



# Water Quality Monitoring in LAO PDR

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## **II. Natural Resources and Environment Strategy and Sector Vision towards 2030**

- Becoming Green, Clean and Beautiful base on green economic growth and sustainable development

### **National Water Resource Strategy to 2025**

- Manage, utilize and develop water resources for the outmost benefits and sustainability, while ensuring environment protection, effective climate change adaptation and livelihood improvement

## ❖ Water Resources Action Plan 2016-2020

1. Formulate/update and implement legislations –such as water & water resources law, meteorology and hydrology law, related regulations, technical guidelines

**2. Water quality monitoring and management –200 sample points & WQ assessment in RBs**

3. Develop/implement river basin management plans in the 10 priority basins (plus 52 RBs)

4. RBs. Conduct groundwater assessment (national GW profiles)

5. Flood and drought/water scarcity management & mitigation (*all basins*).

### **III. Water Quality in LAO PDR**

The water quality in Lao PDR is generally good quality, but it is under pressured due to rapid demographic growth, economic development and urbanization. Water quality deterioration are mainly associated with:

- Hydropower development, decreasing of oxygen in deep-reservoir which lead to the stratification and decomposition of submerge biomass and organic matters;
- Mineral exploration and mining – Acid mine drainage, chemical use, mine tailing....

- Industrial development and Urbanization;
- due to population growth, leads to extensive municipal waste and wastewater discharge to waterways without to proper treatment;
- Organic, nutrient and persistent organic pollutants (pesticide, insecticide) from agricultural areas, especially during the rainy season's where high runoff and river flows occurs;
- Increasing sedimentation due to slash and burn activities, bush clearance for agricultural purpose

# IV. National Monitoring Program

2012-2016

- Monitoring done quarterly/half year or yearly basis;
- Parameter analyses composes of 9 Core Parameters; pH, Temperature, Conductivity, DO, BOD, Nitrite, Nitrate, Total Coliform and Faecal Coliform), general parameters and heavy metals in some stations;

- Water sampling and water quality analyses base on Standard Method for the Examination of Water and Wastewater;
- Water Samples analyzed at the accreditation of ISO/IEC-17025 environmental laboratory, Natural Resources and Environment Research Institute (NRERI, MONRE) ;





- The water quality monitoring networks in Laos : 158 stations, 18 provinces and 11 monitoring stations along Mekong river;
- In 2013-2015 DWR, NRERI and PONREs conducted WQ monitoring in :
  - 116 stations
  - 41 river basins
  - 54 sub-river basins
  - 21 tributaries of sub-river basins

Three months basis, focused on 4 main basic parameters – pH, DO, EC and Temperature.

# General results of Water Quality

Parameter	Unit	National Statistics				
		Lao Environment Standard	Max	Mean	Min	St Deviation
Temp	°C	-	36.50	26.01	12	3.868
DO	mg/L	6	11.96	5.41	0	1.736
pH	-	5-9	9.64	7.43	3.07	0.755
EC	uS/cm	<1,000	10,910	316	10	1,046

# Heavy metals

- Results of analysis of Heavy metals are well under the national standard, only in some rivers Iron (Fe) exceeds the national standards.



## **IV. Constraint and Challenges**

- Inadequate human resource capacity and financial resources;
- Lack of equipment for analysis of complex parameters; toxic and persistent organic pollutants at central environmental laboratory as well as field monitoring equipment for department of environment and natural resources I provinces;

# V. Future Plan

- Expand water quality monitoring networks;
- Define clearer responsibility between the central, province and district on water quality monitoring and analysis ;
- Harmonization of water quality monitoring program into Policies, Laws and Strategies;
- Strengthen capacity of central environmental and regional laboratory (Northern provinces: Louangprabang, Xiengkouang and in Champasak province)

- Gradually, increase the number of variables measures can be increased in relation to the financial resources;
- Laboratory facilities are adequately equipped, maintain and calibrate;
- Strengthen laboratory staffs and necessary skills for the measurement of complex variables;
- Achieving greater QA/QC and expand scopes of laboratory accreditation – ISO/IEC and establishment of the Central Water Quality Laboratory to be the Centre of excellence

**Thank You (Khob Jai)**