

S&T Water Environment Roadmap 2022-2028

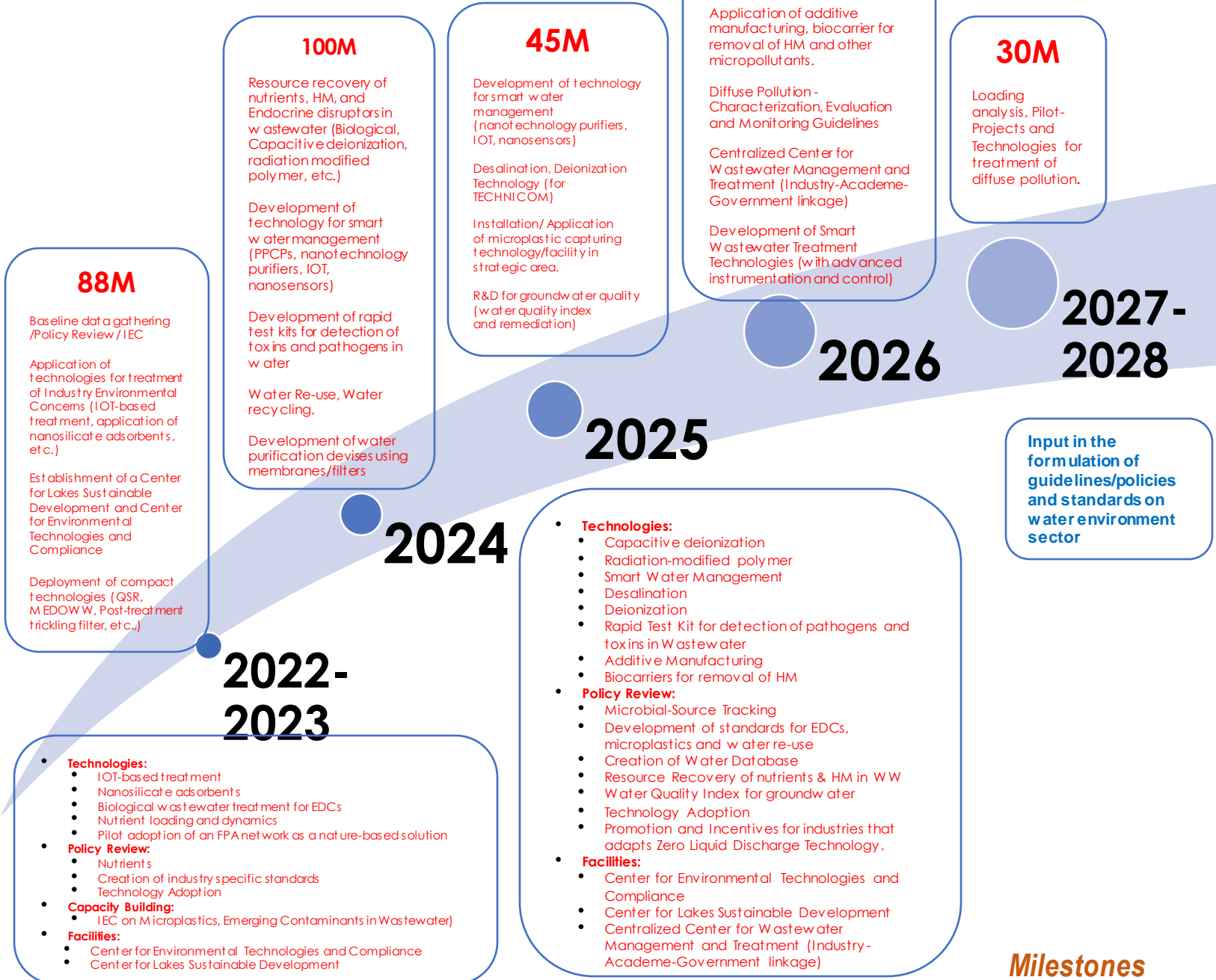
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Overall Strategies

- Human Resource**
 - Capacity building / capabilities of institutions on water quality sensors and use of equipment on HM monitoring.
- R&D Technologies**
 - Development of Clean technologies for wastewater treatment, management, and reuse. (Microplastic capturing technology, Microbial Fuel Cells, Zero-Liquid Discharge, membrane fabrication, smart water management, rapid test kits for detection of toxins and pathogens in WW)
 - Pilot Demonstration of treatment / rehabilitation / remediation technologies (IOT-based treatment, nanosilicate adsorbents, resource recovery (nutrients, HM) using biocarriers or radiation-modified polymer, desalination, deionization)
- Facilities / Services**
 - Establishment of a Center for Lakes Sustainable Development
 - Establishment of a Center for Environmental Technologies and Compliance
 - Establishment of a Centralized Center for Wastewater Management and Treatment (Industry-Academe-Government linkage)
- S&T Policies**
 - Review and formulation of guidelines / policies / standards (water quality index for groundwater, Industry Specific Effluent Standards, EDCs, Microplastics, Diffuse Pollution, Water Reuse, Total Maximum Daily Load, Rain tax)
 - Adoption and implementation of approved policies

Possible Solutions



88M

- Baseline data gathering /Policy Review / IEC
- Application of technologies for treatment of Industry Environmental Concerns (IOT-based treatment, application of nanosilicate adsorbents, etc.)
- Establishment of a Center for Lakes Sustainable Development and Center for Environmental Technologies and Compliance
- Deployment of compact technologies (QSR, MEDOW, Post-treatment trickling filter, etc.)

100M

- Resource recovery of nutrients, HM, and Endocrine disruptors in wastewater (Biological, Capacitive deionization, radiation modified polymer, etc.)
- Development of technology for smart water management (PPCPs, nanotechnology purifiers, IOT, nanosensors)
- Development of rapid test kits for detection of toxins and pathogens in water
- Water Re-use, Water recycling.
- Development of water purification devices using membranes/filters

45M

- Development of technology for smart water management (nanotechnology purifiers, IOT, nanosensors)
- Desalination, Deionization Technology (for TECHNICOM)
- Installation/ Application of microplastic capturing technology/facility in strategic area.
- R&D for groundwater quality (water quality index and remediation)

90M

- Application of additive manufacturing, biocarrier for removal of HM and other micropollutants.
- Diffuse Pollution - Characterization, Evaluation and Monitoring Guidelines
- Centralized Center for Wastewater Management and Treatment (Industry-Academe-Government linkage)
- Development of Smart Wastewater Treatment Technologies (with advanced instrumentation and control)

30M

- Loading analysis, Pilot-Projects and Technologies for treatment of diffuse pollution.

Vision
Sustained ecological functions & services of water ecosystems

- Enhanced industry compliance on wastewater quality policies / regulations
- Upgraded the quality of water ecosystems in the country

2027-2028

Input in the formulation of guidelines/policies and standards on water environment sector

2025

2026

2024

2022-2023

- Technologies:**
 - Capacitive deionization
 - Radiation-modified polymer
 - Smart Water Management
 - Desalination
 - Deionization
 - Rapid Test Kit for detection of pathogens and toxins in Wastewater
 - Additive Manufacturing
 - Biocarriers for removal of HM
- Policy Review:**
 - Microbial-Source Tracking
 - Development of standards for EDCs, microplastics and water re-use
 - Creation of Water Database
 - Resource Recovery of nutrients & HM in WW
 - Water Quality Index for groundwater
 - Technology Adoption
 - Promotion and Incentives for industries that adapts Zero Liquid Discharge Technology.
- Facilities:**
 - Center for Environmental Technologies and Compliance
 - Center for Lakes Sustainable Development
 - Centralized Center for Wastewater Management and Treatment (Industry-Academe-Government linkage)

Overall Outcomes

- Human Resource**
 - PhD, MS, BS students graduated
 - Established pool of experts on water
 - Trained personnel; stakeholders
- R&D Technologies**
 - Clean Technologies for water /wastewater management
 - Pilot-tested/deployed/ Commercialized technologies
- Facilities / Services**
 - Established centers to address water pollution
- S&T Policies**
 - Inputs to DAO 2016-08, and updating of the Philippine Clean Water Act (RA 9275)
 - Drafted NRDP-PCWP to include a Central database on wastewater technologies

Milestones