

Providing Universal Access to Safe Water and Sanitation in the Countryside

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Philippines

Delivered during the **Roundtable Discussion on the Philippines Water Sector: Gaps and Opportunities** | 20 March 2019 Joy Nostalg, Ortigas Center Pasig UK DIT, SCPW, and PWP | <http://www.wetlands.ph/projects/ukscpw-water-rt-d-2019/>

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Decentralized Water System

Prior to 1973 – Domestic Water Supply System in the Philippines is operated by the defunct NAWASA.

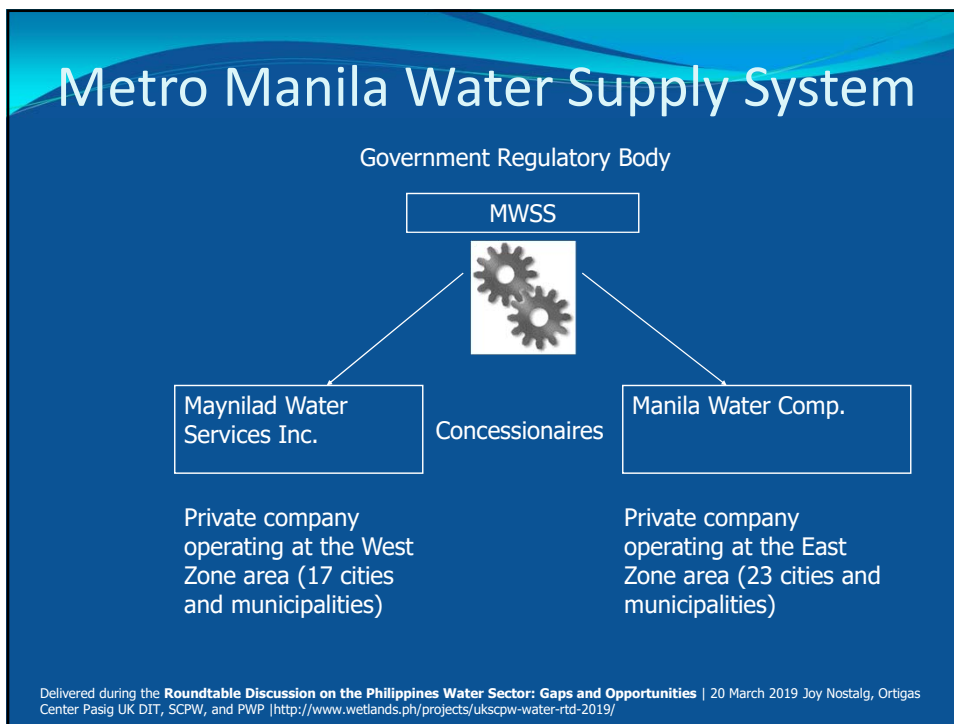
In 1973 – Creation of LWUA by virtue of Presidential Decree 198 with the formation of Water Districts, wherein management of Water Supply System for Metro Manila is given to MWSS while LWUA administer provincial water utilities.

In 1995 – Reorganization of MWSS and LWUA including privatization, if necessary by virtue of Republic Act No. 8041 of 1995 - Water Crisis Act.

Latest Trend – Public Private Partnership/Joint Venture Agreement



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WATER SECTOR IMPLEMENTING AGENCIES IN THE PHILIPPINES

METRO MANILA	PROVINCIAL AREAS	
	URBAN	RURAL
MWSS -Maynilad -Manila Water PRIVATE	LGU-ran Systems PRIVATE (JVA) WATER DISTRICTS (Level III WSS - Individual Household Faucet) 	BWSAs (DILG or LGUs } DPWH) RWSAs } (Level II WSS - Communal Faucet) 

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LWUA's Legal Mandate


PRESIDENTIAL DECREE NO. 198

(AS AMENDED IN 1973 BY P.D. 768 & P.D. 1479)

- ◇ Created the **LOCAL WATER UTILITIES ADMINISTRATION** as a **Specialized Lending Institution** for water utilities
- ◇ Authorized the formation of **WATER DISTRICTS** on a **"Local Option Basis"**

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STATUS OF WATER SUPPLY DEVELOPMENT IN LWUA'S AREA OF COVERAGE

Organized Water Districts	869
Operational	524
Non Operational	229
Towns and Cities Covered by Formed WDs	990
Total Towns and Cities Outside of Metro Manila	1617
% Coverage	61.22%
No of Inactive (LGU-run/Owned/Dissolved)	116
% of Operational WD (Net of Active)	69.69%
No. of Household Connections (Millions)	4.352

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STATUS OF WATER SUPPLY DEVELOPMENT IN LWUA'S AREA OF COVERAGE

Classification of Local Water Districts

<u>Category</u>	<u>Service Connections</u>	<u>No. of WDs</u>
Category A	More than 30,000	23
Category B	More than 10,000	56
Category C	More than 3,000	134
Category D	Less than 3,000	303

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Major Services offered By the Local Water Utilities Administration

Financial – Provide soft and long-term loans

Technical – Undertake and oversee engineering services for project development

Institutional – Provide advisory and training services






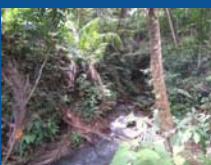
Regulatory – **Water Quality**, Water Rates and Other operational standards

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Water RESOURCES

- **Groundwater**
 - Deepwell
 - Shallow Well
 - Dug Well
 - Spring
- **Surface Water (river, lakes)**
- **Infiltration Gallery**
- **Seawater (FRED)**
- **Water Re-use**
- **Rainwater Harvesting**

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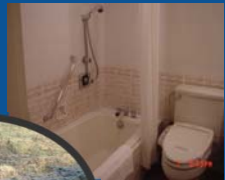



Sources of Water Pollution

❖ POINT SOURCES

INDUSTRIAL Effluents
Heavy Metals (As,Pb,Hg, Cd)
Thermal Waste
 Organic (Animal Waste paper and meat plants)
 Inorganic (N,P,Fe,S,Na K)
 Burning of coal,fuels and oils
 Sulfur and Nitrous oxide

SEWAGE Effluent

- Septic Tank Effluent
- Kitchen and Bathroom
- Garbage (RA 9003-Ecological Solid Waste Management of 2000)

❖ NON-POINT SOURCES

FERTILIZER and PESTICIDE Residues
 Surface water runoff

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Contamination of Groundwater

Groundwater Flow Direction

Sources of Fecal Coliform Bacteria :

Septic tank, pet wastes, Disconnected sanitary sewers, Stormwater runoff, Farm animal wastes

Disease can be transmitted from a latrine too close to the well

1 - Improperly situated pit
Privy contaminates
Water supply

2 - Water is untreated
before use

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Common Pathogenic Illnesses

<ul style="list-style-type: none"> • Cholera • Salmonellosis • Typhoid Fever • Shigellosis • Paratyphoid • Anthrax • Bacillary Dysentery 	<ul style="list-style-type: none"> • Amoebic Dysentery • Giardiasis • Cryptosporidium • Ascaris 	<ul style="list-style-type: none"> • Polio • Infectious Hepatitis
Bacteria	Parasitic	Viral

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Sanitation Strategy

Category Agent	Infection	Pathogenic
Water Borne	Diarrhoeas	B
	Dysenteries	P
	Enteric Fever	Bacterium
	Poliomyelitis	Virus
	Hepatitis A	V
	Leptospirosis	Spirochaete
	Ascariasis	H
	Trichuriasis	H
Water Washed	Skin diseases	M, R, S
	Eye diseases	
	Typhus (louse borne)	Rickettsia
	Relapsing Fever (louse borne)	Spirochaete
Water Based	Schistosomiasis	Helminth
	Guinea Worm ,etc	H
Water Related	Sleeping Sickness	Protozoon
Insect Vector	Malaria	P
	Filariasis	H

- Improve quality of drinking water
- Prevent casual use of unimproved source
- Increase water quantity used
- Improve accessibility and reliability of domestic water supply
- Decrease need of contact with infected water
- Control snail population
- Reduce contamination of surface water by excreta
- Destroy Breeding Ground of Insects
- Use mosquito netting
- Decrease need to visit breeding site
- Improve surface water management

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Arsenic Contamination of Groundwater



Type of Water Source	No. of Sampling Sites	No. of Water samples with elevated As	No. of Water Samples with As levels	No. of Water Samples for Arsenic below MDL
DEEP WELL	• HH Taps	84	13 (15%)	67 (76%)
	• HH Taps	84	13 (15%)	66 (79%)
	• Water RS	4	0	1 (25%)
LOCAL WD	• HH Taps	13	2 (15%)	11 (85%)
	• HH Taps	10	2 (20%)	8 (80%)
	• Water RS	0	0	3 (100%)
Shallow Well	6	0	5 (83%)	1 (17%)
Total	*107	15 (14%)	93 (78%)	9 (8%)

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INTERVENTION AND RESPONSE BY INTER-AGENCIES

- 1.) **Investigations by Health Workers (DOH and LGU)**
 - Review of Records (2010-2014) : @7,000 records
 - House to house visit in 5 barangays, 215 cases with similar skin lesions
- 2.) **Medical Evaluation by Medical Specialists at RHU Lubao,**
 - 123 residents were examined
 - 99 of 123 residents have been treated at EAMC* (Mar-July, 2015)
 - Micronutrient supplementation at the community
 - Nutrition campaign in collaboration with National Nutrition Council
- 3.) **Environmental assessment (sampling)**
- 4.) **Task Force was convened (various departments, DOST, LWUA)**
- 5.) **Distribution of drinking water**
 - bottled water - LGU
 - water rationing – LWUA, LGU and DOH
- 6.) **Systems and Operational Upgrading by the Water District**
- 7.) **Inter-Agency Action**
 - Closure of the heavily contaminated Santiago Pumping Station (As =300 ppb)
 - Installation of Reverse Osmosis mobile treatment unit at Gumi Pumping Station – LWUA (June, 2015)
- 8.) **Safe Water Summit organized by DOH Region 3**
 - (April 16 and 17, 2015)
- 9.) **Communication Plan - June 29, 2015**
- 10.) **Manpower Capability on Dermatological Diseases Expanded (July 22, 2015 – 100 health workers)**
- 11.) **International Collaboration**
 - World Health Organization
 - DRR
- 12.) **Tritium Isotopic Study**
- 13.) **Assessment of nearby towns Guagua, San Fernando and Bacolor**


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Pesticides Contamination of Surface Water

- **Site Investigation:**
 - In November 2011, based on the complaint of a concern citizen on the possibility of pesticides contamination of their drinking water supply, LWUA investigated the situation on the river source of Oroquieta City Water District.
 - Initial sanitary survey was conducted to determine the specific site conditions. Although the pumping station was located downstream of the agricultural areas there were no traces of such pesticide residues were found as reflected on the WD's water quality reports.
- **Action Taken:**
 - Interviewed health officials, agriculture officials, Water District officials, chemical suppliers, and meeting with the Sangguniang Panlungsod on the outcome of the investigation.
 - Managing river water quality
 - Operation and Maintenance

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Discharge of Sewage Effluent and Pesticides to the River

□ Investigation:

- Malaybalay Water District is abstracting water from Sawaga River for domestic water supply.
- A piggery farm is located upstream of the intake structure. The effluent is untreated and directly discharging into the river.
- The nearby pineapple plantation also apply fertilizer thru airborne.
- There was effort to determine the type chemicals used but the multi-national company could not declare the chemical composition since its their trade secret.

□ Mitigation and Response:

- Advise the piggery farm owner to adopt effluent treatment.
- Filed complaint with the local DENR but no response.

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Incidence of Waterborne Disease

□ Investigation:

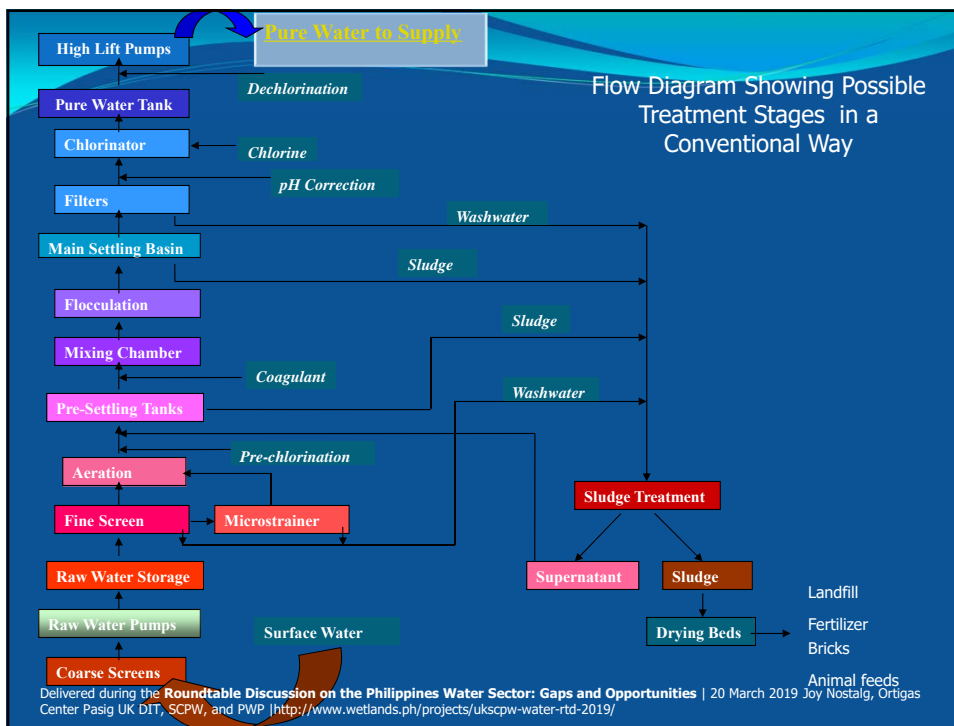
- Calamba Water District experience an epidemic in 2008. LWUA immediately dispatched independent investigating body to look into the situation.
- Water sources were inspected, dumpsite were noted, open spring sources and residents within the three service area of the WD was already affected by the waterborne disease.
- There was no concrete evidence that the source of contamination comes for the WD, but mostly probably from untreated shallow wells and contaminated food.

□ Recommended Plan:

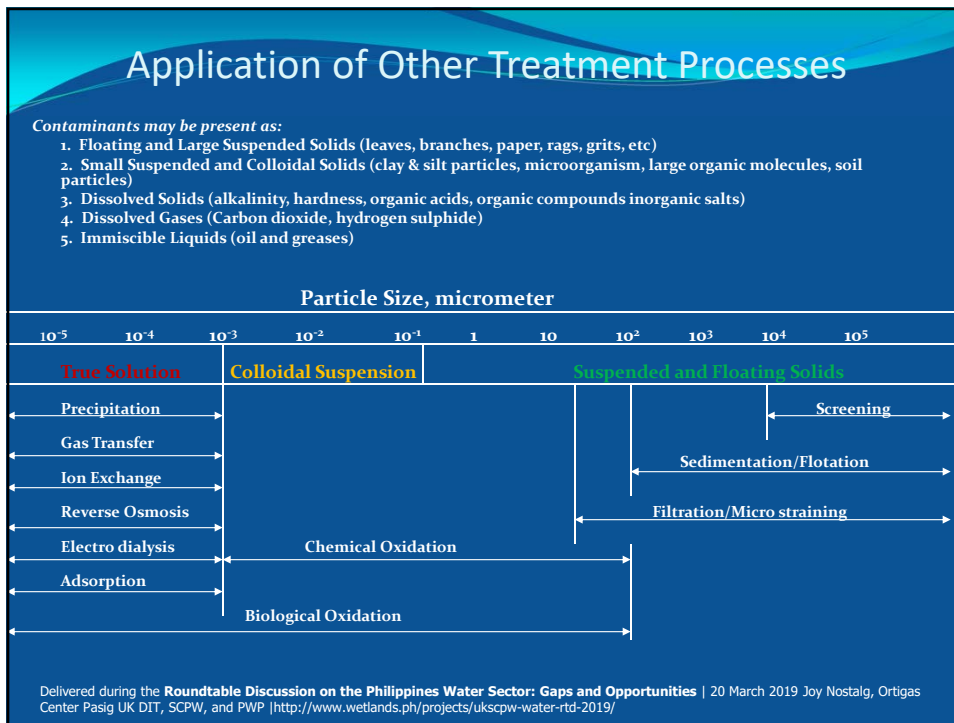
- Rehabilitation works
- Chlorination
- Preventive measures
- System pressure and water quality reports

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PNSDW Criteria

(Philippine National Standards for Drinking Water of 2017)

- ❖ Standards for Drinking-Water Quality
 - Microbiological, Physical & Chemical and Radiological
- ❖ Standards for Water Sampling and Examination
 - Minimum Frequency of Sampling, Minimum Number of Samples, Sampling Requirement, Certified Sampler, DOH Accredited Laboratory and PNRI for Radiological Examination
- ❖ Standards for Other Mode of Distribution of Drinking-water
 - Initial and periodic examination for mobile tanks and bulk water supply, Free chlorine residual shall have at least 0.3mg/l but not to exceed 1.5mg/l at the point of delivery.

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Quality Assurance of Drinking Water

- Bacteriological Quality
 - Identification of microorganisms thru MTFT, MFT and HPC
- Physical and Chemical Quality
 - 15 Organic constituents (industrial)
 - 11 Organic constituents (pesticides)
 - 15 Inorganic constituents
 - 15 Acceptability Aspect
 - 14 Disinfectant by-products
 - 2 Treatment Chemicals
 - 2 Disinfection Chemicals
- Radiological Quality
 - 7 Radionuclides - Identification of [radioactivity](#)
- Mandatory drinking-water Quality
 - 10 Parameters (Level 2 and Level 3 WSS)
- Chlorine Residuals:
 - Chlorine: 0.3mg/L to 1.5mg/L at point of compliance
 - Chlorine Dioxide: 0.2 mg/L to 0.40mg/L prior to distribution
- Water Sampler Accreditation
- Working Laboratory Accreditation
- Proficiency Test

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Classification of Drinking-Water Parameters

- ❑ **Mandatory Parameters**
 - These core parameters are legally enforceable and shall be required by examination by all waters service providers.
- ❑ **Primary Parameters**
 - These are site specific which are chemical impurities that directly affect health through acute or chronic exposure
- ❑ **Secondary Parameters**
 - These are parameters that render water unacceptable for drinking and which affect the efficiency of treatment process.
- ❑ **Emergency Drinking-Water Parameters**
 - LGU to provide temporary water supply during the first 72 hours. Water supply shall be monitored daily for at least 7 days.
- ❑ **Sustainable Development Goal Parameters**
 - The population should be using safely managed drinking water services relative to SDG goal # 6.1.1 in achieving universal and equitable access to safe and affordable drinking water for all by 2030.

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LWDs Water Quality Outlook

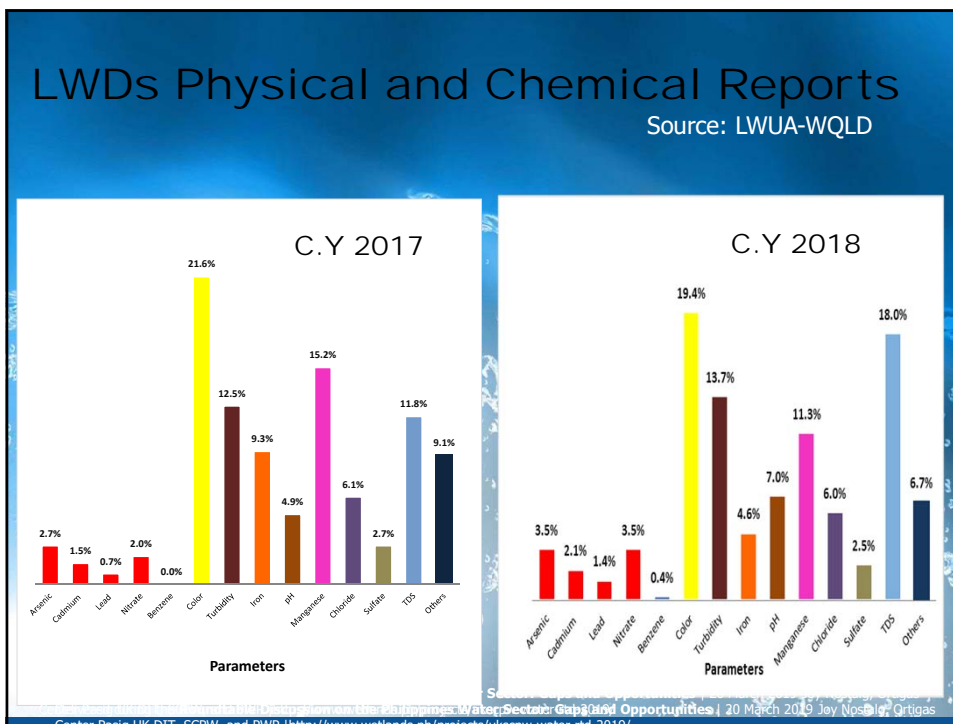
	PHYSICAL			CHEMICAL				METALS		HEAVY METALS				
	Color (Apparent)	Color (True)	Turbidity	pH	Nitrate	Sulfate	Chloride	TDS	Iron	Manganese	Arsenic	Lead	Cadmium	Benzene
No. of Reports	105	92	173	173	173	173	173	173	173	173	173	173	173	173
No. of Analyzed	92	75	164	171	116	125	168	168	154	138	64	76	64	38
No. of Not Analyzed	13	17	9	2	57	48	5	5	19	35	109	97	109	135
No. of Passed	75	67	157	160	115	121	158	142	149	126	64	76	64	20
% ANALYZED	85%	95%	99%	99%	67%	72%	97%	97%	89%	80%	37%	44%	37%	22%
% PASSED vs. Total	72%	91%	92%	66%	70%	91%	82%	86%	73%	37%	44%	37%	12%	
% PASSED vs. Analyze	85%	96%	94%	99%	97%	94%	85%	97%	91%	100%	100%	100%	53%	

LEGEND: NDA - no data available; NA - not analyzed; / - passed; x - not within the allowable limits

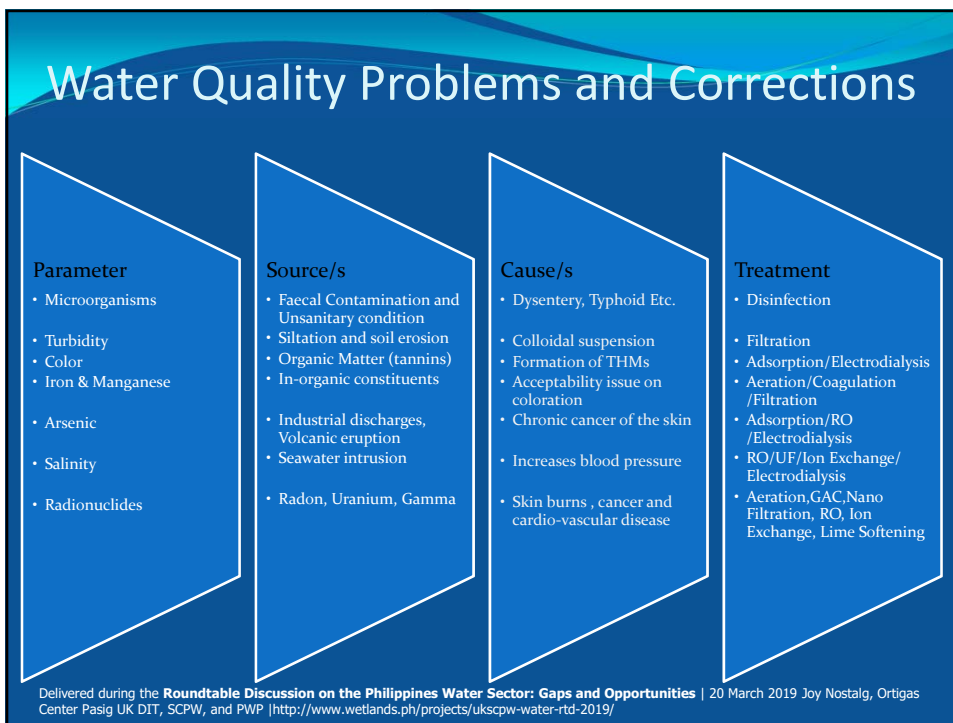
LWUA 2015 Report

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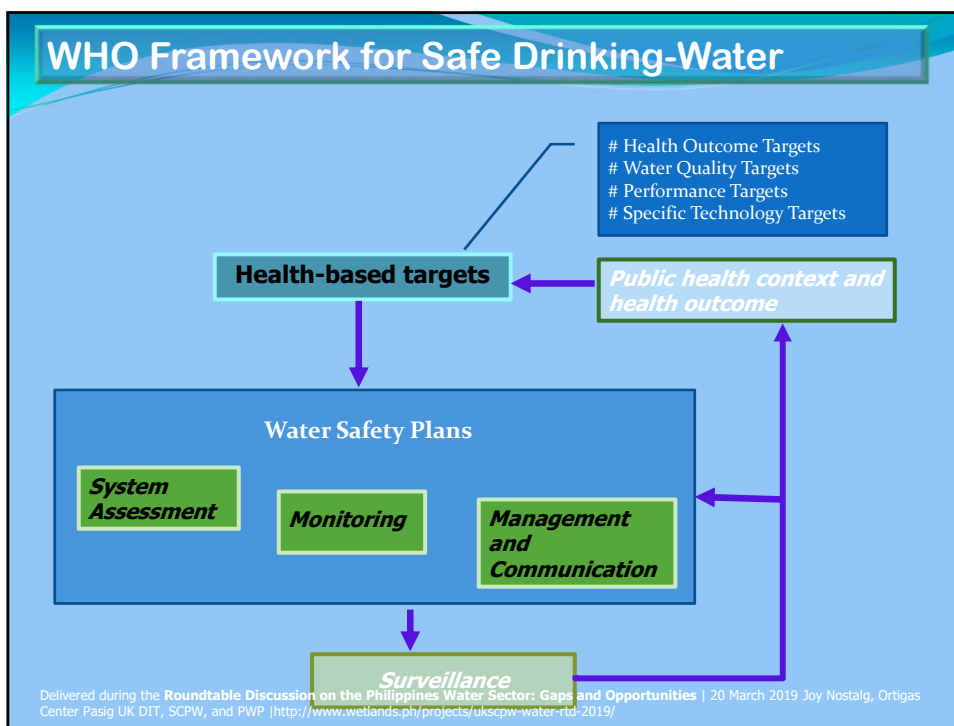
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Regulatory Aspect

Memorandum Circulars

- ✓ Water Quality Compliance
- ✓ Sanctions for Non Compliance
- ✓ Water Safety Plan Submittal
- ✓ Water Quality Monitoring System

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Implementing Guidelines Memorandum Circular 008-97

Implementing Guidelines on Sanctions for Failure of Water Districts to Submit Reports on Water Quality (Board of Trustee Resolution No. 234-Series of 1997)

- ✓ **First Offense:** Admonish the WD in writing for failure to submit reports.
- ✓ **Second Offense:** Warn the WD in writing and require the WD to commit its compliance to submit the report in writing.
- ✓ **Third Offense:** Write the WD Board for its failure to submit water quality report for the third count, all pending request for approval/assistance will be held in abeyance.
- ✓ **Fourth Offense:** Hold release of project funds and assign a sixth member to the WD's Board
- ✓ **Fifth Offense:** Withdrawal of WD's Conditional Certificate of Compliance

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Compliance to LWUA Memorandum Circular 002-08 as amended

Reports Required for Submission to LWUA:

Microbiological Test: Monthly (2 samples per 5,000 population)

- ✓ Total Coliform Test
 - ✓ Standard Value: <1.1 MPN/100mL, MPN-Most Probable Number
- ✓ Fecal Coliform Test (Thermotolerant Coliform/E.Coli)
 - ✓ Standard Value: <1.1 MPN/100mL
- ✓ Heterotrophic Plate Count
 - ✓ Standard Value: <500CFU/mL, CFU-Colony Forming Units

Physical & Chemical Analysis: Annually (1 sample per point of compliance)

- ✓ Physical Quality:
 - ✓ Color, Odour, Turbidity
- ✓ Chemical Quality:
 - ✓ Arsenic, Cadmium, Lead, Nitrate, pH, TDS

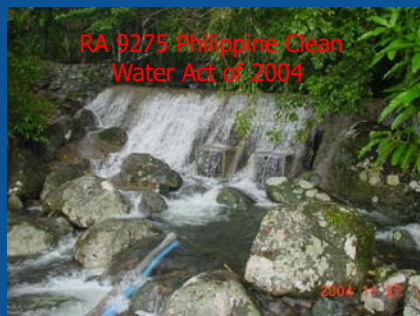
Radiological: Initial (4 Consecutive quarters/year) and Periodic (Once/3 years)

- ✓ Gross Alpha, Gross Beta, Radon, Gamma Tritium

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Water and Wastewater Quality



An Act providing for a comprehensive water quality management and for other purposes in the protection, preservation and revival of fresh and marine water.



The DENR has adopted and promulgated this Administrative Order to provide water quality guidelines and general effluent standards

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Septage Management

- GR No. 171947-48: A supreme court ruling on Feb 15, 2011 to address environmental pollution due to climate change to be operational by December 31, 2020.
- LWUA MC 008-16: Milestone and activities to be undertaken by LWDs particularly those situated along the Manila Bay to come up with their adopted 5-year action plan (2016-2020) to reduce environmental pollution thru waste water collection and treatment systems.

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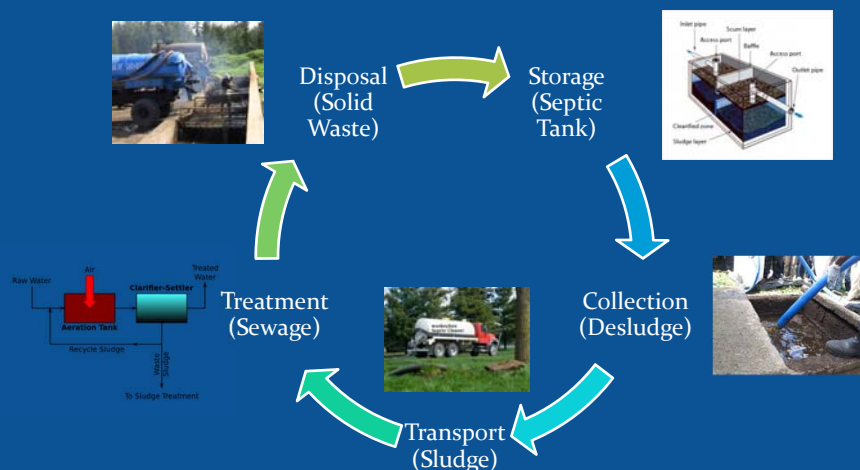
LWUA Initial Steps

- In 1987, the various government agencies planned the “Nationwide Water Supply, Sewerage and Sanitation Master Plan 1988-2000”
- Study show that about **82%** of households in the country has no access to sewerage system. **58%** contaminated groundwater and **64%** exceeded drinking water criterion.
- Pilot Sewerage Treatment Plant Study and Design were made in various WDs, but never implemented because of prohibitive cost.
- Financial Institution like the ADB is offering loans for **Water Sector Development including Sanitation.**

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Sewage Collection and Treatment Process



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Projects under SC Mandamus

- ❑ 52 WDs - Feasibility studies on-going and subject for awarding of Contract to be funded thru GAA 2017
- ❑ 12 WDs Feasibility Studies completed funded by ADB-WDDSP (mostly located along the Manila Bay)
- ❑ 2 WDs Non-Mandamus under sanitation planning stage . Target Area-Panabo, Davao del Norte and Metro Bangued. Abra

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Status of Projects under Unified Financing Framework (Estimated Budget PhP4.7Billion)

- ❑ 30 WDs on Sanitation – Awarded
- ❑ 30 WDs on Non-Revenue-Water – Data gathering stage
- ❑ 30 WDs on Operation of Non-Operational – On-going data gathering
- ❑ 12 Areas of Surface Water as source of supply – Initial screening
- ❑ Areas with Water Quality Issues requiring Treatment
- ❑ WDs Expansion of Service Area Coverage
- ❑ Capacity Building

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Project Financing

□ Fund Requirement

- *Php 2.514 Billion from 2015 to 2020 for LWUA's Manila Bay Clean-Up Program*
- *ADB-2.0 Million US dollar for water sector development projects*

□ Funding Options

- Loans from LWUA, GFIs or PFIs
- DPWH funding as NG cost-share (40% subsidy under NSSMP) but water district may need to partner with local government unit
- ADB WDDSP offers 20% grant, if available

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Thank You Very Much for your
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Good Day and God Bless!



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