PHILIPPINE SITUATION: IMPROVEMENT OF WATER ENVIRONMENT

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PCCI Environment Committee / Filinvest Development Corp.

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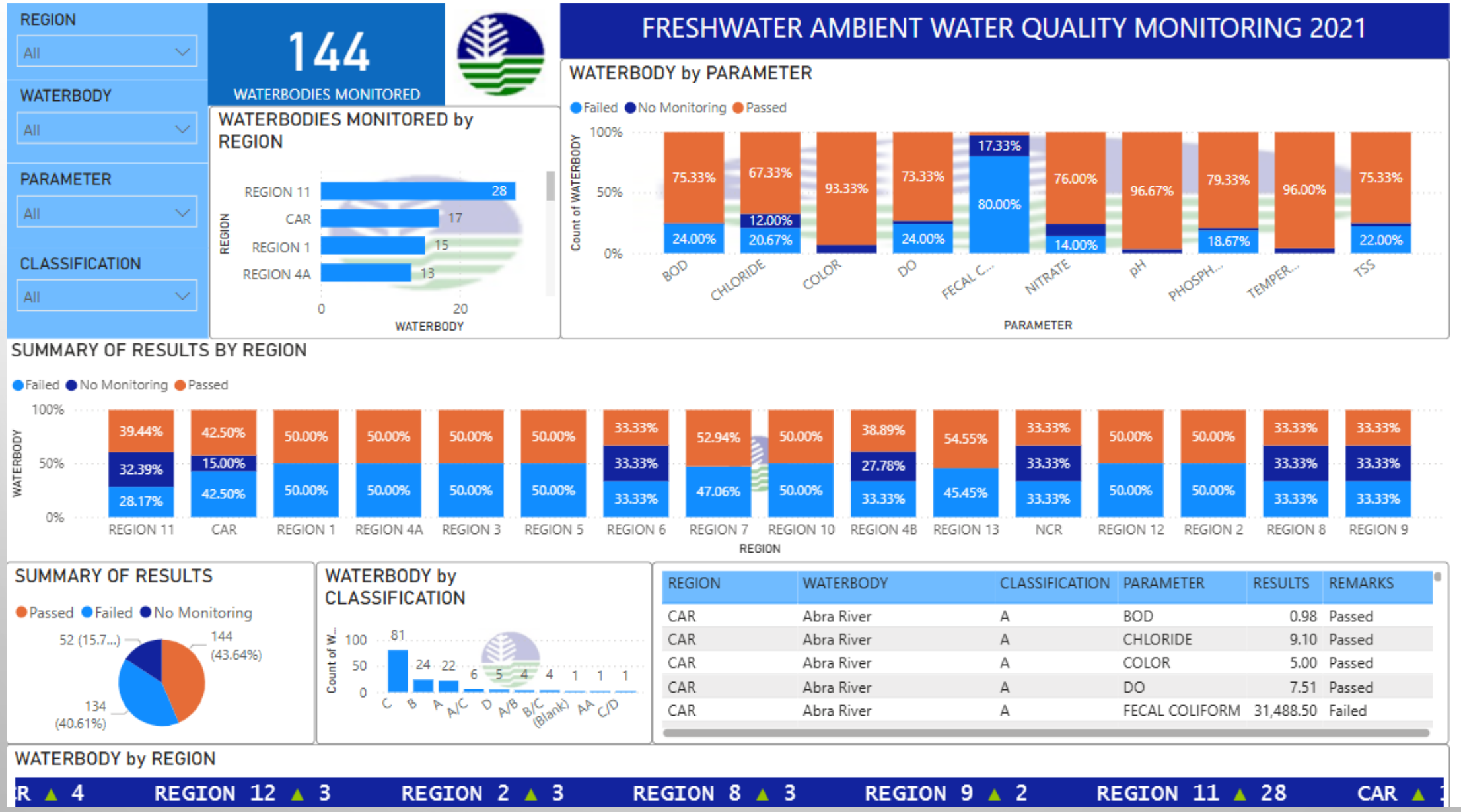
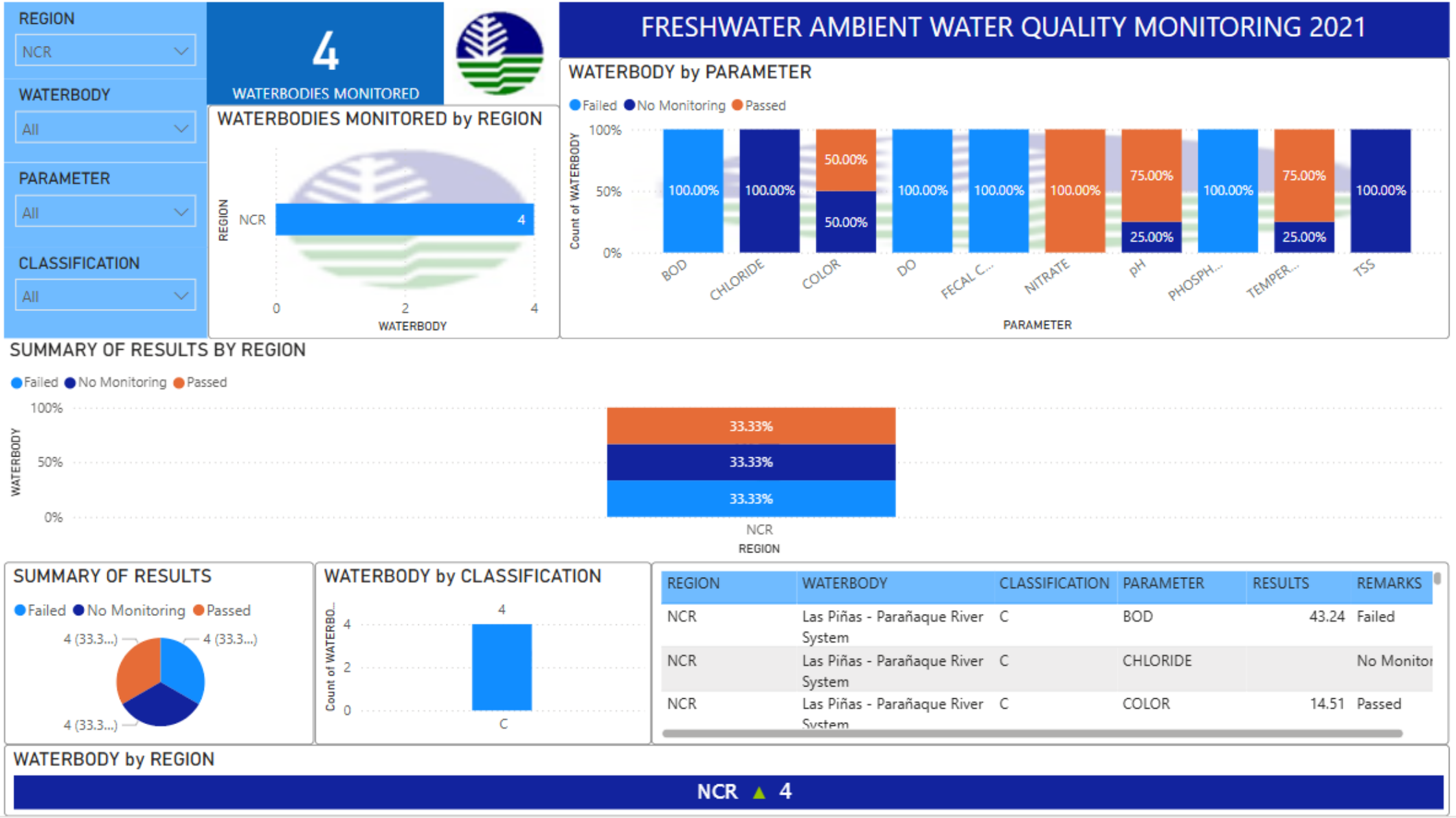
Water Quality Situation (Country-wide)



NCR


REGION
NCR
WATERBODY
All
PARAMETER
All
CLASSIFICATION
All
4
WATERBODIES MONITORED
WATERBODIES MONITORED by REGION
REGION
NCR
4
0
2
4
WATERBODY
FRESHWATER AMBIENT WATER QUALITY MONITORING 2021
WATERBODY by PARAMETER
Failed
No Monitoring
Passed
Count of WATERBODY
100%
50%
0%
100.00%
100.00%
50.00%
50.00%
100.00%
100.00%
100.00%
75.00%
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BOD
CHLORIDE
COLOR
DO
FECAL C...
NITRATE
pH
PHOSPH...
TEMPER...
TSS
PARAMETER
SUMMARY OF RESULTS BY REGION
Failed
No Monitoring
Passed
100%
50%
0%
WATERBODY
33.33%
33.33%
33.33%
NCR
REGION
SUMMARY OF RESULTS
Failed
No Monitoring
Passed
4 (33.3...)
4 (33.3...)
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WATERBODY by CLASSIFICATION
Count of WATERBO...
4
2
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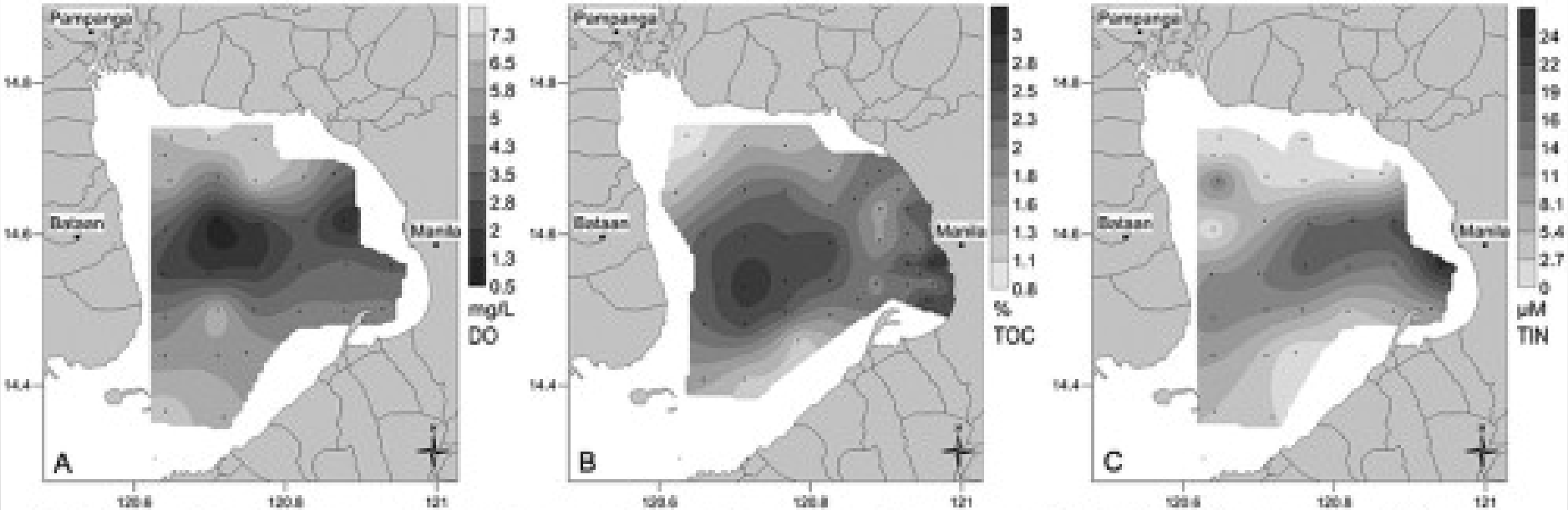
C
REGION
WATERBODY
CLASSIFICATION
PARAMETER
RESULTS
REMARKS
NCR
Las Piñas - Parañaque River System
C
BOD
43.24
Failed
NCR
Las Piñas - Parañaque River System
C
CHLORIDE
No Monitor
NCR
Las Piñas - Parañaque River System
C
COLOR
14.51
Passed
WATERBODY by REGION
NCR
4

Manila Bay Hypoxia



(A) Bottom dissolved oxygen, (B) total organic carbon in surface sediments, and (C) bottom nitrate concentrations in Manila Bay, Philippines

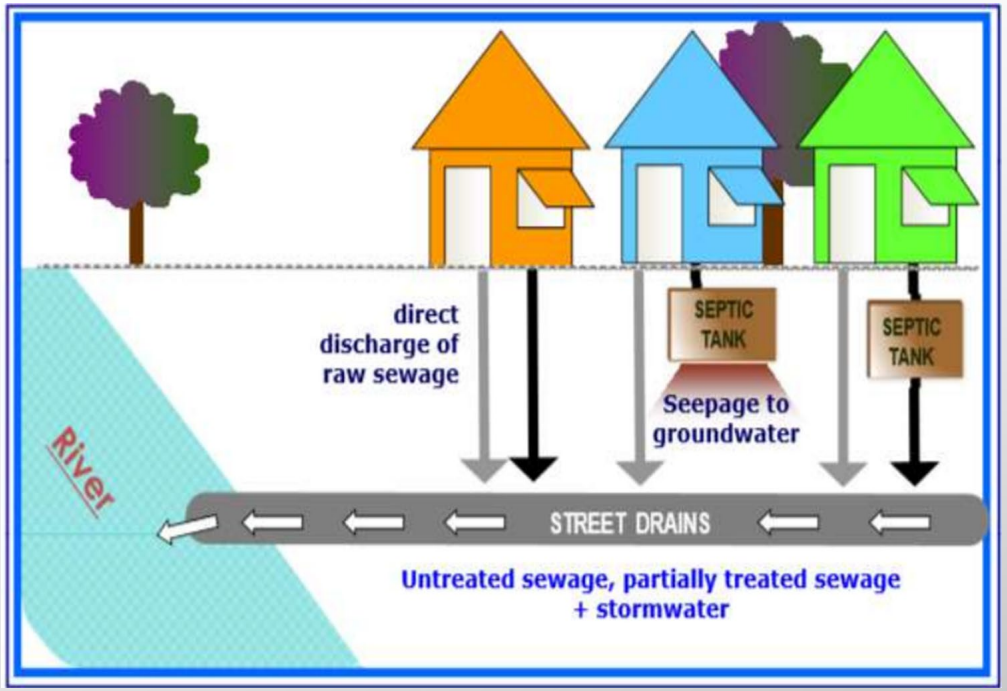
Hypoxia in Manila Bay, Philippines during the northeast monsoon. Jacinto, et al (2011)

- In the wet season, bay-wide average of the near-bottom DO reached 2.1 mg/L.
- Lowest DO values were observed when stratification was present in the water column.
- Nutrient levels in the bay were elevated especially near the bottom.
- The bay worsened as the thickness of the hypoxic layer increased with time.

Spatiotemporal variability of hypoxia and eutrophication in Manila Bay, Philippines during the northeast and southwest monsoons. Sotto, Jacinto & Villanoy (2014)

Wastewater/Sanitation across the country

- **Most households use septic tanks to manage excreta. Used water from showers, kitchen and laundry are discharged untreated to street drains.**
- **Commercial/industrial establishments are expected to have onsite treatment.**
- **In the national capital region, the private water concessionaires have ongoing expansion of sewerage infrastructure.**
- **Economic zones like Subic and Clark have full sewerage. Boracay has a sewer system that covers mostly tourism establishments.**
- **Most top metros like Cebu (2.5M), Davao (1.4M) and Cagayan de Oro (723K) still have no extensive sewer systems.**
- **The water districts mostly focus on water security than sewerage/sanitation services. No absolute clarity on who should deliver sewerage infrastructure: water districts or local governments?**



- R.A. 9275 - CLEAN WATER ACT was passed in 2004.
  - The General Effluent Standards of 1990 were revised in 2016, further adjusted in 2019 for selected parameters.
  - 1990: BOD-focused
  - 2016: nutrient thresholds added, BOD limits retained
- National Septage and Sewerage Master Plan completed in 2010. The DPWH published an operations manual in 2013. Subsidies are available to government project proponents.

Supreme Court *continuing mandamus* target for areas within Metro Manila - February 15, 2011 SC Resolution (G.R. 171947-48):

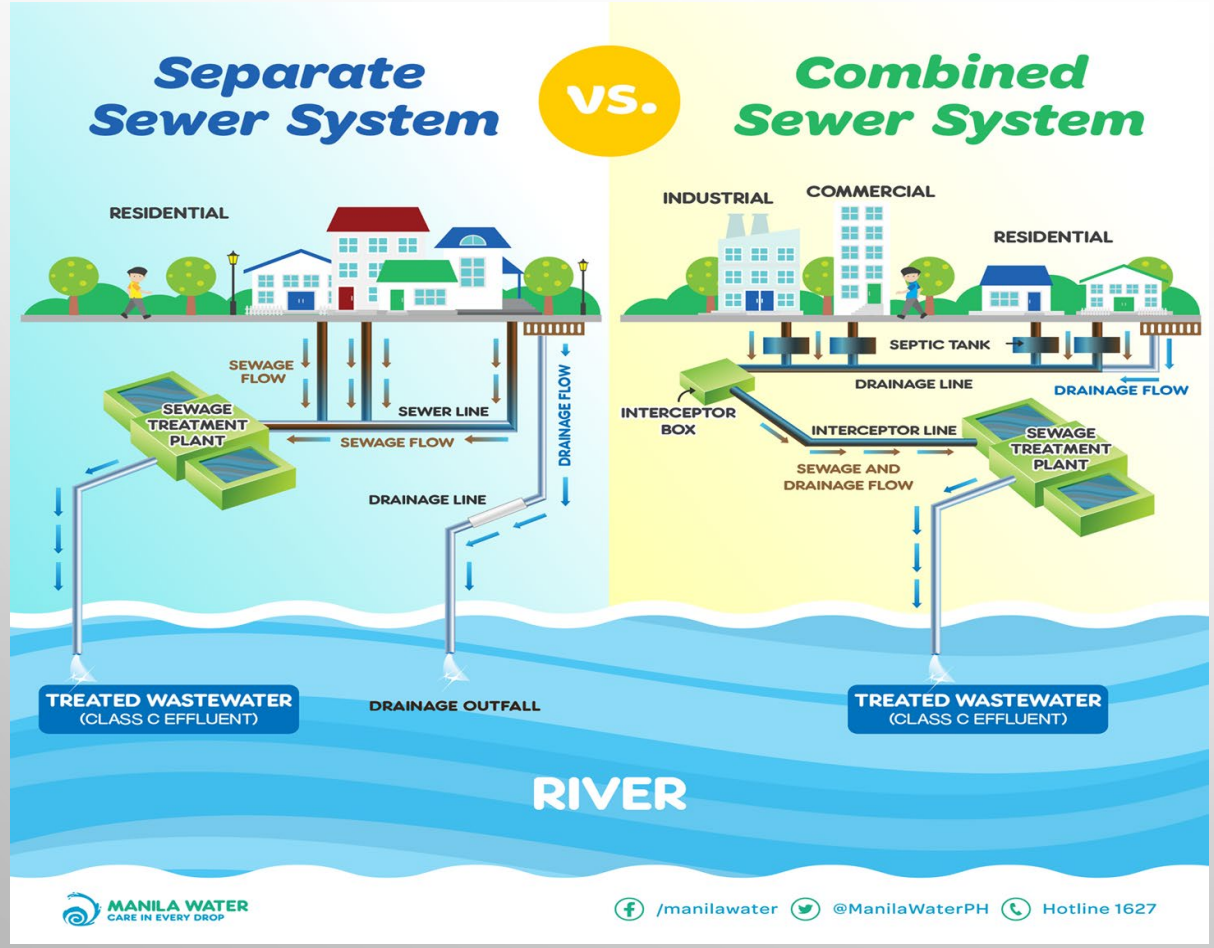
> *The MWSS shall submit to the Court on or before June 30, 2011 the list of areas in Metro Manila, Rizal and Cavite that do not have the necessary wastewater treatment facilities. Within the same period, the concessionaires of the MWSS shall submit their plans and projects for the construction of wastewater treatment facilities in all the aforesaid areas and the completion period for said facilities, which shall not go beyond 2037.*

NSSMP Targets for areas outside Metro Manila:

> ***Target 1**: By 2020, all LGUs have developed septage management systems and the 17 highly urbanized cities (HUCs) have developed sewerage systems.*
>
> ***Target 2**: By 2020, approximately 43.6 million people have access to septage treatment facilities and about 3.2 million will have access to sewage treatment facilities.*
>
> ***Target 3**: By 2020, PhP 26.3 billion has been invested in sanitation improvement projects.*
>
> ***Target 4**: By 2020, about 346 million kilograms of BOD is diverted from the environment per year as a result of the sewerage and septage management projects.*

The Supreme Court *mandamus* set a 2037 target for full wastewater coverage in manila.

Will MWSS and its concessionaires meet the target?
What does full coverage mean?



What about the other Top Metros and the rest of the country?

Is there traction in the expansion of sewerage infrastructure and services?

Who is supposed to deliver wastewater infrastructure and services?

What expansion targets do they have?

Before centralization, we are still likely to continue adopting a decentralized/onsite approach.

Public Health

Water Security

Food Safety & Security

Other Ecosystem Services

SUSTAINABLE WATER QUALITY MANAGEMENT

Capacity of regulators

Unsustainable financial & operating models

Willingness to pay

Piecemeal approach to sewerage expansion

Fragmented, uncoordinated, overlapping water institutions

Environmental standards unsupported by science

Anti-SME policy on access to public wastewater services

Weak environmental data sets and incomplete inventories

Lack of affordable technologies

Filinvest-Hitachi Omni Waterworks, Inc.

FLOW
Filinvest-Hitachi Omni Waterworks, Inc.

Solutions offered by FLOW

FLOW
Filinvest-Hitachi Omni Waterworks, Inc.

Project ‘Newton’ in Filinvest City

Filinvest City, with FDC Water Utilities Inc. and Hitachi Ltd, is working on the upgrading of its sewage treatment plant and construction of a state-of-the-art water recycling facility. FLOW is assigned as the project management company. The upgraded STP using MBR will be capable of 15MLD, and the water recycling facility has a capacity of 10.5 MLD.

Plant Image

FDC Utilities, Inc. - A Subsidiary of Filinvest Development Corporation

FLOW
Filinvest-Hitachi Omni Waterworks, Inc.

DX solution - operating model

STP and WRF will be safely and efficiently managed, based on remote monitoring system and accumulated data within a digital platform.