

Wastewater Management in the Philippines

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Wastewater Management

What is the existing situation?



- In the Philippines, only 10% of wastewater is treated while 58% of the groundwater is contaminated;
- Only 5% of the total population is connected to a sewer network. The vast majority uses flush toilets connected to septic tanks;
- Since sludge treatment and disposal facilities are rare, domestic wastewater is discharged without treatment;

* UNICEF & WHO Study



- According to the UNIDO study, approximately 2,000 cubic meters of solvent wastes, 22,000 tons of heavy metals, infectious wastes, biological sludge, lubricants, and intractable wastes, as well as 25 million cubic meters of acid/alkaline liquid wastes are improperly disposed of annually in Metro Manila alone.



- Data from the Environmental Management Bureau (EMB), Philippines showed that out of the 127 freshwater bodies being sampled, 47% percent were found to have good water quality. However, 40% of those sampled were found to have only fair water quality, while 13% showed poor water quality.



- It is estimated that in 2025, water availability will be marginal in most major cities and in 8 of the 19 major river basins in the country.
- Waterborne diseases remain a severe public health concern in the country.
- About 4,200 people die each year due to contaminated drinking water.

*Joint Monitoring Program for Water Supply and Sanitation of UNICEF and WHO



Major Sources of Pollution

- Inadequately treated domestic wastewater or sewage (48%)
- Agricultural wastewater (37%)
- Industrial wastewater (15%)
- Non-point sources such as rain and groundwater run-offs from solid waste or garbage deposits which is also known as leachate

*Greenpeace's Report: The State of Water Sources in the Phils.



Which areas of the country are most affected?

- Regions with unsatisfactory ratings for their water quality criteria include the National Capital Region (NCR) or Metro Manila, Southern Tagalog Region (Region IV), Central Luzon (Region III), and Central Visayas (Region VII)
- Ilocos Region (Region I) was found to be one of the highest contributors to nitrate contamination

Philippine Environment Monitor (PEM)



- Some estimates point to household wastewater as contributing as much as 60% of water pollution
- About 80% of water provided to households becomes wastewater

* Philippine Environment Monitor (World Bank 2003)



- Economic losses because of poor sanitation – Php 78 billion annually
- Under the Beach Ecowatch Program of the DENR-EMB, 75 frequently visited beaches by both local and foreign tourists are being monitored; only 21 passed the DENR Standards while 51 failed and 3 are under assessment
- Under the DENR-EMB's Tapwatch Program, it was determined that the water from 41% of the total sites/wells tested for potability were found no longer potable



- In Metro Manila, only 11% of the total population is directly/indirectly connected to a sewerage system, 85% are served by over 2 million ill-maintained septic tanks and 4% of the population has no toilet.



Septic tanks are prevalent:

Manila: > 85%

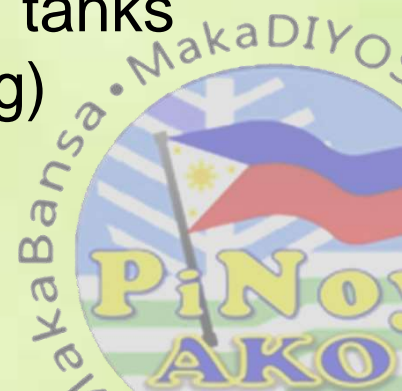
Philippines: >70%



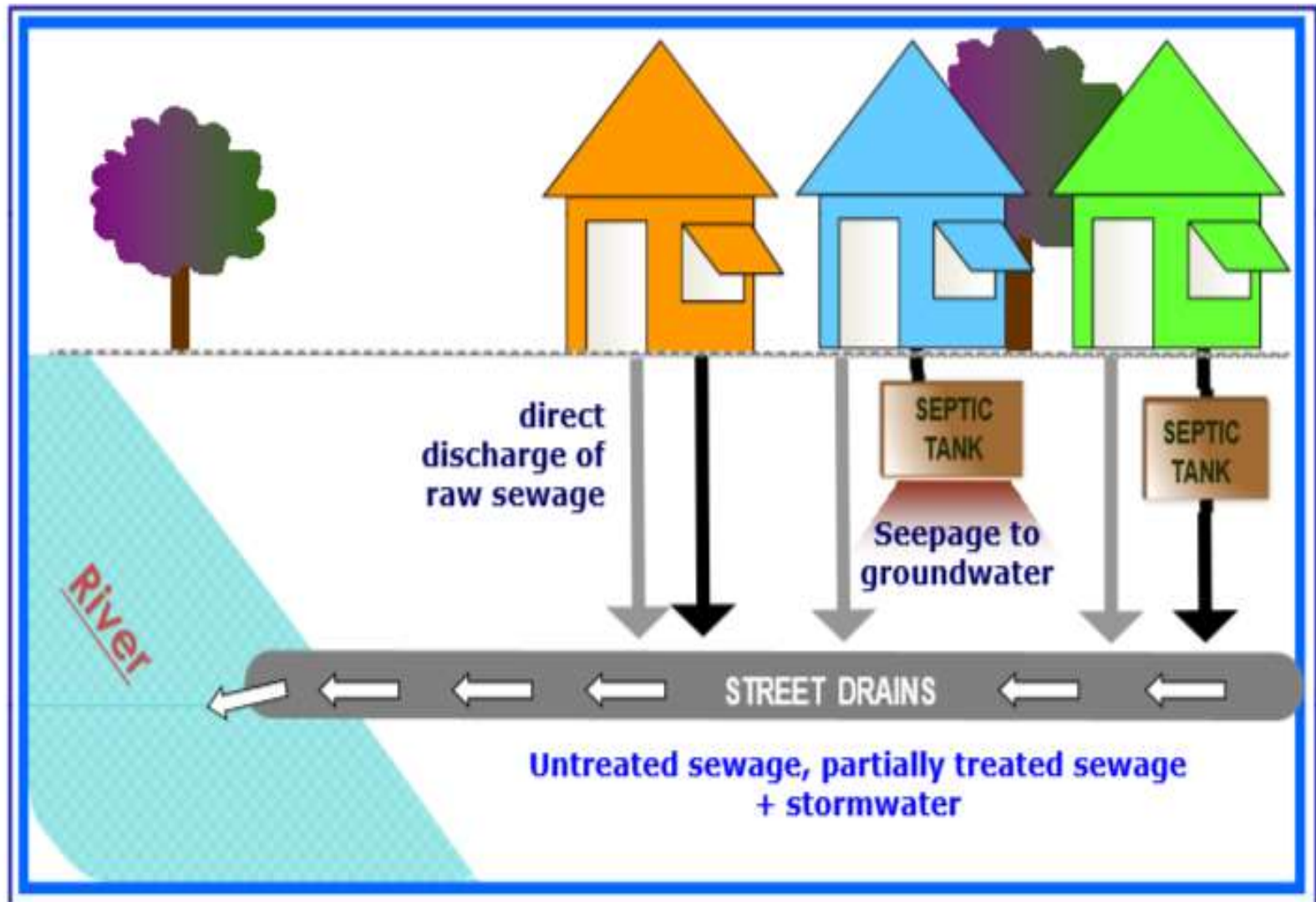
General conditions: undersized, many are single-chambered, commonly the bottom is “unlined”, and regular desludging is not practiced. Most of the time, discharge is directed to drainage canals

In Metro Manila, it was estimated that septic tanks provide only 10% treatment (without desludging)

(ref: Manila Third Sewerage Project Feasibility Study)



Existing sanitation infrastructure for urban areas in the Philippines



SEPTAGE MANAGEMENT SYSTEMS

- There are three (3) operating septage treatment plants in Metro Manila, with a combined capacity of around 1,700 cubic meters/day (serving around 440,000 households).



SEPTAGE MANAGEMENT SYSTEMS

- There are seven (7) new septage treatment plants in Sarangani (6) and Davao Del Sur (1). Each treatment plant serves the municipality where it is located.
- Seven (7) Water Districts are now in different stages of project planning/development for septage management (Dumaguete, Metro Cebu, Cabanatuan, Baliwag, San Pablo, Davao, Zamboanga)



SEPTAGE MANAGEMENT SYSTEMS

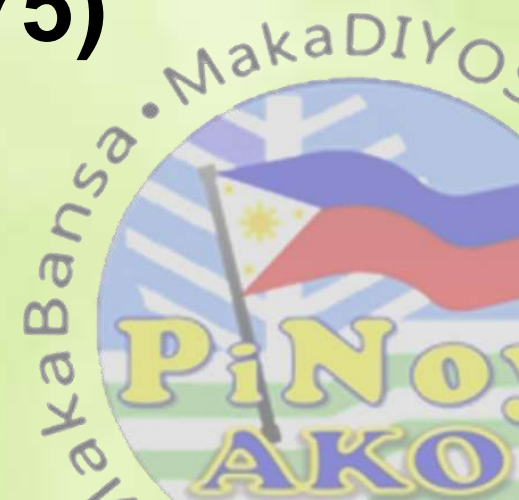
- In Region 3, the Subic Bay Freeport Zone (SBFZ), CDC Special Economic Zone, Authority of the Freeport Area of Bataan (AFAB) and privately-run economic zones have installed sewage/wastewater treatment facilities.
- One (1) Sewage Treatment Plant (STP) constructed by a Water District (Baliuag, Bulacan)
- One (1) pilot STP constructed under the Marilao-Meycauayan-Obando River System (MMORS) Water Quality Management Area (WQMA)



The Supreme Court Decision mandates the Local Water Utilities Authority (LWUA) in coordination with the DENR “to provide, install, operate and maintain sewerage and sanitation facilities and the efficient and safe collection, treatment and disposal of sewage in the provinces of Laguna, Cavite, Bulacan, Pampanga and Bataan where needed at the earliest possible time”. The LWUA has been given until Sept. 30, 2011 to submit the plans for the water districts which must be fully implemented by Dec. 31, 2020.



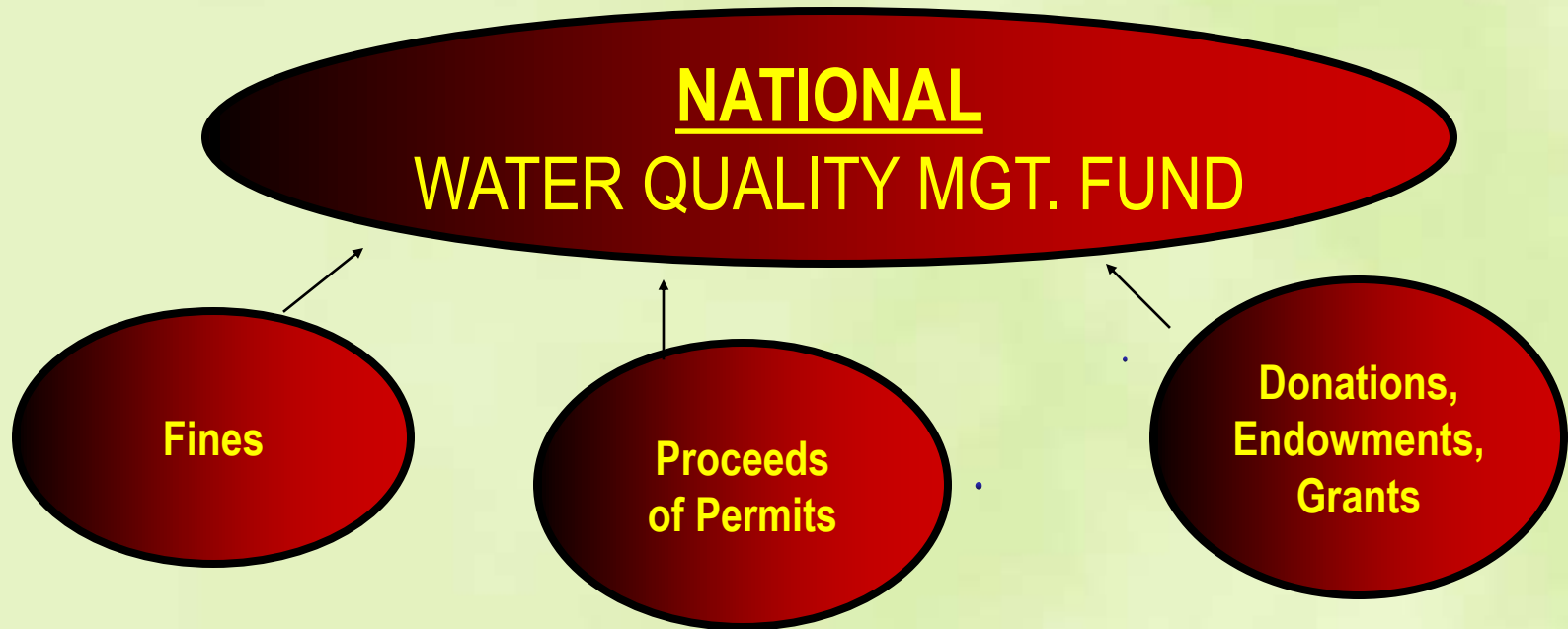
**Mandates of Local Government
Units (LGUs) and Water Service
Providers under the Clean Water
Act of 2004
(Republic Act 9275)**



Declaration of Policy

- The State shall pursue a policy of economic growth in a manner consistent with the protection, preservation and revival of the quality of the country's fresh, brackish and marine waters. (Sec. 2)
- One objective of the Clean Water Act is to formulate a holistic national program of water quality management that recognizes that water quality management issues cannot be separated from concerns about water sources and ecological protection, water supply, public health and quality of life. (Sec. 2, c)

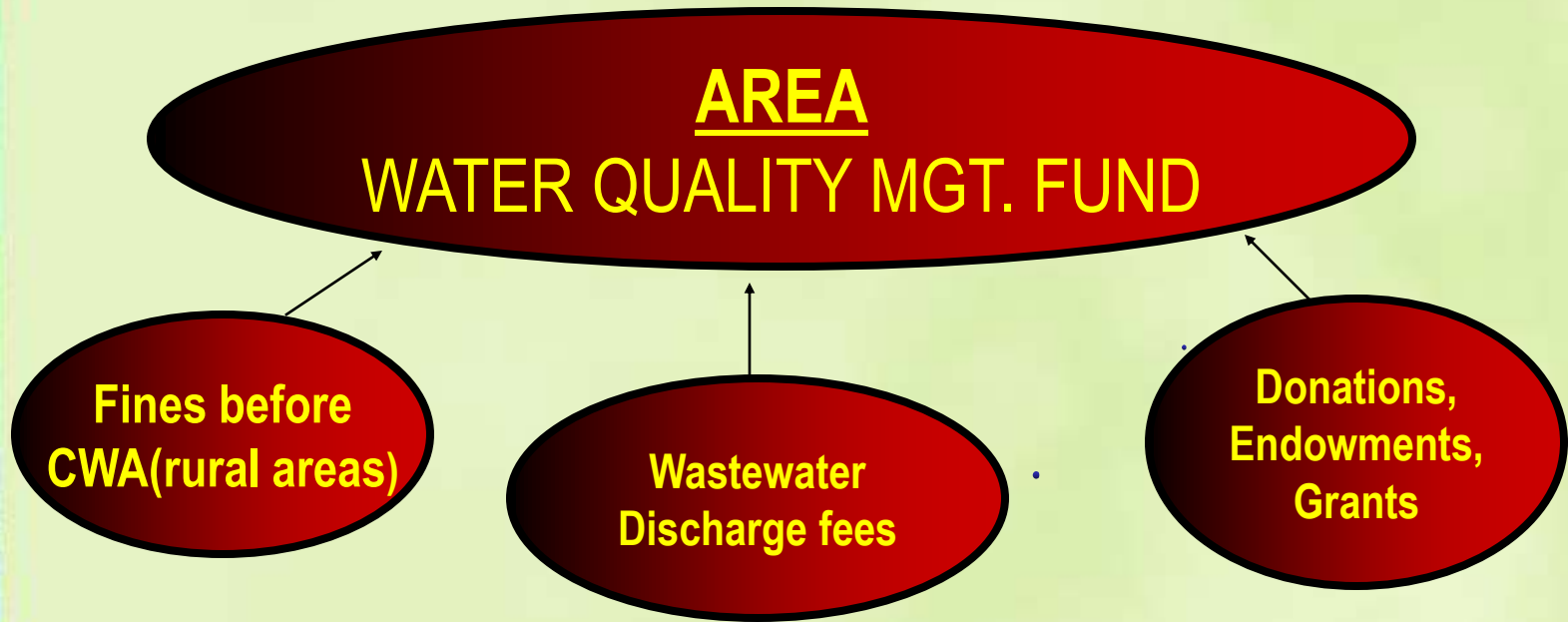
Funding Mechanism



Purpose:

- ✓ To finance containment, clean-up operations,
- ✓ restoration & rehabilitation of affected areas
- ✓ Support research, enforcement, monitoring
- ✓ Provide technical assistance, info, rewards & incentives

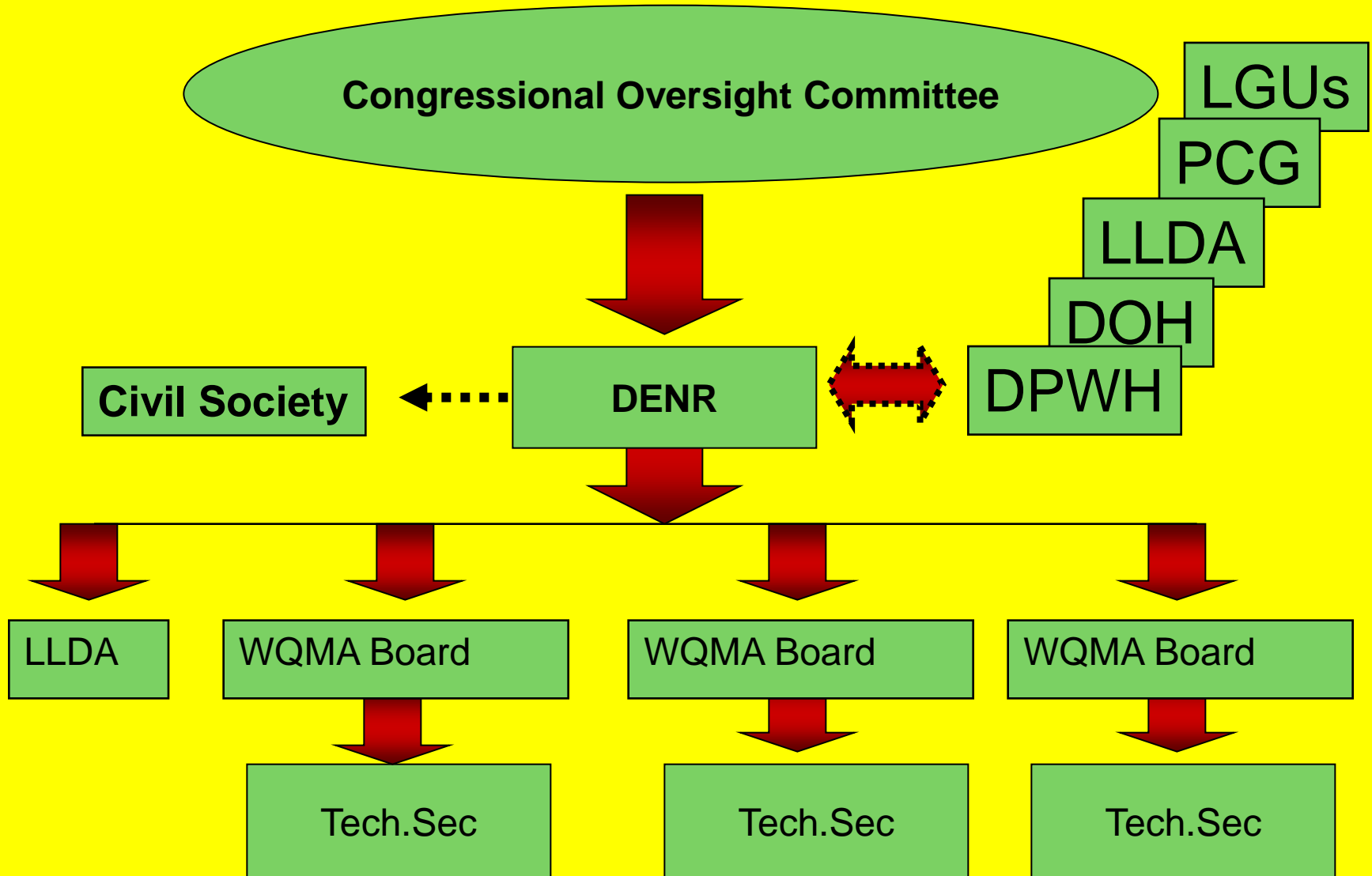
Funding...



Purpose:

- ✓ To maintain, upkeep water bodies
- ✓ To finance wastewater facilities (repair)_
- ✓ Operational expenses of GB
- ✓ Provide technical assistance, info, rewards & incentives

INSTITUTIONAL LINKAGES

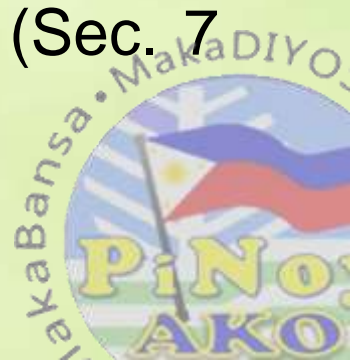


- Under the National Pollution Control Law (PD 984) which was repealed by the Clean Water Act, discharge of untreated wastewater to any waterbody is prohibited.
- Industrial wastewater is being regulated by EMB through the permitting system and industries are required/mandated to treat wastewater through the installation of wastewater treatment facility.



National Sewerage and Septage Management Program

The national sewerage and septage management program shall include a priority listing of sewerage, septage and combined sewerage-septage projects for LGUs based on population density and growth, degradation of water resources, topography, geology, vegetation, programs/ projects for the rehabilitation of existing facilities and such other factors that the DENR Secretary may deem relevant to the protection of water quality. (Sec. 7 and Sec. 8)



LGUs Role Under the Clean Water Act

- LGUs shall share the responsibility in the management and improvement of water quality within their territorial jurisdictions. (Sec. 20)
- Local Government Units are the key players in the Water Quality Management Areas designated by DENR in accordance with Sec. 5 of the Clean Water Act and its IRR



Roles of the Agencies

DENR – provide specific environmental criteria & data for the prioritization of sanitation, sewerage, septage management and combination of different systems and projects

MWSS and LWUA - provide the responsibilities of concessionaires and water districts in sewerage, septage and sanitation management.

DOH - formulate guidelines and standards for the collection, treatment and disposal of sewage including guidelines for the establishment and operation of centralized sewage treatment system.



The League of Municipalities/ Cities/ Provinces

- shall contribute specific inputs reflecting the interests of Local Government Units (LGUs).

LGUs - appropriate the necessary land for the construction of the sewage and/or septage treatment facilities in accordance with the Local Government Code. It shall also submit to DPWH a priority listing of their projects

LGUs and Septage Management

- Each LGU, through the enactment of an ordinance, shall appropriate the necessary land including the required rights-of-way/road access to the land for the construction of the sewage and/or septage treatment facilities in accordance with the Local Government Code. (Sec. 7)
- It may enact ordinances adjusting local property taxes or imposing a service fee system to meet necessary expenses for the operation and maintenance of sewerage treatment or septage management facility servicing their area of jurisdiction. (Sec. 7, CWA)

Sewerage and Septage Management

- For LGUs not considered as highly urbanized cities (HUCs) , the DPWH in coordination with the DENR, DOH and other concerned agencies, shall employ septage or combined sewerage-septage management system. (Sec. 8, CWA)



Water Service Providers and Sewerage/Septage Management

- Within five (5) years following the affectivity of the Clean Water Act (2004), the agency vested to provide water supply and sewerage facilities and/or concessionaires in Metro Manila and other highly urbanized cities (HUCs) as defined in Republic Act No. 7160, in coordination with LGUs, shall be required to connect the existing sewage line found in all subdivisions, condominiums, commercial centers, hotels, sports and recreational facilities, hospitals, market places, public buildings, industrial complex and other similar establishments including households to available sewerage system.

Water Service Providers and Sewerage/Septage Management

- In the case of HUCs, non-HUCs and LGUs where water districts, water utilities and LGU water works have already been constituted and operational, the water supply utility provider shall be responsible for the sewerage facilities and the main lines pursuant to P.D. No. 198 and other relevant laws.
- In areas where there are no existing facilities, the LGUs, water districts or water utilities may adopt septage management program or other sanitation alternatives (Sec. 8.6, IRR of CWA)

Incentive Schemes

- An incentive scheme is hereby provided for the purpose of encouraging LGUs, water districts, enterprises, or private entities, and individuals, to develop or undertake an effective water quality management.
- Government financial institutions such as the Development Bank of the Philippines, Land Bank of the Philippines, Government Service Insurance System, and such other government institutions providing financial services shall accord high priority to extend financial services to LGUs, water districts, enterprises, or private entities engaged in sewage collection and treatment facilities.

Initiatives on Wastewater Management





Wastewater Treatment Facility of the Authority of the Freeport Area of Bataan (AFAB) located in Mariveles, Bataan

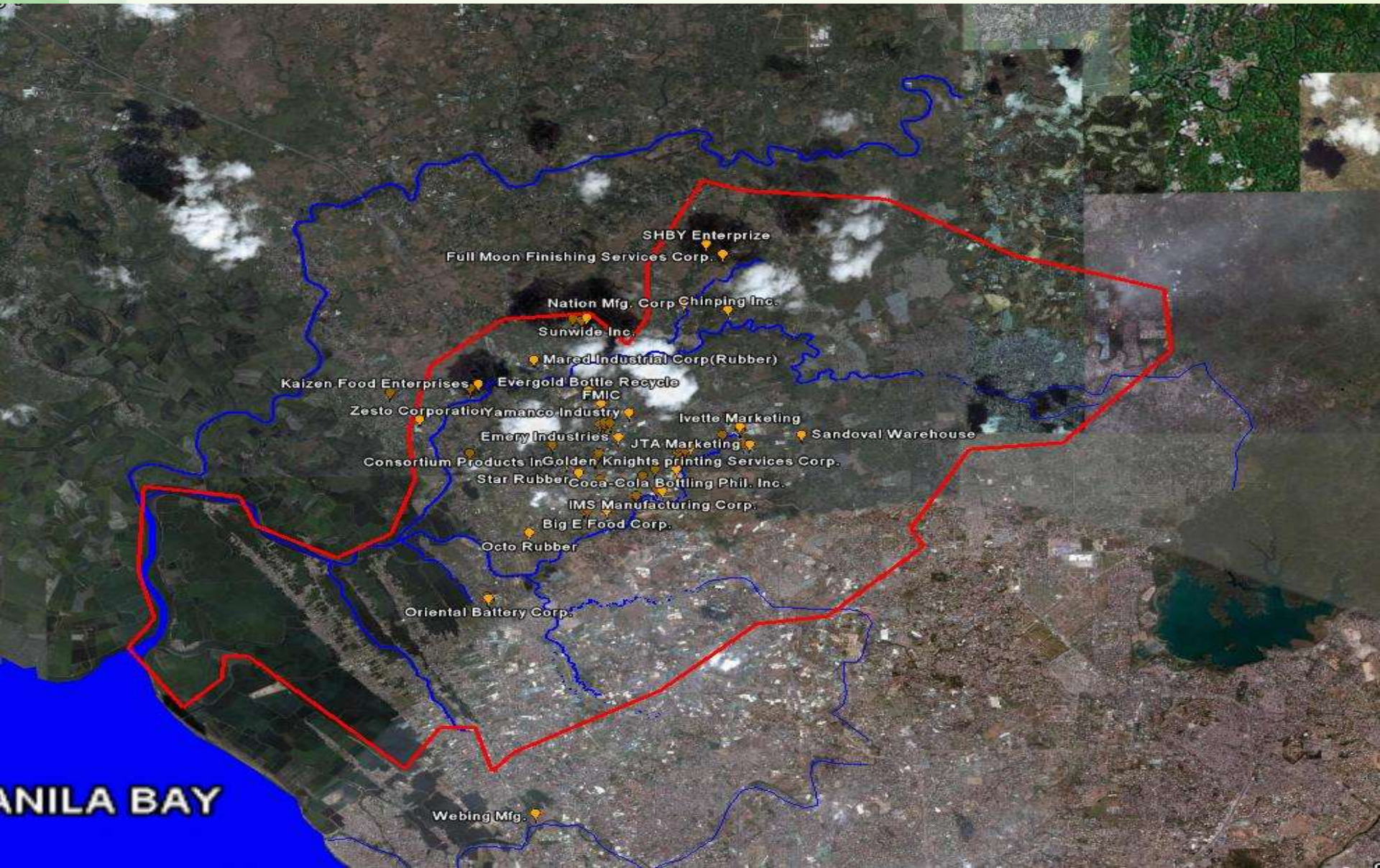
Septage Management Program in Region 3



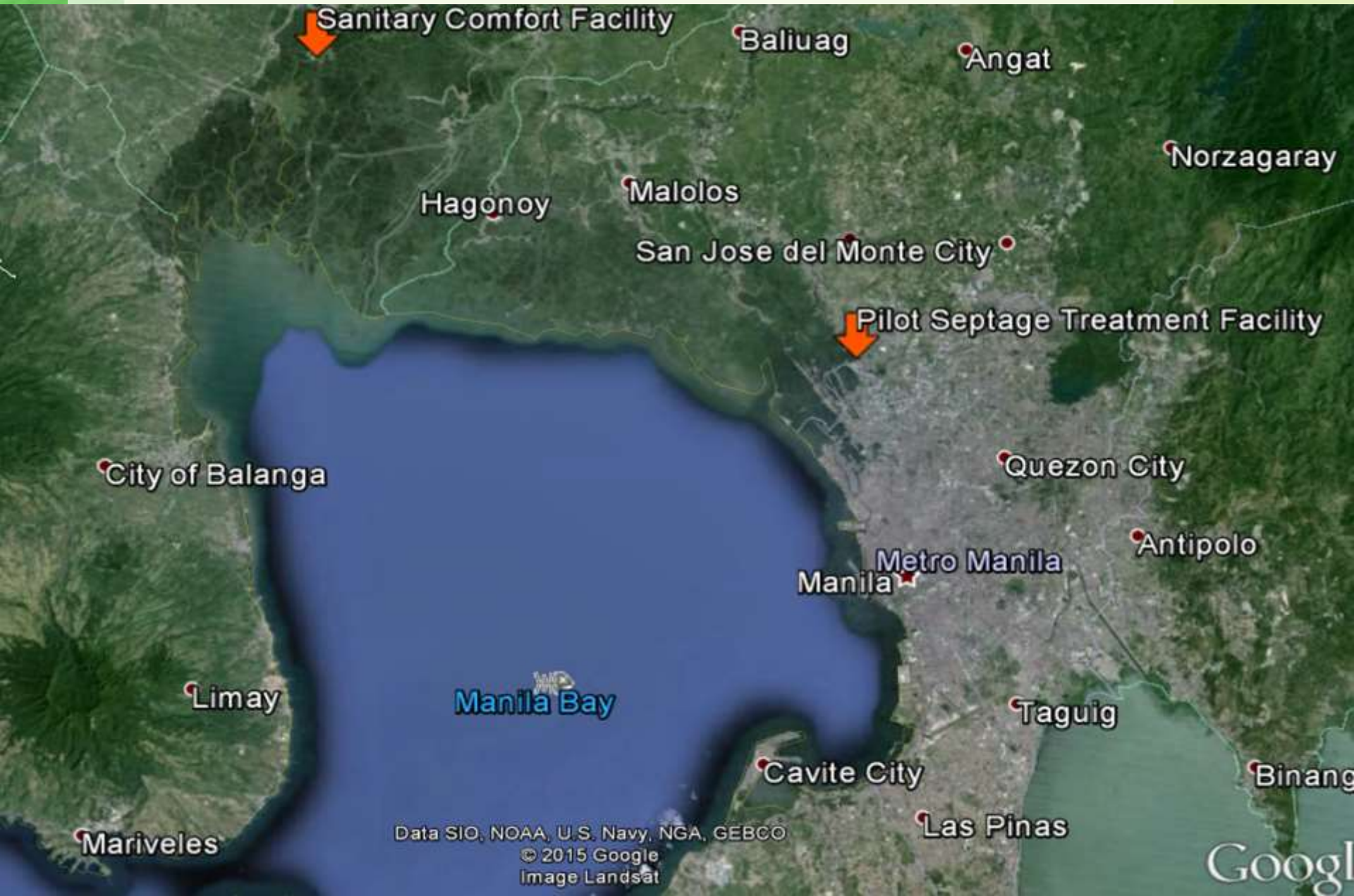
In Bataan, a MOA to launch the Province-wide Septage Management Program was signed by (*From Left to Right*) Mrs. Genevieve Soliman, wife of Mr. Dennis Soliman (owner of Soliman E.C. Septic Tank Disposal); Dir. Lormelyn Claudio, Regional Director of DENR-EMB R3; Hon. Jose C. Villapando, Sr., Board Member of Bataan; Chm. Deogracias Custodio, Chairman and Administrator of AFAB ; Mr. Renato Jose, Jr., Jollibee Foods Corp. Specialist.

It was witnessed by representatives from the LGUs of Bataan.

The Marilao-Meycauayan-Obando River System - Water Quality Management Area (MMORS-WQMA)



EMB R3 Wastewater Management Projects



**The Pilot Septage
Treatment Facility at
Meymart Market, Brgy.
Zamora, City of
Meycauayan, Bulacan**





The treatment facility was designed to treat 200 cubic meters of septage per day which is equivalent to 400 serviced households. This is to demonstrate the reduction of pollution loading in terms of Biochemical Oxygen Demand (BOD) along the Meycauayan river. It was conceptualized to address the 70% pollution load being contributed by households at the Meycauayan-Marilao-Obando River System.



Sasmuan
Sanitary Comfort
Facility located in
Brgy. Sta.
Monica,
Sasmuan,
Pampanga



Inauguration and Turn-over Ceremony of the Sasmuan Sanitary Comfort Facility

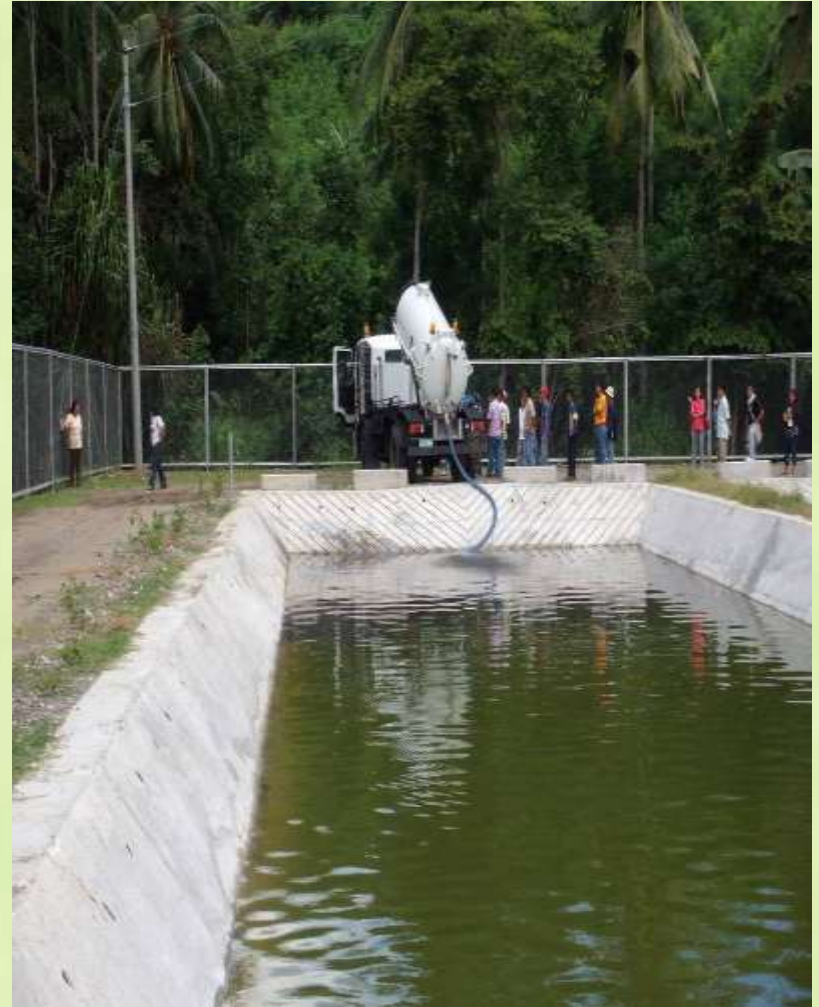
Manila Water Septage Treatment Facilities: San Mateo Septage Treatment Plant



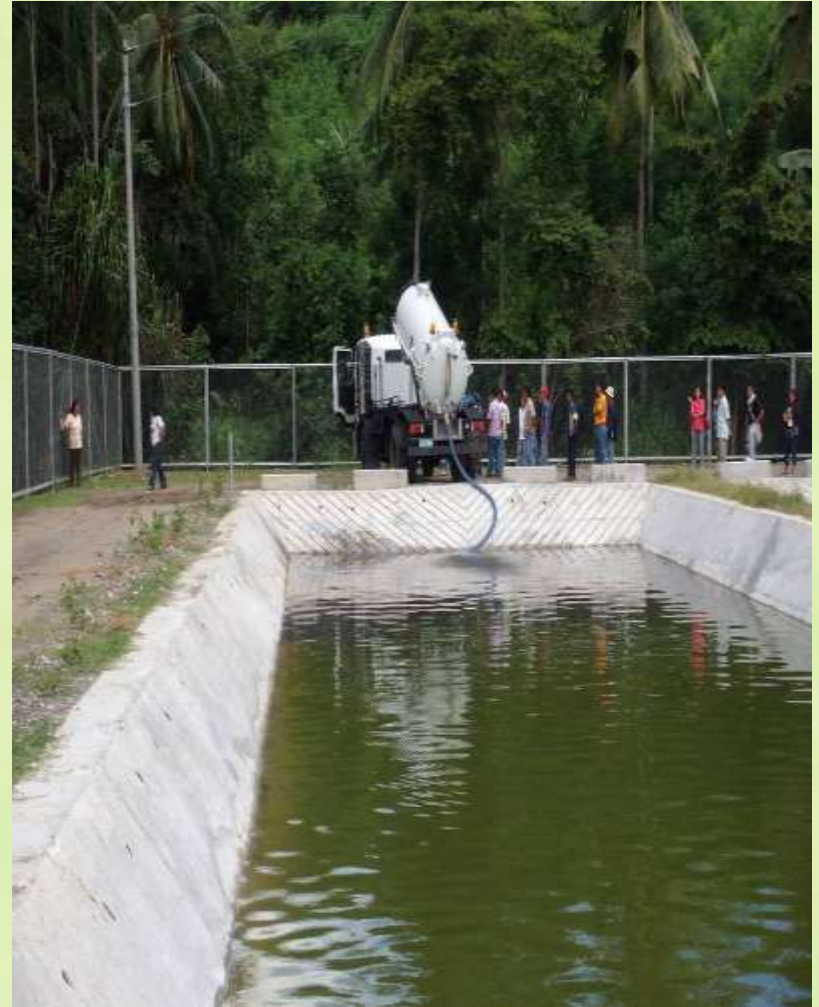
Manila Water Septage Treatment Facilities: San Mateo Septage Treatment Plant



Septage Treatment Plants in Sarangani and Davao Del Sur



Septage Treatment Plants in Sarangani and Davao Del Sur



UP SEWAGE TREATMENT PLANT

Operated by Manila Water Co. Inc. (MWCI)



BAGUIO SEWAGE TREATMENT PLANT

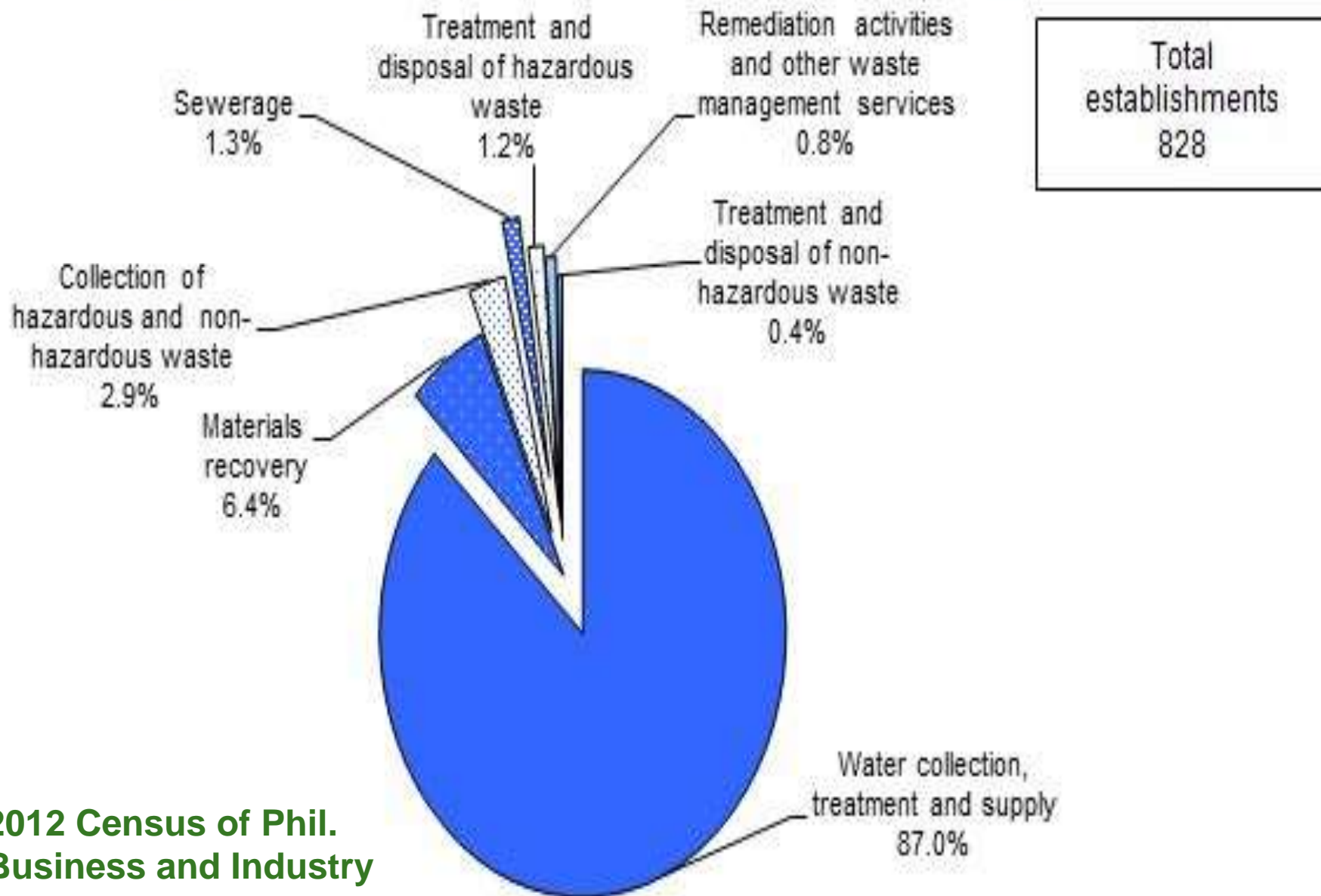
Oxidation Ditch System. Funded by a grant from the Japan International Cooperation Agency (JICA)



Investments in Sanitation, Sewerage and Wastewater Management

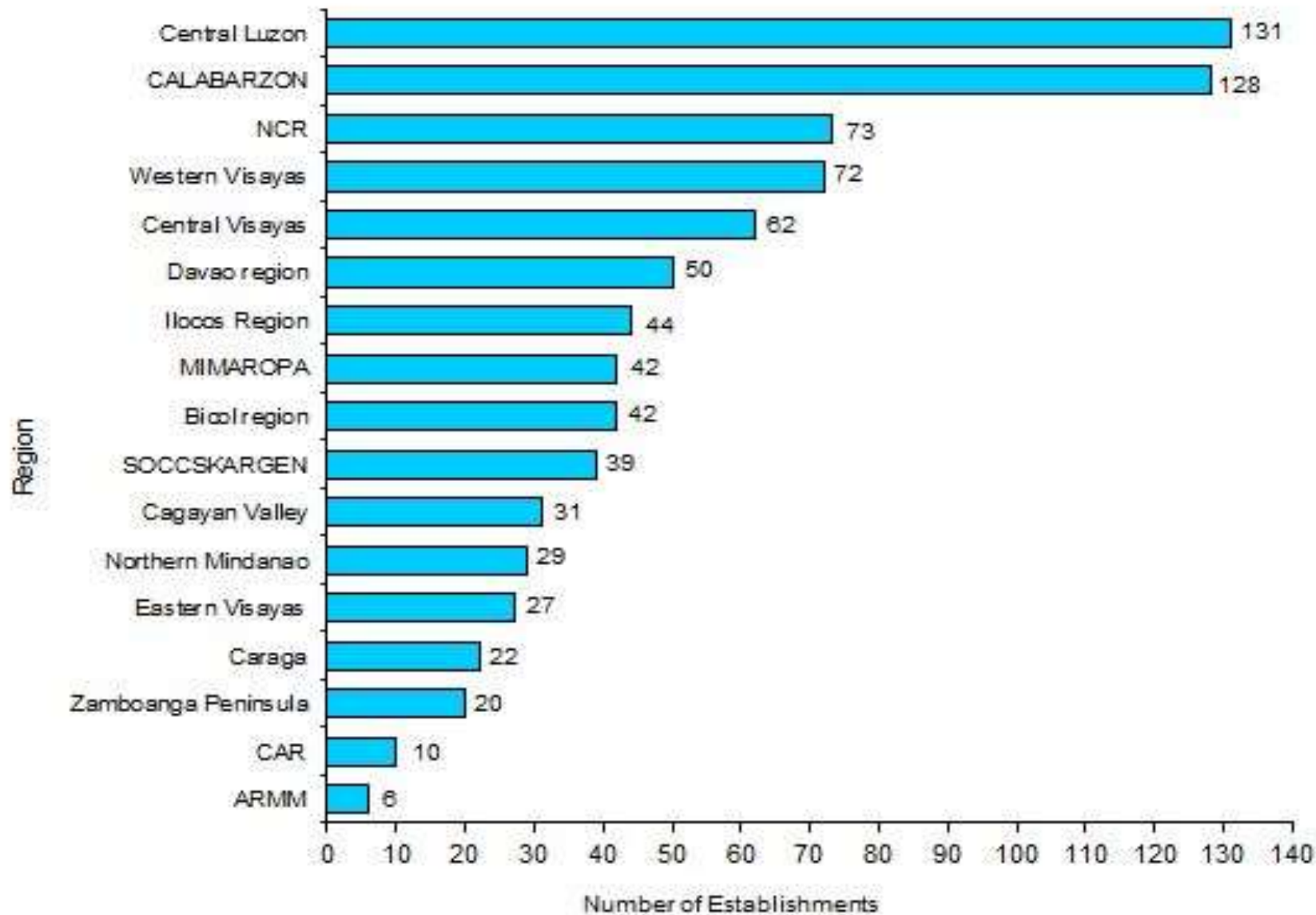


FIGURE 1 Distribution of All Establishments for Water Supply; Sewerage, Waste Management and Remediation Activities Sector by Industry Sub-class: 2012



**2012 Census of Phil.
Business and Industry**

FIGURE 2 Regional Distribution of All Establishments for Water Supply; Sewerage, Waste Management and Remediation Activities Sector: 2012



'Free' Septic Tank Desludging Program



Manila Water

SANITASYON PARA SA BARANGAY
FREE Septic Tank Desludging Program
Register with your Barangay

PREVENT SEPTIC TANK CLOGGING AND
HELP PROTECT THE ENVIRONMENT

- Scheduled every 5 years for non-sewered communities
- Service does not include opening and sealing of septic tanks



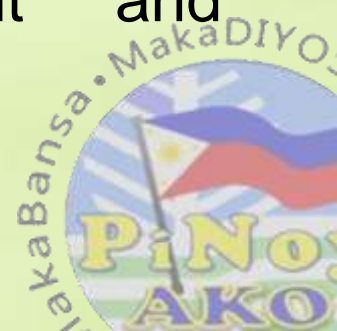
Sagana at Ligtas na Tubig sa Lahat (SaLin Tubig) Project

- Aims to provide water supply systems to the 455 waterless municipalities all over the country,
- Led by the National anti-Poverty Commission in cooperation with DOH and the DILG,
- Aims to increase water service for the waterless population by 50%, reduce the number of waterborne and sanitation-related diseases by 20%, improve access of the poor to sanitation services by at least 10% and establish sustainable operation of all facilities.



LISCOP Project

- A 15 – year development undertaking of the LLDA funded by the WB and the Netherlands to improve the environmental quality of the Laguna Lake and its watershed through a “ solution-in-my-backyard” approach.
- The project assists LGUs in implementing environmental sub-projects such as material recovery facilities (MRFs), conversion of dumpsites into landfills, watershed management and wastewater treatment.



- In Sta. Cruz, Laguna; an initiative supported by LISCOP is the construction and operation of a Decentralized Wastewater System (DEWATS) that treats wastewater from the town's slaughterhouse prior to discharge into the river;
- Biogas is also harvested from the treatment facility that is used by the workers in cooking their food and boiling water.



Philippine Sanitation Alliance (PSA)

- A 4-year program of the USAID which was established in October 2007 and ended in September 2011;
- The project helped promote some of the provisions of RA 9275 by protecting biodiversity and reducing health risks by promoting the adoption of low cost sanitation technology, helping package projects and access to financing as well as the promotion of good hygiene;
- One of its major project is the Dumaguete Market and Septage Management Program



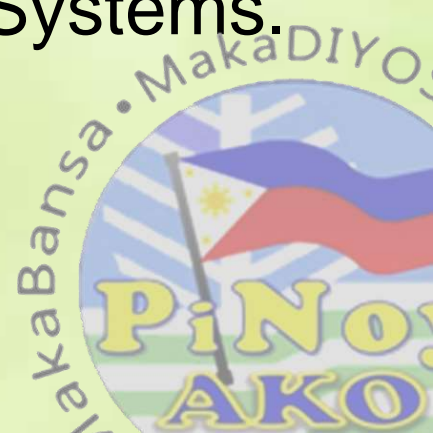
Dumaguete City - Public Market and Septage Treatment Plant

Dumaguete City - home to the Philippines' first government-financed septage management system that became a model for other cities and towns who were motivated to initiate their own systems in their respective communities.



➤ The septage management facility was able to sustain itself through the user's fees, as well as paved the way for the government of Dumaguete City to regulate private desludging service providers.

➤ Facilities developed and planned for the City was a low-cost septage treatment lagoon and Decentralized Wastewater Treatment Systems.



Dumaguete City- Septage Treatment Plant

Dumaguete's (STP) was designed to process all of the septage generated by the LGU from both households and business establishments.

The facility has a total area of 2.0 hectares and employs 6 desludging trucks.



Dumaguete City Public Market

- The city's public market made use of the Anaerobic Baffle Reactor System , a non-mechanized treatment process, which is now widely used in India and Indonesia to treat hospital and domestic wastewater.
- This system is composed of a settling tank, an anaerobic baffle reactor, an anaerobic filter and a planted gravel filter.



Dumaguete City Public Market

The City's treatment facility can process 80 cubic meters of wastewater per day. The plant has a total area of 600 square meters.



Subsurface and surface flow constructed wetlands. The final stage in this passive septage treatment process.

WB - Funded Manila Third Sewerage Project

- An estimated 3.3 million residents in the eastern section of Metro Manila benefitted from the project which has three (3) components: Sewage management, septage management and institutional strengthening



ADB Technical Assistance on Water Supply and Sanitation Projects

- One of the projects supported by ADB was the Metropolitan Waterworks and Sewerage System New Water Source Development from January 2004 to April 2008. The project conducted feasibility studies for Wawa River as a water source, Angat Water Utilization and Aqueduct improvement and Laiban Dam Preparatory projects.



LGU Urban Water and Sanitation Project

- The project aimed to reach approximately 40 LGU-operated water systems, which were given technical assistance and financial support;
- Financial support include civil works, sanitation infrastructure and hiring of construction consultant as well as supervision for improved water supply system.



CONSIDERATIONS IN WASTEWATER MANAGEMENT

- **Cost** - borrowing capacity of LGU, investor, developer
- **Health Impact** - reduced health risks associated with wastewater management



CONSIDERATIONS IN WASTEWATER MANAGEMENT

- **Institutional Framework** - can the program be implemented and sustained?
- **Self-help Potential** - can the community provide the necessary support?



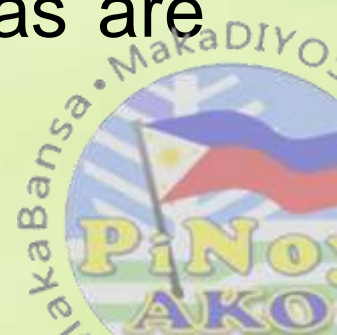
Issues/Concerns

- Infrastructure for collecting sewage
- Land acquisition for treatment plant
- Nutrient removal requirements in the future
- Concept of effluent compliance for publicly – owned treatment facilities
- Sustainability of wastewater tariff structure



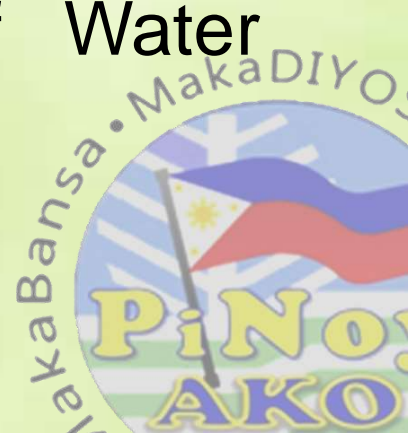
Observations/Recommendations

- Public-Private-Partnership (PPP) will allow Metro Manila and other highly urbanized cities to be finally on track to attain full coverage of wastewater services;
- Most of the challenges associated with wastewater service expansions are associated with the fact that urban areas are already built up;



Observations/Recommendations

- Water and environmental institutions need to respond to technical and social issues;
- Public approval and willingness to pay is essential for the sustainability of our water/wastewater management initiatives;
- Establishment and operations of Water Quality Management Area (WQMA)



THANK YOU FOR YOUR ATTENTION



The Earth is the LORD'S and all that is in it, let us be good environmental stewards (Psalm 24).