Ministry of Natural Resources and Environmental Conservation
Environmental Conservation Department

20th Water Environment Partnership in Asia (WEPA) Annual Meeting and the WEPA International Workshop

Updates of Water Environment Governance in Myanmar

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Presentation Outline

- Introduction
- Water Resources in Myanmar
- Environmental Quality Standards and Water Quality Standards
- Water Resources Management
- Water Quality Monitoring
- Water Quality Assessment at Mekong River and Its Branches in Shan State
- Challenges, Needs and Gaps, Way Forward

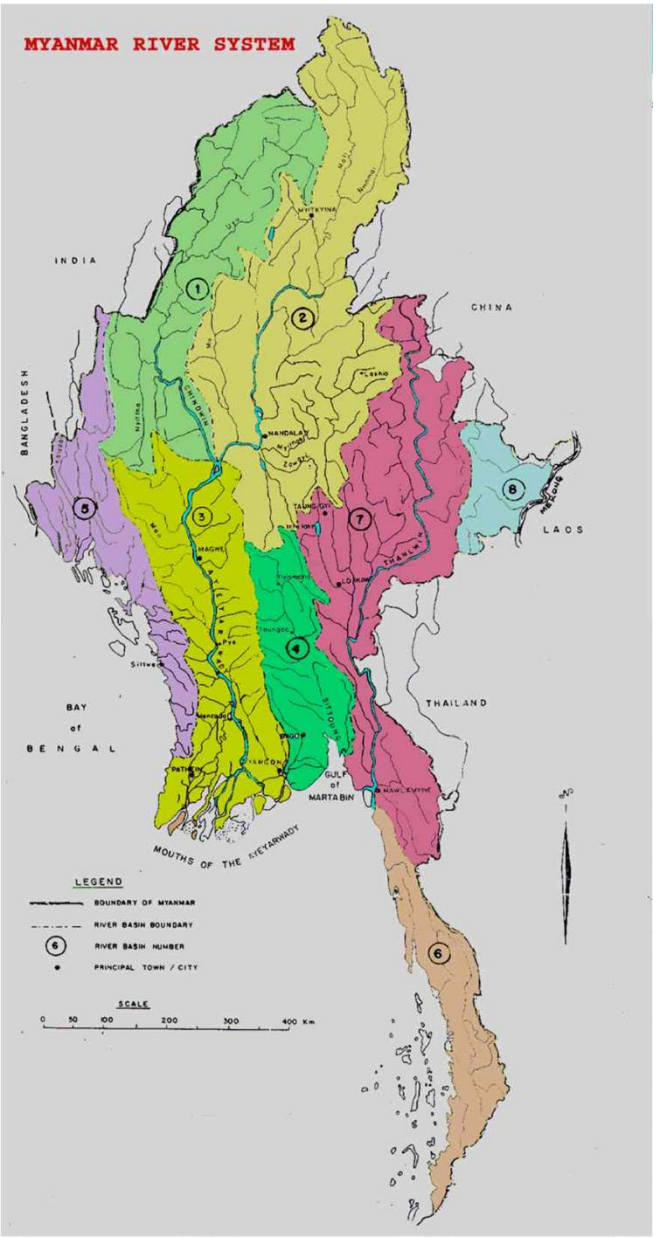
Introduction

Introduction

- Environmental pollution problems can be attributed to the impact on the local environment, public health issues, social issues and economic growth.
- The combination of the industrial development, economic growth and urban expansion led to increase in pollutant emissions.
- In order to prevent the environmental pollution problems, pollution control measures, environmental quality standards, comprehensive monitoring system, enforcement mechanism, effective environmental management system, environmental assessment and research development are the key requirements for the effective implementation.

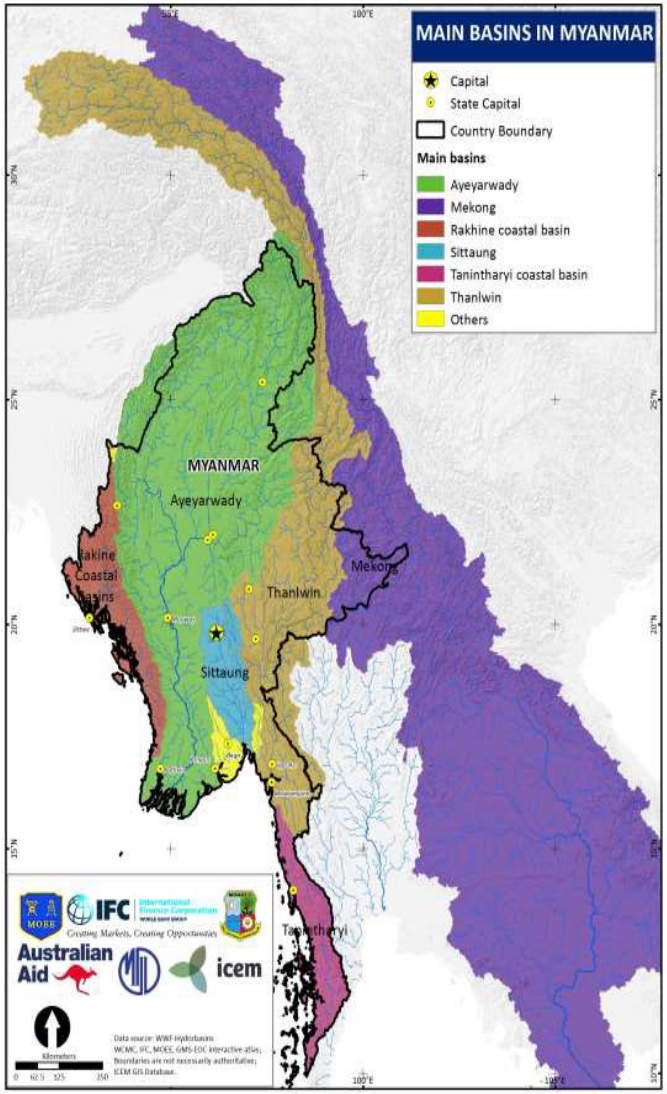
Water Resources in Myanmar

Water Resources in Myanmar



- Potential water resources volume
  - for surface water - 1080 km³
  - for groundwater - 580 km³
- Average Precipitation (mm/year) - 2,091 (2009)
- Total Renewable Water Resources (km3) - 1,003 (2014)
- Total Annual Freshwater Withdrawals (billion m3) - 33.2 (2000)
- Annual Freshwater Withdrawal by Sectors
  - Agriculture - 89% (2000)
  - Industry - 1% (2000)
  - Municipal (including domestic) - 10% (2000)

Major River and Coastal Basins in Myanmar



Basin	Total Basin Area (km2)	Basin Area within Myanmar (%)	Land Area Of Myanmar (%)	Total Main River Length (km)
Ayeyarwady	412,500	90.4 (372,905 km2)	55.5	2170
Thanlwin	283,335	45 (127,493 km2)	19.0	2400
Mekong	824,000	2.7 (21,947 km2)	3.3	3465
Sittaung	34,913	100	5.2	450
Bago	10,261	100	1.5	220
Bilin	3,056	100	0.5	160
Tanintharyi	44,876	100	6.7	400

Environmental Quality Standards and Water Quality Standards

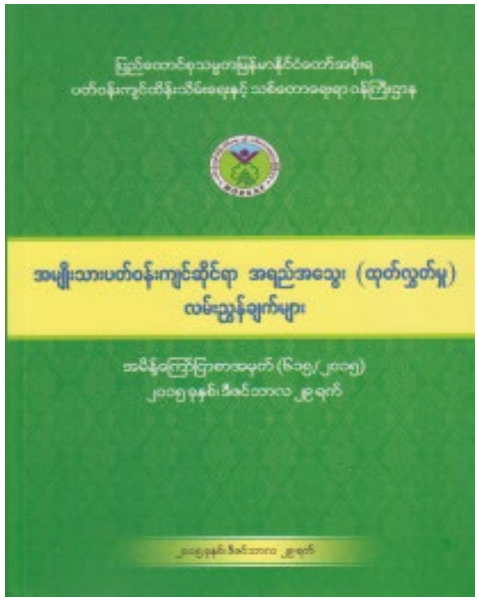
Environmental Law & Regulations

- Environmental Conservation Law (2012)
- Environmental Conservation Rules (2014)
- Environmental Impact Assessment Procedure (2015)
- **National Environmental Quality (Emission) Guidelines (2015)**
- National Environmental Policy of Myanmar (2019)
- Myanmar Climate Change Policy, Strategy and Master Plan (2019)
- Myanmar National Waste Management Strategy and Master Plan (2018-2030) – (2020)
- **National Surface Water Quality Standard (2024)**

National Environmental Quality (Emission) Guidelines

Notification No. 615 / 2015

29th December 2015



Objective

These national Environmental Quality (Emission) Guidelines (hereafter referred to as Guidelines) provide the basis for regulation and control of noise and vibration, air emissions, and liquid discharges from various sources in order to prevent pollution for purposes of protection of human and ecosystem health.

No.		Chapter / Annex
1.	Chapter I	General Provisions
2.	Chapter II	Implementation Procedures
3.	Annex A	Emission Guidelines
		(1) General Guidelines
		➢ Air Emissions
		➢ Wastewater
		➢ Noise Levels
		➢ Odor
		(2) Industry Specific Guidelines
		➢ Energy Sector Development
		➢ Agriculture, Livestock and Forestry Development
		➢ Manufacturing
		➢ Waste Management
		➢ Water Supply
		➢ Infrastructure and Services Development
		➢ Mining

Environmental Quality Standards

Article 10. of Environmental Conservation Law (2012)

Ministry of Natural Resources and Environmental Conservation may, with the approval of the Union Government and the Environmental Conservation Committee, stipulate the following environmental quality standards:

(a) suitable surface water quality standards for the usage in rivers, streams, canals, springs, marshes, swamps, lakes, reservoirs and other inland water sources of the public;

(b) water quality standards for coastal and estuarine areas;

(c) underground water quality standards;

(d) atmospheric quality standards;

(e) noise and vibration standards;

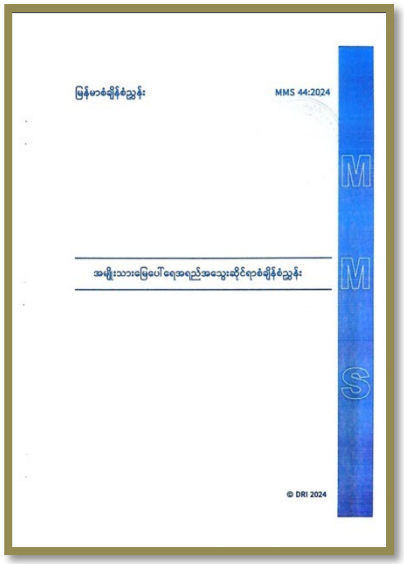
(f) emission standards;

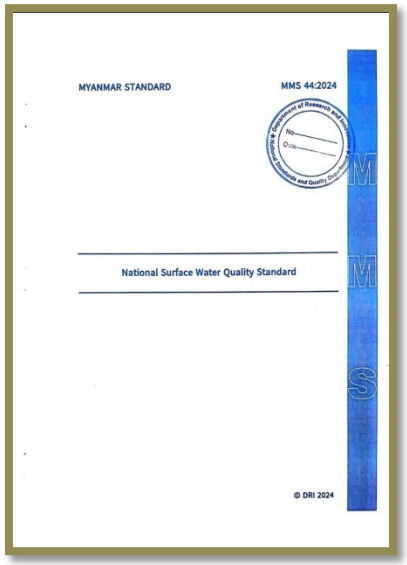
(g) effluent standards;

(h) solid waste standards;

(i) other environmental quality standards stipulated by the Union Government

National Surface Water Quality Standard





Standard Values of Parameters for Human Health

Parameter	Unit	Class I	Class II	Class III	Class IV	Class V
Chemical Parameter						
Boron	mg/L	2.4				
Cyanide	mg/L	0.07				
Fluoride	mg/L	1.5				
Nitrate nitrogen	mg/L	10				
Nitrite nitrogen	mg/L	1				
Organics						
Benzene	mg/L	0.01				
Phenol	mg/L	0.05				
Polychlorinated Biphenyls (PCB)	µg/L	0.5				
Heavy Metals						
Arsenic	mg/L	0.05				
Cadmium	mg/L	0.003				
Chromium (Hexavalent)	mg/L	0.05				
Lead	mg/L	0.01				
Mercury	mg/L	0.001				
Nickel	mg/L	0.07				
Selenium	mg/L	0.04				

Standard Values of Parameters for Environmental Conservation

Parameter	Unit	Class I	Class II	Class III	Class IV	Class V
Physical Parameter						
Total Suspended Solids	mg/L	25	50	75	100	150
Chemical Parameter						
BOD	mg/L	2	3	8	25	30
COD	mg/L	5	8	13	50	100
DO	mg/L	>6	>5	>4	>3	>2
pH	S.U	6.5-8.5	6.5-8.5	6-9	5-9	_
Ammonium nitrogen	mg/L	0.2	0.3	0.5	0.8	0.9
Organics						
Oil & Grease		No noticeably seen				
Biological Parameter						
Escherichia coli (E. coli)	MPN/100 mL (or) CFU/100 mL	20	300	1000	1000	_
Heavy Metals						
Copper	mg/L	0.1	0.3	0.5	_	_

Standard Values of Monitoring Parameters

Parameter	Unit	Class I	Class II	Class III	Class IV	Class V
Physical Parameter						
Colour	TCU (or) mg Pt/ L	15	25	50	100	150
Conductivity	dS/m	1	1.5	1.5	3	6
Total Dissolved Solids	mg/L	500	1000	1000	1500	2000
Turbidity	NTU	5	25	25	50	100
Chemical Parameter						
Chloride	mg/L	250	250	250	350	400
Pesticides						
Atrazine	µg/L	100				
Carbofuran	µg/L	7				
Chlorpyrifos	µg/L	30				
Fenitrothion	µg/L	3				
Glyphosate	µg/L	370				
Permethrin	µg/L	300				
Thiram	µg/L	6				

Technical Cooperation with Water Environmental Partnership Asia (WEPA)

Water Resources Management

Frameworks for Water Resource Management

Institutional Arrangement

Ministry	Agency / Department	Related Responsibilities
Water Power Exploration Board	National Level Committee	Draw up and implement an integrated water management system; develop a national integrated water management strategy, National water resources policy, Water framework directive and a water law.
National Environmental Committee	National Level Committee	National Water Quality Standards and Water resources Conservation
Ministry of Natural Resources and Environmental Conservation	Environmental Conservation Department (ECD)	Environmental and Climate Change management, water environmental management, formulation of national water quality standards
	Forest Department	Watershed Management
Ministry of Construction	Department of Building	Domestic water supply and sanitation
	Department of Urban and Housing Development (DUHD)	Town Planning, domestic water supply and sanitation
Ministry of Health	Department of Public Health	Environmental health, water quality assessment and control

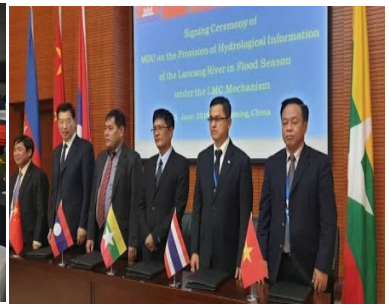
Frameworks for Water Resource Management (Contd.)

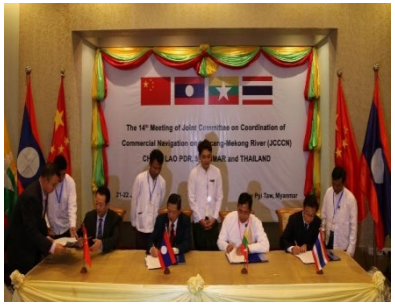
Institutional Arrangement

Ministry	Agency / Department	Related Responsibilities
Ministry of Agriculture, Livestock and Irrigation	Irrigation and Water Utilization Management Department (IWUMD)	Provision of irrigation water for farmland (ground water and surface water) and implementation of flood prevention measures.
	Department of Rural Development (DRD)	Rural water supply
	Department of Fishery	Food security improvement for the socioeconomic benefit of rural communities based on fishery industries.
	Livestock Breeding and Veterinary Department (LBVD)	Livestock waste management
Ministry of Transportation and Communication	Directorates of Water Resources and Improvement of River System (DWIR)	Navigation, sediment and bank erosion control
	Department of Meteorology and Hydrology (DMH)	Hydro-met data collection and analysis, weather forecasting
City Development Committee	City Level Management	City water supply and sanitation, water conservation and protection works

International Cooperation Related to Water Resources

- ASEAN Regional Cooperation (AWGWRM, AWGCME)
- Mekong River Commission
- Mekong-Lancang Cooperation (Water Resources Cooperation JWG)
- Coordination of Commercial Navigation on the Lancang-Mekong River (JCCCN)
- Other cooperation related to ASEAN and Mekong River Basin
- Bilateral Cooperation with neighboring countries and development partners
- Reporting on global SDG indicator 6.5.2 to UNECE and UNESCO in 2020
  - 20% of transboundary basins (river and lake basins and aquifers) with an operational arrangement for water cooperation





Water Quality Monitoring

Water Quality Monitoring

Water Quality Monitoring

- Surface Water Quality
- Ground Water Quality
- Waste Water Quality

Key Parameters for Water Quality Monitoring

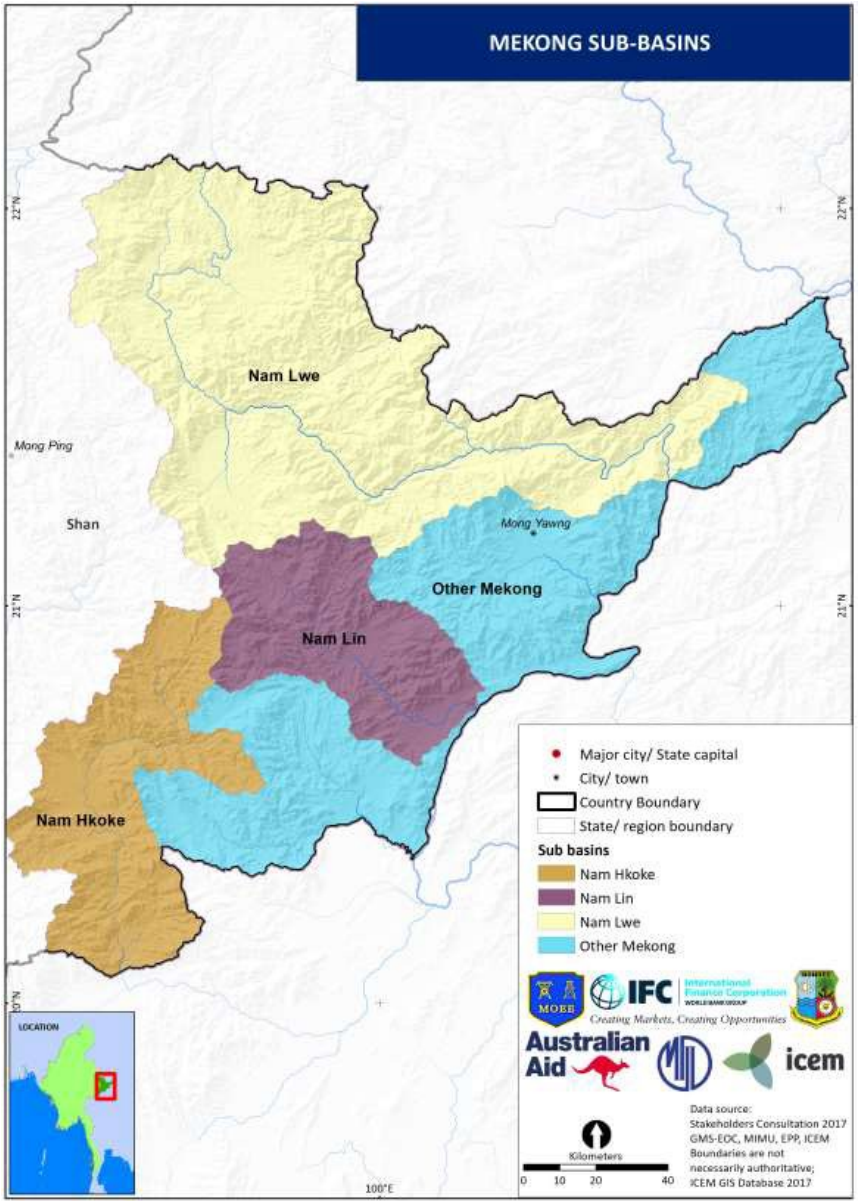
- pH
- Temperature
- Dissolved Oxygen (DO)
- Oxidation Reduction Potential (ORP)
- Turbidity
- Salinity
- Total Dissolved Solids (TDS)
- Electrical Conductivity (EC)
- Heavy Metals

Equipment for Water Quality Monitoring

- Multi-Parameter Water Quality Meter (U-54G)
- Photometer Spectro Direct
- Heavy Metal Digital Test Kit (Lamotte Smart-3 Colorimeter)
- Arsenic Test Kit (Lovibond)
- Trace2O Metalyser / Metalometer
- Oil Content Analyzer
- COD Thermo reactor
- DR-1900 Spectrophotometer
- Atomic Absorption Specterometer (AAS)

Water Quality Assessment at Mekong River and Its Branches in Shan State

Mekong Basin in Myanmar



- 2.7% of the Mekong basin lies within Myanmar
- border with PRC, and LAO PDR
- The tributaries of the Mekong Basin in Myanmar feed into the Mekong River along those borders, contributing 17.6 km3 annually to the annual average flow in the River of 475 km3 - accounting for approximately 3.7% of total annual average flow.

Project for Water Quality Assessment at Mekong River and Its Branches in Shan State (2019-2020)

Location Map of Water Quality Sampling Points

No.	Parameters
1	5 day BOD
2	Arsenic
3	Cadmium
4	Copper
5	Cyanide
6	Iron
7	Lead
8	Mercury
9	Nickel
10	Nitrate-Nitrogen
11	Phosphate
12	Total Suspended Solids

No.	Parameters
1	pH
2	pH (mV)
3	Oxidation Reduction Potential
4	Electrical Conductivity
5	Turbidity
6	Dissolved Oxygen
7	Total Dissolved Solids
8	Salinity
9	Seawater Specific Gravity
10	Water Depth
11	Water Temperature

Location Map of Water Quality Sampling Points

- Mekong River, Kyaing latt Township, Eastern Shan State
- Nam Lway Creek, Mong Yu Township, Eastern Shan State
- Nam Linn Creek, Tarlay Township, Eastern Shan State
- Maehoke Creek, Tarchileik Township, Eastern Shan State
- Golden Triangle Area, Tarchileik Township, Eastern Shan State

Location Map of Water Quality Sampling Points

- The Physical Water Quality of Mekong River is generally good for living aquatic ecosystem.
- Resulted Values of some parameters are above the surface water quality standards.
- Disposal of Wastes from some sectors such as agriculture, mining, water way transportation, domestic wastes from households and tourism.

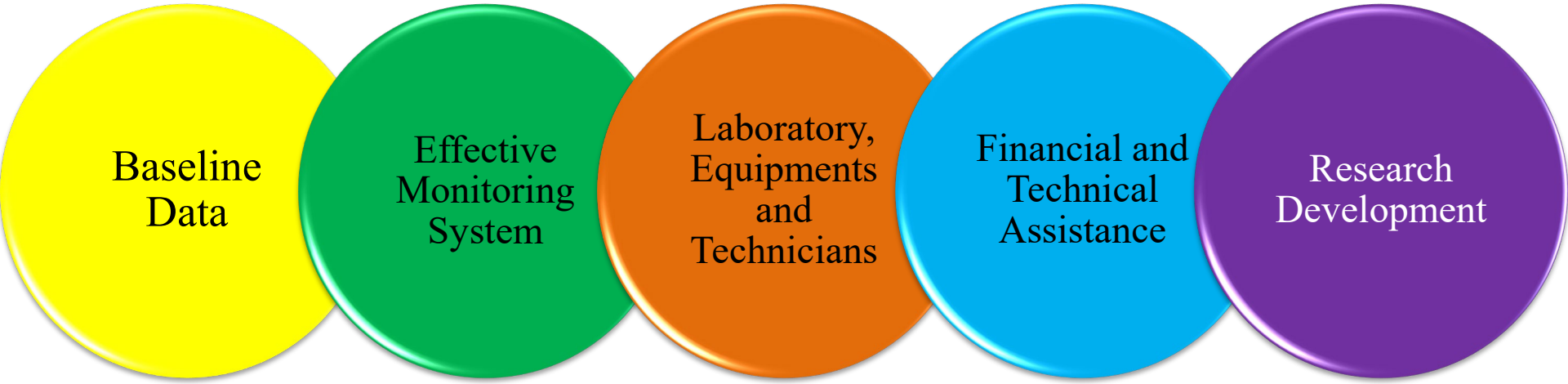
Water Quality Monitoring Equipment and Accessories

No.	Analyzers and Accessories
1.	BOD Measurement System
2.	Water Flow Meter
3.	Multi-Parameter Water Quality Meter (Onsite) U53G
4.	Water Quality Spectrophotometer
5.	Chemical Reagent
6.	Computer, Printer, Copier, Camera
7.	GPS Device
8.	Atomic Absorption Spectrophotometer(AAS) (including its accessories and regents)

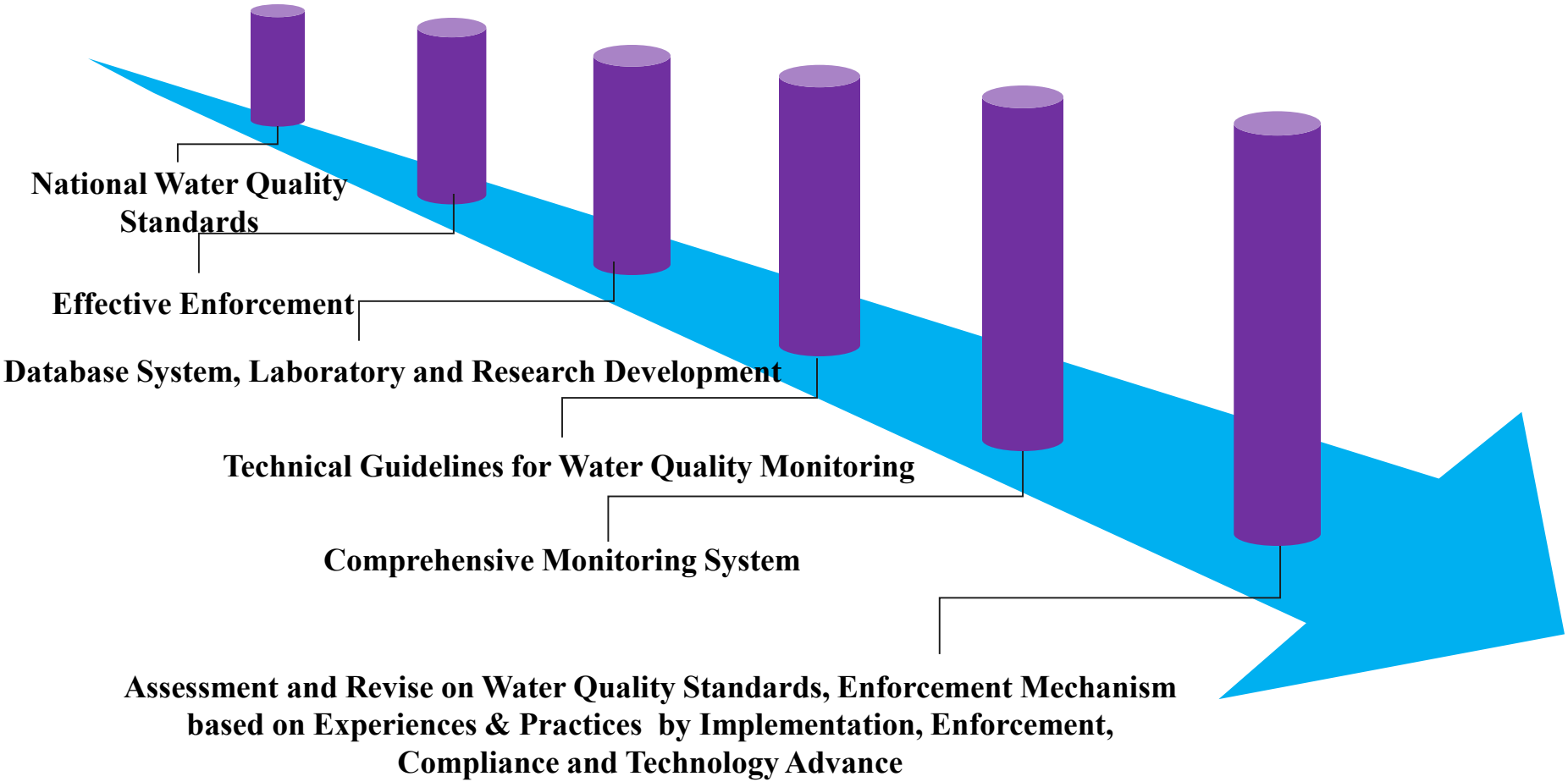
Challenges, Needs and Gaps, Way Forward

Challenges for Water Environment Governance

Needs and Gaps for Water Environment Governance



Way Forward for Water Environment Governance



Thank you for your time and kind attention!