial deficit

VII. Conclusion

These challenges can be overcome by policies, strategies and proper planning which should be context specific accounting for the local economic, social, culture and environmental conditions.

However, the water quality in the drainage canals and marshes has been getting worse due to the increasing discharge of wastewater from urban areas.

Technology consideration for treatment facilities involved technology, operation, maintenance, investment, management, monitoring and capacity building for human resources development for implementation need.

Institutional readjust for match with wastewater treatment regulations, guidelines and

Funding support both with regular budget funding and international supporting Government, NGOs, Private sectors, Investors.

Thank you for your attention

