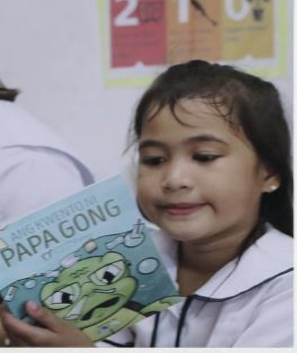


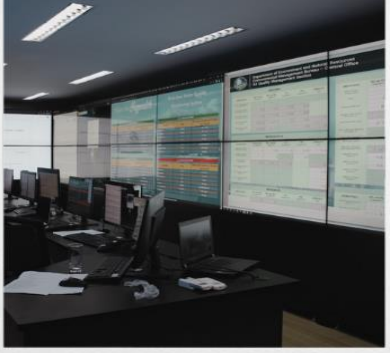








# NATIONAL STATE OF THE BROWN ENVIRONMENT REPORT

*2016-2021*

DEPARTMENT OF ENVIRONMENT AND NATURAL RESOURCES
ENVIRONMENTAL MANAGEMENT BUREAU


## MESSAGE

It is with great pleasure and a sense of duty that I present to you this edition of the National State of the Brown Environment Report (NSoBER), a testament to the dedicated efforts and commitment of the Environmental Management Bureau of the Department of Environment and Natural Resources (EMB-DENR) in safeguarding our environment.

This comprehensive report encapsulates the environmental landscape of the Philippines from 2016 to 2021, covering crucial aspects such as air quality, water quality, solid waste management, toxic chemicals, hazardous wastes, environmental impact assessment, compliance with multilateral environmental agreements, and the overall management of our precious natural resources.

The NSoBER not only delves into technical details but also highlights best practices, public awareness initiatives, environmental education efforts, challenges faced, and recommendations for enhancement across each sector. Furthermore, it sheds light on the collaborative efforts of various stakeholders including government agencies, the private sector, civil society, local governments, and the international community, emphasizing their contributions towards environmental sustainability.

In the face of the unprecedented challenges posed by the COVID-19 pandemic, this report also outlines the adaptive strategies and initiatives undertaken by EMB during the new normal. It provides insights into our activities both pre-pandemic (2016-2019) and during the pandemic year of 2020, displaying resilience and dedication in maintaining environmental protection amidst global adversity.

As we navigate through this report, you will find a detailed overview of our approach and progress in Solid Waste Management, Water Quality Management, Air Quality Management, Environmental Administration, Pollution Adjudication and Environmental Education. Noteworthy improvements in Toxic Chemicals and Hazardous Waste Management and Environmental Impact Assessment are also highlighted, reflecting our continuous pursuit of excellence in environmental stewardship.

I encourage policymakers, decision-makers, planners, academics, and the public to use this report as a definitive resource for understanding the state of our environment, identifying areas for improvement, and collectively working towards a sustainable and resilient future. Together, we can make a meaningful impact and ensure the well-being of our environment for generations to come.

Thank you for your unwavering support and commitment to environmental conservation.

**GILBERT C. GONZALES, *CESO III***
Director

Suggested citation

Environmental Management Bureau (2022). National State of the Brown Environment Report 2016 - 2021. The Philippines.

## About Us

Initially established as a supporting body for the Department of Environment and Natural Resources in 1987, the Philippine Environmental Management Bureau (EMB) became a line bureau with its own offices and independent enforcement authority in 2002. It is the national authority responsible for pollution prevention and control, and environmental impact assessment.

EMB is the national authority in the Philippines that sets air and water quality standards and monitors ambient and point source pollutants. It manages hazardous and toxic wastes under the Toxic Substances, Hazardous and Nuclear Waste Control Act and implements the Philippine Environmental Impact Assessment (EIA) system.

## Our Mission

To protect, restore and enhance environmental quality towards good public health, environmental integrity, and economic viability.

## Our Vision

A nation empowered to protect our finite natural resources, attuned to the pursuit of sustainable development, for a clean and healthy environment that enhances the Filipino Quality of life for present and future generations.

## Preface

As a periodical publication prepared by the Department of Environment and Natural Resources – Environmental Management Bureau (DENR-EMB), the National State of the Brown Environment Report has provided a comprehensive technical report of the country's environmental situation. This latest NSOBER covers the 2016-2021 reports for air quality, water quality, solid waste, toxic chemicals, hazardous wastes, environmental impact assessment, compliance with multilateral environmental agreements, and the management of the environment in the Philippines.

The NSOBER discusses best practices, efforts on public awareness and environmental education obstacles, and suggestions for improving the situation of each sector. In addition, it describes the actions of the many players - government agencies, the commercial sector, civil society, local governments, and the international development community – regarding their contributions to improving our environment.

This report also covers the DENR-EMB approach in the new normal during a global pandemic brought about by COVID-19. Contents include information on the activities conducted before (2016-2019) and during the pandemic (2020) by the Bureau.

The purpose of this Report is to provide a comprehensive review of the progress made by EMB over the last six years. This contains the current situation and plans for Solid Waste Management, Water Quality Management, and Air Quality Management in the Philippines.

This report also includes an overview of the Environmental Administration, the Pollution Adjudication Board, and Environmental Education in the Philippines. The improvement of the Philippines in terms of Toxic and Hazardous Waste Management and the Environmental Impact Assessment are also included in this report. Thus, it is expected that this report will serve as the authoritative reference for those looking for information about the environment in the nation. To wit: politicians, decision-makers, planners, academics, etc. crucial information for the public good will also be provided.

## Abbreviations

| | |
|---|---|
| 10YFP | 10-Year Framework of Programmes on Sustainable Consumption and Production Patterns |
| AA | Attainment Area |
| AADT | Annual Average Daily Traffic |
| AAQMR | Ambient Air Quality Monitoring Results |
| ACAP | Asia Center for Air Pollution Research |
| ADB | Asian Development Bank |
| ADM | Air Dispersion Modeling |
| ADO | Automotive Diesel Oil |
| ADT | Average Daily Traffic |
| AEEAP | ASEAN Environmental Education Action Plan |
| AM | Additive Manufacturing |
| APCD | Air Pollution Control Device |
| APEC-CD | APEC-Chemical Dialogue |
| APMMN | Asia Pacific Mercury Monitoring Network |
| APSI/APSE | Air Pollution Source Installation or Equipment |
| AQI | Air Quality Index |
| AQMF | Air Quality Management Fund |
| AQMS | Air Quality Monitoring Stations |
| ARCP | ASEAN Regulatory Cooperation Project |
| ARI | Acute Respiratory Infections |
| ARMM | Autonomous Region in Muslim Mindanao |
| ASBU | Anti-Smoke Belching Units |
| AWGCW | ASEAN Working Group on Chemicals and Wastes |
| AWQMF | Area Water Quality Management Fund |
| BACT | Best Available Control Technologies |
| BARMM | Bangsamoro Autonomous Region in Muslim Mindanao |

| | |
|---|---|
| bcm | billion cubic meters |
| BFAR | Bureau of Fisheries and Aquatic Resources |
| BFP | Bureau of Fire Protection |
| BIATF | Boracay Inter-Agency Task Force |
| BOC | Bureau of Customs |
| BOD | Biochemical Oxygen Demand |
| BPS-DTI | Bureau of the Philippines Standards |
| CAA | Clean Air Act |
| CAAQMS | Continuous Ambient Air Quality Monitoring Station |
| CAQMS | Continuous Air Quality Monitoring Stations |
| CAR | Cordillera Administrative Region |
| CAS | Chemical Abstract Service |
| CAS RN | Chemical Abstract Service Registry Number |
| CBI | Confidential Business Information |
| CBU | Completely Built-Up |
| CC | Climate Change |
| CCA | Climate Change Adaptation |
| CCIP | Chamber of Cosmetics Industry of the Philippines |
| CCO | Chemical Control Order |
| CCTV | Closed-Circuit Television |
| CDO | Cease and Desist Order |
| CEAP | Catholic Educational Association of the Philippines |
| CEMS | Continuous Emissions Monitoring Systems |
| CER | Compliance Evaluation Reports |
| CHED | Commission on Higher Education |
| CISE | Chloride Ion Specific Electrode |
| CKD | Completely Knocked Down |
| CMC | Cosmopolitan Memorial Chapel |
| CMR | Compliance Monitoring Report |
| CMS | Chemical Management Section |

| | |
|---|---|
| CMVR | Compliance Monitoring and Validation Report |
| CNC | Certificate of Non-Coverage |
| CO | Capital Outlay |
| COC | Certificate of Conformity |
| COMS | Continuous Opacity Monitoring System |
| COP | Conference of Parties |
| COVID-19 | Corona Virus Disease 2019 |
| CRT | cathode-ray tube |
| DA | Department of Agriculture |
| DAHs | Data Acquisition and Handling System |
| DENR AO | DENR Administrative Order |
| DAO | Department Administrative Order |
| DBP | Development Bank of the Philippines |
| DECS | Department of Education, Culture, and Sports |
| DENR | Department of Environment and Natural Resources |
| DepEd | Department of Education |
| DFA | Department of Foreign Affairs |
| DILG | Department of Interior and Local Government |
| DO | Dissolved Oxygen |
| DOE-TCPPA | Department of Energy - Technical Committee on Petroleum Products and Additives |
| DOH | Department of Health |
| DOLE-OSHC | Department of Labor and Employment-Occupational Safety and Health Center |
| DOST | Department of Science and Technology |
| DOST - ITDI | Industrial Technology Development Institute |
| DOST-PHIVOLCS | Department of Science and Technology - Philippine Institute of Volcanology and Seismology |
| DOTC | Department of Transportation and Communication |
| DOTr | Department of Transportation |
| DPWH | Department of Public Works and Highways |

| | |
|---|---|
| DRR | Disaster Risk Reduction |
| DSWD | Department of Social Welfare and Development |
| DTI-BOI | Department of Trade and Industry-Board of Investment |
| EANET | Acid Deposition Monitoring Network in East Asia |
| ECA | Environmentally Critical Areas |
| ECC | Environmental Compliance Certificate |
| ECP | Environmentally Critical Projects |
| ECQ | Enhanced Community Quarantine |
| ECQ* | Enhance Community Quarantine* |
| EDSA | Epifanio Delos Santos Avenue |
| EEC | European Economy Community |
| EEE | Electrical And Electronic Equipment |
| EEID | Environmental Education and Information Division |
| EEIU | Environmental Education and Information Unit |
| EGF | Environmental Guarantee Fund |
| EI | Emissions Inventory |
| EIA | Environmental Impact Assessment |
| EIAMD | Environmental Impact Assessment and Management Division |
| EIARC | Environmental Impact Committee Assessment Review |
| EIS | Environmental Impact Statement |
| EMB | Environmental Management Bureau |
| EMB-ERLSD | Environmental Research and Laboratory ServicesDivision |
| EMF | Environmental Monitoring Fund |
| EMoP | Environmental Management and Monitoring Plan |
| EnMO | Environmental Monitoring Officer |
| EO | Executive Order |
| EPR | Extended Producer Responsibility |

| | |
|---|---|
| EPRMP | Environmental Performance Report and Management Plan |
| EQD-HWMS | Environmental Quality Division-Hazardous Waste Management Section |
| ERF | Environmental Revolving Fund |
| ESWM | Ecological Solid Waste Management |
| ET | Ecotoxicity |
| ETF | Environmental Trust Fund |
| EUFS | Environmental User Fee System |
| FC | Fecal Coliform |
| FCSMO | Flood Control and Sewerage Management Office |
| FLO | Formal Lifting Order |
| FPA | Fertilizer and Pesticide Authority |
| GAELP | Global Alliance to Eliminate Lead Paint |
| Geo-RiskPH | Geospatial Information Management and Analysis Project for Hazards and Risk Assessment in the Philippines |
| GES | General Effluent Standards |
| GHG | Green House Gases |
| GHS | Globally Harmonized System |
| GPS | Global Positioning System |
| GSSS | Global Search for Sustainable Schools |
| GWP | global warming potential |
| HCFC | Hydrochlorofluorocarbons |
| HFCs | Hydrofluorocarbons |
| Hg | Mercury |
| HNTC | Human Toxicity Non Cancer |
| HPMP | Phase-out Management Plan |
| HTC | Human Toxicity Cancer |
| IAQIF | Integrated Air Quality Improvement Framework |
| IATA | International Air Transport Association |
| IATF | Inter-Agency Task Force |

| | |
|---|---|
| IATF-EID | Inter-Agency Task Force for the Management of Emerging Infectious Diseases |
| ICC | International Coastal Cleanup |
| IDO | Industrial Diesel Oil |
| IEC | Information, Education and Communication |
| IEE | Initial Environmental Examination |
| IEMN | International E-Waste Management Network |
| IFO | Industrial Fuel Oils |
| IGES | Global Environmental Strategies |
| IMDG | International Maritime Dangerous Goods |
| IRR | Implementing Rules and Regulations |
| ISP | Institutional Strengthening Project |
| ITWG | Interagency Technical Working Group |
| IUPAC | International Union of Pure and Applied Chemistry |
| JICA | Japan International Cooperation Agency |
| KRA | Key Results Area |
| LBP | Land Bank of the Philippines |
| LCA | Life Cycle Assessment |
| LDC | Less Developing Countries |
| LGU | Local Government Unit |
| LLDA | Laguna Lake Development Authority |
| LPG | Liquified Petroleum Gas |
| LTO | Land Transportation Office |
| LWUA | Local Water Utilities Administration |
| MATDEV | Development of Multiple Materials Platform for Additive Manufacturing |
| MC | Memorandum Circular |
| MC* | Minamata Convention* |
| MCWMC | Metro Clark Waste Management Corporation |
| MEA | Multilateral Environmental Agreements |
| MeHg | Methylmercury |

| | |
|---|---|
| MERS | Mass Emission Rate Standards |
| mg/L | milligrams per liter |
| MMDA | Metro Manila Development Authority |
| MMUTIS | Metro Manila Urban Transportation Integration Study |
| MOA | Memorandum of Agreement |
| MOEJ | Ministry of the Environment of Japan |
| MOOE | Maintenance and Other Operating Expenses |
| MPN | Most Probable Number |
| MRF | Material Recovery Facilities |
| MSW | Municipal Solid Waste |
| MVIS | Motor Vehicle Inspection System |
| NAA | Non-Attainment Area |
| NAAQGV | National Ambient Air Quality Guideline Values |
| NADP | National Atmospheric Deposition Program |
| NAMRIA | National Mapping and Resource Information Authority |
| NAQCAP | National Air Quality Control Action Plan |
| NAQGV | National Air Quality Guideline Values |
| NAQSR | National Air Quality Status Report |
| NASA-AERONET | National Aeronautics and Space Administration - Aerosol Robotic Network |
| NCPP | National Chlorofluorocarbon Phase-out Project |
| NCR | National Capital Region |
| NEAP | Non-Environmentally Accepted Products |
| NEC | National Ecology Center |
| NECP | Non-Environmentally Critical Projects |
| NEEAP | National Environmental Education Action Plan |
| NESSAP | National Emission Standards for Source Specific Air Pollutants |
| NG | National Government |
| NGOs | Non-Government Organizations |

| | |
|---|---|
| NMBPS | National Methyl Bromide Phaseout Strategy |
| NOU | National Ozone Unit |
| NPOA-ML | National Plan of Action for the Prevention, Reduction and Management of Marine Litter |
| NRDC | Natural Resources Development Corporation |
| NSoBER | National State of the Brown Environment Report |
| NSSMP | National Sewerage and Septage Management Program |
| NSWMC | National Solid Waste Management Commission |
| NWQMF | National Water Quality Management Fund |
| NWQSR | National Water Quality Status Report |
| NWRB | National Water Resources Board |
| ODS | Ozone Depleting Substances |
| OEMs | original equipment manufacturers |
| OIMB | Oil Industry Management Bureau |
| OPMS | Online Permitting and Monitoring System |
| ORD | Oxidation – Reduction Potential |
| PAB | Pollution Adjudication Board |
| PAGASA | Philippine Atmospheric, Geophysical and Astronomical Services Administration |
| PATLEPAM | Philippine Association of Tertiary Level Educational Institutions in Environmental Protection and Management |
| PBDE | Polybrominated Diphenyl Ethers |
| PBL | Planetary Boundary Layer |
| PCAA | Philippine Clean Air Act |
| PCBs | Polychlorinated Biphenyls |
| PCEAS | Philippines Center for Environment Awareness and Sustainability, Inc. |
| PCL | Priority Chemical List |
| PCO | Pollution Control Officer |
| PCWA | Philippine Clean Water Act |

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|---|---|
| PD | Presidential Decree |
| PDP | Public Disclosure Program |
| PEISS | Philippine Environmental Impact Statement System |
| PETC | Private Emission Testing Center |
| PFEC | Philippine Federation for Environmental Concerns |
| pH | the potential of Hydrogen |
| PHIVOLCS | Philippine Institute of Volcanology and Seismology |
| PIA | Philippine Information Agency |
| PIC | Prior Informed Consent |
| PICCS | Philippine Inventory of Chemical and Chemical Substances |
| PiChe | Philippine Institute of Chemical Engineers, Inc. |
| PLC | Polymer of Low Concern |
| PM 2.5 | Particulate Matter 2.5 |
| PM 10 | Particulate Matter 10 |
| PMF | Plaster Molding Facilities |
| PMPIN | Pre-Manufacture Pre-Importation Notification |
| PMS | Particulate Matter System |
| PNOC | Philippine National Oil Company |
| PNP | Philippine National Police |
| PNS | Philippine National Standards |
| PNSDW | Philippines National Standards for Drinking Water |
| POD | Philippine Ozone Desk |
| POM | Program Operations Manual |
| POPs | Persistent Organic Pollutants |
| PP | Public Participation |
| PS | Personal Services |
| PTO | Permit to Operate |
| PUJ | Public Utility Jeepneys |
| PUV | Public Utility Vehicle |

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|---|---|
| PUVMP | Public Utility Vehicle Modernization Program |
| RA | Republic Act |
| RAPPID-ADMATEC | Research on Advanced Prototyping and Product Innovation and Development using Additive Manufacturing Technologies |
| RCA | Residual Containment Areas |
| RCVW | Risk Challenge Virtual Workshop |
| RD el | Resource Depletion element |
| RD fos | Resource Depletion fossil |
| RMF | Residual Marine Fuel |
| SARS-CoV-2 | Severe Acute Respiratory Syndrome Coronavirus 2 |
| SAT | Sampling Assessment Team |
| SCTR | Subcommittee on Technical Reachback |
| SDGs | Sustainable Development Goals |
| SDS | Safety Data Sheet |
| SLE | Sustainable Lifestyles and Education |
| SLFs | Sanitary Land Fills |
| SMR | Self Monitoring Reports |
| SOP | Standard Operating Procedure |
| SPTT | Special Permit to Transport |
| SQI | Small-Quantity Importation |
| STMO | Strategic Trade Management Office |
| STP | Sewage Treatment Plants |
| SUNP | Single Use Non-Plastic |
| SUP | Single Use Plastic |
| SWEEP | Solid Waste Enforcement and Education Program |
| SWEET | Solid Waste Educators and Enforcer Team |
| SWM | Solid Waste Management |
| SWMP | Solid Waste Management Plans |
| TBD | Technical Barriers Trade |
| TC 85 | Technical Committee 85 |

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|---|---|
| TDS | Total Dissolved Solids |
| TESDA | Technical Education and Skills Development Authority |
| TLO | Temporary Lifting Orders |
| TOR | Terms of Reference |
| TPSETF | Third Party Source Emission Testing Firms |
| TRAIN Law | Tax Reform for Acceleration and Inclusion Law |
| TRCA | Temporary Residual Containment Area |
| TSD | Treatment, Storage, and Disposal |
| TSP | Total Suspended Particulates |
| TSS | Total Suspended Solids |
| TWG | Technical Working Group |
| UACS | Unified Accounts Code Structure |
| UNEP | United Nations Environment Programme |
| UNIDO | United Nations Industrial Development Organization |
| UP-IESM | University of the Philippines Institute of Environmental Science & Meteorology |
| VCM | Vinyl Chloride Monomer |
| WACS | Waste Analysis and Characterization Studies |
| WEEE | Waste Electrical and Electronic Equipment |
| WHO | World Health Organization |
| WMD | weapons of mass destruction |
| WQG | Water Quality Guidelines |
| WQMA | Water Quality Management Area |
| WQMS | Water Quality Management Section |
| WTF | Wastewater Treatment Facilities |
| WtF | Waste-to-Energy |
| WTO | World Trade Organization |
| WTO-TBT | WTO-Technical Barriers to Trade |
| Yes-O | Youth for Environment in Schools Organization |

# Table of Contents

## Regional Facts and Figures

| Geography | |
|---|---|
| No. of province | 81 Provinces |
| No. of cities | 146 Cities |
| No. of municipalities | 1488 Municipalities |
| No. of barangays | 42,046 Barangays |
| Land area (hectares) | 30 million hectares |
| Forest land | Total Forest Land = 15, 805,325 hectares<br>28.9% Closed Forest, 44% Open Forest, 26% Protected Areas |
| Agricultural | 13.42 million hectares |
| Climate | The Climate of the Philippines is tropical and maritime. It is characterized by relatively high temperatures, high humidity, and abundant rainfall. It is similar in many respects to the climate of the countries of Central America. Temperature, humidity, and rainfall, which are discussed hereunder, are the most important elements of the country's weather and climate. |
| **Demography** | |
| 2021 Population[1] | 111.047 million |
| Population growth rate (%) | 1.51% |
| No. of households | 26,393,906 households (2020) |
| Population density (person/sq. km.) | 379.60 |
| % Urban population | 47.68% |
| Mortality rate (per 1,000 population) | 8 per thousand |
| Five leading causes of mortality | Heart Diseases, Vascular System Diseases, Malignant Neoplasms, Pneumonia, Accidents |
| Five leading causes of morbidity | COVID-19 virus, Acute Respiratory Infection, Acute Lower Respiratory Tract Infection, Bronchitis, Hypertension, |
| % of the population with access to safe water | 47.46% |
| % of households with sanitary toilet | 90% |
| **Economy** | |
| Average annual family income | P 307,190 |
| Gross Domestic Product (GDP) | 23 trillion USD |

[1] https://psa.gov.ph

## I. Executive Summary

The Environmental Management Bureau (EMB) of the Department of Environment and Natural Resources (DENR) is currently working on the environmental management program in coordination with its counterpart agencies, local government units, and private sector stakeholders. This is being done through the DENR's Environmental Management Bureau. Its goal is to significantly cut pollutant emissions caused by the discharge of domestic wastewater, the creation of wastes (such as solid waste, toxic waste, and chemical waste), air pollution, and other aspects that are harmful to the environment or can cause damage to the environment. In general, the Environmental Management Bureau (EMB) is a line bureau of the DENR mandated to implement and enforce six (6) major environmental laws:

1. PD 1586 (Environmental Impact Statement System of 1978)
2. RA 6969 (Toxic Substances and Hazardous and Nuclear Wastes Control Act of 1990)
3. RA 8749 (Clean Air Act of 1999)
4. RA 9003 (Ecological Solid Waste Management Act of 2000)
5. RA 9275 (Clean Water Act of 2004)
6. RA 9512 (National Environmental Awareness and Education Act of 2008).

The year 2021 is being commemorated as the year in which several different calls to action for the revitalization of the environment itself were put into action. While the rest of theworld has been adjusting to the "COVID-19 new normal" from 2016 to 2021, the Philippines have seen a variety of changes in our environment, some of which have been positive while others have been negative. Several natural disasters have also been linked to climate change. The next ten years are the ones that scientists tell us will matter the most in preventing catastrophic climate change, and the EMB has been working nonstop to avoid permanent damage to Earth. A decade may sound like a long time, but these next ten years are the ones that matter the most.

According to the findings of the National State of the Brown Environment Report (NSoBER), there has been a discernible rise in the quality of the environment across the the Philippines. In addition, the report provides an up-to-date summary of the Environmental Management Bureau's activities in terms of the various Multilateral Environmental Agreements (MEA) in which the Philippines has participated.

The Bureau is now implementing the Clean Air Program, the Clean Water Program, and the Solid Waste Management Program out of the ten (10) priority programs under the management of DENR Secretary Roy A. Cimatu and EMB Director William A. Cuñado. To that purpose, extensive analyses and suggestions were included in this report for use in future NSOBE Reports.

### Air Quality

Air quality has been an issue for quite some time, and not only in the Philippines. Air pollution is a serious hazard to human health and the environment, and it comes in many forms, including outside smog and indoor cigarette smoke. Strokes, heart disease, lung cancer, and acute and chronic respiratory disorders are all brought on by the fine particulate matter that is a consequence of ambient (outside) air pollution in both urban and rural regions. According to research conducted in 2018, the Philippines has the third-highest rate of air pollution-related fatalities in the world, with 45.30 per 100,000 residents. This made air pollution a top priority for the WHO in 2019.

Republic Act 8749 (Clean Air Act of 1999) requires the Environmental Management Bureau (EMB), a division of the Department of Environment and Natural Resources (DENR), to ensure that all Filipinos have access to clean air that complies with the National Air Quality

guideline values for criteria pollutants while minimizing any negative effects on the economy.

From 2016 to 2021, air quality in the Philippines improved dramatically. This was no easy feat, given the country's history of volcanic eruptions that have released large quantities of noxious gases into the atmosphere, as well as the transboundary air pollutants that have made their way to the Philippines, such as haze from Indonesia and dust from China. Despite these difficulties, EMB has made significant progress, such as establishing Air Quality Monitoring Stations (AQMS), proposing, and passing legislation and regulations, and conducting air quality sampling and research around the Philippines.
Furthermore, the section also featured the data gathered and presented through the Power BI such as the Particulate Matter 10 and 2.5, Total Suspended Particles, and the Emission Inventory which were established and fully utilized during the pandemic.

The status of air quality in the country is still within the air quality guideline value of 60 µg/Ncm for Particulate Matter 10 (PM10) and 25 µg/Ncm for Particulate Matter 2.5 (PM2.5). However, a slight increase in concentration was observed due to the gradual ease of restrictions as the country slowly opened its economy. An increase in the number of vehicles plying along major thoroughfares was reported by the Metro Manila Development Authority (MMDA) as they decided to bring back the number coding scheme within Metro Manila from 5:00 PM to 8:00 PM every weekday.

In this section of the paper, we also discuss the strategy used to regulate air quality in the face of the new normal, a worldwide pandemic caused by COVID-19. Before this volume, you'll find papers detailing air pollution before (from 2016-2019), during (2020), and the post-pandemic (2021).

## Water Quality

According to a UNICEF assessment from 2013, the Philippines is a developing nation that is also rapidly urbanizing and industrializing. More than 90% of the Philippines' 100+ million population uses unreliable or unsanitary water sources. 55 people a day in the Philippines perish due to water contamination and improper sewage systems.

Water pollution from land (including factories, farms, and homes) is illegal in the Philippines because of Republic Act 9275 (Philippine Clean Water Act of 2004), which requires the DENR to enforce the Environmental Management Board's (EMB) regulations. It offers a multi-sectoral and participatory solution to reduce pollution by incorporating all relevant parties.

Millions of individuals in the Philippines and elsewhere are attempting to weather the COVID-19 outbreak. One of the necessities of existence, water, is out of reach. Having easy access to clean water is more important than ever for the well-being of Filipino families.

The declaration of community quarantine became a limitation during the conduct of monitoring activities specifically on the water quality monitoring of water bodies. Interboundary monitoring from one LGU to another has become a challenge as the Bureau personnel were not able to get actual water samples for analysis due to strict health and safety protocols imposed by the Local Government Units (LGUs). EMB has been working around the clock to prepare for this threat. In 2021, the EMB has successfully categorized 1,156 waterbodies across the Philippines, including all the country's surface waters, groundwater, and coastal and marine waters, despite the pandemic.

In addition to constant water quality monitoring, EMB has also developed several programs and initiatives, such as the Boracay rehabilitation, the adopt an Estero water program, priority rivers, and many more, all to provide Filipinos with the high-quality water they deserve. Part of these efforts review and set effluent standards every five (5) years or as the need arises, Department through the EMB

formulated and approved the "Updated Water Quality Guidelines (WQG) and General Effluent Standards (GES) for Selected Parameters" under DAO 2021-19 dated 30 June 2021 pursuant to Section 19f of Republic Act 9275 This DAO aims to update the water quality guidelines for selected parameters based on the current classification of water bodies and their beneficial use.

## Solid Waste Management

In many areas of the globe, solid waste management is seen as an emergency condition demanding an immediate response from governments and individuals. The amount of waste produced in the Philippines is increasing, and this trend is expected to continue in the coming years. Several causes contribute to the nation's solid waste management problems, including ineffective legal enforcement, a shortage of sanitary landfills, improper disposal, and a rising amount of solid waste.

In the Philippines, solid waste management has not been resolved, especially in heavily populated areas such as Metro Manila. Most issues with the nation's solid waste management arise from inappropriate trash disposal, inadequate waste collection, and a lack of disposal facilities. Diverse sources of trash would continue to contribute to health risks and severe environmental consequences, such as contamination of ground and surface water, flooding, air pollution, and the spread of disease if they were not managed.

The DENR, through the EMB Solid Waste Management Division (EMB-SWMD), is tasked to develop a systematic, all-inclusive, and ecological solid waste management program that would safeguard public health and the environment. The legislation assures the correct segregation, collection, storage, treatment, and disposal of solid waste via the development and implementation of the finest eco-waste products.

One of the highlights of the Bureau's accomplishment during the six years of the report is the closure of all illegal dumpsites in the country. Through the initiative and political will of the DENR Secretary, the DENR through the Environmental Management Bureau (EMB) successfully closed all remaining illegal dumpsites in the country since the passing of the law in 2000. Furthermore, it has been noted that there are 245 fully functioning sanitary landfills for 488 local government units for the last six years, therefore reinforcing efforts to reduce waste output in the Philippines. SWM also helps develop Material Recovery Facilities (MRF) in each barangay. There are 16,418 barangays and 11,637 MRFs in the Philippines.

The mobilization of the EMB Regional Offices to perform on-site monitoring of SLFs in their respective areas was severely impacted by the limitations brought on by the COVID-19 epidemic, which had a direct bearing on the execution of Solid Waste Management. The Bureau largely used statistics and information supplied by local governments and SLF managers. Due to movement limitations imposed during the quarantine period, the EMB Regional Offices had trouble authenticating the supplied data, which might have led to incorrect monitoring of SLF in the areas. Some Regional Offices reduced their SLF monitoring efforts as compared to prior years.

One of the challenges that DENR EMB has experienced is that despite the efforts over the years and the passage of RA 9003 (the Ecological Solid Waste Management Act of 2000), which mandates barangay-level segregation, showed that not all LGUs have implemented the law's mandates to have a solid waste management plan, allocate sufficient funds for its implementation, and require proper segregation in contracts with waste haulers.

## Chemical and Hazardous Waste Management

Under R.A. 6969, the DENR, through the EMB, is tasked with regulating, restricting, or prohibiting the importation, production, processing, sale, distribution, use, and disposal

of chemical substances and combinations that pose an unjustified danger to human health. It also forbids the introduction, even in transit, of hazardous and radioactive wastes and their disposal inside Philippine territorial borders for any reason, and it promotes and facilitates toxic chemical research and study.

Industrialization led to the production of industrial wastes, including hazardous wastes that must be managed to avoid or reduce threats to the environment and public health. Thus, Title III of RA 6969 was primarily intended to address the growing concerns related to poisonous substances, hazardous wastes, and radioactive wastes. It equips regulators and regulated communities with suitable hazardous waste management systems and processes.

This report includes information on the monitoring and survey of chemical importers, distributors, end-users, hazardous waste producers, TSD facilities, and transporters to guarantee their compliance with the Implementing Rules and Regulations of Republic Act 6969. The Online Permitting and Monitoring System (OPMS) was introduced for the application and processing of Chemical Control Order (CCO) registration, Importation Clearance (CCO-IC), and Small Quantity Importation in this portion of the report (SQI). In August of the same year, however, the EMB Director indefinitely stopped the Online Hazardous Waste Manifest System and PCB Online to upgrade the online system and fix various technical concerns. Consequently, all applications pertaining to Hazardous Waste Management were returned to manual processing. Effective 1 June 2020, the Online Hazardous Waste Management System (HWMS) is now operational. Consequently, all transactions pertaining to the management of hazardous wastes must be conducted through the online process of EMB.

Nonetheless, the implementation and monitoring of compliance by each firm are rather difficult, particularly for those with very little and out-of-date training in Environmental Laws. Moreover, some of the difficulties experienced by the EMB under RA 6969 are as follows: i) Information Dissemination (Best Available Technologies for treatment of Hazardous Waste and On-Line Applications for Hazardous Waste Generators, Transporter, TSD Facilities, SQI, CCO Application, etc.); ii) Familiarization with the new system of IIS and online HWMS for processing of HW Generators, Transporters, and facilities; iii) Mobility and Accessibility; Monitoring of establishments in high-risk locations owing to the COVID-19 pandemic; iv) Some businesses are still adapting to the transition to paperless permit applications, and some establishments lack Internet connectivity. Additionally, the system is imperfect and susceptible to technical glitches or errors.

### Environmental Impact Assessment

The Presidential Decree 1586 (Environmental Impact Statement System) or the Environment Impact Assessment System was formally established in 1978. The enactment of Presidential Decree no. 1586 to facilitate the attainment and maintenance of a rational and orderly balance between socioeconomic development and environmental protection. EIA is a planning and management tool that will help the government, decision-makers, the proponents, and the affected community address the negative consequences or risks to the environment. The process assures the implementation of environment-friendly projects.

Constant updates and improvements are made, primarily in the areas of defining and simplifying processes and standardizing standards for the execution and assessment ofthe EIA report and compliance monitoring and reporting. There were 6,204 ECCs awarded in CY 2021,

In addition, 35 projects have received their Environmental Compliance Certificates as of December 2021. Project Screening, Public and Technical Scoping, Procedural Screening,

Environmental Impact Assessment Review and Evaluation via EIARC Meetings, Public Hearings, and Process Documentation have all been completed on time and within scope.

However, community quarantine was established in various regions owing to the COVID-19 epidemic, which also delayed EIA site inspections. Instead, the EIA reports were asked to be verified by requesting the most up-to-date drone photos of the planned project sites.

### Environmental Awareness and Education

The Republic Act 9512 (Environmental Awareness and Education Act of 2008) provides for the promotion of environmental awareness through environmental education which shall encompass environmental concepts and principles, environmental laws, the state of the international and local environment, local environmental best practices, the threats of environmental degradation and its impact on human well-being, the responsibility of the citizenry to the environment and the value of conservation, protection and rehabilitation of natural resources and the environment.

The Department of Education, the Commission on Higher Education, the Technical Education and Skills Development Authority, the Department of Social Welfare and Development, in coordination with the Department of Environment and Natural Resources, the Department of Science and Technology, and other relevant agencies shall be responsible for implementing public education and awareness programs on environmental protection and conservation.

For the past six years, the EMB has been maximizing its resources to bring and improve the environmental awareness and education of Filipinos. The EMB through the Environmental Education and Information Division has been conducting programs and activities.

Furthermore, with the COVID-19 pandemic still affecting the Philippines, environmental events were celebrated without face-to-face interactions. Webinars and contests were conducted with maximum participation from different stakeholders. The EMB website was improved. Likewise, the development of various information, education, and communication materials such as flyers, brochures, activity books, storybooks, videos, infographics, and social cards was carried out. These were printed and uploaded to the EMB Facebook page. The materials were well-received by the public as shown in their high social media engagement. There has been a significant increase of 81% in the EMB's Facebook Page followers/audience from 32,600 last 2020 to 57, 870 in December 2021.

### Environmental Administration

Under E.O. 192, EMB is mandated to provide research and laboratory services; and serve as secretariat in the adjudication of pollution cases.

During the heightened alert of COVID-19, a draft guideline on the conduct of a virtual inspection was developed by the Bureau. This will enable the Regional Offices to conduct the required validation or inspection necessary for the issuance of some environmental permits and to check the compliance of firms regarding environmental laws, rules, and regulations without sacrificing the safety of the firm's employees as well as the Bureau's personnel.

The EMB through the Human Resource and Management Section reviewed the deliberation process of appointments of EMB Regional Offices and endorsed to the Appointing Authority. A total of 131 appointments were issued in CY 2021. 120 appointments with Salary Grade 23 and below were issued by EMB Director and 11 appointments are from DENR Secretary (SG 24).

## II. Air Quality Status in The Philippines

On June 23, 1999, the Philippine Clean Air Act of 1999, or R.A 8749 was signed into law and

took effect on July 19, 1999. Under the Clean Air Act, the DENR-EMB is mandated to:

- Formulate a national program on how to prevent, manage, control, and reverse air pollution using regulatory and market-based instruments, and
- Set-up a mechanism for the proper identification and identification of victims of any damage or injury resulting from the adverse environmental impact of any project activity or undertaking.

The implementation, rules, and regulation of the Clean Air Act (DAO 2000-18) took effect on November 25, 2000. Presidential Decree No. 984, providing for the revision of Republic Act No. 3981, commonly known as the " National Pollution Control Decree of 1976", and by the virtue of Executive Order 192, Series of 1987, the Department of Environment and Natural Resources hereby adopts and promulgates the following rules and regulations.

The revision of said decree is to modify the organizational structure of the National Pollution Control Commission to make it more effective and efficient in the discharge of its functions and responsive to the demands of the times occasioned by the accelerative phase of the country's industrialization program.

### Sources of Air Pollution

In accordance with DAO 2000-81 (Implementing Rules and Regulations for RA 8749), air pollution is defined as "any alteration of the physical, chemical, and biological properties of the atmosphere, or any discharge thereto of any liquid, gaseous, or solid substances that will or is likely to create or to render the air resources of the country harmful, detrimental, or injurious to public health, safety, or welfare, or which will adversely affect their utilization for domestic, commercial, and industrial.

For management purposes, air pollution sources can be classified as stationary, mobile, or area, as described in RA 8749.

Sources of Air Pollution RA 8749 identifies three (3) air pollution sources, namely:

- Stationary source – any building or immobile structure, facility, or installation which emits any air pollutant.
- Mobile source – any vehicle/ machine propelled by or through oxidation or reduction reactions, including combustion of carbon-based or other fuel, constructed or operated principally for the conveyance of persons or the transportation or property or goods that emit air pollutants as a reaction product. The data used in mobile sources include the following:
- Data from published sources such as LTO Registration (Regional/Provincial /Municipal), Total sales of fuel oil and LPG in NCR (DoE), and USEPA CARB emission factors.
- Vehicle Count in major and minor roads, Number of fuel-burning units in each industry, and Fuel Type and consumption rate (total or by unit).
- Area source – relatively large areas of specific activities that generate significant air pollutants. The data used in mobile sources include the following:
  - Data from published sources include waste disposal rate per dumpsite, Statistical Fuel Use, Construction, Fires, and USEPA Emission Factors
  - SMRS of commercial Area Sources, e.g., Gasoline Dispensing, Dry Cleaning, and Population at the barangay level,were available, but household emissions (cooking, garbage burning), Road resuspension were not included.

### Ambient Air Quality Monitoring

The purpose of having prescribed monitoring equipment and technology is to safeguard the DENR-EMB in reporting reliable data - to ensure that any data released is of satisfactory quality and at par with national and international standards. This safeguard results in the DENR-EMB becoming restrictive in the choice of monitoring equipment and technology, which is both an advantage and a disadvantage to them.

The DENR-EMB monitoring network is referenced in the USEPA requirements based on Table 1 of the IRR of RA 8749, Item B. There are considerations given to the local conditions and data availability, such as population and economic activities/ development, and land uses. The required equipment technology of the EMB Central Office is restrictive because its monitoring objective is mainly for compliance with the regulations.

From 2016 to 2021, there are two kinds of Air Quality Monitoring Stations (AQMS) installed throughout the Philippines, Continuous Ambient Air Quality Monitoring Stations, and Manual Monitoring Stations. All monitoring stations should be in strategic sites consistent with the requirements of the National Ambient Air Quality Guideline Values of RA 8749 and the Manual on Air Quality Monitoring and Analysis prepared by the Bureau.

### Continuous Open-Path Monitoring Station

- Differential Optical Absorption Spectroscopy (DOAS) - is an equivalent method used for measuring the concentration of Ozone, Sulfur oxide, Nitrogen Oxide, Benzene, Toluene, and p-Xylene in the air. Calibration Requirement: Reference and Span: $O_3$, $SO_X$, $NO_X$, Benzene, Toluene, p-Xylene (BTX).
- Non–Dispersive InfraRed (NDIR) - is a USEPA reference method for measuring the concentration of Carbon Monoxide (CO) pollutants. Calibration Requirement: Zero and Span: CO.
- Tapered Element Oscillating Microbalance (TEOM) - a USEPA equivalent method used for measuring $PM_{10}$ and $PM_{2.5}$, which uses the gravimetric principle using a standard flow rate of the following: 3.00 liters per minute (lpm) for $PM_{2.5}$, 1.67 lpm for PM Coarse, and 12.00 lpm for Bypass Flowrate, for a total flow rate of 16.67 lpm. Filled-up calibration Requirement: Flow Rate, Ambient Temperature, and Pressure
- Meteorological Instruments (MET) - composed of sensors to monitor Temperature, Pressure, Relative Humidity, Global Radiation, Rainfall, Wind Speed, and Wind Direction. Calibration Requirement: Span values as per manufacturer's specification.

### Particulate Monitoring System (PMS)

It uses the following instruments:

- Beta Attenuation Monitor (BAM) is a USEPA equivalent method that measures the air's particulate Matter (PM 10 and PM2.5). Calibration Requirement: Mass Foil, Flow Rate, Ambient Temperature, and Pressure.
- Meteorological Instruments (MET) - composed of sensors to monitor Temperature, Pressure, Relative Humidity, Global Radiation, Rainfall, Wind Speed, and Wind Direction. Calibration Requirement: Span values as per manufacturer's specification.

### Conventional Monitoring Stations (CMS)

- It uses various USEPA equivalent methods monitoring instruments to measure $SO_2$, $NO_2$, and $O_3$ continuously.

Meteorological conditions that influence the behavior of air pollutants, like wind speed and direction, temperature, rainfall, radiation, and humidity, are also measured in these stations. Pollutant concentrations, e.g., CO, $NO_2$, $SO_2$, and $O_3$ measured by the equipment/analyzer, are stored in the data logger in the station.

The sampling equipment is located all over the Philippines and classified according to the monitoring and criteria pollutants monitored. The highest number of AQMS stations were in NCR with 31.4%, followed by 8.6% in Region 3, 6.7% in Region 5, 5.7% in Region 1,6, and 11, 4.8% in Region 4-A,7,9,3.8% in Region 13, 10, 4-B and 2, 2.9% in CAR and Region 12, and Region 8 with only 1%. It reveals that most of the ambient stations for Northern Luzon were located along the coastlines and that the majority of the AQMS stations are jammed in NCR compared to the other regions.

The EMB has a total of Hundred Six (106) Air Quality Monitoring Stations throughout the Philippines. There are Four (4) kinds of Air Quality Monitoring Stations (AQMS); (1) Open-Path Station, (2) Particulate Matter Monitoring System (PMS) Station, (3) Conventional Monitoring Station, and (4) Manual Monitoring Station.

As of December 2021, approximately 80% of the air quality monitoring stations are operational while 20% are not operational or for repair/replacement.

For 2016-2021, EMB has managed to maintain and monitor all the stations.

In 2017, out of 101 stations, only 98 were monitored due to the stations being not functional and damaged by the typhoon during the past few years. The other stations that weren't monitored were marked as damaged due to the environmental impact on the machine and/or parts of the machine were broken and were not available to produce data due for a long time.

It is also essential to know how many people are served by these stations. According to the graph for the population and the amount of AQMS, the NCR still has the most stations for 2019- 2020. However, NCR ranks as the second-highest region in population with 13,484,462, following Region 4A with 16,195,042. Following the NCR Region with Region 3, the stations and population were balanced.

However, the remaining regions show a limited number of AQMS compared with the number of people.

### Manual Monitoring Stations

It uses USEPA reference method monitoring instruments, particularly the gravimetric method, to measure Total Suspended Particulates (TSP), PM10, and PM2.5. The sampling frequency for this kind of station is once every six (6) days, according to the provisions under section 12 of RA8749.

### National Air Quality Guideline Values (NAQGV)

In compliance with RA 8749 or the Philippine Clean Air Act of 1999, as well as Section 2 of DENR Administrative Order (DAO) 2000-81 or the Review of Air Quality Guideline Values, the Environmental Management Bureau-Department of Environment and Natural Resources (EMB-DENR), together with its created Technical Working Group (TWG) reviewed the PM2.5 Air Quality Index (AQI) Breakpoints.

To protect public health, safety, and the general welfare, the formulated the PM2.5 AQI Breakpoints under the DENR Administrative Order No. 2020-14 or Establishing the Breakpoints for PM2.5 AQI and amending Section 5 (a) of DAO 2013-13 “Establishing the

Provisional National Ambient Air Quality Guideline Values for PM2.5 " was established including cautionary statements. For example, the Total Suspended Particulates (TSP) is a regulatory measure of the mass concentration of particulate matter (PM) in community air.

According to WHO, TSP is one of the air contaminants that might cause health concerns such as developing acute respiratory infections (ARI), asthma, emphysema, lung cancer, cardiovascular illness, and chronic obstructive pulmonary disease.

### Ambient Air Quality Monitoring Results

The annual geometric mean was calculated per region using the annual averages from the monitoring stations with qualified numbers of data. The criteria to be included in the regional geometric average is that the data capture rate in the station must not be less than 75%.

It is important to note that the average station data may not entirely represent the air pollution in the region because of the confounding factors of land use, topography, and meteorology that tend to differentiate the air quality from one place to another in a particular region.

Among the regions, NCR, Region 5, and Region 13 have complete annual monitoring values of TSP from 2004 to 2018. On the other hand, Regions 6 and Region 7 completed the monitoring from 2016 to 2018

Particulate Matters (PM2.5 and PM10) are any solid particles in the air in the form of smoke, dust, and vapors. Particulate matter is produced by many sources, including burning diesel fuels by vehicles, fossil fuels, mixing and applying fertilizers and pesticides, road construction, industrial processes, and operation of woodstoves. Some microscopic particles in the air can be breathed into the lungs, causing increased respiratory disease and lung damage.

In 2019, the values for PM10 showed that Metro Manila (45 µg/Ncm) attained a more significantvalue than the nationwide values (35 µg/Ncm).

However, with the declaration of community quarantine and strict implementation of lockdowns in Metro Manila, 75% data requirement for air quality monitoring stations was not achieved. Hence, data captured in CY 2020 may not represent CY 2020. Overall, the air quality nationwide in terms of PM10 has significantly improved by 55% from CY 2012 baseline (From 60 µg/Ncm in CY 2012 to 27 µg/Ncm in CY 2020).

The improvement in air quality nationwide was attributed to the limited human activity during the declaration of community quarantine starting in March 2020.

High PM concentration might be attributed to its location, which is just a few meters away from the major road where vehicle emissions directly influence the result of the PM concentration, and traffic ranges typically from moderate to heavy during rush hour.

### Annual Total Suspended Particles (TSP) for 2016-2021

Total Suspended Particulates (TSP) refer to all atmospheric particles in the atmosphere with diameters equal to or less than 100 micrometers. These relatively *coarse* particles are mainly related to soiling and dust nuisance.

TSP is a regulatory measure of the mass concentration of particulate Matter (PM) in community air. According to WHO, TSP is one of the air contaminants that might cause health concerns such as developing acute respiratory infections (ARI), asthma, emphysema, lung cancer, cardiovascular illness, and chronic obstructive pulmonary disease.

To measure the TSP, a high-volume air sampler is used to collect total suspended particulate

matter in ambient air with no preference for size selection. According to MC 2005-013, the calculated maximum representative annual concentration for any site in the area during each year of the three (3) years does not exceed the NAAQGV; as for the TSP, the yearly average is 90 ug/cu.m.

### Annual Average Concentration for CO, $SO_2$, $NO_2$, and $O_3$

There is a total of 187 Air Quality Monitoring Stations (AQMS) throughout the islands of the Philippines that are qualified to collect concentration data. The number of air quality monitoring stations did not vary between 2016 and 2018, but in 2020 there were an extra two for carbon monoxide, six for nitrogen dioxide, four for ozone, and six for sulfur dioxide. Between 2016 and 2020, eight AQMS are available for assessing the concentrations.

There was a total of five concentration-sampling sites in Region 3, making it the region with the most available stations.

Regions 4B and 6–9 cannot be monitored by the AQMS because they lack the tools required to gather concentration samples.

In addition, it is essential to closely follow the processes, techniques, and frequency that are outlined in Annex 1.2 to ensure that the criterion pollutants are being monitored, sampled, and measured properly.

Only a fraction of stations has submitted their average annual concentration measurements for the year 2021. With an annual air quality guideline value of 150 ncm/ug, the result for NO2 in the National Capital Region (NAMRIA Station) was 20.59, whereas the result for Region 2 at the St. Paul University Campus station was 1.05. Both collections of data showed a value that was below the mean concentration.

For CY 2021, there was either insufficient data collection or further stations had gone offline, thus only a small amount of data was made available.

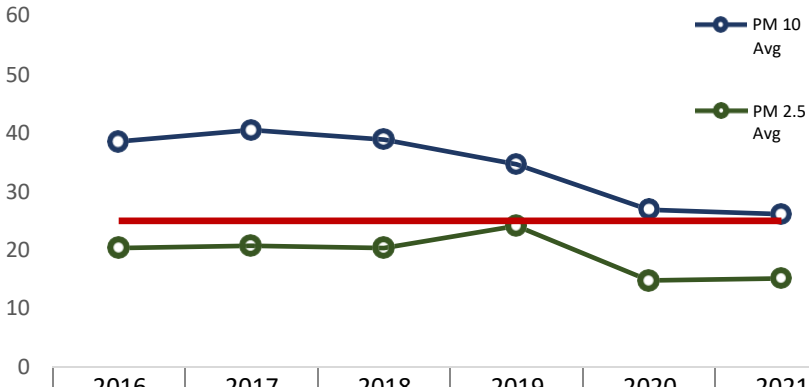



Table 2.1: Ambient Air Quality Monitoring Stations in the Philippines for TSP in Other Urban Centers AQM Stations

| Station Location | 2016 | 2017 | 2018 | 2019 | 2020 | 2021 |
|---|---|---|---|---|---|---|
| Iloilo City | 115 | 83 | 90 | 66 | 34 | 21 |
| Butuan City | 76 | 84 | 115 | 95 | | 118 |
| Naga City | 71 | 91.5 | 104 | | | |
| Mandaue City | 61 | 60 | 59 | | | |
| Iriga City | 57 | 112 | 60 | | | |
| Legazpi City | 41 | 105 | 71 | | | |
| Bocaue | | 412 | 293 | | 218 | 216 |
| San Fernando | | 217 | 90 | | 38 | 112 |
| Cabadbaran City | | 65 | 93 | 92 | | 81 |
| Sta. Cruz | | 41 | 44 | | 70 | 73 |
| Baco | | | 20 | 21 | 20 | |
| Tuguegarao City | | | | 58.5 | 37.5 | 41.33 |
| Cebu City | | | | | | 57 |

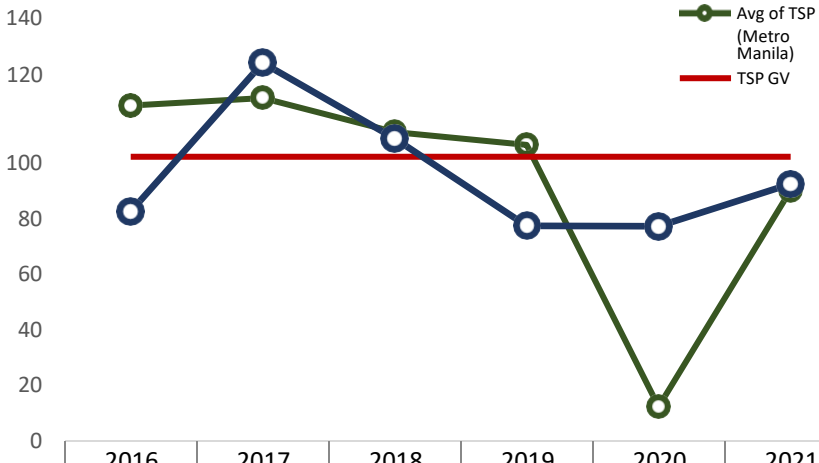
Table 2.2: Ambient Air Quality Monitoring Stations in the Philippines for TSP in Metro Manila AQM Stations

| Station Location | 2016 | 2017 | 2018 | 2019 | 2021 |
|---|---|---|---|---|---|
| BFD Compound East Avenue Q. C. | 138 | | | | |
| Bureau of Fire Cmpd., Ayala Avenue cor., Buendia St., Belair | 122 | 140 | 125 | 103 | |
| Dept. of Health , San Lazaro St., Rizal Avenue | 107 | 99 | 95 | 92 | 78 |
| Mandaluyong City Hall, Maycilo Circle, Plainview | 144 | 126 | 110 | | |
| Manila Observatory, Ateneo De Manila University | 44 | 55 | 57 | 52 | |
| Marikina Sports Complex, Sumulong Highway, Sto. Niño | 107 | 95 | 92 | 95 | |
| National Ecology Center Cmpd. East Avenue Central | | 136 | 120 | 122 | |
| Pamantasan Lungsod ng Valenzuela | 97 | 127 | 93 | 102 | |




| | 2016 | 2017 | 2018 | 2019 | 2020 | 2021 |
|---|---|---|---|---|---|---|
| PM 10 Avg | 38.58 | 40.55 | 38.94 | 34.72 | 26.92 | 26.15 |
| PM 2.5 Avg | 20.36 | 20.71 | 20.36 | 24.13 | 14.78 | 15.16 |
| PM2.5 Annual GV | 25 | 25 | 25 | 25 | 25 | 25 |

Figure 2.1: National Annual PM 10 and PM 2.5, 2016-2021




| | 2016 | 2017 | 2018 | 2019 | 2020 | 2021 |
|---|---|---|---|---|---|---|
| Avg of TSP (Metro Manila) | 108.43 | 111.14 | 98.86 | 94.33 | 0 | 78 |
| TSP GV | 90 | 90 | 90 | 90 | 90 | 90 |
| Avg of TSP (Outside NCR) | 70.29 | 123.82 | 96.58 | 65.17 | 65 | 80.2 |

Figure 2.2: National Total Suspended Particulates, 2016-2021

## Legislation And Policy

From 2016-2021, the DENR-EMB issued policies on air quality management as shown in the table below. These directives were issued to further strengthen the implementation of the air quality efforts in the Philippines. Overall, there are 2 DAO, and 2 EMB MCs approved for the CY 2016-2021.

### Executive Order

| Document No. | Title |
|---|---|
| EO 1997-446 | Mandating The Phase-Out Of Leaded Gasoline As One Of The Means Of Solving Air Pollution |

### Department Administrative Order

| Document No. | Title | Date Approved |
|---|---|---|
| DAO2020-14 | Establishing the Breakpoints for Particulate Matter 2.5 (PM2.5) Air Quality Index (AQI) and Amending Section 5 (a) of DAO 2013-13 "Establishing the Provisional National Ambient Air Quality Guideline Values for Particulate Matter 2.5 (PM2.5)" | October 21, 2020 |
| DAO 2016-23 | Adoption of Euro 4/IV Emission Limits / Standards | June 28, 2016 |

### EMB Memorandum Circular

| Document No. | Title | Date Approved |
|---|---|---|
| EMB MC 2020-17 | Guidelines on the Issuance of Permit to Operate (PTO) for Air Pollution Source Installation or Equipment (APSI/APSE) through the Online Permitting and Monitoring System (OPMS) | May 11, 2020 |
| EMB MC 2020-003 | Mandating All EMB Regional Offices (EMB-ROs) to Establish an Air Quality Network Center using a Uniform Data Acquisition and Handling System (DAHS), which shall act as a Repository of Industrial Emission of Firms Required to install Continuous Emission Monitoring Systems (CEMS) / Continuous Opacity Monitoring System (COMS) | January 27, 2020 |

## Air Quality Management

### Air Quality Management Fund

The Air Quality Management Fund (AQMF) was set up to finance the containment, removal, and clean-up operations of the Government in pollution cases; guarantee restoration of the ecosystems and rehabilitate areas affected by the acts of violators of the Clean Air Act; and to support research, enforcement and monitoring activities and capabilities of the relevant agencies, as provided under the Rule of the IRR of RA 8749.

The fund is used for activities that directly support the objectives outlined in the Air Quality Action Plan of the Airsheds. It is reserved for national purposes and is allocated among the airsheds in support, grant, or financial assistance. In 2016, the Air Quality Management Fund (AQMF), formerly labeled Fund 155, was changed to fund 337 due to UACS's revised chart of accounts. The fund collections reported here include supervision and regulation enforcement fees, other service income, other gains, LTP fines, and Penalties. Air Quality Management Fund.

From 2020 to 2021, due to the ongoing Corona Virus Disease 2019 (COVID-19) pandemic, the actual fund collection was a lot smaller than the target values. Aside from the heavily imposed lockdowns, other cities and regions have waived the payment of the late penalties. This move encourages the citizens to stay at home and observe the imposed quarantine guidelines to minimize the spread of COVID-19. However, the fines and penalties can be renewed after the quarantine has been lifted.

The following details can be seen through the help of the National Budget Circular 542, which shall maintain a transparency seal containing information such as annual reports and assessment reports as required under the National Budget Circular Nos. 507 and 507-A dated January 31, 2007, and June 12, 2007, respectively, for the last three (3) years

Table 2.3: Consolidated Air Quality Management Fund, 2016-2021

| | 2016 | | 2017 | |
|---|---|---|---|---|
| AQMF | Target | Actual | Target | Actual |
| Supervision and regulation of Enforcement Fees | ₱43,900,000.00 | ₱33,940,810.74 | ₱26,463,000.00 | ₱103,589,720.88 |
| Other Service Income | ₱2,584,000.00 | ₱59,375.00 | ₱4,550,000.00 | ₱22,130.00 |
| Other Gains | | ₱1,430.00 | | |
| LTO Fines and Penalties | | ₱85,000.00 | ₱15,765,000* | |
| Total | ₱46,484,000.00 | ₱34,086,615.74 | ₱31,013,000.00 | ₱103,611,850.88 |
| DATA SOURCE | FAR5ASOFDECEMBER2016 | | FAR5ASOFDECEMBER2017 | |

* to LTO Deposited to LTO funds

| | 2018 | | 2019 | |
|---|---|---|---|---|
| AQMF | Target | Actual | Target | Actual |
| Supervision and regulation of Enforcement Fees | ₱108,770,000.00 | ₱100,238,885.23 | ₱114,205,000.00 | ₱130,032,966.04 |
| Other Service Income | ₱23,000.00 | ₱572,840.00 | ₱25,000.00 | ₱77,933.00 |
| Other Gains | | ₱5,960.00 | | |
| LTO Fines and Penalties | | | | ₱58,643.50 |
| Total | ₱108,793,000.00 | ₱100,817,685.23 | ₱114,230,000.00 | ₱130,169,542.54 |
| DATA SOURCE | FAR-5-as-of-December-2018 | | FAR-5-as-of-December-2019.pdf | |

| | 2020 | | 2021 | |
|---|---|---|---|---|
| AQMF | Target | Actual | Target | Actual |
| Supervision and regulation of Enforcement Fees | ₱119,918,000.00 | ₱79,451,558.54 | ₱132,210,000.00 | ₱91,883,373.17 |
| Other Service Income | ₱26,000.00 | ₱236,840.50 | ₱28,000.00 | ₱685,459.50 |
| Other Gains | | | | |
| LTO Fines and Penalties | | | | |
| Total | ₱119,944,000.00 | ₱79,688,399.04 | ₱132,238,000.00 | ₱92,568,832.67 |
| DATA SOURCE | FAR-5-as-of-December-31-2020.pdf | | Far-5-as-of-December-2021.pdf | |

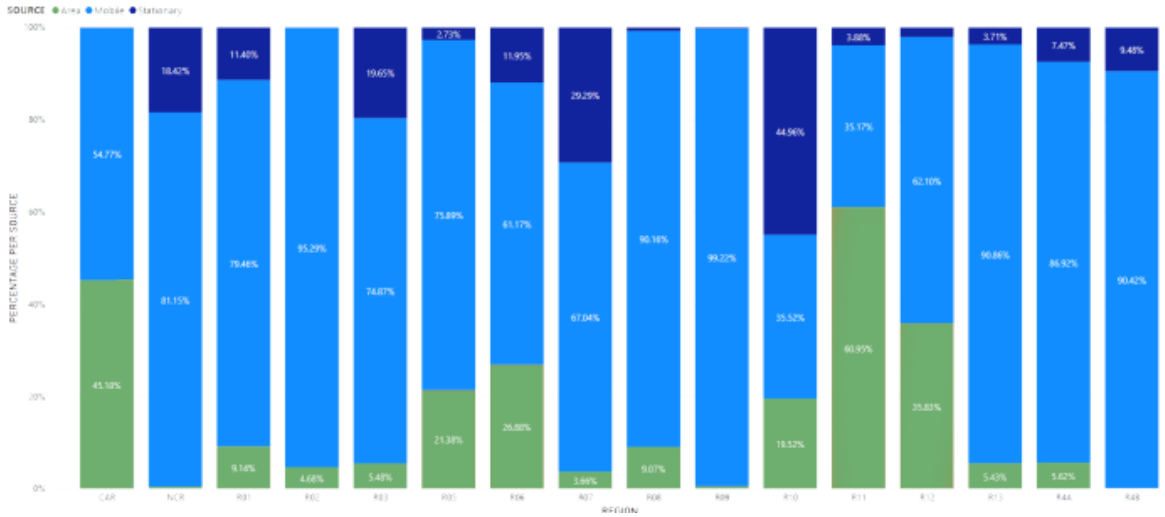


Figure 2.3: Regional Emission Inventory Percentage of Source, 2018

The EMB is required under RA 8749 or theClean Air Act to conduct an inventory of emissions once every three years. The Emissions Inventory (EI) estimates come from stationary, mobile, and area sources.

In 2015 and 2018, the encoded data shows that the prominent emission source generally came from the Mobile Sources for all the emissions.

The annual geometric mean was calculated per region using the annual averages from the monitoring stations with qualified numbers of data. The criteria are that to be included in the regional geometric average, the data capture rate in the station must not be less than 75%.

When averaged, it is important to note that the station data may not entirely represent the air pollution in the whole region because of the confounding factors of land use, topography, and meteorology that tend to differentiate the air quality from one place to another in a particular region.

The Emissions Inventory by source conducted in 2015 shows that the majority (65%) of air pollutants came from mobile sources such as cars, motorcycles, trucks, and buses. Almost 21 percent were contributed by stationary sources such as power plants and factories. The rest (14%) were from area sources such as construction activities, open burning of solid wastes, and kaingin in the uplands

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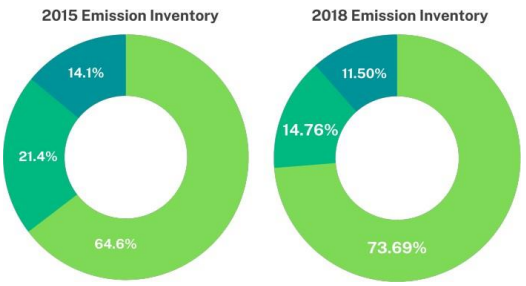
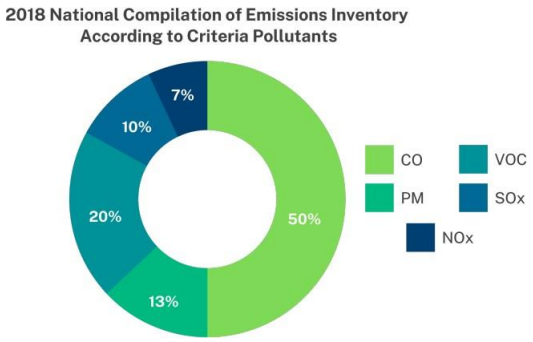



Figure 2.4: National Emission Inventory, 2015 and 2018

Emissions from mobile sources rose at the national level from 65% in 2015 to 74% in 2018; their levels also showed a growing tendency from 2002 to 2018, at a pace of two million tons per year. Since its 2015 peak, both the stationary and the area sources have declined: the former by 21.4% to 14.76% and the latter by 14.19% to 11.50%.




Based on the 2018 National Emission Inventory, most of the regions in the country point to mobile emissions as the major source of air pollution in the country. It was estimated that 73.69% were from mobile sources, 14.76% from stationary sources, and 11.55% from area sources. The stationary source has decreased by 20% since its 2015 value, while the area source decreased by 5% from its 2015 inventory.

## Management of Stationary Sources

"Stationary source" refers to any building, fixed structure, facility, or installation that emits or may emit any air pollutant. Existing stationary sources of air emissions situated within an attainment region for a specific pollutant, or pollutants will be required to pay a charge for the mass rate of emissions for those pollutants.

For stationary sources, the EMB conducts source emission testing of firms to determine their compliance with the National Emission Standards for Source-Specific Air Pollutants (NESSAP). Further, all sources of air pollution that may emit or emits air pollutants must secure a valid Permit to Operate (PTO) issued by the EMB Regional Director unless otherwise stated under Annex C of MC 2020-17.

Firms operating such sources are required to designate a Pollution Control Officer (PCO) to oversee all environmental permits and clearances and submit Quarterly Self Monitoring Reports (SMRs) and Semi-Annual Compliance Monitoring Reports (CMR) (if applicable) to the EMB. Given the voluminous stationary sources, the DENR-EMB, through DAO 2013-26, has Accredited Third Party Source Emissions Testing Firms to cater to the testing needs. Further, for large sources which may emit >750 tons/year of any regulated pollutant, installation of Continuous Emission Monitoring (CEMS) / Continuous Opacity Monitoring System (COMS) is required.

The CEMS/COMS data are submitted in real-time to the EMB Data Acquisition and Handling System (DAHs) of the EMB Central and Regional Offices. PTO includes the name and address of the firm, date of issuance and expiration ofPTO, applicable emission limits, reportorial requirements, list of APSI and APCD with corresponding capacity, and operational and other conditions.

Bantay Tsimineya is one of the components of the Linis Hangin Program, it focuses on the industrial sources of air pollution.

To strengthen the enforcement of the Bantay Tsimeneya, the DENR EMB Accredited Third Party Source Emission Testing Firm conducts stack emission testing for compliance purposes.

For Large Sources (>750 tons/year), the Installation of a Continuous Emission Monitoring System (CEMS) is required. Before operations, firms are required to secure a Permit to Operate (PTO) for each source, designate a Pollution Control Officer (PCO) to oversee all appropriate duties regarding the operation of the air pollution source in control facilities, and submit quarterly self-monitoring reports (SMRs) to the DENR-EMB.

In 2018, the performance increased by 53%due to the intensified survey conducted in compliance with the instruction of the DENR Secretary to conduct a survey and inspection of all establishments located on the beaches/recreational waterbodies. This larger coverage of permits to operate has led to a major improvement in stationary emissions which decreased to 20% since the 2015 inventory.

In 2019, the numbers have decreased. In 2020, there are over 4,200 Firms surveyed and 440 COC issued nationwide, despite the several lockdowns caused by the COVID-19 pandemic, EMB has managed to continue the industrial compliance monitoring and the linis hanging program.

### Third-Party Source Emission Accredited Stack Testers (CY 2021)

To monitor all sources with the potential to emit air pollution, the Bureau accredits Third Party Source Emission Testing Firms (TPSETF) to carry out source emission tests and effectively perform sampling activities in accordance with the provision of the Philippine Clean Air Act (PCAA) and its Implementing Rules and Regulations (IRR). According to DAO-2006-003[2] the objectives of the third-party source emission testing firms are the following:

- Assure stakeholders, regulators, and the public of the reliability of source emission test results; and;
- Ensure that accredited firms are fully capable of conducting source emission tests in accordance with the IRR of RA 8749 (DAO 2000-81).

DENR-EMB TPSETF Firm conducts stack emission testing for compliance purposes. For Large Sources ( >750 tons/ year), the Installation of a Continuous Emission Monitoring System (CEMS) is required. Before operations, firms are required to secure a PTO for each source, designate a Pollution Control Officer (PCO) to oversee all appropriate duties regarding the operation of the air pollution source in control facilities, and submit quarterly SMRs to the DENR-EMB.

While there is a vast number of TPSETF located in Metro Manila (NCR), people involved in this manner should also note that those who would like to avail of the service are allowed to take the testing in parts of the Philippines.

The TPSETF undergoes written, oral and proficiency exams to pass the accreditation. These are done by the Sampling Assessment Team (SAT) which are selected personnel of AQMS from the central and regional offices. The said team also conducts regular monitoring/observation of accredited firms to ensure that they continuously follow proper testing procedures. Annual training on stack emission testing is also carried out to provide lectures to stack testers aside from the regular coordination meeting to discuss updates, issues, and concerns.

In 2024, 29% of the current TPSETF would end their license in 2023, 24% in 2025, 26% in 2022, and 21% in 2024. The renewal of their accreditation shall be valid for three (3) years and shall be renewed within two months before its expiration. They must also comply with the requirements for renewal such as i) assessment of previous stack testing activities; ii) good standing record, and iii) continuing education on air quality source emission testing.

### Management of Mobile Sources

Mobile sources are any vehicle propelled by or through the combustion of carbon-based or other fuel, constructed and operated principally for the conveyance of persons or the transportation of property or goods. It has already been reported in the 1996 to 1999 Metro Manila Urban Transportation Integration Study (MMUTIS) that the sources of major atmospheric pollutants such as particulate matter and NOx come mostly from motor vehicle exhaust emissions mainly attributed to jeepneys, buses, and taxicabs.

The total volume of emissions of criteria pollutants attributed from the transport sector disaggregated as to the types of motor vehicles

[2] DAO-2006-003 (emb.gov.ph)

and areas of operation have not yet been fully studied and reported.

The DENR-EMB-NCR escalated its anti-smoke bellowing campaign by roadside apprehension throughout the stretch of EDSA and other high-traffic density zones in Metro Manila under the Bantay Tambutso program. Some anti-smoke spewing operations were organized in Caloocan, Quezon, Mandaluyong, Makati, Pasay, Mandaluyong, and Muntinlupa.

In comparison with the previous NSoBER, the Bantay Sunog, and Bantay Tambutso sa Eskwela and Malls were no longer implemented under the EMB.

### Private Emission Testing Center (PETC) Program

The implementation of the Act is a multi-sectoral undertaking to be spearheaded by the DENR. The institutions involved in the implementation of the various components of the Act such as in the Mitigation of air pollution from mobile sources, the DENR is joined by the Land Transportation Office (LTO), Department of Transportation (under Sec 21,25, and 46), and other private sectors.

The two programs that were conducted under the mitigation of air pollution from mobile sources were the PETC and the MVIS.

The PETC is a privately – owned facility for determining the level of opacity and testing the gaseous content of motor vehicle emissions. Its job is to determine if the vehicle emissions conform to the standards set by the DENR under the CAA. Compliance with emission standards of all motor vehicles has been started in January 2003 in a nationwide scope through the operationalization of PETCs.

### Motor Vehicle Inspection System Inspection (MVIS) Project

The MVIS, under the DAO 2000-82 of the DENR mentioned that the used (in-use) vehicles shall be required to meet emissions standards contained in the IRR to renew their registrations.

This compliance shall be demonstrated through mandatory yearly inspections, to be carried out through the Motor Vehicle Inspection System (MVIS), operated by the Department of Transportation and Communication / Land Transportation Office (DOTC/LTO), or its authorized private MVIS.

For CY 2016-2021, LTO received a total revenue of ₱34,207,680 for the 13,751 apprehended vehicles due to smoke belching. CY 2021 is the year where there was the lowest number (755) of vehicles apprehended, and CY 2018 was noted as the year with the highest number of vehicles (4,243) apprehended.

Both programs aim to reduce the Total Suspended Particulates (TSP) concentration along the airsheds in the Philippines and also to promote public awareness about air pollution, inculcate environmental awareness and a culture of voluntary compliance with environmental regulations among motorists, and reduce pollution from mobile sources by up to 20%.

### Certificate of Conformity (COC)

In compliance with the Memorandum Circular No. 2018 – 05: Implementing Guidelines For The Conduct of An Actual Inspection Of New Motor Vehicles To The Issuance Of A Certificate Of Conformity (CoC) from the Department of Environment and Natural Resources (DENR), through the Environmental Management Bureau (EMB) in accordance with the Section 22 of the Philippine Clean Air Act of 1999 (RA 8749), the Air Quality Management Section (AQMS) issues a Certificate of Conformity (COC) to all new imported or new locally-assembled motor vehicles to be introduced to the Philippine market. The COC is a requirement for the registration of all new vehicles which certifies their compliance with existing emission standards and EURO IV Emission Limits (DAO 2015-04).

The Certificate of Conformity (COC) shall be issued by the Department through the Bureau to a motor vehicle manufacturer, assembler, or importer certifying that a motor vehicle type complies with the numerical emission standards in this Rule, using the relevant ECE test procedures or their equivalent as approved by the Department. No new motor vehicle shall be allowed initial registration unless a valid COC issued by the Department through the Bureau is granted. New motor vehicles shall refer to the following:

- Motor vehicles are designed and manufactured in the Philippines using brand-new engines and spare parts.
- Motor vehicles assembled in the Philippines using original and brand-new parts and components imported into the country are completely knocked down (CKD); and
- New motor vehicles completely built-up (CBU) imported into the country.

From 2016 to 2021, a total of 2979 COCs were issued. The CoC was divided by the type of vehicles which were classified as heavy-duty vehicles (33%), passenger vehicles (32%), motorcycles (26%), and light vehicles (9%).

Additionally, it was also shown that 53% of theissued CoCs vehicles used diesel in comparison with gasoline. One of the reasons Filipinosprefer diesel is that it is easier to refine from crude oil than gasoline because it is heavier and less flammable. As a result, diesel frequently costs less than gasoline in most nations. Additionally, diesel fuel is around 25% less expensive in the Philippines.

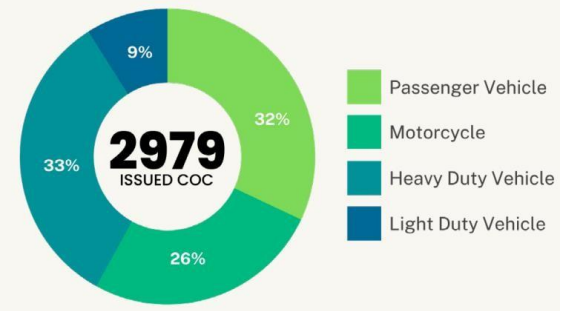



Figure 2.5: Percentage of Issued COC

In 2019, DENR through EMB is now accepting online applications for its COC issued to new vehicles which certify a vehicle's compliance with existing emission standards. The online service allows for a convenient and transparent process of acquiring documents from the EMB. The emission standards are set pursuant to the Act, as evidenced by a Certificate of Conformity (COC) issued by the DENR, through the EMB.

*The Application for a COC shall be submitted by the motor vehicles manufacturer, assembler, importer, or their duly authorized representatives, through the Online Permitting and Monitoring System (OPMS) of the Bureau.*

### 2018 Study on Jeepney Contribution to Mobile Source Emission

The jeepney has been one of the main modes of transportation in the Philippines since World War 2. In the 1930s, these evolved into modified imported automobiles with attached carriages that operated as low-cost passenger utility vehicles in Manila. Despite being the most popular mode of transportation in the Philippines, the jeepneys are also known for their random stopping and starting to let people on and off, which is the usual cause of

significant traffic congestion. Unlike the buses, the jeepneys have no set stops. Furthermore, in the streets of metro manila alone, it was found that diesel-fed jeepneys were responsible for 15% of the particulate matter emissions in Metro Manila.

Additionally, in a study conducted by the EMB in support of the DOTR's Public Utility Vehicle Modernization Program (PUVMP), it was found that Jeepneys contribute at least 25% or about 42,602.40 tons/ year of the emissions from the UV sector.

The EMB, as empowered by the Philippine Clean Air Act of 1999 (RA 8749) and in coordination with the Local Government Units (LGU), monitors smoke-belching vehicles through the Anti-Smoke Belching Units (ASBU) to apprehend violators and conduct information campaigns. In order to determine the impact of the emissions from Jeepneys, the EMB study used CALPUFF to approximate hot spot areas within Metro Manila.

In 2019, it was found that 40,392, or 66% of apprehended vehicles that ply through Metro Manila's thoroughfares failed the testing. Quezon City has the highest smoke-belching vehicle at 96% (4,828).

### 2019 Roadside Emission Apprehensions

Roadside Anti-Smoke belching apprehension aims to ensure compliance of mobile vehicles with the emission standards set by RA 8749 or the Philippine Clean Air Act. Random monitoring was conducted to apprehend in-use vehicles, including trucks, utility vehicles, buses, and motorcycles, for fuel efficiency, management, and regular vehicular maintenance.

Any vehicle suspected of violation of emission standards through visual signs, such as, but not limited to, smoke-belching, shall be subjected to an emission test by a duly authorized testing center; for this purpose, the DOTC or its authorized testing center shall establish a roadside inspection system. Furthermore, all law enforcement officials and deputized agents accredited to conduct vehicle emissions testing and apprehensions shall undergo mandatory training on emission standards and regulations. For this purpose, the Department, together with the DOTC, DTI, DOST, Philippine National Police (PNP), and other concerned agencies and private entities, shall design a training program.

In 2019, a total of 60,000 vehicles underwent roadside apprehension by EMB in partnership with DOTR, LTO, and MMDA. The Vans (PVT), also known as the Private Vehicles, was marked as the highest vehicle type with 82.72% that have failed the roadside apprehension; meanwhile, the tow trucks were the lowest vehicle type with 9.29%.

In April 2020, no roadside apprehension occurred in all theregions due to the Enhanced Community Quarantine Lockdown (ECQ). This was to follow the IATF Guidelines and health protocols to prevent and minimize the local spread of emerginginfectious diseases in the country. MMDA implemented the No Contact Traffic Apprehension, which utilizes CCTV, digital cameras, and other gadgets or technology to capture videos and images to apprehend vehicles violating traffic laws, rules and regulations.

In some regions, roadside apprehension is still conducted. In 2021, Region 5 and 6 representatives from EMB, together with the representatives from LGU, LTO, and other assigned officers, conducted a roadside apprehension. But instead of giving tickets to violators, they distributed IEC materials like stickers and eco-friendly bags to PUJ and PUV drivers and reminded them to maintain the excellent upkeep of their engines to reduce air pollution.

Table 2.4: Number of Apprehension by Vehicle Type

| Apprehension by Vehicle Type | PASSED | % Passing | FAILED | % Failing |
|---|---|---|---|---|
| 1. Vans (PVT) | 3,799 | 17.28% | 18,184 | 82.72% |
| 2. PUJ | 4, 409 | 35.81% | 7,902 | 64.19% |
| 3. Vans (PUV) | 2,444 | 25.77% | 7,039 | 74.23% |
| 4. TRK | 2, 747 | 40.02% | 4,117 | 59.98% |
| 5. PUB | 2,895 | 43.61% | 3,743 | 56.39% |
| 6. SUV | 316 | 26.53% | 875 | 73.47% |
| 7. SEDAN (PVT) | 509 | 43.25% | 668 | 56.75% |
| 8. SEDAN (Taxi) | 173 | 40.52% | 254 | 59.48% |
| 9. TOW TRK | 332 | 90.71% | 34 | 9.29% |

## Improvements In Transport System that Affects the Air Quality in The Philippines

RA 8749 indicates that the mobile sources are LIMITED to vehicles constructed and operated "principally for the conveyance of persons or the transportation of property or goods in a public highway or street open to public use." In 2016-2021, the Philippines adjusted themeans of commuting for the people, by implementing the EURO 4 E-Jeepneys, formulation of the EDSA Carousel, and the BikeLanes which were further strengthened during the 2019-2020 lockdowns. However, RA 8749 limits the DENR-EMB authority to the other mobile sources. The off-road vehicles such as in shipping ports, aviation, and rail were all handled by other agencies.

### Euro 4 In the Philippines

The Euro standards were intended to control pollutant emissions from automobiles and have been extensively accepted or used as a foundation for local, comparable standards across the world. Euro 1 through Euro 6 is the six tiers of these criteria, with the first being the most permissive and the final being the most stringent. In January 2016, the Department of Environment and Natural Resources mandated that all fuels in the Philippines meet the Euro 4 standard. This standard permits fuels containing up to 50 ppm of sulfur and up to 1% benzene in unleaded gasoline.

### Jeepney And Tricycle Modernization

Jeepneys are one of the most popular means of transportation in the Philippines, in line with this, most LGUs such as Pasig, Manila, Muntinlupa, Valenzuela, and Mandaluyong had been using e-vehicles in their cities. However, other parts of the country such as Region 2, and 4A were not implementing the advancement yet. Furthermore, based on the emission inventories conducted by EMB Region V, it was found that almost 75% of emissions come from mobile sources, and once the Jeepney Modernization's implementation is completed, these emissions will gradually decrease.

### EDSA Bus Carousel

In 2018, a proposal for a Bus Rapid Transit system using World Bank financing was accepted. The Quezon Avenue, EDSA was supposed to be the second phase of the development of the bus rapid transit system. Line 2, dubbed the Central Corridor, would eventually become the EDSA Carousel. The Inter-Agency Task Force for the Management of Emerging Infectious Diseases (IATF-EID) issued a community quarantine on March 16, 2020, in response to the COVID-19 pandemic which suspended practically all public and private transit along EDSA. This opened the path for the EDSA Busway to be built right away. The EDSA Busway is only open to authorized buses and emergency vehicles like ambulances.

### Bike Lane In EDSA

The Department of Transportation (DoTr), Department of Public Works and Highways (DPWH), and the Metropolitan Manila Development Authority (MMDA) will work on the installation of bollards, lightings on bicycle paths, and painting of lanes, as part of the government's bicycle lane project to ensure the

safety of the cyclists. These improvements to be instituted have been agreed upon during an inspection of bicycle lanes on Metro Manila roads. The promotion of the usage of bikes has been helpful not only for the physical well-being of Filipinos but also in lessening the air pollution in Metro Manila. Bikes do not emit hazardous pollutants into the atmosphere, nor do they emit carbon dioxide, which contributes to climate change. It is estimated that a modest increase in bicycle use each year might save 6 to 14 million tons of CO2.

### Management of Area and Other Sources

An area source is a source of air emissions that is not confined to a discrete point or points of emissions, examples of which (but not limited to) are construction activities (TSP or PM10), unpaved road ways (TSP or PM10), lagoons (photochemically reactive compounds and/or other emissions), industrial facilities with many small or generalized potential sources such as valves, seals, etc. (photochemically reactive compounds and/ or other emissions); and common generally industrial, small, non-regulated point sources (e.g. dry cleaners and gasoline stations) where the point source(s) cannot feasibly or practically be measured.

Household cooking, meat curing, and waste burning are also among the contributors to area sources. Pursuant to Part VII, Section 13 (d) of the RA 8749 IRR, open burning of materials such as plastic, polyvinyl chloride, paints, ink, wastes containing heavy metals, organic chemicals, petroleum-related compounds, industrial wastes, ozone-depleting substances and other similar toxic and hazardous substances, is prohibited.

### Attainment and Non-Attainment Areas

The Bureau shall delineate areas where the existing ambient air quality is at below the National Ambient Air Quality Guideline Values given in Part II and designate such areas as “attainment areas.” Designation of attainment areas will be based onmonitoring data collected using the reference methods in Part II and other relevant information, including meteorological data anddata covering existing nearby sources.

One of the Air Quality Principles stated in the IRR of RA 8749 is the recognition that the air quality management is primarily area- based and that are most effective at the level of airsheds. As defined in the act, “Airsheds” are areas with similar climates, meteorology, and topology which affect the interchange and diffusion of pollutants in the atmosphere.

Sub-areas within Airsheds may therefore have similar air quality, and encounter similar problems, development programs, and prospects.

### Status of Airsheds

The basis of the designation for the attainment and non-attainment relies on Section 2 of MC 2005-013, wherein, the area shall be based on monitoring data collected using the reference methods and other equivalent methods approved by the Bureau in Part 2 of DAO 2000-81 and/or other relevant information, including meteorological data, and data covering existing nearby sources.

As of 2021, there are a total of twenty-two (22) airsheds in the Philippines, five (5) of which are geothermal airsheds that are specially designated due to the presence of a geothermal plant in the area. For each of the airsheds officially designated, Governing boards have also been established.

Table 2.5: Designated Airsheds in the Philippines

| NAME OF AIRSHED | DAO / MC No. | DATE SIGNED | AREAS COVERED |
|---|---|---|---|
| NATIONAL CAPITAL REGION AIRSHED | DAO 2011-11 | October 19, 2011 | Valenzuela, Malabon, Navotas, Caloocan, Manila, Quezon City Marikina, San Juan, Mandaluyong, Makati, Pasig, Pateros, Pasay, Taguig, Paranaque, Las Pinas, Muntinlupa |
| BLISTT AIRSHED | DAO 2003-04 | February 12, 2003 | Baguio, La Trinidad, Itogon, Sablan, Tuba |
| NORTHEASTERN PANGASINAN (NEPA) AIRSHED | DAO 2004-07 | March 23, 2004 | Binmaley - 2nd District, Lingayen - 2nd District, Calasiao - 3rd District, Binalonan - 4th District, Laoac - 5th District, Pozorrubio - 6th District, Sison - 5th District, Urdaneta City - 5th District, San Manual - 6th District, San Fabian - 4th District, San Jacinto - 4th District, Mangaldan - 4th District, Malasiqui - 3rd District, Mapandan - 3rd District, San Carlos City - 3rd District, Sta. Barbara - 3rd District, Dagupan City - 4th District, Manaoag - 4th District |
| METRO TUGUEGARAO (PIESTTA) AIRSHED | DAO 2004-05 | May 23, 2004 | Penablanca, Iguig, Enrile, Solana, Tuguegarao City, Tuao, Amulong |
| BULACAN - PAMPANGA - BATAAN AIRSHED | DAO 2011-11 | October 19, 2011 | Apalit, San Simon, Minalin, Sasmoan, Guagua, Lubao, Floridablanca, San Fernando City, Macabebe, Masantol, Sta.Rita, Bacolor, San Luis, Mexico, Sta. Ana, Candaba, Arayat, Magalang, Angeles City, Balibago, Mabalacat, Clark Special Economic Zone, Hermosa, Orani, Samal, Abucay, Balanga, Pilar, Orion, Limay, Mariveles, Sta.Maria, Meycauayan, Obando, Bocaue, Balagtas, Marilao, Malolos City,San Jose del Monte, Norzagaray, Angat, Plaridel, Hagonoy, Calumpit, Paombong, Guiguinto, Pulilan, San Idefonso, San Rafael, Baliuag, Bustos Dona Remedios Trinidad |
| CAVITE - LAGUNA - RIZAL AIRSHED | DAO 2011-11 | October 19, 2011 | Bacoor, Kawit, Noveleta, Cavite City, Rosario, Tanza, Naic, Ternate, Maragondon, Magallanes, Tagaytay City, Mendez, Indang, Silang, Carmona, Dasmarinas, Imus, Gen.Trias, Trece Martires, Alfonso, General Mariano Alvarez, Amadeo, San Mateo, Montalban, Antipolo City, Taytay, Angono, Cainta, Teresa, Binangonan,, Jala-jala, Pililia, Tanay, Cardona, Moraon, Baras, Talim Island, San Pedro, Binan, Sta. Rosa, Cabuyao, Calamba City |
| BACO-CALAPAN CITY-NAUJAN AIRSHED | DAO 2006-02 | January 16, 2006 | Baco, Calapan City, Naujan |
| NAGA CITY AIRSHED | DMC 2003-13 | July 14, 2003 | Mabulo, Sabang, Triangulo, Concepcion Pequna, Bagumbayan Sur, Bagumbayan Norte, Coception Grande, Calauag, Penafrancia, Dayangdang, Dinaga, San Francisco, Cararayan, San Isidro, Carolina, Panicuason, Tinaga, Abella, Sta. Cruz, Del Rosario, Pacol, Liboton, San Felipe, Naga |
| LEGAZPI CITY AIRSHED | MC 2015-03 | March 26, 2015 | Legazpi City |

Table 2.6: Designated Geothermal Airsheds in the Philippines

| NAME OF AIRSHED | DAO / MC No. | DATE SIGNED | AREAS COVERED |
|---|---|---|---|
| METROPOLITAN ILOILO AIRSHED | DAO 2005-11 | June 10, 2005 | Iloilo City, Oton, San Miguel, Pavia, Leganes |
| METRO CEBU AIRSHED | DMC 2002-11 | October 07, 2002 | Cebu City, Mandaue City, Lapu-Lapu City, Talisay City, Naga, Minglanilla, Cordova, Compostela, Consolacion |
| TACLOBAN CITY AIRSHED | DAO 2015-11 | May 29, 2015 | Tacloban City |
| ZAMBOANGA CITY AIRSHED | DMC 2003-20 | September 30, 2003 | Zamboanga City |
| METRO CAGAYAN DE ORO AIRSHED | DMC 2003-17 | September 12, 2003 | Cagayan de Oro City, Jasaan, Villanueva, Tagoloan, Opol, El Salvador |
| DAVAO CITY AIRSHED | DAO 2003-02 | February 12, 2003 | Davao City |
| SOUTH COTABATO AIRSHED | DAO 2004-22 | August 3, 2004 | General Santos City, Koronadal City, Polomolok, Tupi, Tampakan, Tantangan, Banga, Surallah, Norala, Sto. Nino, T'boli, Lake Sebu |
| AGUSAN DEL NORTE - BUTUAN CITY AIRSHED | DAO 2008-06 | May 13, 2008 | Butuan City, Buenavista, Cabadbaran, Carmen, Jabonga, Kitcharo, Las Nieves, Magallanes, Nasipit, Santiago, Tubay, Remedios T. Romualdez |



### Geothermal Airsheds in the Philippines

The Philippine Geothermal Areas are in a volcanic setting that is geologically different from other areas in the country. Recognizing the environmental and economic contribution of geothermal resources to the country, the establishment of the geothermal airshed is being issued in compliance with RA 8749.

The guidelines for the coverage of the geothermal airshed shall be the geothermal area as defined in the MC 2002-13 also known as the Establishment of Geothermal Areas as Airsheds are as follows:

- The coverage of the geothermal airshed shall be the geothermal area as defined in the circular and the adjacent area that may be affected by the dispersion of air pollutants from the geothermal operation.
- A geothermal airshed is hereby provided for geothermal areas with existing projects and those listed in the Philippine Energy Plan and other geothermal areas certified by the Department of Energy thereafter.
- The area coverage of geothermal airshed can be amended consistent with the evolution of the geothermal project, in consultation with appropriate local government authorities and upon approval by the Department pursuant to Sec. 9 of RA 8749, Rule XV, Sec 12 of its IRR.

## Publications

### Manual for Siting and Design of Air Quality Monitoring Stations

The Environmental Management Bureau will be adopting a Manual for Siting and Design of Air Quality Monitoring Stations in the Philippines, as mandated by EMB Memorandum Circular No 2021-06, issued on May 03, 2021. The Manual aims to guide the EMB's regional offices in selecting the appropriate site(s) for their respective Air Quality Monitoring Stations (AQMS), including technical specifications. This is also in compliance with Section 1, Part V, Rule XIV of DENR Administrative Order No. 2000- 81 (Implementing Rules and Regulations of RA 8749 (Philippine Clean Air Act of 1999), which mandates the designation and establishment of an ambient Air Quality Network nationwide. Siting Criteria is a guideline for locating and installing Air Quality Monitoring Stations and Equipment for specific objectives. The siting of the station shall be in accordance with the monitoring objectives of the air quality monitoring stations as well as the general siting guidelines provided for in the memorandum circular.

Other components of the Manual are the following: Meteorological Mast; Positioning of Collocated Air Samplers; Air Quality Monitoring Station Design; and Determining Area Representativeness of Air Quality Monitoring Stations. In order to address the current issues, challenges, and technological advancements in Air Quality Monitoring, the EMB shall review the manual every two (2) years, or as necessary, from the date of issuance.[3] [4]

### Procedural Manual on Data Handling Protocols for Criteria Air Pollutants

The Environmental Management Bureau (EMB) adopts the Procedural Manual on Data Handling Protocols for Criteria Air Pollutants, as mandated by EMB Memorandum Circular No 2021-07, issued on May 03, 2021. The manual also clarifies the requirements for data handling and its completeness, sampling

[3] RA 8749 (emb.gov.ph)

[4] RA 8749 (emb.gov.ph)

frequencies, data capture requirement, Conversion of Concentration Values to Air Quality Index (AQI) values, and spatial averaging of criteria air pollutants, among others. The said Manual will be reviewed every two (2) years, or as necessary, from the date of issuance.

### National Air Quality Status Reports

The National Air Quality Status Report (NAQSR) is required under Part V, Rule 13 of Section 4 of the Clean Air Act. The report reviews the status of the air quality in the country, with an emphasis on the major Philippines cities, particularly Metro Manila. The NAQSR includes an in-depth analysis using the hard scientific data generated through monitoring and research activities, to identify the current air quality situation and trends. The status also covers the critical areas, activities, and regulations that DENR-EMB needs an intervention necessary in improving the air quality status in the Philippines. It would also serve as a guide and reference document for the stakeholders and the public regarding air quality.

## Researches

### A Study: Public Utility Jeepney Modernization Health Impact / Benefit Assessment

In 2017, the Public Utility Vehicle Modernization Program (PUVMP) was launched to reform the public transport industry through the replacement of old units with more efficient, modern units, and fleet consolidation and management to formalize operations.

Class 1 jeepneys can accommodate 9-12 seated passengers and would mostly service low-demand areas and shorter routes. Class 2 units are designed with a maximum seating capacity of 23 passengers, allow standing passengers, and are the main replacement for old jeepneys.

The key findings of the study showed that the adoption of modern jeepneys resulted in the reduction of CO, NMVOC, SOx, NOx, and PM Emissions. The modern jeepneys would also provide health benefits and mortality avoidance for the citizens of Metro Manila, CALABARZON, and Central Luzon. Lastly, the study emphasized that the projected benefits are highly sensitive to the fleet size of the modern units, and their ability to take in more passengers during peak hours.

### Sec. 19: Review of Mass Emission Rates Standards

The review of emission standards from concentration-based to mass-rate units will consider the impacts on the economy, health, and availability of pollution control technologies and their cost implications. Consultation meetings and workshops with stakeholders from the industry are held to gather input in the standards development, especially on best available control technologies (BACT) that may be employed to meet more stringent emissions standards.

On May 31, 2019, the DENR-EMB in Partnership with Clean Air Asia conducted a one (1) day Consultation Workshop on the Best Available Control Technologies for the Policy Review of the Mass Emission Rate Standards (MERS) for Stationary Sources held at Crowne Plaza, Ortigas, Pasig City.

### Revisiting the Clean Air Action Plan

The Department of Environment and Natural Resources (DENR), through the Environmental Management Bureau (EMB), in partnership with Clean Air Asia, facilitated the Interagency Workshop on the Integrated Air Quality Improvement Framework – National Air Quality Control Action Plan on 20 November 2019. The

workshop became a venue for government agencies and other stakeholders to assess the achievements and needs in implementing the Philippine Clean Air Act.

In the workshop, a World Café Session was facilitated. A World Café Session is a dynamic group discussion where participants were grouped into three and rotated in stations where they discussed different topics with the moderator, in relation to the provisions of the Philippine Clean Air Act. In Station 1, the roles of each agency were shared, specific programs and policies being implemented were identified and strengths and challenges in performing each role were discussed. In Station 2, strengths, and points for development in communicating and coordinating with other agencies were shared. In Station 3, the needs to perform the roles of each agency were shared.

Also, a breakout session was facilitated, by grouping in relation to control of (1) stationary source emissions, (2) mobile source emissions, and (3) area source emissions. What can be further integrated into the Integrated Air Quality Improvement Framework (IAQIF) and National Air Quality Control Action Plan (NAQCAP) was discussed in consideration of what is currently done and what should be done way forward. Each of the three (3) groups brainstormed what can be included in terms of their agency's role, other agencies' and groups' inclusion and roles in the NAQCAP.

### 2019 Southeast Asian Transboundary Haze

The latest episode of the Southeast Asian haze occurred in 2019. This was a long-term problem that happens in variable degrees during the region's dry seasons. It was mostly caused by forest fires caused by illegal slash-and-burn clearance on behalf of the palm oil business in Indonesia, primarily on the islands of Sumatra and Borneo, which spread swiftly during the dry season. In the second and third weeks of September 2019, the Southern Region of the Philippines experienced the effect of the Indonesian Forest Fires through the Southeast Asian Transboundary Haze. The affected regions were Region 4b, Region 9, Region 8, Region 13, and ARMM.

Backward and forward air trajectories using the NOAA-HYSPLIT and wind vectors from MERRA-2 were plotted to find the sources of biomass burning to the recurring smoke haze in this region. In conclusion, using air trajectory analysis and the results of aerosol sample analysis using ground-based data indicate that the haze event experienced in the Southern Philippines was influenced by the transboundary air pollution from Indonesia.

Furthermore, news outlets have covered this event, as it raises concerns about aviation safety and at the same time possible health risks, especially for people with lung problems. Light to moderate haze was covering the southern city of Zamboanga, the central cities of Cebu and Dumaguete, and the western province of Palawan. Authorities were verifying other areas that may also have been affected.

In Region 10, Florencio Dominguez Jr. head of the Environmental Monitoring and Enforcement in Region 10, said their air quality monitoring equipment detected an increase of particles in the air over Cagayan de Oro. The different EMB ROs have spread their announcements and guidelines during the haze period through different media outlets (news, radio, and social media). For example, Region 7 have posted a public announcement through their EMB Facebook page and on their website. In line with this, DOH has also posted guidelines on how to cope with the haze event.

## 2020-2021 New Year's Eve Celebration

According to Executive Order (EO) 28 Series of 2017, President Rodrigo Duterte has ordered the Philippine National Police (PNP), in coordination with the Department of Health (DOH), the Department of Interior and Local Government (DILG), the Department of Environmental and Natural Resources (DENR), and the Bureau of Fire Protection (BFP) to enforce the EO as mentioned earlier which shall include allowable areas for community fireworks and confiscation and destruction of prohibited firecrackers and pyrotechnic devices.

For the past three years, this New Year's Eve pollution levels in all sites except Las Piñas remained "unhealthy" according to the US EPA 24hr standard. This means that PM exposure at this level may pose health risks, especially to sensitive individuals (e.g. children, the elderly, and people with respiratory conditions). Even though there have been significant improvements in reducing airpollution during New Year's Eve, more progressis still necessary to maintain safe levels of air quality.

During the CY 2021 New Year's Eve celebration, a total of eight (8) stations in the National Capital Region (NCR) measured PM2.5 ambient air quality data. Six (6) stations in the National Capital Region (NCR) were comparable to the CY 2020 NYE. It was found that the NYE 2021 has significantly lower concentrations of PM10 compared to the NYE 2020 at an average of 59% decrease, this may be attributed to the strict measures being implemented by the Metro Manila Mayors pursuant to MMDA Resolution No. 20-17 "Prohibiting Individual and Household Use of Firecrackers and Other Pyrotechnic Devices During General Community Quarantine.

During the CY 2021 New Year's Eve celebration, a total of thirteen (13) stations and six (6) stations measured PM10 and PM2.5 ambient air quality data outside the National Capital Region (NCR), respectively.

It was found that the Koronadal City Station in South Cotabato measured a maximum of 166 ug/NCM PM10 from noon MN to 2:00 AM 1/1/2021 which is above the PM10 24-hour National Ambient Air Quality Guideline Value (NAAQGV) of 150 ug/NCM. The three (3) stations exceeded the 24- hour National Ambient Air Quality Guideline Value (NAAQGV) of 35 ug/ NCM for PM2.5

## 2020 Taal Volcano Eruption

The Department of Science and Technology – Philippine Institute of Volcanology and Seismology (DOST – PHIVOLCS) has raised the Alert Level 4 (Hazardous Eruption Imminent) as Taal Volcano in Batangas located about 60 kilometers south of Manila spewed ash 10 – 15 km high following a phreatic or steam-driven eruption in several points inside the crater which had begun at 1:00 PM. As of noon, Taal Volcano remained under Alert Level 4 as it spewed lava fountains.

The DOST – PHIVOLCS issued through a bulletin at 8:00 AM on 13 January 2020 that the spewing of lava is a magmatic eruption recorded from 2:49 AM to 4:28 AM. This eruption is characterized by weak lava fountaining accompanied by thunder and lightning. The Department of Environment and Natural Resources (DENR) through the Environmental Management Bureau (EMB) conducted ambient air quality monitoring in the affected areas (National Capital Region, Central Luzon, CALABARZON).

Monitoring started at 9:00 pm January 12, 2020 till noon on January 13, 2020. In NCR, four (4) stations have recorded an Air Quality Index (AQI) of Unhealthy for Sensitive Groups levels namely Las Piñas City Station, Taguig City

Station, Mandaluyong City Station, and San Juan City Station. The AQI relates a certain range of daily averages of ambient air quality concentrations into indices that are more layman.

Volcanic ash consists of powder-size to sand-size particles that have been blown into the air by an erupting volcano. Exposure to falling ash may cause several health problems. Anyone who already suffers health problems such as bronchitis, emphysema, or asthma should avoid exposure to volcanic ash.

Assessment of wind direction and speed show surface winds coming from the northeast to the southwest may affect the dispersion of the ash plume coming from the Taal Volcano. Light particles such as PM10 and PM2.5 may remain suspended above the 10 – 15 km ash plume height influenced by the upper Planetary Boundary Layer (PBL). During boreal winter, lower-level winds are northeasterly (ground to around 2 km). Upper air (>10km) winds are westerly due to the subtropical jet stream. If jet steam is north of Luzon, the wind is southerly. When the jet stream is over Luzon, winds are westerly (towards the east).

The forecast shows westerly upper-air winds from Tuesday onwards. However, coarse and heavy particles such as TSP which may consist of fine scoria tend to settle in nearby areas (Batangas, Cavite, and parts of Metro Manila) due to gravity.

## Strengthening the Online Services

### Continuous Emission Monitoring Systems (CEMS)

Continuous Emission Monitoring Systems (CEMS) means the total equipment required under the Clean Air Act's Implementing Rules and Regulations or as directed by the EMB, used to sample and condition (if applicable), analyze, and provide a permanent record of emissions or process parameters. Such records shall be the basis of the firm's compliance with the emission standards. Further, it may be an approved monitoring system for continuously measuring the emission of a pollutant from an affected source or facility and as such, may be used in computing annual emission fees.

Stationary Sources exceeding 750 tons/year of particulate matter must install a COMS for opacity. The opacity measurements shall not exceed the applicable standard of 20% as measured by COMS averaged over a rolling six-minute period subject to the exceptions stated in Section 2 (b) of Rule XXV of DAO 2000-81. Industries engaged in emission trading or averaging are required to install CEMS for that parameter.

### Data Acquisition and Handling System (DAHS)

The DENR Under the EMB MC No. 2020-003 mandates all EMB Regional Offices (EMB-ROs) to establish an Air Quality Network Center using a uniform Data Acquisition and Handling System (DAHs) which shall act as a repository of industrial emission of firms required to install Continuous Emission Monitoring Systems (CEMS) / Continuous Opacity Monitoring System (COMS). Its main objective is to establish a system that shall act as a central repository of all data and information related to industrial emissions of firms required to install CEMS/COMS in compliance with Section 19 of RA 8749.

Furthermore, all EMB ROs shall establish a secure infrastructure to receive and store CEMS/COMS data and shall be responsible for ensuring that their DAHs, as well as the firm/proponent's DAHS, are compatible with the existing DAHS used by the EMB CO. The DAHs of each RO shall be accessed in the central DAHS of the EMB CO. All EMB ROs are given one (1) year from the issuance of MC 2020-003 to establish a system and integrate it with the EMB CO DAHS. Failure to comply with

this MC shall result in a poor performance rating of the ROs.

### Implementation of the Adopt-A-Continuous Ambient Air Quality Monitoring Station (CAAQMS) Program and CEMS/COMS Test Connection thru Uniform Data Acquisition and Handling System

The Environmental Management Bureau (EMB) of the Department of Environment and Natural Resources (DENR) recently launched Adopt a Continuous Ambient Air Quality Monitoring Station (CAAQMS), and the Continuous Emission Monitoring System/ Continuous Opacity Monitoring System (CEMS/COMS) Test Connection thru Uniform Data Acquisition and Handling System to strengthen the capacity of EMB in terms of air quality monitoring.

According to EMB, the programs launched by EMB will enhance the capacities of EMB technical personnel to monitor ambient air quality as well as the compliance of industries with the Clean Air Act.

Attainment areas are defined as areas in compliance with the National Ambient Air Quality Guidelines while non-attainment areas are areas that do not meet the prescribed guideline values. According to Air Quality Management Section Chief, Engr. Jundy del Socorro, the meeting discussed various updates on actions undertaken to determine potential donors and confirm their participation in the program. Regional offices also provided updates on the status of existing air quality monitoring stations as well as the timeline for the test connection allowing industries to connect to the EMB Data Acquisition and Handling System.

### Interactive Air Quality Data Dashboard

Air Quality Monitoring Data gathered from all the Ambient Air Quality Monitoring Stations of DENR-EMB in the Philippines are readily available on the EMB Official Website thru the Interactive Air Quality Data dashboards.

The Interactive Air Quality Data Dashboard using Microsoft Power BI allows the public to have easy access to Historical and Recent Statistical Air Quality Monitoring Data, Emissions Inventory, Anti-Smoke Belching Apprehension Data, Permit-to-Operate Air Pollution Source Installation issued to Firms, among others. This can be accessed anytime and anywhere on the EMB Website. Clients can select and filter specific air quality monitoring stations, year,and city, among others.

### Real-Time Ambient Air Quality Monitoring

As part of its commitment to the public and for data transparency, the EMB has also implemented the monitoring and producing of the real-time values of the air quality for the public to use. EMB has also required the Monitoring Station to be installed with (fiber) internet with a minimum internet speed of 50 Mbps to enable the real-time transfer of data and remote access to the Monitoring Station.

Philippines AQI is the official mobile app of the EMB - Central Office under the DENR, which aims to monitor air quality across various air quality monitoring stations nationwide.

### Online Permitting System for Permit to Operate (OPMS-PTO)

As part of its commitment to promoting environmental protection, particularly addressing air pollution, the DENR-EMB has launched the new and improved Permit to Operate (PTO) Air Pollution Source Equipment and Installation Version 2.0, as part of its Online Permitting and Monitoring Systems (OPMS) on August 18, 2021.

OPMS is a premiere web application developed by the DENR-EMB that offers end-to-end solutions for environmental compliance, especially for Air Pollution Source Installation or

Equipment. Likewise, it is also the response of the EMB to the COVID-19 pandemic, which reduces the need for applicants to personally visit the Bureau's Regional Offices, and request and apply for their needed clearances and permits.

The following are the system improvements and salient features of the new version of OPMS-PTO:

The distinction between the four (4) PTO application types:

- Temporary PTO is required for applicants which require source emission testing. TPTO is valid for 90 days.
- Once you have conducted source emission testing, you must apply for Temporary to Regular. This is valid for four years and nine months.
- If your source is not required to conduct source emission testing, you may apply for a New Regular PTO, which is valid for five years; and
- Thirty (30) days before the expiration of your permit, you must apply for its Renewal (valid for five years).

System Upgrade of OPMS-PTO

- The applicant may now view the requirements uploaded in Step 1 by clicking the "View Requirements."
- In Step 3, the applicant may now view the list of Accredited Third-Party Source Emission Testing Firms (TPSETF) and the list of DENR Recognized Laboratories by clicking buttons linked to the EMB website.
- If the plant information is the same as the establishment information, the proponent may tick the "Same as Establishment?" drop-down.
- APSI and APCD have been improved to include a "Delete All" button and force the applicant to view the "Instruction" before downloading the CSV template. VI. The APSI and APCD pictures are displaying correctly again. VII. The Sampling and Analysis Methods have been streamlined to approvedmethods per policies. VIII. The requirements have been streamlined based on the size of the APSI.

## Partnerships and Initiatives

### Acid Deposition Monitoring Network in East Asia (EANET)

The acid deposition happens when fossil fuels are burned and pollutants such as sulfur dioxide and nitrogen oxide are released into the atmosphere and fall to the ground in wet or dry forms. Aside from contributing to air pollution, these make soils, lakes, and other water bodies become acidic. In order to address these concerns, the Acid Deposition Monitoring Network in EastAsia (EANET) was organized in 1998 as an intergovernmental initiative.

The rules of procedure for the network were adopted at the Third Session of the Intergovernmental Meeting (IG3) held in November 2001 in Chiang Mai, Thailand. Thirteen countries participate in EANET namely, Cambodia, China, Indonesia, Japan, Lao PDR, Malaysia, Mongolia, Myanmar, Philippines, the Republic of Korea, Russia, Thailand, and Vietnam. UN Environment acts as the EANET Secretariat while the Asia Center for Air Pollution Research (ACAP) in Niigata, Japan serves as the Network Center. The objectives of the EANET are to:

- Create a common understanding of the state of the acid deposition problems in East Asia;
- Provide useful inputs for decision-making at the local, national and regional levels aimed at preventing or reducing adverse impacts on the environment caused by acid deposition; and
- Contribute to cooperation on the issues related to acid deposition among participating countries

EANET's activities include (1) acid deposition monitoring, evaluation, and quality control; (2) technical support, research, and capacity building; (3) awareness raising and; (4) cooperation and information exchange.

### Asia Pacific Mercury Monitoring Network (APMMN)

The Asia Pacific Mercury Monitoring Network (APMMN) is a cooperative effort to systematically monitor mercury in the air and rainwater in the Asia-Pacific region. Its creation is the result of a 2013 workshop wherein environment ministers and scientists agreed to develop a standardized pilot network to monitor wet deposition and atmospheric concentrations of mercury in the region. It involves environmental ministries or agencies of the Philippines (DENR), Japan, Korea, Indonesia, Thailand, Vietnam, Canada, Taiwan, and the USA, the National Oceanic and Atmospheric Administration, two academic institutions, namely the National Central University, Taiwan and the Indian Institute of Technology, Hyderabad, India, and the National Atmospheric Deposition Program (NADP), a scientific research and monitoring organization in the United States.

Its goal is to advance the science of global atmospheric mercury monitoring in the Asia-Pacific region. There are five APMMN sites as of 2018, i.e., Pampanga, Philippines; Jakarta, Indonesia; Nantou, Taiwan; Pathum Thani, Thailand; and Hanoi, Vietnam. Except for the Taiwan site, which does wet and dry monitoring, only wet monitoring is done in the other four sites.

On March 2018, DENR received a mercury sampler from the Government of Taiwan. The survey for a suitable site for taking air samples and training in the use of the equipment was conducted in June 2018. The results from the mercury sampler serve as inputs to the Asia-Pacific Mercury Monitoring Network. Since the last quarter of 2018, mercury wet deposition monitoring has been conducted in a selected site in Clark Air Base, Pampanga. Samples are collected weekly and are submitted to Taiwan University every month for analysis. The DENR, through the EMB, has been collecting and shipping wet deposition samples for analysis to the network since 25 September 2018.

In September 2018, a set of gold amalgam mercury samplers was donated by the Ministry of the Environment of Japan (MOEJ) to the DENR. It is capable of monitoring the mercury in the ambient air. The DENR, United States Environmental Protection Agency (US EPA), and Environmental Protection Administration Taiwan (Taiwan EPA) co-organized the 7th Annual Asia-Pacific Mercury Monitoring Network Partners Meeting on 5-7 September 2018 in Quezon City, Philippines.

### Training, Workshops, and Seminars

In 2019, Seven (7) seminars and workshops were conducted. One (1) major workshop namely the Revisiting of DAO 2000 – 82, focused on the various functions of all concerned agencies in cleaning the air. One (1) major workshop namely the National Air Quality Training Workshop was instructive wherein a USEPA personnel was invited to speak on their programs and procedures for airshed management. One (1) consultation workshop for the MERS review was conducted to inform the stakeholders and concerned agencies on the possibility of revising the emission standards.

Several of the workshops and seminars conducted and attended by the AQMS during 2020 were put to a halt due to the pandemic. However, in 2021, EMB has integrated into its online applications. Hence, EMB conducted several training and workshops for the new and improved OPMS-PTO and CEMS. EMB also continued the conduct of the National Air Quality and Airshed Management Workshops and the publication of the National Air Quality

Status Report for 2019- 2020. Some of the notable workshops were presented below:

### Training on Basic Stack Emission Testing, Principles of Combustion, and Design of Air Pollution Control Device (APCD) for Visayas Cluster

The Environmental Management Bureau of the Department of Environment and Natural Resources (DENR) successfully conducted four (4) days of Training on "Basic Stack Emission Testing: Method 1 to 5 for Particulate Matter (PM), Method 7 for Oxides of Nitrogen (NOx), Method 8 for Sulfur Dioxide (SO2) and Method 10 for Carbon Monoxide (CO)", "Principles of Combustion" and "Design of APCD" at the Royce Hotel, Angeles, Pampanga on March 4 to 8, 2019. It was headed by the Sampling Assessment Team (SAT)composed of technical staff from Regions NCR, 3 and 4A and the Central Office – Air Quality Management Section staff. The training was participated by the EMB Regional Technical Personnel from Regions 4B, 6, 7, and 8.

### Seminar-Workshop on Emission Inventory (Stationary, Mobile, Area) And Air Dispersion Modelling for EMB Personnel (2020)

In support to the capacity building for EMB Regional Offices (EMB ROs), the DENR Environmental Management Bureau (EMB) has successfully held the seminar–Workshop on Emission Inventory (Stationary, Mobile, Area) and Air Dispersion Modelling for Region IX Personnel through Microsoft Teams on December 14-15, 2020. The workshop was hosted by EMB Central Office-Air Quality Management Section and attended by EMB Region IX technical staff from Environmental Monitoring and Enforcement Division (EMED) with participation from EMB Central Offices Environmental Impact Assessment and Management Division (EIAMD).

### 126-Hour Training on Comprehensive Meteorology and its Impact to Air Quality

The Environmental Management Bureau (EMB) under the Department of Environment and Natural Resources (DENR), in partnership with the University of the Philippines Institute of Environmental Science and Meteorology (UP-IESM), conducted the 126-hour Training on Comprehensive Meteorology and its Impact on Air Quality via Zoom Meeting Platform from October to December 2021.

### Public Awareness and Education Programs

Relation with the Philippine Clean Air Act which indicates the promotion of public information and education to encourage the participation of an informed and active public in air quality planning and monitoring. To fulfill this, the DENR-EMB has been conducting some of the methods conducted for the information drive were:

- Clean Air Month Celebration
- Increasing and sustaining compliance of mobile sources through roadside apprehension
- Conduct free emission testing for government vehicles
- Conduct garage testing as an awareness and advocacy campaign
- Conduct Vehicle Counting
- Support the use of non-motorized vehicles to promote Clean Air
- Monitoring of the PETC
- Information and Education Campaign (IEC) on the health and environmental Impacts of Smoking
- Distribution of IEC materials during smoke belching operations
- Conduct of Airshed Governing Board Meetings
- Capacity Building for the LGU and Stakeholders
- Conduct Air Dispersion Modelling Workshops for the EMB Employees
- Conduct Mangrove and tree planting
- Promotion of Urban Greening Initiatives in every barangay

- Creation of a database through the conduct of an actual survey on the number of households and commercial establishments in the locality which includes data on volume consumption of fuel, (charcoal, LPG, gas), building construction, solid waste generation, etc
- Monitoring of barangays implementing the ban on open burning and corresponding IEC activity/Information Drive
- Conduct training for the Pollution Control Officers.
- Radio Guesting on the different radio stations to promote the strategies and current programs for air quality
- Forum regarding Ozone's Depleting Substances

The EMB, in partnership with EEID and EEIU has produced different publications such as brochures, flyers, manuals, and infographics which were distributed during events and the conduct of road apprehension. EMB ROs made sure that the infographics distributed were translated into their local.

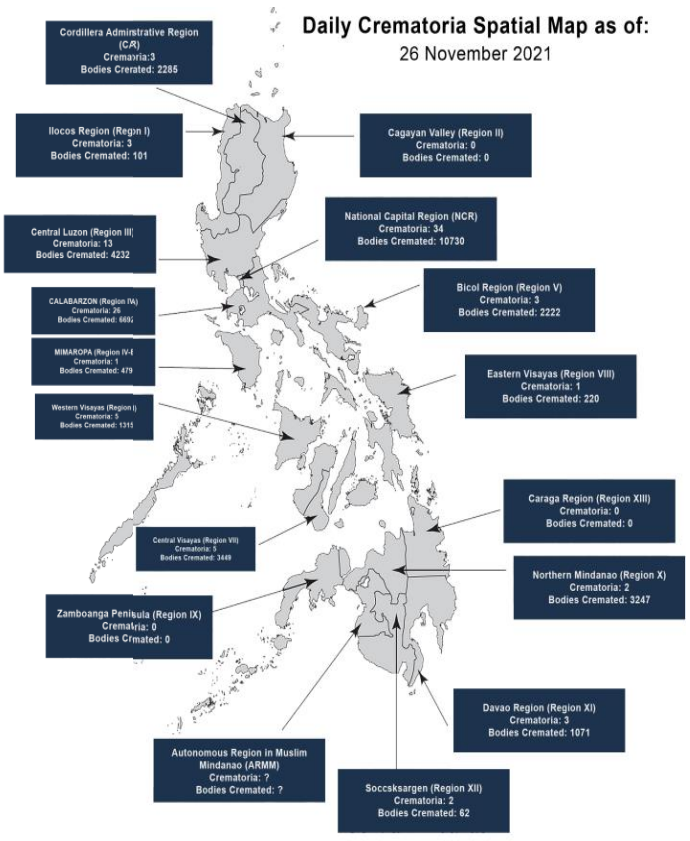
## Pandemic Highlights

The COVID-19 pandemic posed to be one of thebiggest challenges not only in the Central office but also in the different Regional Offices of EMBin conducting air quality management for years. Nevertheless, the ROs and the COs managed to use the available efforts and resources to monitor the region's air quality despite healthprotocols imposed by the Inter Agency Task Force for the Management of Emerging Infectious Diseases. During the pandemic, dailyair quality monitoring and emission inventory were still conducted to assess their impact on air quality within the Airshed. Continuous efforts were also made to ensure that the data was submitted to EMB Central Office for consolidation and presented to the Airshed Governing Board.

## Crematoria Monitoring

Due to the rise of COVID-19 cases in the country, there is also a significant rise in the frequency of crematoria operations in the country as part of efforts to combat the spread of COVID-19. The heightened use of the crematories has compelled the EMB-AQMS to conduct daily monitoring of the number of bodies cremated within its administrative area of jurisdiction.

Following the protocol, those who failed to comply with the environmental laws and policies were issued Notices of Violation and required to rectify their violations committed and abide by the Environmental Laws. In Region 10, two (2) crematoria are operating within region 10, one from Divine Shepherd Memorial Gardens, Inc., and the other one from Cosmopolitan Memorial Chapel (CMC). Permit to Operate (PTOs) were checked for the said installations, and a Notice of Violation was issued to CMC for operating their crematorium without a valid PTO.



## Air Quality Amid the Pandemic

As reported throughout the world, many countries have experienced a decrease in air pollution due to the 2019 - 2020 coronavirus pandemic.

During the implementation of ECQ, frequent decreases in daily PM10 concentration were measured in several Continuous Air Quality Monitoring Stations (CAQMS) of EMB Metro Manila. The decrease is due to fewer human activities, suspension of public transportation, and reduced number of vehicles plying in major thoroughfares, which are a significant source of air pollution in Metro Manila. Up to 59% of PM10 concentration reduction was measured during the implementation of ECQ; Weekday averaged daily comparison was conducted to determine PM10 reduction on a specific day of the week before and during the implementation of ECQ. All the measured daily concentrations of PM10 Nationwide are within the 24Hour Guideline Value of 150 ug/ Ncm and are categorized as "Good" to "Fair" in terms of Air Quality Index (AQI), respectively.

Weekday comparative analyses are conducted by comparing weekdays in different weeks (eg. Monday in 1st week vs Monday 2nd the week vs 3rd week etc.). This was attributed to the decrease in fossil-fueled vehicles which is approximately 81% of air pollution sources in Metro Manila.

The ECQ has halted the above smoke belchers by preventing approximately 96% of the Average Daily Traffic (ADT) from traveling in Metro Manila. The partial lockdown on Metro Manila and extending the metropolis' class suspensions up to April 12, 2020, has reduced the ADT only to government vehicles, essential services, skeletal force, and those who use their vehicles to purchase essential commodities. For the above reason, air quality was significantly improved.

In addition to the Emissions Inventory conducted by the EMB, the Metro Manila Development Authority (MMDA) also monitorsthe Annual Average Daily Traffic (AADT) in the Metro.

For 2018, it was found that 2,811,455 vehicles ply the major thoroughfares, C1 to C5 and R1 to R10, of Metro Manila. Based on the Annual Increase of 10.14% for NCR from CY 2018 to CY2019 of the Registered Motor Vehicles reported by the Land Transportation Commission (LTO), the AADT for CY 2019 was estimated to be 5,555,435. Using the above estimate, the ADT of Metro Manila during the ECQ was also estimated to be 159,145.

## Way Forward

For CY 2022, the Bureau will be targeting the following policies in relation to Air Quality Management:

- Policy Review and Update on Stationary Source Mass Emission Rate Standards (MERS) Phase 2
- Guidelines on Ambient Air Quality Guideline Values / Standards for Hazardous Air Pollutants - Phase 3
- Guidelines on Accreditation of CEMS/COMS Audit Service Providers
- Guidelines on Emission Charge System
- Updating of DAO 2000 - 82 Philippine Integrated Air Quality Improvement Framework - National Air Quality Control Action Plan
- Stricter monitoring of stationary sources of pollution including the major industries
- Source Apportionment for the identification of ambient air
- Pollution sources and the quantification of their contribution to pollution levels
- Intensified IEC and public awareness campaign/communicate air quality status to the public using appropriate communication channels with the help of media partners
- Additional manpower to accomplish all the targets and to support ambient air units' future innovations in improving and monitoring the Air Quality at the Regional Levels.

## III. Water Quality in the Philippines

The Philippine Clean Water Act of 2004 (Republic Act No. 9275) seeks to preserve the nation's water bodies from contamination by land-based sources (industries and commercial entities, agriculture, andcommunity/household activities.) It offers a comprehensive and integrated plan for preventing and minimizing pollution via a multi- sectoral and inclusive approach, including all stakeholders.

The DENR is the lead agency mandated by the Clean Water Act to ensure the law's implementation. It has been tasked to develop policies and guidelines in support of the implementation of the CWA and to provide a comprehensive and integrated strategy for preventing and minimizing pollution through a multi-sectoral and participatory approach involving all stakeholders.

Furthermore, the Environmental Management Bureau, thru the Water Quality Management Section (WQMS), is mandated by the Philippine Clean Water Act of 2004 (RA 9275) to develop and promote water quality standards and regulations and implement the Clean Water Program for the abatement and control of pollution from land-based sources.

### Overview of Water Bodies

Classification means the categorization of all water bodies considering the existing quality of the body of water and the most beneficial current and future use of said bodies of water and lands bordering them, such as for residential, agricultural, aquacultural, commercial, industrial, navigational, recreational, wildlife conservation andaesthetic purposes, among others.

Beneficial use means using the environment or any element or segment conducive to public or private welfare, safety, and health. It shall include, but not be limited to, water use for domestic, municipal, irrigation, power generation, fisheries, livestock raising, industrial, recreational, and other purposes.

1. Using water for domestic purposes means the utilization of water for drinking, washing, bathing, cooking, or other household needs, home gardens, and watering lawns or domestic animals.
2. Water use for municipal purposes means using water t o supply the water requirements of the community.
3. The use of water for irrigation means the utilization of water for producing crops.
4. The use of water for power generation means using water to produce electrical or mechanical power.
5. Using water for fisheries means using water for the propagation of cultured fish as a commercial enterprise.
6. The use of water for livestock raising means using water for large herds or flocks of animals raised as a commercial enterprise.
7. The use of water for industrial purposes means the utilization of water in factories, industrial plants, and mines, including the use of water as an ingredient of a finished product; and
8. Using water for recreational purposes means using water for swimming pools, bathhouses, boating, water skiing, golf courses, and other similar facilities in resorts and other places of recreation.

Water quality criteria are the benchmark for which monitoring data are compared to assess the quality of water bodies based on established classifications. The Bureau has two major activities for the conduct of waterbody classification. The EMB Regional Offices submit reports on the waterbodies for classification, and the EMB Central Office reviews and endorses these submissions for approval. The approved classification of waterbodies will be compiled and endorsed for issuing the DENR Memorandum Circular.

In C.Y. 2021, the Bureau endorsed forty-four (44) additional waterbodies for classification according to their best usage and water quality to be maintained. As of 2022, EMB has classified 942 water bodies in the country in terms of best usage and water quality. Of these classified water bodies, 806 are rivers, 22 are lakes, and 114 are coastal and marine waters. [5]

## Water Resources

### Inland Surface Water

From 2014 to 2019, EMB monitored 794 inland surface waterbodies; 7 had Class A.A. portions; 279 with Class A; 272 with Class B; 420 with Class C, and 38 with Class D. Among the 110 classified coastal and marine water bodies, 10 have Class S.A. portions; 68 with Class S.B.; 60 with Class SC and 2 with Class SD

### Major River Basins

The Philippines has 18 major river basins, which occupy 110,524 km2, representing more than one-third of the country's total land area.

### Lakes

According to the Bureau of Fisheries and Aquatic Resources (BFAR) of the Department of Agriculture (DA), as of 2019, 79 lakes in the country are mostly utilized for fish production, with 10 considered the major hosts for aquaculture production in the Philippines.

### Groundwater

Groundwater or aquifers refer to water collected in porous layers of the underground formation. The country's groundwater resources supply the water needs for most households, agricultural activities, and industrial processes. Considering the dependence of most households on groundwater for drinking water, furthermore, protecting groundwater quality is critical to ensuring a continuous water supply. Likewise, preventing groundwater contamination is essential, considering the difficulties and cost requirements to remediate contaminated groundwater.

Potential causes of groundwater contamination include household wastewater, agricultural runoff, and industrial effluents. This occurs when toxic substances enter the aquiferor water table in the form of leachate. Sewage from households and businesses is the largest contributor to bacterial contamination of groundwater. The presence of coliform bacteria in drinking water sources may contribute to the transmission of diseases such as diarrhea, cholera, dysentery, and hepatitis A.

However, there is limited updated data on groundwater resources in the country. The initial estimates have shown that the total groundwater demand as of 2019 grew from 4.3 billion cubic meters (bcm) in 1988 to 5.8 bcm in 1994, representing an average annual increase of 5.3 percent.

## Lakes

Table 3.1. Lakes in the Philippines

| REGION | NAME OF WATERBODIES | PROVINCE | CLASSIFICATION | TYPE | YEAR CLASSIFIED |
|---|---|---|---|---|---|
| Region 8 | LAKE BITO | MCARTHUR, LEYTE | B | Lake | 2018 |
| Region 10 | LAKE APO | VALENCIA CITY, BUKIDNON | B | Lake | 2020 |
| Data Source: | https://app.powerbi.com/view?r=eyJrIjoiMTYxOTJjNjEtYTljZC00MmJjLTgyNjgtODJiZjc4MWRiZWYwIiwidCI6ImY2ZjRhNjkyLTQzYjMtNDMzYi05MmIyLTY1YzRlNmNjZDkyMCIsImMiOjEwfQ%3D%3D&pageName=ReportSection8598f6d86020e0ceaaec&fbclid=IwAR3ACSSy69PQZznhapIymuVGGeMR6v96rW0akizE3RFF3ifmdF2TmhIAD74 | | | |

## Marine

Table 3.2. Marine Waters in the Philippines

| REGION | NAME OF WATERBODIES | PROVINCE | CLASSIFICATION | TYPE | YEAR CLASSIFIED |
|---|---|---|---|---|---|
| Region 2 | GONZAGA BAY | GONZAGA, CAGAYAN | SB | Marine | 2019 |
| | STA. ANA BAY (ENTIRE BAY) | CAGAYAN | SB | Marine | 2019 |
| Region 3 | BALER BAY | BALER, AURORA | SB | Marine | 2019 |
| | SUBIC BAY | ZAMBALES | SB | Marine | 2016 |
| Region 4B | SAN ISIDRO BAY (WHITE BEACH) | PUERTO GALERA, ORIENTAL MINDORO | SB | Marine | 2016 |
| | ULAN BAY | MOGPOG, MARINDUQUE | SB/SC | Marine | 2016 |
| Region 5 | MASBATE BAY | MASBATE | SC | Marine | 2017 |
| | MOBO BAY | MOBO MASBATE | SB | Marine | 2017 |
| Region 7 | PANGLAO COASTAL WATER | BOHOL | SB | Marine | 2017 |
| | OSLOB COASTAL WATER | OSLOB, CEBU | SB | Marine | 2020 |

## Marine

Table 3.2. Marine Waters in the Philippines

| REGION | NAME OF WATERBODIES | PROVINCE | CLASSIFICATION | TYPE | YEAR CLASSIFIED |
|---|---|---|---|---|---|
| Region 9 | LIMPAPA-LABUAN COASTAL WATER | ZAMBOANGA CITY, ZAMBOANGA DEL SUR | SC | Marine | 2020 |
| | LITTLE STA. CRUZ COASTAL WATER | ZAMBOANGA CITY, ZAMBOANGA DEL SUR | SA | Marine | 2020 |
| | PAGADIAN BAY (PART OF ILLANA BAY AND MORO GULF) | PAGADIAN CITY, ZAMBOANGA DEL SUR | SC | Marine | 2020 |
| | GREAT STA. CRUZ ISLAND | ZAMBOANGA CITY | SB | Marine | 2016 |
| | SINUBONG TO PATALON COASTAL WATERS | ZAMBOANGA CITY | SB | Marine | 2016 |
| | DAPITAN BAY | DAPITAN CITY, ZAMBOANGA DEL NORTE | SB/SC | Marine | 2019 |
| | DIPOLOG BAY | DIPOLOG CITY, ZAMBOANGA DEL NORTE | SC | Marine | 2019 |
| Region 10 | MANTIGUE ISLAND COASTAL WATERS | CAMIGUIN | SA | Marine | 2016 |
| | WHITE ISLAND COASTAL WATER | CAMIGUIN | SA | Marine | 2016 |

## Marine

Table 3.2. Marine Waters in the Philippines

| REGION | NAME OF WATERBODIES | PROVINCE | CLASSIFICATION | TYPE | YEAR CLASSIFIED |
|---|---|---|---|---|---|
| Region 11 | DAVAO GULF (STA. MARIA TO MALITA AREA) | MALITA, DAVAO OCCIDENTAL | SC | Marine | 2016 |
| | LAIS RIVER | MALITA, DAVAO OCCIDENTAL | B | Marine | 2016 |
| | MAYO BAY | MATI CITY DAVAO ORIENTAL | SB | Marine | 2017 |
| | DAVAO GULF (DAVAO ORIENTAL) | BANAY-BANAY TO LUPON (SAN ISIDRO TO GOV. GEN), DAVAO ORIENTAL | SC/SB | Marine | 2020 |
| Region 13 | SIARGAO ISLAND COASTAL AND MARINER WATERS | MARINE PROTECTED AREAS OR NO ACTIVITY ZONE, SURIGAO DEL NORTE; | | | |
| | THE WHOLE AREA OUTSIDE THE PROTECTED AREAS, SURIGAO DEL NORTE | | SA | Marine | 2020 |

## Rivers

Table 3.3. River Waters in the Philippines

| REGION | NAME OF WATERBODIES | PROVINCE | CLASSIFICATION | TYPE | YEAR CLASSIFIED |
|---|---|---|---|---|---|
| CAR | IKMIN RIVER | PROVINCE OF ABRA | B | River | 2020 |
| Region 2 | KINALABASA | QUEZON, NUEVA VIZCAYA | C | River | 2016 |
| | LINTUNGAN | QUEZON, NUEVA VIZCAYA | B/C | River | 2016 |
| | SULONG RIVER | QUEZON, NUEVA VIZCAYA | C | River | 2016 |
| | CAMGAT-SURONG RIVER | KASIBU, NUEVA VIZCAYA | C | River | 2017 |
| | DINAUYAN RIVER | KASIBU, NUEVA VIZCAYA | B | River | 2017 |
| Region 3 | MADLUM RIVER | SAN MIGUEL BULACAN | B | River | 2017 |
| | BALAONG RIVER | SAN MIGUEL BULACAN | B | River | 2017 |
| | ALMACEN RIVER | HERMOSA, BATAAN | C | River | 2019 |
| | MALIMBA RIVER | GAPAN AND SAN ISIDRO, NUEVA ECIJA | C | River | 2019 |
| | MORONG RIVER | MORONG, BATAAN | B | River | 2019 |
| | PASIG-POTRERO RIVER | ANGELES CITY, PORAC AND BACOLOR, PAMPANGA | C | River | 2019 |
| | NAMBALAN RIVER | MAYANTOC, TARLAC | B/C | River | 2019 |
| | DIBALO RIVER | SAN LUIS AND BALER, AURORA | B | River | 2019 |
| | SACOBIA RIVER | MABALACAT, PAMPANAG | B/C | River | 2019 |
| | RIO CHICO RIVER | SCIENCE CITY OF MUNOZ AND STO. DOMINGO, NUEVA ECIJA | C | River | 2019 |
| | PUDOC RIVER | BALER, AURORA | C | River | 2019 |
| | LUCONG RIVER | BAMBAN, CAPAS AND CONCEPCION, TARLAC | C | River | 2020 |
| | ABACAN RIVER | ANGELES CITY, PAMPANGA | B | River | 2020 |

Table 3.3. River Waters in the Philippines

| REGION | NAME OF WATERBODIES | PROVINCE | CLASSIFICATION | TYPE | YEAR CLASSIFIED |
|---|---|---|---|---|---|
| Region 4A | MALING RIVER | ATIMONAN QUEZON | B | River | 2016 |
| | PISIPIK RIVER | GUMACA QUEZON | A/B | River | 2016 |
| | SIAIN RIVER | PLARIDEL QUEZON | B | River | 2016 |
| | LOBO RIVER | LOBO BATANGAS | B | River | 2017 |
| | PAMINTAHAN-TUBIG NG BAYAN-SALA RIVER | LIPA CITY BATANGAS | C | River | 2017 |
| | STA. MARIA-MAYOR-ROMELO RIVERS | STA. MARIA, LAGUNA | C | River | 2019 |
| | SILONGIN RIVER | SAN FRANCISCO, QUEZON | B/C | River | 2019 |
| | MASIN-SANTA LUCIA RIVER | TAYABAS CITY/MAUBAN, QUEZON | B/C | River | 2019 |
| | KALIWA RIVER | TANAY, RIZAL | A | River | 2019 |
| | PAGSANGAHAN RIVER | SAN FRANCISCO, QUEZON | B | River | 2020 |
| | YABAHAAN RIVER | SAN ANDRES AND SAN FRANCISCO, QUEZNON | B | River | 2020 |
| | GUINHALINAN RIVER | BUENAVISTA AND NARCISO, QUEZON | B/C | River | 2020 |

Table 3.3. River Waters in the Philippines

| REGION | NAME OF WATERBODIES | PROVINCE | CLASSIFICATION | TYPE | YEAR CLASSIFIED |
|---|---|---|---|---|---|
| Region 4B | BALANACAN RIVER | MOGPOG MARINDUQUE | C | River | 2016 |
| | TAGUM RIVER | STA. CRUZ, MARINDUQUE | C | River | 2016 |
| | TAWIRAN TAGUM | STA. CRUZ, MARINDUQUE | A/B/C | River | 2016 |
| | BANGON RIVER | ODIONGAN ROMBLON | C/SC | River | 2017 |
| | GABAWAN RIVER | ODIONGAN ROMBLON | C | River | 2017 |
| | BONGOY RIVER | ODIONGAN ROMBLON | SC | River | 2017 |
| | SABANG RIVER | SABLAYAN OCCIDENTAL MINDORO | SC | River | 2017 |
| | RIZAL RIVER | ROXAS, PALAWAN | C | River | 2019 |
| | PANITIAN RIVER* | QUEZON, PALAWAN | C | River | 2019 |
| | PANGGALAAN RIVER | CALAPAN, ORIENTAL MINDORO | C | River | 2019 |
| | LAMIKAN RIVER | QUEZON, PALAWAN | A/B/C | River | 2019 |
| | CARAMAY RIVER | ROXAS, PALAWAN | B/C | River | 2019 |
| | BUCAYAO RIVER | CALAPAN, ORIENTAL MINDORO | C | River | 2019 |
| | BARBACAN RIVER* | ROXAS, PALAWAN | C | River | 2019 |
| | BANUS RIVER | GLORIA, ORIENTAL MINDORO | C | River | 2019 |
| | ARAMAYWAN RIVER*(QUEZON STREAM) | QUEZON, PALAWAN | A/C | River | 2019 |
| | APURAUAN RIVER* | ABORLAN, PALAWAN | B/C | River | 2019 |
| | ARAMAYWAN RIVER*(NARRA STREAM) | NARRA, PALAWAN | A/C | River | 2019 |

Table 3.3. River Waters in the Philippines

| REGION | NAME OF WATERBODIES | PROVINCE | CLASSIFICATION | TYPE | YEAR CLASSIFIED |
|---|---|---|---|---|---|
| Region 4B | AGSALIN RIVER* | GLORIA, ORIENTAL MINDORO | C | River | 2019 |
| | ABORLAN RIVER* | ABORLAN, PALAWAN | B/C | River | 2019 |
| | ABONGAN RIVER* | TAYTAY, PALAWAN | C | River | 2019 |
| | QUINLOGAN/KINLOGAN RIVER* | QUEZON, PALAWAN | C | River | 2019 |
| | TAGBUAYA RIVER | RIZAL, PALAWAN | A/B | River | 2020 |
| | MONGPONG RIVER | SABLAYAN, OCCIDENTAL MINDORO | B | River | 2020 |
| | RANSANG RIVER | RIZAL, PALAWAN | B/SC | River | 2020 |
| | MALAMBUNGA RIVER | BATARAZA, BROOKE'S POINT, PALAWAN | A/B | River | 2020 |
| | IWAHIG RIVER | RIZAL, PALAWAN | B | River | 2020 |
| | IRAAN RIVER | RIZAL, PALAWAN | B | River | 2020 |
| | CANDAWAGA RIVER | RIZAL, PALAWAN | A/B/C | River | 2020 |
| | CAMPONG ULAY RIVER | RIZAL, PALAWAN | A/B | River | 2020 |
| | CULASIN RIVER | RIZAL, PALAWAN | B/C/SC | River | 2020 |
| | AMNAY RIVER | SABLAYAN AND STA. CRUZ, MINDORO OCCIDENTAL | B | River | 2020 |
| | ALIPID RIVER | SABLAYAN OCCIDENTAL MINDORO | B | River | 2020 |

Table 3.3. River Waters in the Philippines

| REGION | NAME OF WATERBODIES | PROVINCE | CLASSIFICATION | TYPE | YEAR CLASSIFIED |
|---|---|---|---|---|---|
| Region 5 | CABILOGAN RIVER | ALBAY | C | River | 2016 |
| | QUINALE | ALBAY | C | River | 1983/2016 |
| | SAN FRANCISCO | ALBAY | B/C | River | 1996/2016 |
| | LIMBANAN RIVER | LIMBANAN, CAMARINES SUR | C | River | 2019 |
| | POLANTUNA RIVER | LUPI, CAMARINES SUR | B | River | 2019 |
| | GELADIOC RIVER | MAGALLANES, SORSOGON | C | River | 2020 |
| | BARIT RIVER | IRIGA CITY AND BUHI, CAMARINES SUR | B | River | 2020 |
| | DARAGA RIVER | IRIGA CITY AND BUHI, CAMARINES SUR | C | River | 2020 |
| Region 6 | ALIBUNAN | | A | River | 2016 |
| | CADIMAHAN | | C | River | 2016 |
| | MALANDOG RIVER | HAMTIC, SAN JOSE AND SIBALON ANTIQUE | C | River | 2019 |
| | TABUN-AC/AGUTAYAN RIVER | SAN ENRIQUE AND DINGLE, ILOILO | C | River | 2020 |
| | JANIPAAN-JELICUON WATERSHED | PROVINCE OF ILOILO | C | River | 2020 |
| | CABANO RIVER | JORDAN AND SAN LORENZO, GUIMARAS | B/C | River | 2020 |
| | DAO RIVER | TOBIAS FORNIER, ANTIQUE | B/C | River | 2020 |
| Region 7 | TAMBUL RIVER | SAN REMEGIO, CEBU | A | River | 2019 |
| | SINGKULAN RIVER | TABUELAN, CEBU | B | River | 2019 |
| | STA. ANA RIVER | BARILI, CEBU | B | River | 2019 |
| | SEñORA RIVER | LAZI, SEQUIJOR | A/B | River | 2019 |
| | PANGDAN RIVER | CITY OF NAGA, CEBU | B/C | River | 2019 |
| | NAGHALIN RIVER | CATMON, CEBU | B | River | 2019 |
| | MAHIGA RIVER | CEBU CITY AND MANDAUE CITY | C/D | River | 2019 |
| | MATUTINAO RIVER | ALEGRIA AND BADIAN, CEBU | B | River | 2019 |
| | LANGUYON RIVER | TUBURAN, CEBU | A/B | River | 2019 |
| | KINALUMSAN RIVER | CEBU CITY, CEBU | B/C/D | River | 2019 |
| | DUMLOG RIVER | SIBONGA, CEBU | B | River | 2019 |
| | CANSAGA RIVER | CONSOLACION, CEBU | D | River | 2019 |
| | DUMANJUG, RIVER | DUMANJUG, CEBU | B | River | 2019 |
| | ILAYA RIVER | RONDA, CEBU | B | River | 2019 |
| | CAN-ASUJAN RIVER | CARCAR,CEBU | B/C | River | 2019 |
| | BAWO RIVER | CATMON AND SOGOD, CEBU | A | River | 2019 |
| | CANAMUCAN RIVER | COMPOSTELA, CEBU | B/C | River | 2020 |

Table 3.3. River Waters in the Philippines

| REGION | NAME OF WATERBODIES | PROVINCE | CLASSIFICATION | TYPE | YEAR CLASSIFIED |
|---|---|---|---|---|---|
| Region 8 | AMPARO RIVER | MACROHON, SOUTHERN LEYTE | B | River | 2016 |
| | BANGQUEROHAN/BONQUEROGON RIVER | BATO, LEYTE | C | River | 2016 |
| | DANAO RIVER | TAFT, EASTERN SAMAR | C | River | 2016 |
| | SIBUGAY RIVER | ALBUERA, LEYTE (UPSTREAM/DOWNSTREAM) | A/C | River | 2017 |
| | DUPONG RIVER | ISABEL, LEYTE (UPSTREAM/DOWNSTREAM) | A/C | River | 2017 |
| | BUSAY RIVER | BABATNGON, LEYTE | B | River | 2018 |
| | TABUNOK RIVER | PALOMPON AND ISABEL, LEYTE | C | River | 2019 |
| | ANTIAO RIVER | CATBALOGAN CITY, SAMAR | B/D | River | 2019 |
| | ANAS RIVER | NAVAL, BILIRAN | C | River | 2020 |
| Region 9 | LITUBAN | ZAMBOANGA DEL NORTE | B | River | 2016 |
| | LAMBUYONG RIVER | ALICIA ZAMBOANGA SIBUGAY | B | River | 2017 |
| | LIMPAPA | ZAMBOANGA CITY | A/B | River | 2019 |
| | BALANGASAN RIVER | PAGADIAN CITY, ZAMBOANGA DEL SUR | A | River | 2019 |

Table 3.3. River Waters in the Philippines

| REGION | NAME OF WATERBODIES | PROVINCE | CLASSIFICATION | TYPE | YEAR CLASSIFIED |
|---|---|---|---|---|---|
| Region 10 | ALORAN RIVER | ALORAN MISAMIS OCCIDENTAL | A/B/C | River | 2017 |
| | MARANDING RIVER | SAPAD, LANAO DEL NORTE | A/B/C | River | 2019 |
| | MOLUGAN RIVER | EL SALVADOR, MISAMIS ORIENTAL | C | River | 2019 |
| | MASIU RIVER | LANAO DEL NORTE | A | River | 2020 |
| | POONABAYABAO RIVER | LANAO DEL NORTE | A | River | 2020 |
| | USOGAN-MIGPANGE RIVER | BONIFACIO, MISAMIS OCCIDENTAL | A/B/C | River | 2020 |
| | TAKARA RIVER | LANAO DEL NORTE | A | River | 2020 |
| | RAMAIN RIVER | LANAO DEL NORTE | A | River | 2020 |
| | LIANGAN RIVER | BACOLOD, LANAO DEL NORTE | A/B/C | River | 2020 |
| Region 11 | CUABO RIVER | DAVAO ORIENTAL | B | River | 2020 |
| | BITAOGAN RIVER | DAVAO ORIENTAL | B | River | 2020 |
| | TIBUNGOY RIVER | DAVAO ORIENTAL | C | River | 2020 |
| | MATANAO RIVER | DAVAO DEL SUR | C | River | 2020 |
| | MAYO RIVER | DAVAO ORIENTAL | B | River | 2017 |
| | CARAGA RIVER* | CARAGA, DAVAO ORIENTAL | A | River | 2019 |
| | PINTATAGAN RIVER | PANTUKAN COMPOSTELA VALLEY AND BANAYBANAY, DAVAO ORIENTAL | B | River | 2019 |
| | CASAUMAN RIVER* | MANAY, DAVAO ORIENTAL | A | River | 2019 |
| | QUINONOAN RIVER* | TARRAGONA AND MANAY, DAVAO ORIENTAL | A | River | 2019 |

Table 3.3. River Waters in the Philippines

| REGION | NAME OF WATERBODIES | PROVINCE | CLASSIFICATION | TYPE | YEAR CLASSIFIED |
|---|---|---|---|---|---|
| Region 12 | LIBUNGAN RIVER | NORTH COTABATO | B | River | 2016 |
| | MACABASA RIVER | NORTH COTABATO | C | River | 2016 |
| | GLAN RIVER | GLAN SARANGANI PROVINCE | B | River | 2017 |
| | MALAPATAN RIVER | MALAPATAN SARANGANI PROVINCE | C | River | 2017 |
| | SAPU MASLA RIVER | MALAPATAN SARANGANI PROVINCE | C | River | 2017 |
| | BIG MATEO, RIVER | KIDAPAWAN CITY, NORTH COTABATO | B | River | 2019 |
| | LIMUNAN RIVER | KALAMANSIG, SULTAN KUDARAT | B | River | 2019 |
| | MATAMPAY | COTABATO CITY | B | River | 2019 |
| | SEBAYOR RIVER | KALAMANSIG, SULTAN KUDARAT | B | River | 2019 |
| | SALAMAN RIVER | LEBAK, SULTAN KUDARAT | C | River | 2019 |
| | SMALL MATEO RIVER | KIDAPAWAN CITY, NORTH COTABATO | B | River | 2019 |
| | TARBUNG RIVER | COTABATO CITY | B | River | 2019 |
| | TAMONTAKA RIVER | COTABATO CITY | B | River | 2019 |
| | TAMBILIL RIVER | KIAMBA, SARANGANI PROVINCE | C | River | 2020 |
| | TALUK RIVER | KIAMBA, SARANGANI PROVINCE | B | River | 2020 |
| | DALOL RIVER | COLUMBIO, SULTAN KUDARAT | B | River | 2020 |
| Region 13 | MARIHATAG RIVER | MARIHATAG, SURIGAO DEL SUR | A | River | 2016 |
| | ADGAY RIVER | SURIGAO DEL SUR | A | River | 2016 |
| | MARIHATAG RIVER | MARIHATAG, SURIGAO DEL SUR | A | River | 2016 |
| | ADGAY RIVER | SURIGAO DEL SUR | A | River | 2016 |
| | MAMKAS RIVER | KITCHARAO AGUSAN DEL NORTE | A | River | 2017 |
| | MAMKAS RIVER | KITCHARAO AGUSAN DEL NORTE | A | River | 2017 |
| | AGAY RIVER | RT ROMUALDEZ, BUTUAN CITY AND MAGALLANES, AGUSAN DEL NORTE | C | River | 2019 |
| | ACLAN RIVER | NASIPIT, AGUSAN DEL NORTE | C | River | 2019 |

## Water Bodies Classification

Establishing classification for water bodies is an essential component of water quality management. In addition, it serves as a guide in enforcing the general effluent standards. The WQMS has two major activities for the conduct of Waterbody classification. First, the EMB ROs submit reports on the waterbodies for classification. The WQMS reviews and endorses these water bodies for approval. The approved classification of water bodies will be compiled and endorsed for the issuance of a memorandum circular.

As of 2021, the EMB has classified 904 water bodies (44 additional waterbodies for C.Y. 2021) in the country in terms of best usage and water quality. Of these classified water bodies, 794 are inland surface waters (consisting of 780 rivers and 14 lakes), while 110 are coastal and marine waters.

Water bodies classifications are arranged in the orderof the degree of protection required, with Class A.A. and S.A. generally having the most stringent water quality, respectively, for fresh surface waters and marine/coastal waters, and Class D and S.D. waters have the least stringent water quality for fresh surface waters and marine waters respectively. The classification serves as a benchmark; hence water bodies and their tributaries within WQMAs shall keep their water quality within the Water Quality Guidelines, conforming to the water body's classification (e.g., Class C or Class SC) or even improve the quality to higher classification (e.g., from C to B or S.C. to S.B.).

Since water bodies have several beneficial uses, some are classified differently per reach or portion. Out of 794 classified water bodies, 216 have multiple classifications. Hence, there are 1156 classifications. In 794 classified inland surface water bodies, seven (7) have Class A.A. portions, 279 with Class A; 272 with Class B; 420 with Class C; and 38 with Class D. In 110 classified coastal and marine water bodies, 10 have Class S.A. portions; 68 with Class S.B.; 60 with Class SC, and two (2) with Class SD.

This activity is influenced mainly by the status of the waterbody and its dominant utilization. Thus, several steps must be taken to assess the beneficial use of the water body. These involve conducting field surveys and monitoring of the water body and laboratory and data analysis. The public also has a huge influence on the classification of water bodies. Therefore, EMB Regional Offices conduct public survey and/or public hearing as part of the process in determining the water classification.

The field survey is considered the most tedious part of the classification process as it involves office work, fieldwork, and laboratory and data analysis. The survey aims to establish the baseline data or evaluate the sustainability of the water body for various specific purposes.

For the nine (9) remaining targets for the designation of water quality management area (WQMA), continuous water monitoring and sampling and public consultation will still be conducted until 2021 to designate a WQMA. Sampling activities were not conducted during the nationwide lockdown (ECQ) due to the COVID-19 pandemic.

Table 3.4 Distribution of Water Bodies per Classification and Beneficial Use, 2019

| Classification | Beneficial Use | Number |
|---|---|---|
| INLAND SURFACE WATERS | | |
| Class A.A. | Public Water Supply Class I. Intended primarily for waters having watersheds that are uninhabited and otherwise protected and which require only approved disinfection to meet the Philippines National Standards for Drinking Water (PNSDW) | 7 |
| Class A | Public Water Supply Class II. For sources of water supply that will require complete treatment (coagulation, sedimentation, filtration, and disinfection) to meet the PNSDW | 279 |
| Class B | Recreational Water Class I. For primary contact recreation such as bathing, swimming, skin diving, etc. (particularly those designated for tourism purposes) | 272 |
| Class C | 1. Fishery Water for the propagation and growth of fish and other aquatic resources | 420 |
| | 2. Recreational Water Class II (Boating, etc.) | |
| | 3. Industrial Water Supply Class I (For manufacturing processes after treatment) | |
| Class D | Navigable Waters | 38 |
| Number of Inland Surface Water Body Classifications | | 1,016 |

Table 3.4 Distribution of Water Bodies per Classification and Beneficial Use, 2019

| Classification | Beneficial Use | Number |
|---|---|---|
| COASTAL AND MARINE WATERS | | |
| Class S.A. | 1. Protected Waters – Waters designated as national or local marine parks, reserves, sanctuaries, and other areas established by law (Presidential Proclamation 1801 and other existing laws) and/or declared by appropriate government agencies, LGUs, etc. | 10 |
| | 2. Fishy Water Class I – Suitable for shellfish harvesting for directhuman consumption | |
| Class S.B. | 1. Fishery Water Class II – Waters suitable for commercial propagation of shellfish and intended as spawning areas for milkfish (*Chanos chanos)* and similar species | 68 |
| | 2. Tourist Zones – for ecotourism and recreational activities | |
| | 3. Recreational Water Class I – intended for primary contact recreation (bathing, swimming, skin diving, etc.) | |
| Class SC | 1. Fishery Water Class III – For the propagation and growth of fish and other aquatic resources and intended for commercial and sustenance fishing | 60 |
| | 2. Recreational Water Class II – For boating, fishing, or similar activities | |
| | 3. Marshy and/or mangrove areas declared as fish and wildlife sanctuaries | |
| Class SD | Navigable waters | 2 |
| Number of Coastal and Marine Water Body Classifications | | 140 |
| Total Number of Water Body Classifications | | 1,156 |
| Data Source: DENR Administrative Order (DAO) 2016-08 (Water Quality Guidelines and General Effluent Standards); EMB, 2019<br>Source: NWQSR 2014-2019 | | |

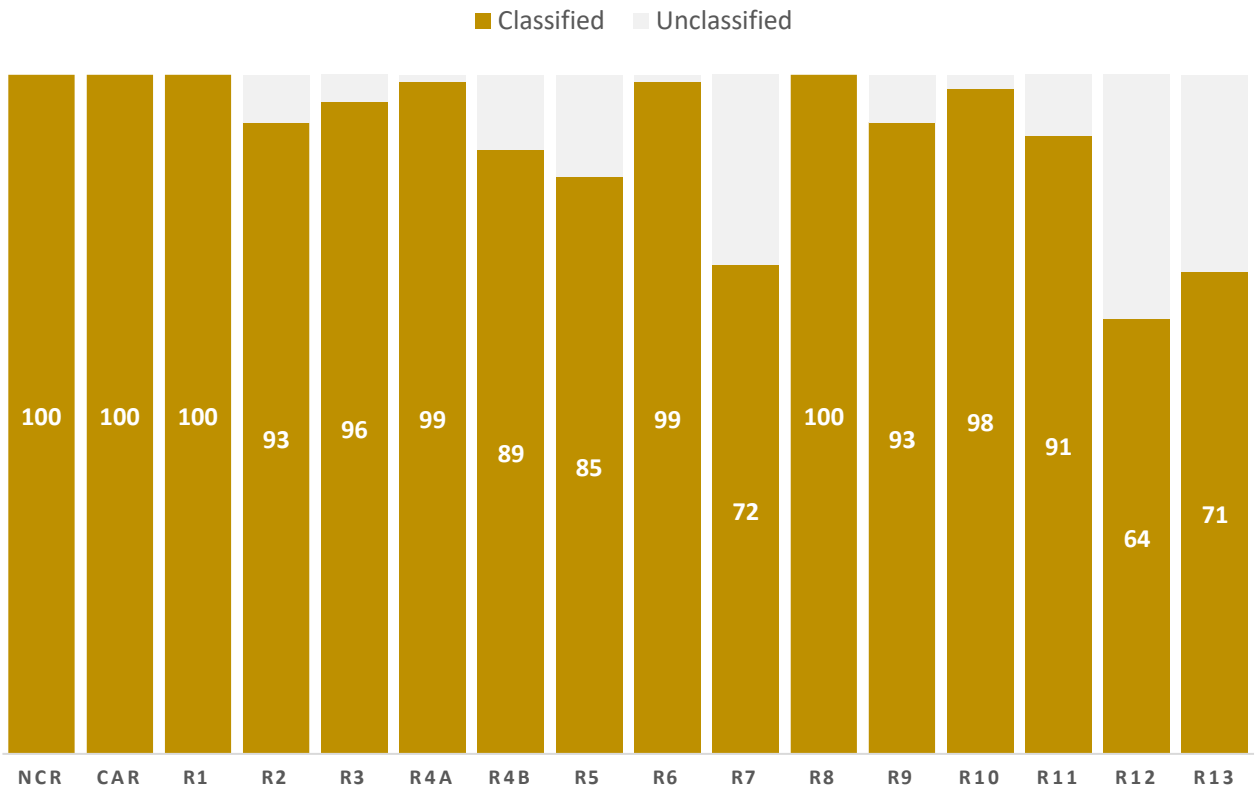



Figure 3.1: Water Bodies Classification, 2021

## Legislation and Policy

The supplementary regulations promulgated by the DENR and its attached bureaus and agencies from 2016 to 2021 to further strengthen the implementation of RA 9275 are listed below. Furthermore, several other laws and policies have also been promulgated by the national government and other government agencies in support of DENR's mandate on water quality management.

To further strengthen the implementation of PD 1067 and RA 9275, the supplementary regulations have been promulgated by DENR from 2016 to 2021.

Table 3.5. Legislation and Policies Supporting the Philippine Clean Water Act

| Document No. | Title |
|---|---|
| RA 10654 | An Act to Prevent, Deter and Eliminate Illegal, Unreported, and Unregulated Fishing Amending RA 8550, otherwise known as "The Philippine Fisheries Code of 1998" and Other Purposes |
| RA 11038 | Expanded National Integrated Protected Areas System Act of 2018. An Act Declaring Protected Areas and Providing for their Management |
| E.O. no. 53, Series of 2018 | Creating a Boracay Interagency Task Force, providing for its Powers and Functions and those of the Member-Agencies Thereof and Other Measures to Reverse the Degradation of Boracay Island |
| Administrative Order No. 16, Series of 2019 | Expediting the Rehabilitation and Restoration of the Coastal and Marine Ecosystems of the Manila Bay and Creating the Manila Bay Task Force |

| Document No. | Title | Date Approved |
|---|---|---|
| DAO 2016-03 | Designation of the Bued River System Water Quality Management Area and Creation of its Governing Board | April 18, 2016 |
| DAO 2016-04 | Designation of the Naga River Watershed Water Quality Management Area and the Creation of its Governing Board | April 18, 2016 |
| DAO 2016-05 | Designation of the Coron Bay Water Quality Management Area and Creation of its Governing Board | May 3, 2016 |
| DAO 2016-06 | Designation of the Sabang Bay Water Quality Management Area and Creation of its Governing Board | May 3, 2016 |
| DAO 2016-08 | Water Quality Guidelines and General Effluent Standards of 2016 | May 24, 2016 |
| DAO 2016-14 | Designation of Lake Sebu Water Quality Management Area and Creation of its Governing Board | June 21, 2016 |
| DAO 2016-15 | Designation of the Ayala River Water Quality Management Area and Creation of its Governing Board | June 21, 2016 |
| DAO 2016-16 | Designation of the Tagoloan River Basin Water Quality Management Area and Creation of its Governing Board | June 21, 2016 |
| DAO 2016-17 | Designation of the Talomo River Water Quality Management Area (WQMA) and Creation of its Governing Board | June 21, 2016 |
| DAO 2016-18 | Designation of the Naguilian River System Water Quality Management Area and Creation of its Governing Board | June 21, 2016 |
| DAO 2016-19 | Designation of the Cañas-Maalimango River Water Quality Management Area and Creation of its Governing Board | June 21, 2016 |

Table 3.6. Legislation and Policies Supporting the Philippine Clean Water Act

| Document No. | Title |
|---|---|
| DMC 2016-08 | Additional List of Classified Water Bodies |
| Addendum to DENR Memorandum Circular No. 2018-06 | Requiring all Hotels, Resorts, and Similar Establishments in the White/Long Beach Area in Boracay (Station 1 to 3) with fifty (50) rooms and below to have their own Sewage Treatment Plant (STP), those with forty-nine (49) rooms and below to have a clustered STP or they may opt/elect to have its separate treatment and those Hotels, Resorts, and similar Establishments in other areas of Boracay with fifty (50) rooms and above to have a separate STP (DMC 2018-07). |

| Document No. | Title | Date Approved |
|---|---|---|
| EMB MC 2021-01 | Clarification on the Implementation of Section 10 of DENR Administrative Order No. 2016-08 | January 27, 2021 |
| EMB MC 2020-001 | Suspension on the Implementation of Advanced Training Modules for Pollution Control Officers | January 22, 2020 |
| EMB MC 2020-002 | Reiteration on the Implementation of Sections 10 and 14 of DENR Administrative Order No. 2014-02 | January 23, 2020 |
| EMB MC 2020-004 | Clarification on the Reporting Requirements for Specific Parameters Under DENR Administrative Order No. 2016-08 or the Revised Water Quality Guidelines and General Effluent Standards of 2016 | January 29, 2020 |
| EMB MC 2020-006 | Clarification in the Implementation of Rules 13.8 and 14.18 of DENR Administrative Order No. 2005-10 | February 12, 2020 |
| EMB MC 2019-001 | Supplementary Clarification on the coverage of DAO 2016-08 Relative to the Granting of not more than five (5) Years Grace Period | January 31, 2019 |
| EMB MC 2019-04 | Advanced Training Modules for Pollution Control Officers (PCOs) | March 26, 2019 |
| EMB MC 2016-12 | EMB Approved Methods of Analysis for Water and Wastewater | November 21, 2016 |
| EMB MC 2016-04 | Operation Manuals for the National Water Quality Management Fund (NWQMF) and Area Water Quality Management Fund (AWQMF) | |

## Compliance and Enforcement

RA 9275 mandates DENR, through EMB, to be the national authority responsible for pollution prevention and control and environmental impact assessment in pursuit of sustainable development. Its mission is to restore, protect, and enhance environmental quality towards good public health, environmental integrity, and economic viability, including the protection, preservation, and revival of the quality of the country's fresh, brackish, and marine waters by implementing the activities such as water quality monitoring, issuance of notice of violations and CDOs and compliance monitoring of establishments.

### Wastewater Discharge Permits Issued

A Wastewater Discharge Permit (WWDP) is a legal license granted by the DENR-EMB Central and Regional Office that defines and outlines the required wastewater discharges (quality and quantity) from any facility or project. Each outfall or discharge site of a project or facility must have a WWDP.

EMB regulates industrial wastewater through the permitting system, and industries are required/mandated to treat wastewater through the installation of wastewater treatment facilities. Only private houses and those under LLDA's administrative jurisdiction are exempt. Businesses in the LLDA's jurisdiction must have a discharge permit.

Region 3 granted and generated the most permits from 2016 to 2021. In Region 3, the Subic Bay Freeport Zone (SBFZ), the CDC Special Economic Zone, the Authority of the Freeport Area of Bataan (AFAB), and privately-operated economic zones have established sewage/wastewater treatment facilities; hence the high number of permits being generated per year.

In 2021, the DENR-EMB implemented the Issuance of Wastewater Discharge Permit Online; this involves the New and Renewal of permits through the Online Permitting Monitoring System (OPMS).

### Notice of Violation

The Notice of Violation (NOV) refers to a document issued to a person, facility, or business entity informing that person, facility, or entity that certain acts or omissions in the course of its business operation or relating to the conduct of its business have been committed or are continuously being committed in violation of pollution and environmental management law/s. Among others, RA 9275 prohibits the following:

- Discharging or depositing any water pollutant to the water body or such which will impede natural flow in the water body
- Discharging, injecting, or allowing to enter into the soil, anything that would pollute groundwater
- Operating facilities that discharge regulated water pollutants without the valid required permits
- Disposal of potentially infectious medical waste into the sea by vessels
- Unauthorized transport or dumping into waters of sewage sludge or solid waste.
- Transport, dumping, or discharge of prohibited chemicals, substances, or pollutants listed under Toxic Chemicals, Hazardous and Nuclear

The Legal Services Section, in partnership with the Regional Offices and Water Quality Management Section of EMB, is involved in

issuing Notices of Violation to non-compliant industries or commercial establishments, conducting technical conferences, and investigating the complaints. In 2021, Region 4A had the greatest number of Notices of Violation issued. From 2016 to 2021, the National Capital Region had the largest number of filed reports or NOVs.

In relation to the NOVs, a total of 28,490 Firms are monitored for Water Related Concerns in the Philippines. The data that was gathered came from the EMB Central Office, have shown that Region 3 contained most of the firms that the EMB monitored from 2016 to 2021. In C.Y. 2021, 930 firms were monitored.

### Water Quality Management Area (WQMA)

Section 5 of RA 9275, or the Philippine Clean Water Act of 2004, tasked the DENR in coordination with the National Water Resources Board to designate certain areas as Water Quality Management Areas (WQMA) using appropriate physiographic units, such as watersheds, river basins, or water resources regions.

The objectives of the WQMA are to protect, thru stakeholders' collaboration, the water body, and its tributaries by keeping their water quality within the Water Quality Guidelines or Criteria conforming to the water body's classification (e.g., Class C or Class SC) or even improve the quality to higher classification (e.g., from C to B or S.C. to S.B.).

A governing board formed of representatives of mayors and governors of member LGUs, as well as members of relevant national government agencies, duly registered nongovernmental organizations, the water utility sector, and the commercial sector, would control the water management area. The governing board chair will be the DENR representative who works through the EMB. In the instance of local government units (LGUs) that are members of more than one (1) management board, the LGUs are required to appoint a single delegate to serve as their voice in all the management areas in which they participate.

The WQMA Action Plan will be developed to address waterquality concerns and difficulties in the area, ultimately resulting in improved or better waterquality, as mentioned earlier.

In 2021, the Department of Environment and Natural Resources (DENR) issued administrative orders that declared two more water quality management areas (WQMA), namely the Bolo River System and the Panglao Island and Coastal Waters. There are currently thirty-nine (39) Water Quality Management Areas (WQMAs) that have been designated, and this number does not include the areas that fall under the purview of the Laguna Lake Development Authority (which was designated as one WQMA due to the provisions of Section 5 of RA 9275).

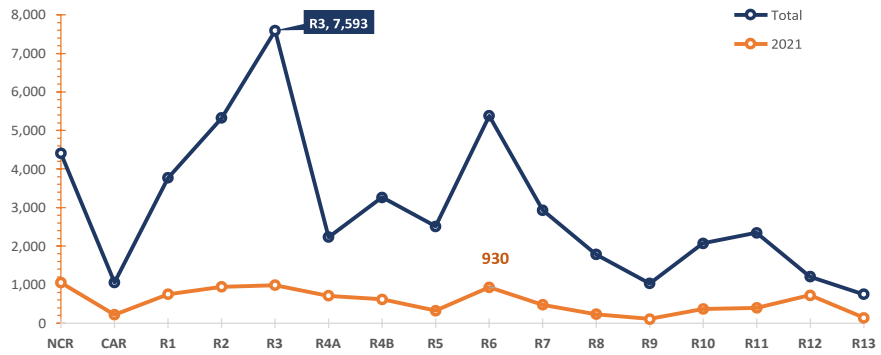



Figure 3.2: Number of Firms Monitored for Water -Related Concerns by Region

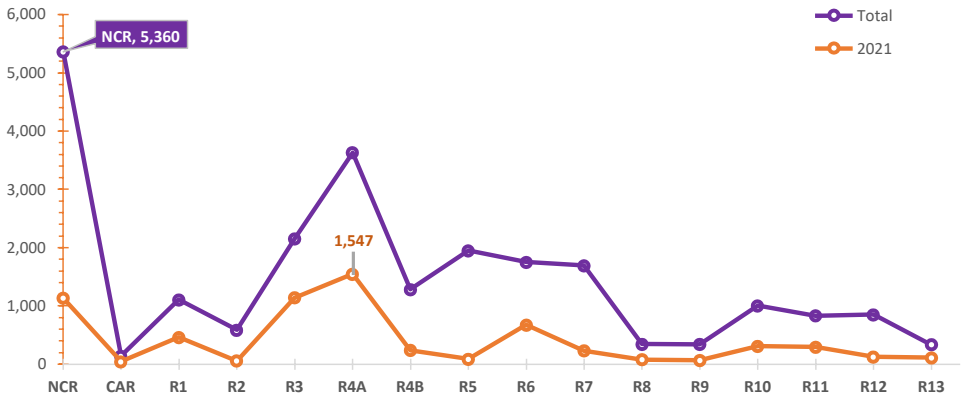



Figure 3.3: **Notice of Violations Issued in Regional Levels**

Table 3.7. List of Water Quality Management Areas, 2016-2021

| REGION | DAO | List of WQMA (2016-2021) |
|---|---|---|
| NCR | 2018-10 | Malabon-Navotas-Tullahan-Tinajeros River System |
| NCR | 2018-12 | Las Piñas-Parañaque River System |
| CAR | 2016-03 | Bued River |
| CAR | 2018-02 | Upper Amburayan River System |
| R01 | 2016-18 | Naguilian River System |
| R01 | 2018-03 | Lower Amburayan River System |
| R01 | 2021-23 | Bolo River System |
| R4A | 2016-19 | Cañas-Maalimango Rivers |
| R4A | 2018-11 | Iyam-Dumacaa Rivers |
| R4B | 2016-05 | Coron Bay |
| R4B | 2016-06 | Sabang Bay |
| R4B | 2021-44 | Bacuit El Nido Bay |
| R05 | 2016-04 | Naga River Watershed |
| R06 | 2019-15 | Boracay Island WQMCA |
| R07 | 2021-24 | Panglao Island Coastal Waters |
| R08 | 2018-04 | Dupong, Matlang and Merida |
| R09 | 2016-15 | Ayala River |
| R10 | 2016-16 | Tagoloan River Basin |
| R11 | 2016-17 | Talomo River |
| R12 | 2016-14 | Lake Sebu |
| Data Source | EMB - Water Quality Management | |

Lake Sebu

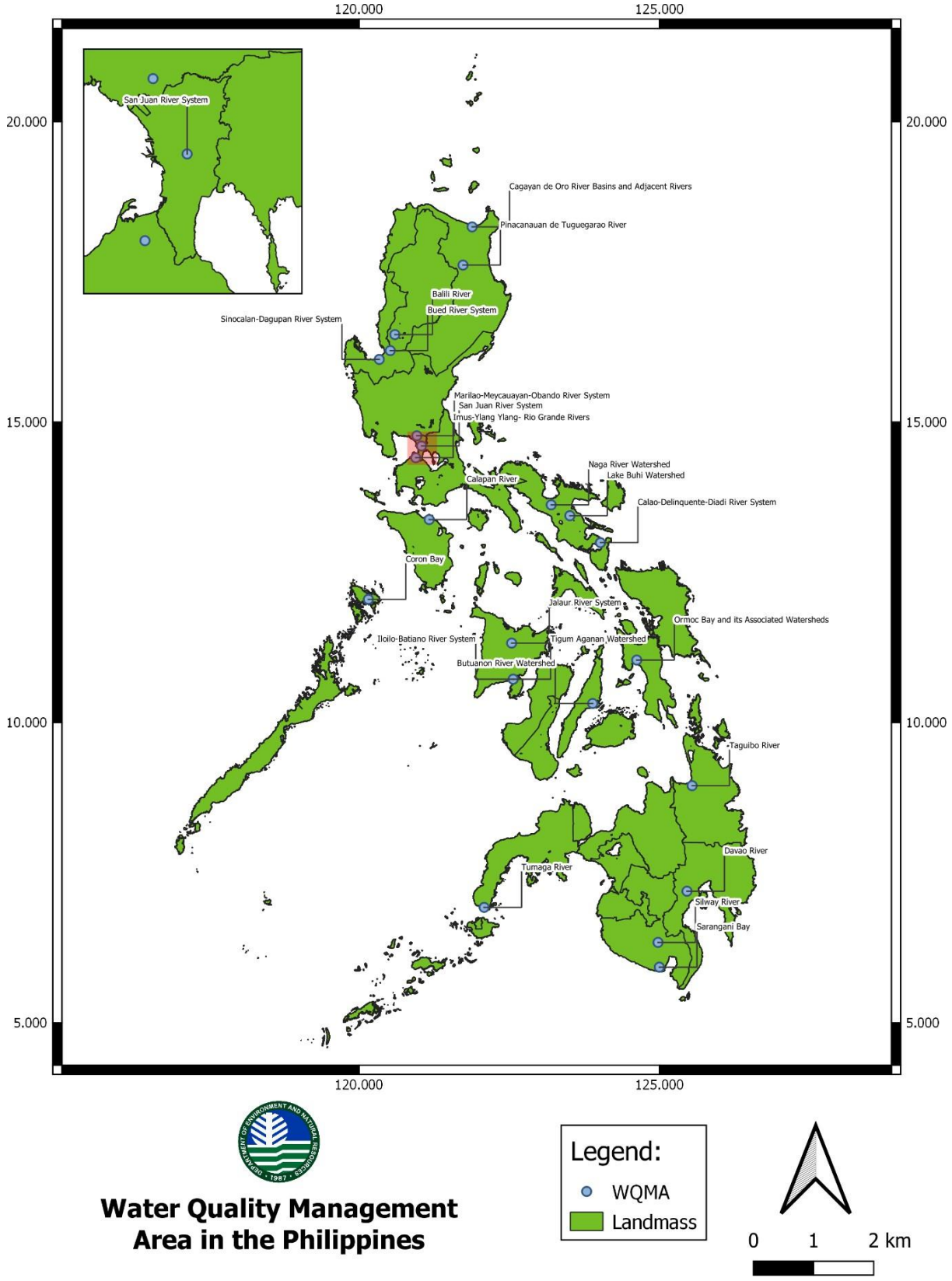



Figure 3.4: Water Quality Management Area in the Philippines

### Designation and Operationalization

Section 5 of RA 9275, or the Philippine Clean Water Act of 2004, tasked the DENR in coordination with the National Water Resources Board to designate certain areas as WQMA using appropriate physiographic units, such as watersheds, river basins, or water resources regions.

The objectives of the WQMA are to protect, thru stakeholders' collaboration, the water body, and its tributaries by keeping their water quality within the Water Quality Guidelines or Criteria conforming to the waterbody's classification (e.g., Class C or Class SC) or even improve the quality to higher classification (e.g., from C to B or S.C. to S.B.).

A governing board formed of representatives of mayors and governors of member LGUs, as well as members of relevant national government agencies, duly registered nongovernmental organizations, the water utility sector, and the commercial sector, would control the water management area. The governing board chair will be the DENR representative who works through the EMB. In the instance of local government units (LGUs) that are members of more than one (1) management board, the LGUs are required to appoint a single delegate to serve as their voice in all the management areas in which they participate.

The Water Quality Management Act (WQMA) Action Plan will be developed to address water quality concerns and difficulties in the area, ultimately resulting in improved or better water quality of the water body.

In 2021, the Department of Environment and Natural Resources (DENR) issued administrative orders that declared two more water quality management areas (WQMA), namely the Bolo River System and the Panglao Island and Coastal Waters. There are currently thirty-nine (39) Water Quality Management Areas (WQMAs) that have been designated,and this number does not include the areas that fall under the purview of the Laguna Lake Development Authority (which was designated as one WQMA due to the provisions of Section 5 of RA 9275).

Currently, there are forty (40) designated WQMAs nationwide. Twenty-two (22) WQMAs are in Luzon, eight (8) in Visayas, and ten (10) in Mindanao.

## Water Quality Assessment

### Scientific Parameters for Water Quality

Table 3.8. Primary Parameters for Water Quality Monitoring as per DAO

| SCIENTIFIC PARAMETER | DEFINITION | IMPLICATION |
|---|---|---|
| Biochemical Oxygen Demand (BOD) | Amount of dissolved oxygen needed by the microorganism to break down the organic matter in water. | High BOD Levels indicate the presence of organic pollution in the water |
| Dissolved Oxygen (D.O.) | The volume of oxygen contained in the water is vital in supporting aquatic life. | Low D.O. levels mean water is polluted |
| Total Suspended Solids (TSS) | Solids or substances suspended in water may include plankton, animal matter, industrial wastes, clay, silt, and sewage. | High TSS values block the sunlight on the surface of the water, causing low D.O. levels |
| Oil and Grease | The thin layer on the surface of the water would dry and form unsightly deposits. | High oil and grease value means the water is polluted |
| Phosphate-phosphorus | One of the nutrients essential to the growth of algae and other biological organisms causes algal bloom, which affects the amount of D.O. in water, especially during the decomposition of algae. | High phosphate causes the D.O. levels to decrease |
| Nitrate-nitrogen | One form of dissolved nitrogen occurs naturally in soil and water.It is the primary source of plant nutrients and may be used as fertilizer. | High Nitrate-nitrogen causes the D.O. levels to decrease. |
| The potential of hydrogen (pH) | The measure of acidity and basicity of water | pH 7 = neutral; 7 < pH = acidic ; pH > 7 = basic |
| Temperature | The degree of hotness or coldness can be measured using a thermometer. This is one factor affecting a water body's normal biological process. | High temperatures increase the decomposition rate of algae, causinga decrease in dissolved oxygen values. |
| Total Dissolved Solids (TDS) | Solids in water can be passed through a filter (usually with a pore size of 0.45 micrometers). TDS is a measure of the amount of material dissolved in water. | High TDS results affect the pH and can adversely affect aquatic life. |
| Turbidity | The measure of how much light can travel through water. | High turbidity provides a medium for microbial growth. |
| Salinity | The measure of salts dissolved in water. | High salinity values lower the concentration of dissolved oxygen. |

| | | |
|---|---|---|
| Conductivity | Measures of water's ability to conduct electricity. This ability is due to the presence of dissolved salts. | Any change in conductivity in a body of water is an early indicator of pollution. |
| Total Coliform | Group of related bacteria found in water, human, or animal waste. | Presence of which indicates imminent health risk. |
| Fecal Coliform | Part of the Total Coliform Group but is found in human or animal waste. | Presence of which implies the disposal of human and animal waste. |

### Monitoring of Priority Recreational Waters (Bathing Beaches)

The Bureau identified forty-four (44) priority recreational waters to be monitored in C.Y. 2021. Out of forty-one (41) priority recreational monitored for Fecal Coliform, seventeen (17), or 39%, passed the 100MPN/100mL standard, while out of forty (40) recreational monitored for pH, thirty-eight (38), or 86% of bathing beaches were within pH criteria.

### Monitoring of Other Recreational Waters

One hundred-seventeen (117) bathing beaches are being monitored in C.Y. 2021. Only 46 bathing beaches (39%) were within the Water Quality guideline (WQG) for Fecal Coliform, and 84 (72%) were within the WQG for pH. Due to COVID-19 travel restrictions, there were stations that the Regional Offices did not access; thus, some have no data for fecal coliform (14 bathing beaches) and pH readings (32 bathing beaches). There were more water quality monitoring stations with no pH monitoring due to the lack of a water quality checker to monitor in-situ parameters.

### Monitoring of Priority Waterbodies

To improve water quality and comply with the water quality standards, monitoring of priority rivers was conducted by the Bureau. In C.Y. 2021, the Bureau identified fifty (50) priority thirty-nine (39) waterbodies passed the water quality standard for Dissolved Oxygen (D.O.), while thirty-seven (37) waterbodies passed the water quality standard for Biochemical Oxygen Demand (BOD).

### Monitoring of Other Waterbodies

In C.Y. 2021, Hundred Forty-Seven (147) rivers were monitored throughout the Philippines. Out of 147 waterbodies, only 140 were monitored for D.O. and 145 for BOD. Regarding D.O., a total of 111 water bodies, or 79%, were within the water quality guideline. For BOD,117 waterbodies, or 81%, passed the waterquality standard.

### Programs on Water Quality Enhancement and Rehabilitation

Programs on water quality enhancement and rehabilitation in the Philippines are spearheaded by the DENR and supported by other government agencies, NGOs, financing institutions, and development partners. These programs are discussed hereafter:

### Water Quality Equipment

The EMB continuously provides our regional counterpart the needed support and resources for activities related to water quality improvement of our water bodies' current degraded state, particularly those designated

as WQMAs. For example, the EMB recently conducted an inventory of the operational and non-operational water quality checkers to assess the needed additional equipment and estimated cost for possible sourcing of funds from the National Water Quality Management Fund (NWQMF).

For the succeeding year, sixteen (16) units of portable real-time water quality monitoring equipment were proposed for distribution to EMB Regional Offices (1 unit in each region) and sixteen (16) units of multiparameter water quality checkers (1 per region) to strengthen the capability of the EMB in monitoring and assessing water quality nationwide.

The portable real-time water quality monitoring equipment can measure Biochemical Oxygen Demand (BOD), Dissolved Oxygen (D.O.), Chloride, pH, Temperature, Nitrate, Fecal Coliform, Tryptophan, Refined Oils, Crude Oils, Ammonium, Salinity, Turbidity, E-Coli in real-time.

The multiparameter water quality checkers are handheld devices capable of measuring pH, Oxidation – Reduction Potential (ORP), D.O., conductivity, salinity, Total Dissolved Solids (TDS), Temperature, Turbidity, Depth, and Global Positioning System (GPS).

### Adopt an Estero / Waterbody Program

Adopt an Estero / Water Body Program is a collaborative undertaking between and among the Estero Community Donor-Partner, Local Government Unit/s, other government agencies, and the DENR. Response to the continuing mandamus by the Supreme Court for agencies led by the DENR to clean up Manila Bay, mainly through the esteros and empty waterways into it.

The objectives of this project include the following: a) to clean the esteros of waste debris and silt starting in 2010 until all have been cleaned up and b) to mobilize Estero communities in cleaning the Estero and enlist their active participation in the actual clean up, and in implementing and preparing plans to sustain a clean Estero in the future years.

Out of two hundred forty-eight (248) esteros/waterbodies monitored in C.Y. 2021, one hundred (100) waterbodies exhibited significant improvement in terms of BOD, while seventy-six (76) waterbodies showed water quality improvement in terms of D.O.

During the periodic community clean-up of esteros conducted by the EMB, donor partners, LGUs, and surrounding communities, the participants recovered 5,420 sacks and 2,504 kgs of mixed solid waste in the said activity, composed of 998 individuals.

Improvements in water quality may be measured in terms of Dissolved Oxygen (D.O.) and Biochemical Oxygen Demand (BOD). D.O. is the concentration of oxygen measured in its dissolved form. Fish and other aquatic organisms require at least 5 milligrams per liter (mg/L) of dissolved oxygen to live. A DO level below this value cannot sustain the growth and productivity of aquatic life. On the other hand, BOD determines the oxygen concentration required to decompose the organic matter from a pollution source. The demand for oxygen does not occur directly where the effluent or runoff water is discharged. Instead, it is manifested downstream, where the decomposition finally occurs. Thus, a higher BOD value indicates a greater degree of pollution. Most aquatic organisms cannot survive if the BOD level is above 7 mg/L.

### Number of Waterbodies Adopted per Region under Adopt an Estero / Water Body Program

Table 3.9. Number of Waterbodies Adopted per Region

| Regional Offices | Water bodies | Signed MOA |
|---|---|---|
| R1 | 47 | 64 |
| R2 | 24 | 61 |
| R3 | 31 | 33 |
| R4A | 58 | 64 |
| R4B | 26 | 42 |
| R5 | 34 | 39 |
| R6 | 36 | 70 |
| R7 | 25 | 35 |
| R8 | 23 | 29 |
| R9 | 36 | 82 |
| R10 | 34 | 38 |
| R11 | 52 | 53 |
| R12 | 36 | 59 |
| CARAGA | 50 | 44 |
| CAR | 36 | 98 |
| NCR | 37 | 40 |
| TOTAL | 585 | 851 |

Table 3.10. Improved Water Quality of Waterbodies interms of D.O. and BOD

| Year | Dissolved Oxygen | Biochemical Oxygen Demand |
|---|---|---|
| 2013 | 27 | 35 |
| 2014 | 75 | 78 |
| 2015 | 110 | |
| 2016 | 89 | 78 |
| 2017 | 85 | 93 |
| 2018 | 125 | 138 |
| 2019 | 147 | 153 |
| 2021 | 76 | 100 |

*num of monitored waterbodies: 248

Truckloads of garbage were collected during community clean-ups of esteros periodically conducted by the EMB, donor partners, LGUs, and surrounding communities. After each clean-up, the esteros/water body showed a gradual decrease in the volume of solid wasteswithin the area of the adopted water bodies.

| 2021 Clean-up* | | |
|---|---|---|
| Sacks | Kilograms | Participants |
| 5,420 | 2,504 | 998 |

Due to the threat of the Corona Virus Disease 2019 (COVID-19) pandemic, travel restrictions policies, and localized lockdowns, water quality monitoring sampling and clean-up activities have been very minimal. However, the regional offices reported that coordination with the adopters had been undertaken

### Manila Bay Clean-Up Program

On January 27, 2019, DENR Secretary Roy A. Cimatu officially declared the start of the Manila Rehabilitation at the Baywalk in Manila. People attended to witness the declaration and join the Solidarity Walk from the Quirino Grandstand to the staging area (Baywalk) were about 5,000 individuals, primarily representing the 13 Mandamus agencies, local government units, and the private sector.

The Manila Bay area covers eight (8) provinces and 18 local government units in three regions (NCR, Region 3, and Region 4A). Four of the provinces are coastal (Bataan, Bulacan, Cavite, and Pampanga), and the other four are non-coastal (Laguna, Nueva Ecija, Rizal, and Tarlac)

The main goal of the Manila Bay Clean Up Program is to restore the water quality of Manila Bay per the Writ of Continuing Mandamus of the Supreme Court on Manila

Bay issued on December 18, 2016, directing 13 government agencies to clean up, rehabilitate, and preserve Manila Bay and to restore and maintain its waters to S.B. level to make them fit for swimming, skin-diving, and other forms of contact recreation.

The water quality monitoring results show that the fecal coliform count of all monitoring stations of EMB NCR and Region 4A exceeds the Water Quality Guideline (WQG) for Class S.B. of 100 MPN / 100 mL. In addition, in terms of dissolved oxygen concentration, no monitoring stations of EMB NCR and the majority of EMB Region 4A are compliant with WQG for Class S.B. of 6 mg/L.

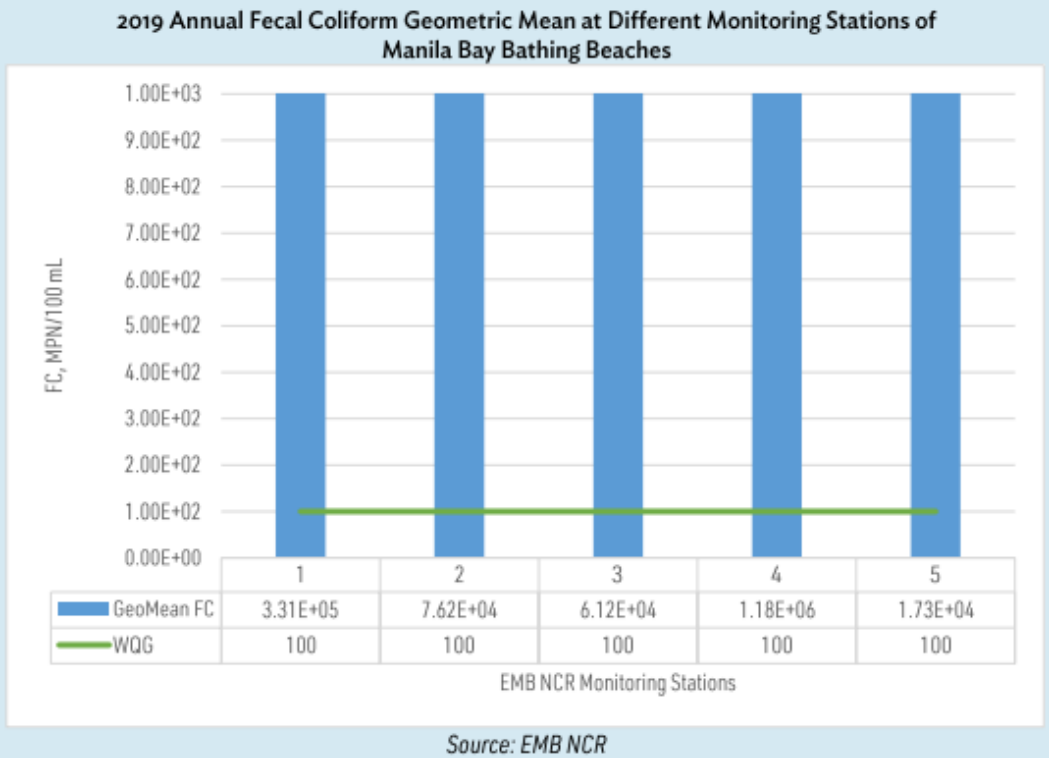
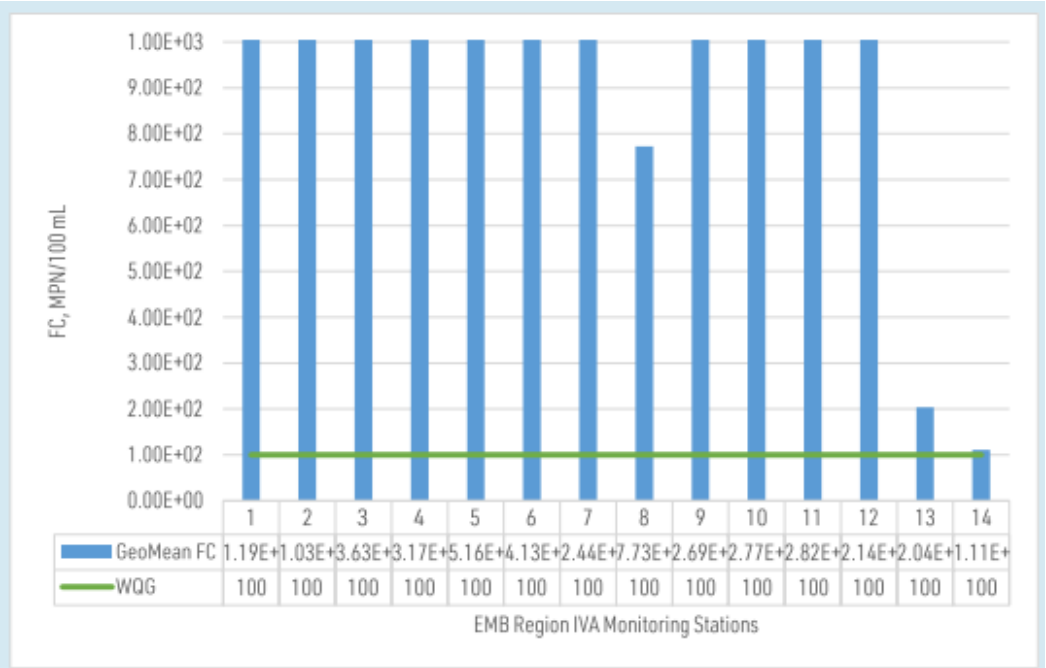
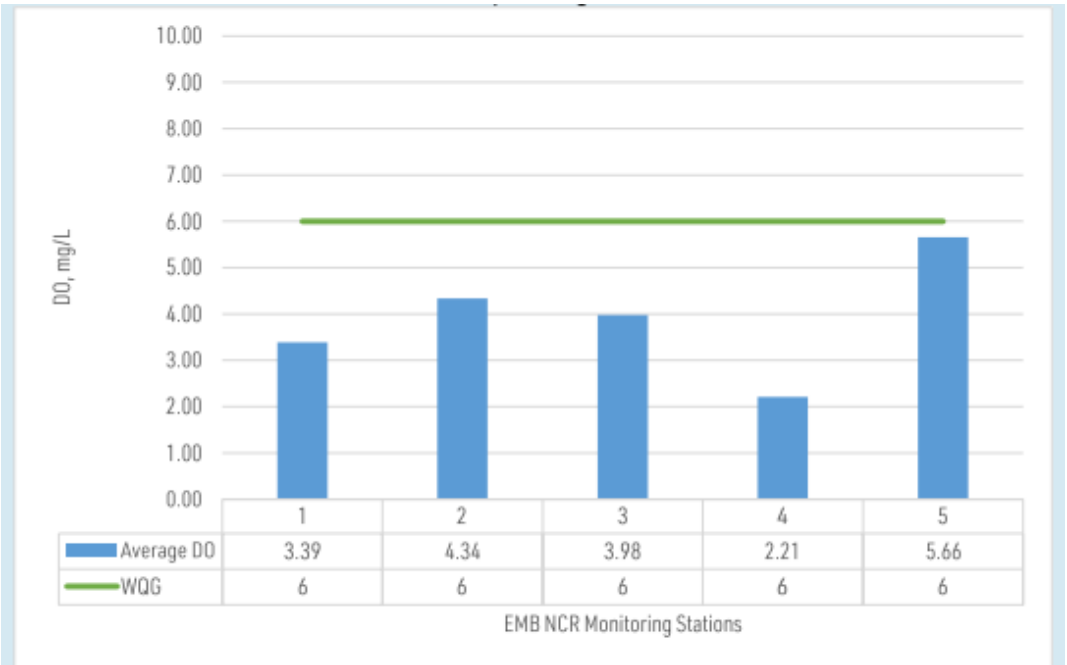



Figure 3.4: Annual Fecal Coliform Geometric Mean at Different Monitoring Stations of Manila Bay Bathing Beaches, 2019

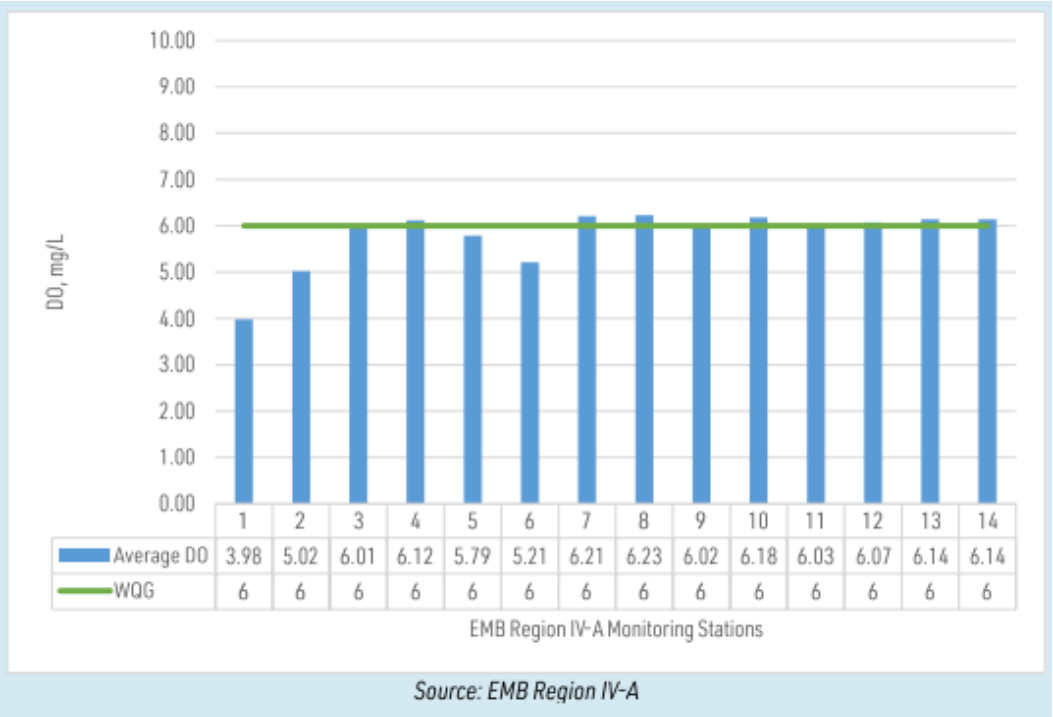



*Source: EMB Region IV-A*




*Source: EMB NCR*

Figure 3.5: Annual Average Dissolved Oxygen at Different Monitoring Stations of Manil Bay Bathing Beaches, 2019




*Source: EMB Region IV-A*

### Priority Recreational Waters / Bathing Beaches (Beach Watch Program)

The program aims to establish baseline data and provide the latest / updated information on the present quality of the bathing beaches. It also aims to inform the resort/facility owners to institute measures to improve the quality of their respective bathing beaches. This is a joint undertaking among EMB and other government agencies such as DOH, DoT, and LGUs in which it was forged in identifying tourist and recreational areas and those of waterbodies intended for primary contact recreation (Class B or S.B. waters).

Recreational water such as rivers, lakes, and coastal waters used for recreational purposes and other use water intended for primary contact recreation where there is intimate contact of the human body with the water, such as bathing, swimming, etc. waters shall be monitored based on their intended beneficial usage and to prevent and abate pollution and contamination to protect public health, aquatic resources, crops, and other living organisms.

As of 2021, Out of 117 water bodies monitored, only 41 or 35.04% are within the 100 MPN/100 mL Water Quality Guidelines for Fecal Coliform (F.C.) counts. On the other hand, 71.55% are within the 7.0 to 8.5 Water Quality Guidelines for pH reading.

Due to COVID-19 Travel Restrictions, no monitoring was done in the subsequent waterbodies, 14 have no submission for F.C., and 32 have no submission for pH levels.

### Priority Rivers Program (Sagip Ilog Program)

Prioritizes activities related to the improvement of the water quality of waterbodies, and results of water quality monitoring are regularly submitted to EMB Central Office. All priority rivers monitoring shall be prioritized, and the water quality

monitoring results should be submitted monthly.

Activity under this program includes data gathering through monthly water quality monitoring. Regularly monitor biochemical oxygen demand concentration, dissolved oxygen concentration, pH, and other water quality parameters.

Based on the history of this program, all the priority rivers are in highly urbanized areas and are more polluted, which needs to be given priority for rehabilitation. Therefore, the criteria being used are the location and the extent of pollution of a river that needs to be prioritized for a monitoring and rehabilitation program.

The Bureau has identified 42 priority rivers for monitoring. These rivers identified are seen to be critical in terms of their water quality. For C.Y. 2018, 37 priority rivers were monitored; out of which, 30 (or 81%) passed in terms of BOD while 31 (or 84%) in terms of D.O.

### Boracay Island's Temporary Closure and Continuing Rehabilitation

On April 6, 2018, through Presidential Proclamation No. 475, a State of Calamity was declared in the barangays of Balabag, Manoc-Manoc, and Yapak (Island of Boracay) in the Municipality of Malay, Aklan, effecting the temporary closure of the world-renowned tourist destination to pave the way for its rehabilitation from serious environmental damage, amidst pollution woes. As part of the closure, Boracay was closed for six months except to its registered residents and employees. The closure had a significant effect on the livelihood of local people.

The government announced in 2022 that the program had successfully rehabilitated the island's environment. Research of Boracay's "actual carrying capacity" was initially commissioned by the DENR Ecosystems Research and Development and the University of the Philippines at Los Banos, Laguna. Boracay's land acreage, visitor activity levels, and other environmental elements were all included in the study.

The study found that Boracay can support a maximum of 54,945 visitors at once, comprised of 19,215 tourists and 35,730 locals, including 22,395 stay-in workers. With a current population of around 70,700, Boracay has exceeded its carrying capacity by nearly 30%. Given the available surplus of one-third, the DENR is considering moving around 6,000 workers to the Malay town of Aklan on the mainland. The Department of Environment and Natural Resources (DENR) is looking into the possibility of receiving housing and transportation assistance from businesses and hotels. The current port will be gated off for tourist usage, but there is the option of building a new one for locals to use.

Environmentalists and even long-time inhabitants of Boracay have pointed to algae bloom in the island's coastal waters as evidence of pollution and poor water quality. Algal blooms, according to the Malay municipal administration, some business owners, and some inhabitants, are a natural seasonal occurrence that occurs on Boracay every summer and has done so since before the island was created.

### Public Awareness and Environmental Education

The DENR conducted IEC on Water Pollution, Health, and sanitation Through the EMB in cooperation with the various LGUs in the Philippines. The event's purpose was to raise awareness about the significance of water bodies and the negative effects of pollution and inadequate sanitation.

In addition, the EMB WQMS and in collaboration with the EEID and the EEIUs, has produced IEC materials. This material consists of information on the fundamental principles of water quality, including the sources of water pollution and its impact on individuals and society. The purpose of this materials is to educate the public about the importance of being environmentally conscientious and to encourage the public to work together to mandate environmental management and preservation.

### Pandemic Responses

#### Personal Protective Equipment (PPE) for EMB Employees

Due to the COVID-19 pandemic, many of the operations of EMB have been stopped. To continue the operations, the EMB employees must undergo an RT-PCR exam before heading into the field and ensuring that they wear PPE.

In some Regions, to ensurethe safety of all EMB employees, both permanent and job order, Regional Directors ordered and distributed personal protective equipment (PPE) such as washable and disposable face masks, face shields, washable bunny suits, and shoe covers for use during fieldwork and monitoring.

The danger of contracting COVID-19 is minimized because of the Regional Directors and the whole EMB-I staff's stringent and constant adherence to minimal public health standards, including personal protective equipment (PPE), physical separation, and frequent hand cleaning.

### Way Forward C.Y. 2022

#### Upgrading of Water Quality Management Information System Database

An upgrade is being developed for the system in C.Y. 2021. The said upgrade covers all ambient water quality monitoring data collected and will be collected by the Environmental Management Bureau through manual sampling and profiling of waterbodies for record and safekeeping for reference, analysis, evaluation, and study. The system also merges the data acquired by the proposed real-time water quality monitoring system with the EMB integrated information system. This new system builds from the existing Water Quality Management Information System with enhancement on the gray areas and issues encountered in the previous version of the system.

#### Policy Formulation the Bureau will be targeting the following policies in C.Y. 2022:

1. Guidelines on the Designation of Waterbodies as Non-Attainment Areas (NAA) or Attainment Areas (A.A.s)
2. Supplemental Rules and Regulations on the Nationwide Implementation of the Wastewater Charge System under Rules 13 and 14 of DAO 2005-10.

## IV. Solid Waste Management

The National Solid Waste Management Commission (NSWMC) is the lead agency tasked with implementing the Republic Act 9003 and the Ecological Solid Waste Management Act of 2000. The law, signed on January 26, 2001, calls for the institutionalization of a national program to manage the control, transfer, transport,

processing, and disposal of solid waste in the country. Chaired by the Department of Environment and Natural Resources (DENR), the Commission will effectively prescribe policies to achieve the objectives of RA 9003. It will oversee the implementation of appropriate solid waste management plans by end-users and local governments as mandated by law.

The Commission is also ordered to establish the National Ecology Center, which will serve as the depot of information, research, database, training, and networking services for the implementation of the provisions of the Ecological Solid Waste Management Act. It comprises 17 Commission members, 14 representatives from government agencies, and 3 from the private sector.

## Sources of Wastes in the Philippines

The amount, composition, and sources of solid waste can be statistically determined through waste analysis and characterization studies (WACS

Table 4.1. Sources of Waste in the Philippines

| Source | Description |
|---|---|
| Municipal Solid Waste | Municipal Solid Waste (MSW) comes from residential, commercial, institutional, and industrial Sources |
| Residential Waste | This type of waste constitutes a huge part of the MSW; it includes scraps, yard waste, paper and cardboard, glass bottles, plastic containers, and sandbags. |
| Commercial Solid Waste | Includes commercial establishments and public or private markets. |
| Institutional Sources | Includes government offices and educational and medical institutions. |
| Data Source: | National Solid Waste Management Status Report (CY 2008-2018) |

Section 16 of the Ecological Solid Waste Management Act of 2000, or RA 9003, mandates Local Government Units to develop their 10-year Solid Waste Management Plans (SWMP) consistent with the National Solid Waste Management Framework. Section 17b identifies waste characterization as a required component.

To analyze the composition of waste, it is necessary to first separate the chosen waste quarter into its several component categories (such as biodegradable, recyclable, special waste, and residual trash) and then to weigh each component separately. A well-functioning segregation and collection system may be indicated if the end-of-pipe waste sample contains few recyclable and biodegradable materials. When the proportion of biodegradable and recyclable garbage is high, more work must be put into developing effective diversion measures. The findings may be compared to in-situ composition analyses to evaluate the efficacy of waste reduction initiatives.

From 2008 up until 2013, biodegradable wastes comprised about half (52.31%) of MSW, although primary data suggest that figures can range from 30% to as much as 78%, which was seen in the CY 2021, wherein the biodegradable waste rises to 54.6% in comparison with the previous years. Typical bio-waste consists of kitchen or food waste and yard or garden waste. From the available information from 2008 to 2013, it could be estimated that 86.2% of compostable waste comes from food scraps, while 13.8% are leaves and twigs. Furthermore, BARMM, with 75.96%, was recorded as the highest at the regional level.

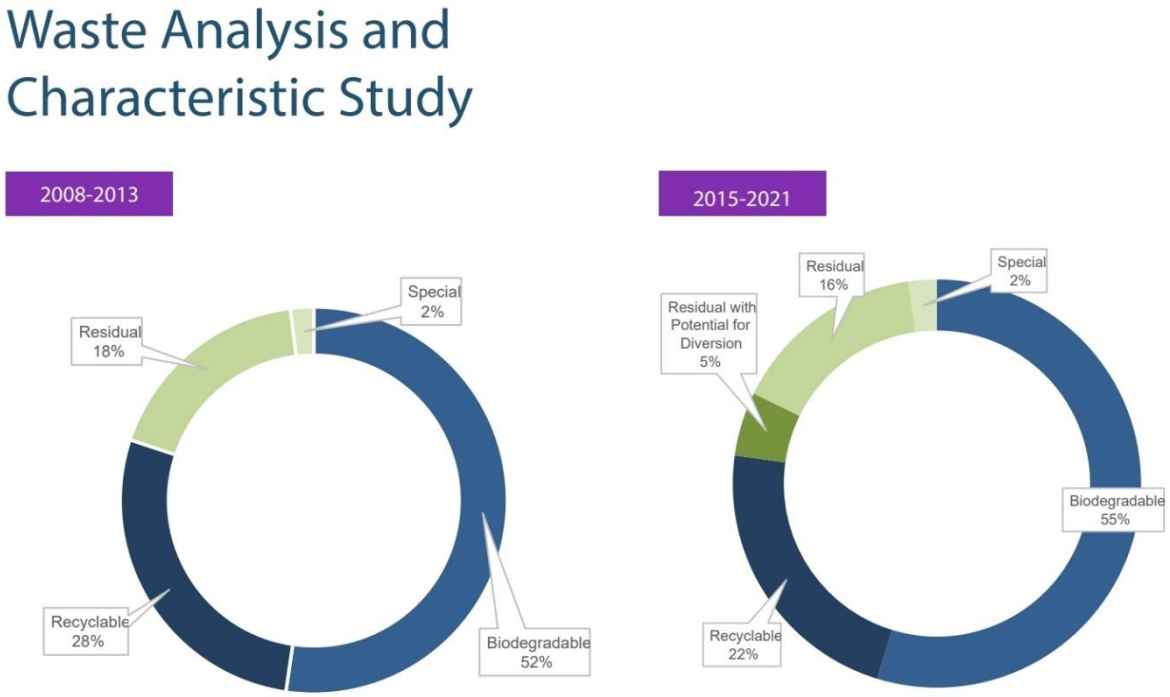


Table 4.2. Waste Characteristics in the Philippines CY 2021

| Region | Biodegradable | Recyclable | Residual with Potential for Diversion | Residual | Special |
|---|---|---|---|---|---|
| CAR | 54.04% | 23.87% | 9.41% | 10.08% | 2.73% |
| NCR | 43.13% | 34.02% | 2.19% | 12.32% | 8.33% |
| 1 | 52.20% | 22.93% | 2.03% | 20.32% | 3.32% |
| 2 | 59.62% | 16.82% | 2.61% | 18.15% | 2.79% |
| 3 | 47.88% | 22.72% | 9.79% | 16.15% | 2.57% |
| 4A | 50.92% | 23.89% | 9.24% | 14.54% | 1.20% |
| 4B | 65.10% | 28.53% | 0.00% | 4.57% | 0.14% |
| 5 | 50.98% | 25.27% | 4.25% | 18.32% | 1.19% |
| 6 | 57.90% | 22.07% | 0.11% | 17.88% | 2.06% |
| 7 | 51.86% | 21.34% | 3.68% | 20.75% | 2.38% |
| 8 | 53.22% | 28.29% | 1.13% | 15.04% | 2.35% |
| 9 | 60.80% | 21.78% | 9.43% | 6.81% | 1.22% |
| 10 | 60.69% | 19.60% | 0.43% | 17.73% | 1.60% |
| 11 | 73.17% | 10.01% | 1.03% | 14.86% | 0.99% |
| 12 | 68.42% | 12.28% | 5.87% | 12.36% | 1.09% |
| 13 | 52.59% | 27.36% | 3.79% | 13.40% | 2.86% |
| Grand Total | 54.66% | 22.44% | 5.07% | 15.46% | 2.24% |

Meanwhile, recyclable wastes from 2008 up until 2013 accounted for almost a third (27.78%) of MSW, with an estimated range of 4.1% to 53.3%. However, in the latest data of SWM for 2021, it was shown that there was a reduction (22.44%) in terms of percentage. The decrease in rate is due to the new category; 5% of the wastes in the Philippines wereconsidered "Residual with Potential for Diversion." Examples of wastes categorized as "potential for diversion" are coconut husks which can be used as an alternative for fuel forfactories, and durable plastic wastes, which canbe used as a material in making bricks.

Special wastes, including household healthcare waste, WEEE, bulky waste, and other hazardous materials, contribute to 2%. Despite the CoVID-19 pandemic that started in December 2019, the rate of special wastes did not rise.

Finally, residuals have been found to make up 16% of generated MSW, which was 1% lower than the previous years. In General, by comparing the data from 2008 to 2018 with the 2021 data, a decrease in waste generation could be observed in all the waste types; the special wastes retain the percentages throughout the years.

## Status of implementation of RA 9003 from 2016-2021

Local governments are prohibited from operating open or controlled dumpsites by Republic Act 9003, also known as the Ecological Solid Waste Management Act of 2000. In addition, these governments are required to establish materials recovery facilities, also known as ecology centers, in every barangay or cluster of barangays to promote waste prevention and reduction at the grassroots level. A solid waste transfer station or sorting station is one component of a material recovery facility. Other components of this kindof facility include a drop-off center, a composting facility, and a recycling facility.

RA 9003 makes it mandatory for local governments to have solid waste management plans that include strategies on residual, recyclable, biodegradable, and special wastes. These strategies can include the strict implementation of the "no segregation, no collection" policy, recycling single-use plastics, composting, and construction of vaults for health care waste. In addition, the law mandates that local governments must have plans that include strategies for residual waste.

## Sanitary Landfills

In 2021, 245 fully Operational Sanitary Land Fills (SLFs) will be available. The law mandates the closure and rehabilitation of all dumpsites and their replacement with SLFs. SLFs are disposal facilities with impermeable liners to prevent liquid discharges from polluting ground and surface waters. It should also have a gas management system to reduce risks of burning or explosion, a regular soil cover to minimize odor, and other environmental protection features.

Sections 40 to 42 of RA 9003 provide the criteria for site selection, establishment, and operation of SLFs. Specifically, Section 41 stipulates the minimum requirements for establishing SLFs: a landfill liner system, leachate collection and treatment, gas control recovery system, groundwater monitoring wells, a daily cover during operations and final cap over the filled landfill, and a closure and post-closure maintenance procedure.

Compared to the 2019 data, the operational open dumps closed dumpsites undergoing rehabilitation, and closed dumpsites not being rehabilitated were part of the 2020 data, including the status of rehabilitation activities supported by the EMB for the existing dumpsites for CY 2016-2018. The total number of Sanitary Landfills rose from 241 in CY 2020 to 245 operational sanitary landfill in CY 2021, servicing 488 LGUs Serviced by the Sanitary landfills.

## Illegal Dumpsites

Twenty years after the Ecological Solid Waste Management Act was approved, the DENR, through the Environmental Management Bureau, closed all illegal dumpsites in CY 2021. The number of illegal dumpsites in the country has completely dissipated over the past seven years, from 553in 2008 to none in 2021. These dumps might have either been completely closed and rehabilitated or are undergoing rehabilitation for closure.

For the safe disposal of solid wastes, 245 operational Sanitary Landfills areservicing 478 LGUs nationwide as of 2021.

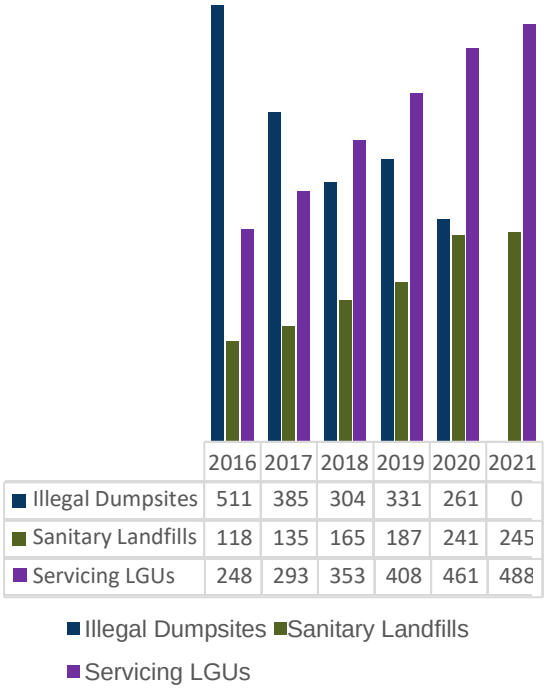



Figure 4.1: Total Number of Illegal Dumpsites and Sanitary Landfill, 2016-2021

## Residual Containment Areas (RCA)

The Residual Containment Area (RCA) is a temporary containment area where we put our residual wastes until EMB or LGUs can establish a sanitary landfill. In some provinces in the Philippines, if an operation of a dump site is stopped may it be due to the abrupt closure of the dump site, the MRF is being utilized as a Temporary Residual Containment Area (TRCA) where residuals collected are temporarily stored. Overall, there are 396 reported RCAs.

## Materials Recovering Facilities

A materials recovery facility (MRF) is where collected and separated garbage is sorted. It is also a location where separated recyclables held separately by kind, such as paper, plastics, metal, and so on until they are sold to trash dealers or recyclers. The MRF also has a composting facility where biodegradable trash is processed. Section 32 of RA 9003 mandates the formation of MRF in a barangay or cluster of barangays, where it will be created, and for what purpose, while Section 33 provides criteria for MRF establishment.

Under Section 32 of RA 9003, a Material Recovery Facility (MRF) shall be established in every barangay or barangay cluster. The facility shall be established in a barangay-owned or leased land or any suitable open space to be determined by the barangay through its Sanggunian. For this purpose, the barangay or barangay cluster shall allocate a certain parcel of land for the MRF. The determination of the site and the actual establishment of the facility shall likewise be subject to the guidelines and criteria set pursuant to this Act.

Section 33 of RA 9003. Guidelines for the Establishment of Materials Recovery Facilities shall be designed to receive, sort, process, and store compostable and recyclable material efficiently and environmentally soundly. The facility shall address the following considerations:

- The building and/or land layout and equipment must accommodate efficient and safe materials processing, movement, and storage.
- The building must be designed to allow efficient and safe external access and to accommodate the internal flow.
- The EMB Regional Office or the NSWMC Secretariat can provide technical assistance in establishing an MRF.


| | 2015 | 2016 | 2017 | 2018 | 2019 | 2020 | 2021 | Jun-22 |
|---|---|---|---|---|---|---|---|---|
| Established | 9,335 | 9,883 | 10,052 | 10,340 | 10,722 | 11,546 | 11,637 | 11,738 |
| Servicing Barangays | 12,607 | 13,155 | 13,324 | 13,612 | 13,994 | 14,450 | 16,418 | 16,817 |

Figure 4.2: Total Number of Established MRFs, 2015-2022

**Out of 11,637 established MRFs, 91 of which were newly established for CY 2021. Lastly, it was also noted that 16,418 are serviced barangay nationwide.*

## Ecological Solid Waste Management

As implemented in RA 9003 refers to Ecological Solid Waste Management (ESWM) as the systematic administration of activities that provide for segregation at source, segregated transportation, storage, transfer, processing, treatment, and disposal of solid waste and all other waste management activities which do not harm the environment.

Furthermore, it was also stated that RA 9003 must set guidelines and targets for solid waste avoidance and volume reduction through source reduction and waste minimization measures, including composting, recycling, reuse recovery, green charcoal process, and others, before collection, treatment, and disposal in appropriate and environmentally sound solid waste management facilities in accordance with ecologically sustainable development principles.

### Composting

Composting is recognized as a method for satisfying the required waste diversion standards under RA 9003. To achieve a stable state for nuisance-free storage and handling and is mature enough for safe application in agriculture, biodegradable solid waste must undergo biological breakdown under-regulated primarily aerobic conditions. It may function as an MRF subcomponent or as a separate operation. Furthermore, the legislation mandates the compilation of a database of compost markets and the establishment of standards for compost quality.


Composting on a local scale is often done in the Philippines in various containers, including compost pits, tire towers, coconut shell stacks, bottomless bins, clay pots, and plastic bags. Meanwhile, large-scale composting may be done in windrows (via turning, passive aeration, active aeration, and static piles), in-vessel (such as agitated beds, composting silos, and rotating drum bioreactors), and by vermin or worm composting.

### Recycling

Under the provisions of RA 9003, it is acknowledged that recycling plays a vital part in meeting the necessary criteria for trash diversion. This legislation provides for an inventory of markets, eco-labeling of recyclables, and instructions for developing and managing buy-back facilities and MRFs. Additionally, the law labels recyclables in accordance with environmental standards. Recycling may either be carried out as part of a MRF) or in a separateprocessing plant.

Most of the time, recyclables, especially those with a high commercial value, such as paper, scrap metals, and plastics, are sold to trash dealers, consolidators, and recyclers. The salvage yards receive the collected recyclables from the MRFs that they service. In many instances, the recyclable materials are brought to junkshops or specified places during events involving collecting recyclables by either semi-formal or informal garbage collectors or even by the creators of the waste themselves.

### Recipients of SWM Equipment

The EMB has provided SWM equipment to the LGUs to manage plastic waste. Like the project of the Honorable Senator Cynthia A. Villar, the plastic molders provided to 94 LGUs will convert plastic waste into school chairs. SWM equipment is currently being installed in the LGUs. In 2021, there will be a total of 992 shredders and composters and 94 Plaster Molder Facilities (PMF) in the Philippines. It was noted that Region 3 has the largest number of shredders and composters, with 119 machines deployed; meanwhile, for the PMF, the largest number can be found in NCR with 16 PMFs.

Furthermore, the DENR has plans to deploy industrial-grade shredder-composter machines to each of the 178 local government units (LGUs) in the Manila Bay region by 2021 to assist them in complying with RA 9003. A shredder- composter combo features a new composter capable of processing one ton of compost material in 24 hours and a new shredder capable of processing two tons of organic waste per day.

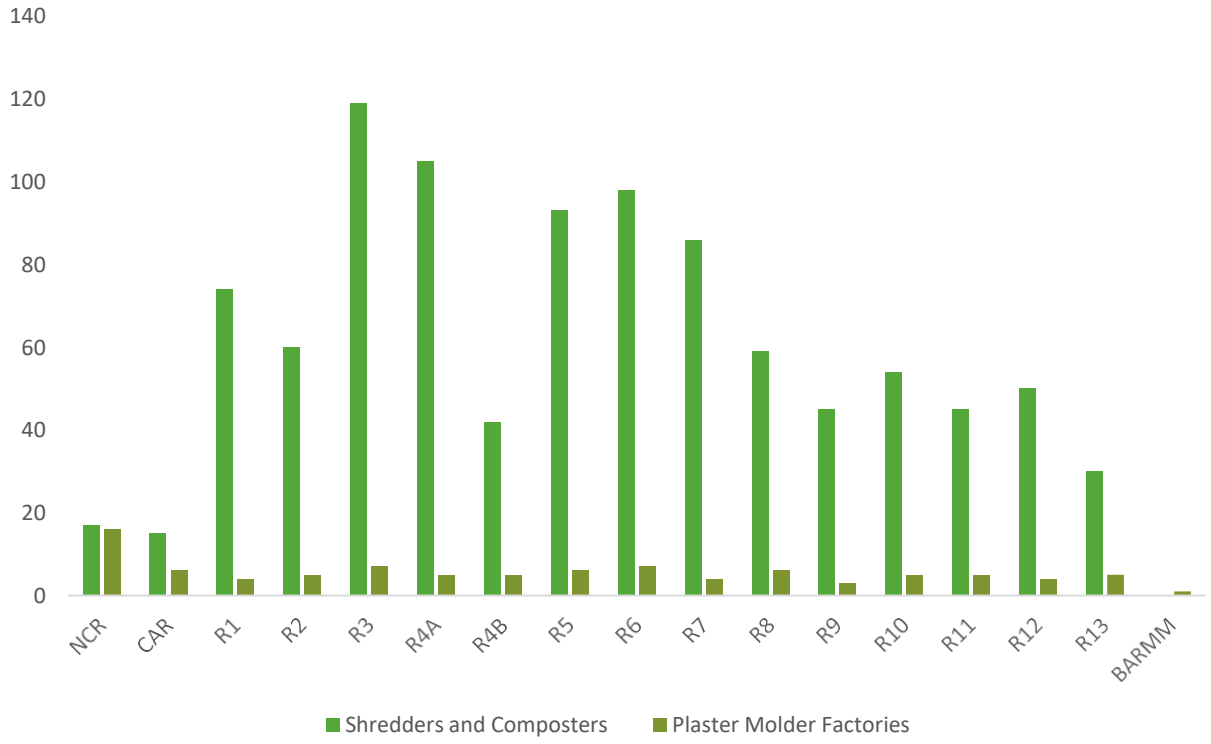



Figure 4.3: Total Number of Installed Shredders and Composters and Plastic Molder Factories per Region

Table 4.3. Product Specifications of Solid Waste Equipment

| Solid Waste Equipment | Product Specifications | Other features: |
|---|---|---|
| Biogas Digester | Outside Dimensions: 3.0 x 3.0 x 3.0 meters<br>Capacity: 1,000 kilograms per day<br>Types of wastes used as a feedstock: Biodegradable wastes<br>Engine: 8 hp water-cooled Diesel Engine<br>Capacity: 300 kg/hour for bio waste; 800 kg/hour for coconut.<br>Portable Type: 2 wheels | Product: Methane Gas used for fuel cooking<br>Total Number Procured: 16<br>Other Features: Biodegradable waste shredder<br>Materials can shred Bio-waste, leaves, fruits and vegetables, paper, banana trunks, corn and rice stalks, etc. |
| Biowaste Shredder and Composter | Capacity: 1000 kilograms in 24 hours operation<br>Type of waste used as a feedstock: Biodegradable wastes<br>Energy capacity: 12 HP<br>Workforce capacity: 3<br>Total number procured: 1217* | Output: Commercial-grade compost (minimum NPK formula of 5/5/5)<br>Products: CCTV |
| Plastic Recycling Equipment | Capacity: minimum of 250 kilograms per hour<br>Type of waste used as feedback: Plastic Waste<br>Energy Capacity: 2 HP<br>Manpower Capability: 5 | Output: 12 chairs per hour<br>Total number procured: 94<br>Products: Plastic Washer, Plastic Dryer Machine, Plastic Extruder, Hydraulic Press Machine, Cooling Tubs, Plastic Chair Molds |
| Trash Traps | Length: Varies depending on the site<br>Total Number Procured: 268<br>Components: Trash traps, Manually Operated Waste Lifter, Plastic Boat, Tools/Materials Operation | |

## Projected Waste Generation

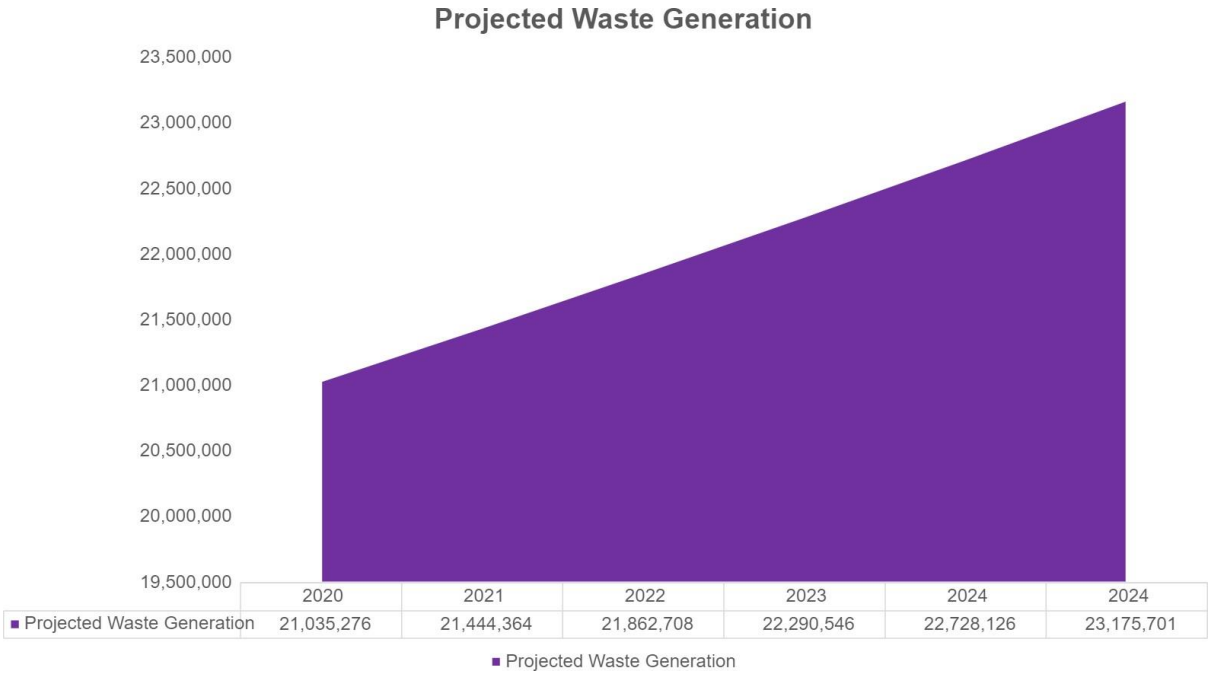



Figure 4.4: Projected Waste Generation, 2020-2024

According to the prior projection of waste generation (2008-2020), the annual amount of waste in the country is expected to increase from 13.48 million tons in 2010 to 14.66 million tons in 2014 to 18.05 million tons in 2020. The quantity of the garbage that is created each year in the Philippines may be estimated using the per capita rate of 0.40 as well as the annual anticipated population. It was projected that the amount of garbage generated will grow between the years 2020 and 2024. It is anticipated that a total of 21,444,384 tons of trash would be generated in 2021. Furthermore, the maximum amount of waste that is expected to be recorded in the Philippines in 2024 is anticipated to be 23,175,701 tons.

In addition to that, an investigation of the predicted quantities of garbage was carried out at the regional level. It was stated that Region 4A was anticipated to have the maximum quantity of rubbish by the year 2025, and the estimated waste creation takes place over the course of five years. In addition, it wasstated that this accumulation of waste was anticipated to take place over the course of fiveyears.

Projected Waste Generation on Regional Levels

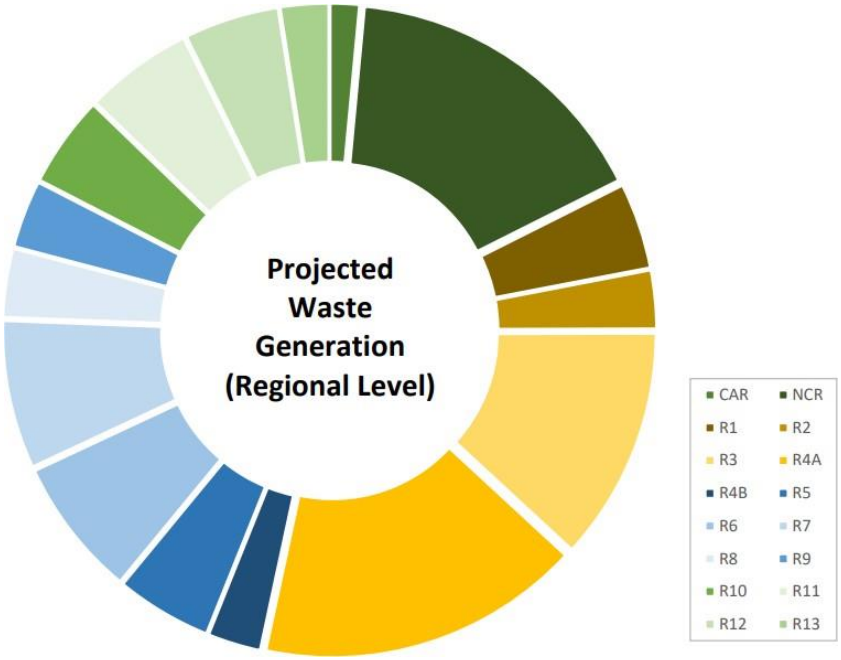



Figure 4.5: Projected Waste Generation in Regional Level, 2020-2024

Table 4.4. Projected Waste Generation on Regional Levels (2020-2025)

| Region | 2020 | 2021 | 2022 | 2023 | 2024 | 2025 |
|---|---|---|---|---|---|---|
| CAR | 304,999 | 309,990 | 315,070 | 320,240 | 325,503 | 330,859 |
| NCR | 3,306,138 | 3,363,676 | 3,422,370 | 3,482,245 | 3,543,329 | 3,605,648 |
| 1 | 911,487 | 922,127 | 932,896 | 943,798 | 954,833 | 966,003 |
| 2 | 615,743 | 624,073 | 632,516 | 641,075 | 649,750 | 658,543 |
| 3 | 2,421,170 | 2,472,155 | 2,524,258 | 2,577,504 | 2,631,920 | 2,687,532 |
| 4A | 3,277,484 | 3,376,818 | 3,479,358 | 3,585,214 | 3,694,495 | 3,807,320 |
| 4B | 554,292 | 564,524 | 574,974 | 585,649 | 596,554 | 607,693 |
| 5 | 1,014,062 | 1,028,229 | 1,042,595 | 1,057,164 | 1,071,938 | 1,086,920 |
| 6 | 1,468,109 | 1,486,774 | 1,505,687 | 1,524,850 | 1,544,267 | 1,563,943 |
| 7 | 1,542,761 | 1,571,676 | 1,601,238 | 1,631,463 | 1,662,369 | 1,693,975 |
| 8 | 723,321 | 733,342 | 743,506 | 753,814 | 764,269 | 774,873 |
| 9 | 705,619 | 718,319 | 731,269 | 744,474 | 757,938 | 771,669 |
| 10 | 951,292 | 969,784 | 988,652 | 1,007,904 | 1,027,549 | 1,047,594 |
| 11 | 1,122,245 | 1,144,346 | 1,166,898 | 1,189,910 | 1,213,392 | 1,237,354 |
| 12 | 976,228 | 999,219 | 1,022,783 | 1,046,935 | 1,071,690 | 1,097,064 |
| 13 | 509,042 | 516,323 | 523,712 | 531,208 | 538,813 | 546,530 |
| Grand Total | 21,035,276 | 21,444,364 | 21,862,708 | 22,290,546 | 22,728,126 | 23,175,701 |

## 10-year Solid Waste Management Plan

To help the government increase the number of SLFs and LGUs with access to SLFs, the Department organized the Coalition of Solid Waste Management Providers or CSWMP, a private sector group composed of service providers on SWM. They are invited during the regular deliberation of LGU Ten-Year SWM Plans as resource persons to identify areas where they can aid in waste disposal.

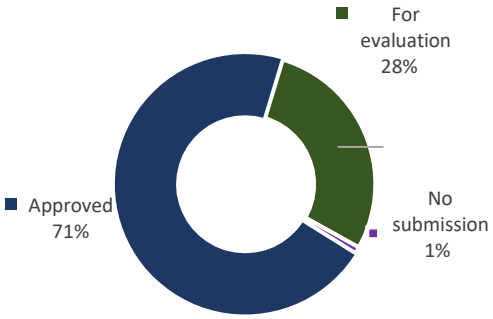



Figure 4.6: LGU Ten-Year Solid Waste Management Plans

## Waste Generation

It's no secret that the Philippines has a waste management issue; it's ranked as Southeast Asia's fourth-highest garbage production and is a major source of ocean pollution. This is due to several issues, such as the increasing past in which we produce garbage and the widespread failure to adequately address trash collection, sorting, and recycling at the municipal level.
The pandemic made the problem much worse by increasing medical waste from PPE like face masks, as well as single-use plastics from sources like food delivery services and internet retailers. EMB estimated that between June 2020 and April 2022, daily healthcare waste generation averaged 1,400metric tons. It is also estimated that from 2022to 2025, the country's produced garbage wouldreach 92 million tons in total.

Garbage production in the Philippines in 2016 was 19.8 million. The National Solid Waste Management Commission (NSWMC) projects that by 2021, the Philippines would generate 21.8 million tons of waste, and by 2025, this number will rise to 23.6 million tons.

From 2020 to 2025, the projection of waste generation was expected to increase. The total projected waste for 2021 is 22,030,673 tons. For the whole Philippines, the max projected waste recorded is 1.15 million.

Table 4.5 Process of Approval of LGU 10-Year Solid Waste Management Plan

| CLIENT ACTIVITY | AGENCY ACTION | PROCESSING TIME | PERSONS RESPONSIBLE |
|---|---|---|---|
| 1. Submit 10 year ESWM Plan through the EMB Regional Offices | 1. Final Review and evaluation of the submitted plan – Form 1, 2 and 3 will be accomplished and returned to the LGUs | 10 days | • Chief, SWMD<br>• Chief, NSTS Section<br>• SWMD Evaluator |
| 2. If submitted plan is not suitable for deliberation – the LGU should provide additional information being required | 2.1 Request additional information from the LGUs through the EMB ROs | 4 days | • Chief, SWMD<br>• Chief, NSTS Section<br>• SWMD Evaluator |
| 3. If submitted plan is suitable for deliberation – the LGU should accomplish Form 4 in reference to forms 1, 2 and 3 as endorsed by the SWMD. | 3.1 Upon submission of the final plan and accomplished forms, it will be endorsed to the Executive Committee for deliberation and a letter of invitation will be prepared by the NSWMC Secretariat to be signed by the EMB Director | 1 day | • Chief, SWMD<br>• Chief, NSTS Section<br>• SWMD Evaluator<br>• Office of the EMB Director |
| 4. The LGU through its Local Chief Executive will present their SWM Plan to the NSWMC-Execom | 4.1 If Not Acceptable - additional information for clarification will be requested from the LGUs | 4 days | • SWMD Evaluator<br>• EMB Regional Evaluator |
| | 4.2 If Acceptable - the NSWMC-Execom will endorse it to the NSWMC Enbanc for approval | 1 day | • SWMD Evaluator<br>NSWMC Executive Committee Members |
| | 4.3 SWMD will prepare a resolution approving the plan for signature of the EnBanc Chairman | 2 day | • SWMD Evaluator<br>NSWMC EnBanc Members |
| 5. The LGU will submit Final copy of the approved plans and forms through the EMB Regional Offices | 5.1. SWMD will update the database and records for monitoring purposes and reference | 2 day | - SWMD Evaluator and database manager |
| TOTAL: | | Complex | 20 days |

Table 4.6. Resolutions Issued by the NSWMC, 2016-2021

| Document No. | Title | Date Approved |
|---|---|---|
| Presidential Decree | | |
| PD 825 | Providing penalties for improper disposal of garbage and other forms of uncleanliness and other purposes | November 7, 1975 |
| Republic Act | | |
| RA 9003 | An act providing for an Ecological Solid Waste Management Program, creating the necessary institutional mechanisms and incentives, declaring certain Acts Prohibited and Providing Penalties, Appropriating Funds, Therefore, and for other purposes | January 26, 2001 |
| Department Administrative Order | | |
| DAO 2019-21 | Guidelines Governing Waste-To-Energy (WtE) Facilities for the Integrated Management of Municipal Solid Wastes | November 26, 2019 |
| DAO 2001-34 | Implementing Rules and Regulations of Republic Act 9003 | December 20, 2001 |
| DAO 1998-50 | Adopting the landfill site identification and screening criteria for municipal solid waste disposal facilities | |
| DAO 1998-49 | Technical Guidelines for Municipal Solid Waste Disposal | |
| EMB Memorandum Circular | | |
| EMB MC 2019 – 008 | Adopting the National Solid Waste Management Commission (NSWMC) Resolution No. 669 Series of 2016, "Guidelines Governing the Establishment and Operation of Waste-to-EnergyTechnologies for Municipal Solid Waste" | September 16, 2019 |
| EMB MC 1988-39A | Amending Memorandum Circular No. 39-A, Dated January 19, 1988. By Reconstituting The Presidential Task Force On Waste Management | March 21, 1994 |

## Enforcement and Compliance

### Solid Waste Enforcement and Education Program (SWEEP EnMO)

The DENR and the local government units (LGUs) have been working together to execute the RA 9003 since the SWEEP program was initiated in2017. This was done to improve the cooperation and partnership between the DENR and the LGUs.

All EMB EnMo reports are submitted through the Integrated Information System or IIS. Through the Solid Waste Enforcement and Education Program, the EMB hired Environmental Monitoring Officers or EnMos to monitor contaminated sites and mobilize the barangays to clean up these contaminated sites.

Monitoring dirty public areas, disposal facilities, and materials recovery facilities is how the EnMOs will aid local government units in meeting the requirements of RA 9003. They will also assist the local government units in establishing model barangays, which will implement four aspects of ecological solid waste management, including resource recovery, segregation at the point of generation, separate collection, and management of waste residuals. Furthermore, the EnMos also conduct information, education, and communication campaign in the barangays to inform them of the requirements of RA 9003. In 2021, 327 EnMos were hired nationwide to conduct this activity and inspect and monitor SWM facilities.

## Programs and Projects

### Enhancement of the EMB NSWMC Website

The easily accessible solid waste management information uploaded on the EMB website includes the following:

1. Status of LGU Ten-Year SWM Plans;
2. LGU Solid Waste Profile;
3. Solid Waste Generation projection;
4. LGU Best Practices on SWM;
5. Operational Sanitary Landfills;
6. Sanitary Landfill Designs;
7. Recipients of SWM Equipment;
8. Closed Illegal Dumpsites;
9. Waste Analysis and Characterization Study (WACS) Manual;
10. Non-Environmentally Acceptable Products (NEAP) Documents;
11. NPOA-ML Documents;
12. SWM Module for DepEd by Nestle and NSWMC;
13. Link to the website of the Philippine Center for Environmental Protection and Sustainable Development, Inc. Featuring the Eco-labelled products under Green Choice Philippines

The EMB Data Center provides the stakeholders with accessible information on waste generation in the country. The Philippines generates around 61,096 tons of solid waste per day. In the National Capital Region, around 9,834 tons of waste are generated daily.

### Strengthening the use of MS Power BI for Data Visualization

The EMB Data Center provides the stakeholders with accessible information on waste generation in the country. The Philippines is generating around 61,096 tons ofsolid waste per day. In the National Capital Region, around 9,834 tons of waste are generated daily. Furthermore, other datasets such as the locations of the MRF and the number of SLFs in the Philippines were also visualized using MS Power BI and can be accessed on the EMB SWM Website.

## Technical Assistance to Local Government Units

### Sanitary Landfill Design and Landfill Assessment

Another key result area on solid waste management is the support to LGUs in the site assessment of proposed sanitary landfills for the disposal of solid wastes. The EMB, through the Regional Offices, hired licensed geologists and civil engineers lodged at the SWM Section; in the conduct of site assessment, the parameters being considered include:

1. Proximity to groundwater resources;
2. Proximity to perennial surface waters;
3. Local Geological Conditions (Underlying Rock Formation);
4. Seismic Conditions (proximity to faults);
5. Soil properties and availability of cover material;
6. Topography (terrain and slope);
7. Vulnerability to flooding;
8. Proximity to ecologically sensitive or environmentally critical;
9. Consistency with current or proposed land use classification;
10. Proximity to airports
11. Landfill area and lifespan;
12. Haul distance, accessibility, and road conditions;

All 16 EMB Regional Offices developed a Feasibility Study to assist the LGU Clusters in their areas of jurisdiction in establishing a Common Sanitary Landfill, and the designs will be uploaded to the DENR-EMB website for easy access to the LGUs and Regional Offices. Furthermore, The EMB, thru the Regional Offices, hired Civil Engineers further to assist the LGUs in the design of SLFs.

## Research and Development

### Support for the Implementation of the National Plan of Action for the Prevention, Reduction, and Management of Marine Litter (NPOA-ML)

In the year 2021, the National Solid Waste Management Commission used Resolution No. 1441 to officially implement the National Plan of Action for the Prevention, Reduction, and Management of Marine Litter also known as NPOA-ML.

The program was introduced to the public on November 26, 2021, in Tacloban City, and the EMB Regional Offices are now in the process of executing the Regional Launch between the months of July and October 2022. It was also approved by the DENR as shown by the DENR Memorandum Circular no. 2021-10.

The NPOA-ML has set the overall objective of "zero waste to Philippine seas by 2040." Their vision is "The Philippines free of marine litter via shared responsibility, accountability, and participatory governance." It also aims to provide the blueprint to enhance the current efforts of the country in resource and waste management to bring an additional lens to marine litter issues and the control of additional leakage of waste into bodies of water.

Furthermore, the NPOA ML is consistent with the provisions of RA 9003 on mandatory segregation (Sections 21 and 22), segregated collection, transfer, and transport of wastes (Sections 23 and 25), and mandatory solid waste diversion starting at 25% (Section 20.) The segregation and collection of solid wastes shall be conducted at the barangay level specifically for biodegradable and recyclable wastes, provided that the collection of non-recyclable materials and special wastes shall be the responsibility of the municipality or city.

### Assessment of Plastic Soft drinks Straw and Coffee Stirrer

The soft plastic drink straw and plastic coffee stirrers have been added to the list of non-environmentally acceptable products (NEAP) that may soon be banned as part of the implementation of Republic Act (RA) 9003 or the Ecological Solid Waste Management Act of 2000 by the National Solid Waste Management Commission (NSWMC).

Benny D. Antiporda, Undersecretary for Solid Waste Management and Local Government Units (LGUs) Concerns at the Department of Environment and Natural Resources (DENR) and Alternate Chair of the NSWMC, presided over a virtual en banc meeting on Tuesday (Feb. 2) to discuss a draft resolution declaring plastic soft drink straws and plastic coffee stirrers as NEAP. The final tally was 11 in favor and 3 against, therefore the two proposals were approved overall.

In a study that was conducted by Engr. Reynald L. Esguerra and Dr. Denvert C. Pangayao showed that single-use plastic is defined as any plastic material that is designed to be disposable and items that are intended only to be used once before they are thrown away or recycled. These items include food packaging, grocery bags, bottles, cutlery, stirrers, and straws. Theyhave also assessed plastic straws and stirrers and their equivalent alternative materials.

### Assessment of Plastic Straws

Distribution and usage of plastic straws are often restricted or banned in some areas. Limiting the use of disposable plastics will drastically reduce trash accumulation. However, this policy's enforcement and observance must be treated with seriousness. Straws that can only be used once will accumulate over time unless people act.

### Assessment of Plastic Stirrer vs Wooden Stirrer

The assessment is based on the Ministry of Environment and Food Denmark, Environmental Protection Agency entitled, "LCA of Single-Use Plastic Products in Denmark: Brief Report" published in September 2019.

Based on the data gathered, the following impact categories were identified for further discussion namely: Climate Change (CC), Particulate Matter formation (PM), Resource Depletion fossil (RD fos), and Resource Depletion Elements (RD el). However, Human Toxicity Cancer (HTC), Human Toxicity non-Cancer (HTNC), and Ecotoxicity (ET) were not included due to the high uncertainty of the outcome.

Based on the data shown above, single-use non-plastic (SUNP) performs better as compared with single-use plastic (SUP). Hence, replacing polypropylene plastic with wood is recommended.

## Publications

### SWM Materials for DepEd by Nestlé and NSWMC

One of the goals of Nestlé is for their packaging is to have their packaging (including plastics) does not end up in landfills, oceans, lakes, or rivers. The company is working hard to keep its promise and help make the future without trash. To do this, Nestle has promised that by 2025, all their packaging will be recyclable or reusable. 85.4% of all Nestlé packaging is already recyclable or reusable, but they know they still need to domore.

Hence, to fulfill their commitment, one of the projects of Nestlé is to produce IEC materials that were distributed to the primary (elementary) schools in the Philippines. This is

in partnership with the Department of Education (DepEd) and DENR.

### Strengthening the distribution of IEC Materials

The DENR-EMB has also strengthened the distribution of IEC Materials thru the Environmental Education and Information Unit and intensified Information Education Communication (IEC) Campaign on Solid Waste Management for Households, Communities and in Schools. To further increase their knowledge and understanding of the implementation of Republic Act 9003 or the Ecological Solid Waste Management Act of 2000.

The pandemic didn't also hinder the goal of DENR-EMB to raise awareness during the lockdown as several infographics, videos, and seminars were conducted for the general public to join and participate in.

## Pandemic Highlights

### Interim Guidelines on COVID-19 Health Care Wastes

The imposition of the Enhanced Community Quarantine (ECQ) in March 2020 due to the COVID-19 pandemic drastically affected the monitoring activities of the Bureau due to travel restrictions. It prevents some regional offices from inspecting some illegal dumpsites operating within their jurisdiction. Despite the said restrictions, they could comply and submit data to the central office using online platforms (i.e., IIS, Email, Facebook Messenger,MS Teams, and Zoom), which helped and eased transactions with other offices.

Furthermore, for SWEEP, despite the restrictions and challenges brought about by the pandemic, all 326 EMB EnMOs nationwide completed the monitoring of 28,671 sites and facilitated the clean-up of 23,180 unclean sites in 2021. The EnMOs were also able to assist in the inspection and monitoring of SWM facilities, initial review of Ten Year SWM Plans and monitoring of approved 10-year plans, information and education, andcommunication (IEC) campaign, and enforcement of other environmental laws such as monitoring of sewage treatment plants (STPs).

### Management of Infectious Healthcare Waste during the COVID-19 Pandemic

The Department of Environment and Natural Resources thru the Environmental Management Bureau did not stop promulgating laws and policies despite the ongoing pandemic all over the world. This was done to ensure that the public are still complying with the proper waste disposal despite the community quarantine and lockdowns implemented by the Philippine Government.

The EMB Memorandum Circulars that were implemented during the 2020 ECQ are the following: i) EMB MC 2020-20 or the Provisional Guidelines on the Hazardous Wastes Management during the Extended Enhanced Community Quarantine Period, ii) EMB MC 2020-16 or the Amendment of the Interim Guidelines on Issuance of Special Permit to Transport (SPTT) for the Transportation of Hazardous Wastes within the Community Quarantine Period; and the iii) EMB MC 2020-14 or the Interim Guidelines on Issuance of Special Permit to Transport (SPTT) for the Transportation of Hazardous Wastes within the Community Quarantine Period.

## Way Forward for 2022

The following are the on-going programs, project and activities under the solid waste management:

- Extended Producer Responsibility Bill
- Non-Environmentally Acceptable Products and Packaging Materials (NEAP)
- Conduct of Life-Cycle Assessment on Single-Use Plastics for Possible Non-

Environmentally Acceptable Products and Packaging Materials (NEAP)

- Support for the Implementation of the National Plan of Action for the Prevention, Reduction, and Management of Marine Litter (NPOA-ML)
- Support to LGUs in the Management of Biodegradable Wastes
- Support to LGUs in the Site Assessment of Proposed Sanitary Landfills for Waste Disposal

Support to LGUs in the Site Assessment of Proposed Sanitary Landfills

- Development of a Feasibility Study for the Establishment of a Sanitary Landfill for the use of LGU-Cluster
- Support to LGUs in the Design of Sanitary Landfills
- Solid Waste Enforcement and Education Program (SWEEP)

## V. Toxic Substances and Hazardous and Nuclear Wastes Control Act of 1990 (RA 6969)

RA 6969 under the DAO 1992-29, Section 2 "Declaration of Policy" indicates that it is the policy of the State to regulate, restrict, or prohibit the importation, manufacture, processing, sale, distribution, use, and disposal of chemical substances and mixtures that present unreasonable risk and/or injury to health or the environment; to prohibit the entry, even in transit, of hazardous and nuclear wastes and their disposal into Philippine territorial limits for whatever purpose; and to provide advancement and facilitate research and studies on toxic and hazardous and nuclear wastes.

### Chemical Management

The mandate of the Chemical Management Section is to implement Title II (Toxic Chemical Substances) of Republic Act 6969 and act as the focal section on Multilateral Environmental Agreements relating to chemical management such as the Rotterdam Convention and Stockholm Convention. The thrust of the section is to control possible chemical emissions at the source- the industry, to minimize the risk to human health and the environment. The core activity of the section is the development of policies anchored on RA 6969.

- Inventory of chemicals and chemical substances currently used in, manufactured in, and imported to the Philippines, and update the Philippine Inventory of Chemical and Chemical Substances (PICCS).
- Update the list of chemical substances that DENR-EMB determines to pose a potentially unreasonable risk to public health, to the workplace, and to the environment, then register importers, users, and manufacturers of these chemicals through the Priority Chemical List (PCL).
- Evaluate the safety of notified new chemicals and chemical substances by requiring prior notification of new chemicalsubstances to be manufactured in or imported to the Philippines; developed a Pre- Manufacture Pre-Importation Notification (PMPIN) process andprocedure.
- Regulate, limit, gradually phase out, or ban those chemical substances that are determined to pose unreasonable risks to public health and the environment through the issuance of a Chemical Control Order (CCO).
- Educate and inform the public on the hazards and unreasonable risks in the manufacture, handling, storage, transport, processing, distribution, use, and disposal of toxic chemicals.

### Hazardous Waste Management

The primary responsibility of the Environmental Quality Division-Hazardous Waste Management Section (EQD-HWMS) is to enforce and assist the EMB Regional Offices in the implementation of Title III (Hazardous Waste Management) of DAO 1992-29, the Implementing Rules and Regulations of RA 6969 and DAO 2013-22, its Procedural Manual.

The hazardous waste management section is mandated to implement the Title III of the Implementing Rules and Regulations of RA 6969 which provides for the regulation of all hazardous wastes from generation, transport, storage, re-use and recycling, treatment, and disposal as well as the importation of recyclable materials containing hazardous substances and export of hazardous waste.

## Regulated Chemicals

### Philippine Inventory of Chemicals and Chemical Substances (PICCS)

The Philippine Inventory of Chemicals and Chemical Substances (PICCS) is a list of all existing chemicals and chemical substances used, imported, distributed, processed, manufactured, stored, exported, treated, or transported in the Philippines. The chemicals and chemical substances in the inventory were nominated by the industries themselves.

The first PICCS was published by DENR-EMB in 1995 and subsequently, PICCS updates were published in 2000, 2002, 2005, 2008, 2011, 2013, 2015, 2017, and 2020. The PICCS contains the following information:

- Chemical name and the Chemical Abstract Service Registry Number (CAS RN), a unique identifying number assigned to a particular chemical or chemical substance.
- CAS Registry Index names that are assigned to chemicals in accordance with the International Union of Pure and Applied Chemistry (IUPAC) nomenclature.
- The common name of the chemical or chemical substance, only if different from the CAS Registry Index name.

### Purposes of PICCS

PICCS was developed to provide the government, industry, and the public with a core inventory of all existing chemicals and chemical substances in the country. It serves as a guide for manufacturers and importers of chemicals. Manufacturers and importers do not need to notify and secure clearance from DENR- EMB before they manufacture or import chemicals included in PICCS; provided that these chemicals are not in PCL and are not subject to CCOs.

Chemicals and chemical substances not included in PICCS cannot be manufactured or imported unless the proponent follows the PMPIN notification assessment process as discussed in the subsequent sections of this manual.

Updating of the PICCS is done annually and includes all new chemicals that have been issued non-confidential PMPIN Clearance Certificates.

All these new chemicals are submitted for verification of their CAS Registry Name and CAS Registry No. with the Chemical Abstract Service Office in the USA. Any correction is consulted with the notifier of the chemical.

https://chemical.emb.gov.ph/wp-content/uploads/2021/05/EMB-MC-2021-08-2021PICCS.pdf

Readers may access the complete list of the PICCS (last updated in 2021) from the QR Code.

## Exemptions to PICCS and the PICCS Updating Rules

Table 5.1 Summary of Exemptions to PICCS and the PICCS Updating Rules

| EXEMPTION TO PICCS | EXEMPTION TO THE PICCS UPDATING |
|---|---|
| • Non-chemical substances<br>• Naturally occurring substances<br>• Mixtures (The individual components are the ones to be checked for inclusion in PICCS, not the mixture itself)<br>• Radioactive substances, pesticides, drugs, foodstuffs, and consumer products that are regulated by other laws in the Philippines<br>• By-products (Wastes) | Small-quantity chemicals manufactured or distributed (not imported) for market test and research and development in quantities less than 1,000 kg per year (for SQI Application) |

### Pre-Manufacture, Pre-Importation Notification (PMPIN)

The new chemical substance is defined as any chemical that is not included in PICCS. The Pre-Manufacturing and Pre-Importation Notification (PMPIN) aims to screen harmful substances before they enter Philippine commerce. Its main objective is to ensure that new chemicals that would pose an unreasonable risk to human health and the environment either be denied to be manufactured or imported into the country, or be placed under control and restriction to limit potential releases.

Manufacturers and importers (proponents) of a new chemical are required to notify DENR-EMB of their intent to manufacture or import the new chemical. Together with this notification, the proponent submits the appropriate PMPIN forms. There are two kinds of PMPIN forms for notification. These are:

- PMPIN Abbreviated Form: used when a new chemical to be manufacturedor imported is being used in a country with a developed and/or similar chemical review process as the Philippines, and sufficient information is submitted by the notifier that exhibits that the notified chemical will not pose an unreasonable risk.

- PMPIN Detailed Form: used when the new chemical being manufactured or imported is not yet listed in any country or when DENR-EMB determines that the information submitted for the new chemical does not contain sufficient documentation to enable DENR-EMB to determine the safety of the new chemical.

Once a new chemical has been assessed and approved by DENR-EMB for import and manufacture, the proponent is granted a clearance by DENR-EMB to import and manufacture the new chemical. The proponent is also required to submit a Notice of Commencement to Import or Manufacture Form (along with the requirements stated in the form). Only after submission of this form will the new chemical be added to PICCS.

## Relevant Policies

- DAO 1992-29 Implementing Rules and Regulations of Republic Act 6969 Guidelines on Small Quantity Importation under Republic Act 6969 and Its Implementing Rules and Regulations
- EMB MC 2014-010 Guidelines for the Disclosure of Confidential Business Information (CBI) and Monitoring of Small-Quantity Importation (SQI), and Pre-Manufacture Pre-Importation Notification (PMPIN)
- EMB MC 2016-003 Implementation of Online Processing of Priority Chemical List (PCL) and Pre-manufacture Pre-importation Notification (PMPIN) Under the Title II of DENR AO 29, Seriesof 1992, of RA 6969
- DAO 2019-18 Polymers and Polymer ofLow Concern (PLC) Exemption from the
- PMPIN Process
- EMB MC 2020-00Data Requirements for Pre-Manufacture and Pre-Importation Notification (PMPIN) Procedures

### Polymers and Polymer of Low Concern (PLC) Exemption from the PMPIN Process

The Department of Environment and Natural Resources has issued the DENR Administrative Order for Polymers and Polymer of Low Concern (PLC) Exemption from the PMPIN Process. This will exempt certain polymers from applying for a PMPIN Compliance Certificate.

The Order will take effect fifteen days after publication in a newspaper of general circulation and upon acknowledgment of receipt of a copy thereof by the Office of the National Administrative Register (ONAR).

### Regional Distribution of Hazardous Waste Generated

The EMB is required by RA 6969 to regulate and manage the import, production, processing, distribution, use, transportation, treatment, and disposal of dangerous chemicals and hazardous waste. Consequently, the formulation of the geographical distribution of hazardous waste produced in the Philippines from 2016 to 2021. The Philippines classifies hazardous waste into 13 categories (Annex 4.8).

Moreover, based on the data acquired by the EMB HWMS, it was determined that the Cordillera Administrative Region (CAR) generated the most hazardous waste from CY 2016 to CY 2021, with 4,962,216 tons, while Region 12(6,458 tons/year) generated the least hazardous waste.

Table 5.2 Hazardous Waste Generated by Region, 2026-2021

| HW GENERATED (tons/year) | 2016 | 2017 | 2018 | 2019 | 2020 | 2021 | Total |
|---|---|---|---|---|---|---|---|
| I | 1,691 | 4,378 | 4,906 | 3,704 | 60,492 | 2,351 | 77,522 |
| II | 10 | 110 | 156 | 945 | 535 | 1,210 | 2,967 |
| III | 626,367 | 246,408 | 331,614 | 49,065 | 654,020 | 45,652 | 1,953,126 |
| IV-A | 118,570 | 278,060 | 106,117 | 1,171,473 | 1,992,542 | 94,865 | 3,761,627 |
| IV-B | 3,212 | 713 | 343 | 481 | 2,038 | 1,316 | 8,101 |
| V | 26,656 | 23,198 | 498 | 10,566 | 1,550 | 138 | 62,606 |
| VI | 1,134 | 3,643 | 3,774 | 2,998 | 2,450 | 2,582 | 16,581 |
| VII | 383,674 | 18,070 | 51,016 | 191,328 | 16,684 | 2,326 | 663,097 |
| VIII | 20,777 | 24,045 | 10,893 | 129,993 | 890 | 10,315 | 196,912 |
| IX | 23,217 | 3,385 | 2,070 | 1,391 | 269 | 918 | 31,250 |
| X | 0 | 9,604 | 14,309 | 18,989 | 49,152 | 8,717 | 100,770 |
| XI | 4,477 | 1,230,148 | 16,764 | 648,227 | 6,862 | 2,264 | 1,908,742 |
| XII | 407 | 1,417 | 1,689 | 2,077 | 413 | 454 | 6,458 |
| NCR | 114,970 | 47,576 | 38,899 | 33,755 | 169,174 | 19,710 | 424,084 |
| CAR | 21,304 | 194,740 | 369,559 | 2,403,828 | 1,969,334 | 3,451 | 4,962,216 |
| CARAGA | 139,343 | 13,052 | 38,649 | 154,340 | 3,816,180 | 1,418 | 4,162,982 |
| TOTAL | 1,485,808 | 2,098,545 | 991,256 | 4,823,161 | 8,742,584 | 197,687 | 18,339,041 |

In addition, information from Regional Levels (Annex 4.2 to 4.7) indicates that wasted industrial oil including sludge (I101) and explosive and unstable chemicals (E503) is the largest and smallest contributors to Hazardous Wastes for CY 2021, respectively.

Wastes containing cyanide (A101) with a total of 6,860,748 tons/year was the biggest accumulation of hazardous waste in the Philippines, while wastes with halogenated dangerous organic compounds accumulated the least (L401).

## Inventory of HW Generators, Transporters, and Treatment, Storage, and Disposal Facilities (TSD)

Controls are also placed on hazardous wastes to guarantee that the nation's industrial growth is carried out in an ecologically responsible way and that the negative effects that industrial operations have on both people and the environment are minimized as much as possible. The creation, transportation, storage, re-use/recycling, treatment, and disposal of many hazardous wastes are all governed by various forms of regulation.

The DAO 92-29 described the following:

The waste generator means a person (natural or juridical) who generates or produces hazardous wastes, through any commercial, industrial or trade activities. A waste transporter means a person (natural or juridical) who is licensed to transport hazardous waste.

TSD Facilities are also known as Transport, Storage, and Disposal Facilities. These are the facilities that were constructed/installed after the approval of the DAO 92-29.

A waste treater means a person (natural or juridical) who is licensed to treat, store, recycle, or dispose of hazardous waste.

The National Capital Region (NCR) and Region 3 (in 2020) were found to have the largest number of waste generators registered. Additionally, from 2016 to 2021, the region with the largest number of registered Hazardous Waste Transporters was Region 4A. This was documented for the whole period.

In terms of the TSD Facilities, it was discovered that Region 3 and Region 4A, which are interchangeable, have a significant number of TSDs situated in the vicinity.

By DAO 36, Series of 2004, entitled "Revising DAO 92-29 to Further Strengthen the Implementation of RA 6969 and Prescribing the Use of Procedural Manual," on Hazardous Waste Management, DAO 92-29 was revised to reflect the amendments made by DAO 36. The list of the types of hazardous waste that are controlled by RA 6969 may be found in DAO 04-36. In addition, anyone that generates hazardous waste operates facilities for TSD, or transports hazardous waste is required to register with the EMB or receive the appropriate transport or treatment licenses.

Additionally, those that generate hazardous waste are obligated to submit a report quarterly. On the other side, transporters are obligated to get permission to transport before engaging in any transport activity and to submit a manifest to EMB after every shipment. Before engaging in any action related to recycling, treatment, storage, or disposal, TSD establishments are required to obtain an Environmental Compliance Certificate (ECC).

## Policies and Legislations

Table 5.3 Summary of Policies and Legislation on Hazardous Waste Management

| Policies for Update | Updates on Policies |
|---|---|
| Amendment Of Department Administrative Order (DAO) 2013-22, Series of 2013 "Revised Procedures and Standards for the Management of Hazardous Wastes (Revising DAO 2004-36) | • On 30 July 2021 EMB notified World Trade Organization (WTO) – Technical Barriers Trade (TBD) through BPS-DTI (Bureau of the Philippines Standards) that the proposed amendments to DAO 2013-22 and WTO-TBT were given time to submit their comments.<br>• On 12 January 2022 EMB requested an update on the notification of WTO-TBT of the amendments to DAO 2013-22<br>• On 18 January 2022 BPS-DTI replied that WTO members did not submit any comments<br>• Presently, the comments collated from all stakeholders' meetings are being discussed by the HWMS.<br>• Also, the online systems currently in operation are being incorporated in the amendments of the DAO 2013-22 |
| Guidelines on the Environmentally Sound Management of Waste Electrical and Electronic Equipment | • Provide the framework mechanism for the appropriate management of WEEE<br>• Reduce the amount of electrical and electronic equipment (EEE) type of waste and the hazards brought about by its components<br>• Promote the reuse of EEE and valorization (placing value or price too) of its waste components<br>• Encourage involvement of all relevant agencies and stakeholders in the life cycle of EEE<br>• Institutionalize the principle of EPR |

## Globally Harmonized System (GHS)

Under Republic Act No. 6969, "Toxic Substances and Hazardous and Nuclear Wastes Control Act of 1990" and the Joint DTI-DENR-DA-DOF-DOH-DILG-DOLE-DOTC Administrative Order No. 01 Series of 2009 on "The Adoption and Implementation of the Globally Harmonized System of Classification and Labeling of Chemicals (GHS)", the Environmental Management Bureau – DENR has issued DAO 2015-09.

### Important Aspects of Law

Implementation of the GHS Classification and Labelling in accordance with the following schedule:

| Chemicals | Effectivity |
|---|---|
| Single substances and compounds covered under CCO and PCL Chemicals initially listed | 2016 |
| High Volume Toxic Chemicals | 2017 |
| Toxic Chemicals under the IATA and IMDG list of Dangerous Goods | 2018 |
| Mixtures | 2019 |

## Priority Chemical List (PCL)

### Assessment of PCL Chemicals

Among the chemicals in PCL, DENR-EMB determines which chemicals should be regulated. In addition, DENR-EMB imposes special reporting requirements that apply only to chemicals included in PCL. This is an essential aspect of the PCL process since these reports will enable DENR-EMB to obtain the necessary information concerning the priority chemicals and their uses.

Assessment of the potential hazards and risks posed by each chemical in PCL is not an easy process. It not only requires knowledge of the toxicity of a substance but also other characteristics of a substance that may influence the severity and duration of adverse impacts. These include a chemical's persistence and tendency to bioaccumulate through the food chain.

The following primary criteria have been established by DENR EMB for PCL based on the selection criteria and used in other industrial countries such as European Union, Australia, Japan, Canada, Korea, and the United States. In addition, qualitative and quantitative information that is unique to the Philippines such as chemical use and management, production quantity, percentage of release, occupational exposure, disposal methods, and technical and economic feasibility of its regulation are considered:

Persistence refers to the property of a substance whose half-life in water, sediment, soil, or air exceeds a duration of fifty (50) days. Sludge may be used as a surrogate for sediment. Metals are considered to be persistent in all media.

Toxicity refers to the quality of a substance that meets any of the following criteria:

- Acute lethality
- Chronic or sub-lethal toxicity
- Teratogenicity
- Carcinogenicity
- Bioaccumulation potential is the measure of a substance's ability to bioaccumulate in the food chain.

## Chemical Control Order (CCO)

DENR-EMB issues Chemical Control Orders (CCOs) that prohibit, limit, or regulate the use, manufacture, import, transport, processing, storage, possession, and wholesale of those priority chemicals that DENR-EMB determined to be regulated, phase-out, or banned because of the serious risks they pose to public health, workplace, and environment. At any one time, DENR-EMB may impose a regulation, a phase-out plan, or a ban on a chemical or chemical substance when it determines that such action is necessary.

Chemicals and chemical substances that pose an unreasonable risk to public health or the environment are potentially subject to CCOs. Each year, after due consideration of industrial needs, the health and environment risks, the Philippine commitment to international and regional treaties and conventions, and DENR-EMB's capabilities and resources to manage the controlled chemicals, DENR-EMB may determine what chemicals listed as a priority (PCL) should be regulated, controlled, or phase out.

## Inventory of Mercury, Cyanide, Asbestos, Ozone Depleting Substances, and Polychlorinated Biphenyls

In accordance with RA 6969, chemicals that pose a threat to human health and the environment are regulated in terms of import, manufacture, sale, use, distribution, and disposal. These regulated chemicals include the following: mercury, cyanide, asbestos, ozone-depleting substances, polychlorinated biphenyls, and lead.

## Chemical Control Order Regulations

Table 5.4 List of Chemical Control Order Regulations

| CCO | Document No. | Policies |
|---|---|---|
| Mercury and Mercury Compounds | DAO 1997-38 | Chemical Control Order (CCO) for Mercury and Mercury Compounds |
| | DAO 2019-20 | Revised Chemical Control Order (CCO) for Mercury and Mercury Compounds (Revising DAO 1997-38) |
| Cyanide and Cyanide Compounds | DAO 1997-39 | Chemical control Order (CCO) for Cyanide and Cyanide Compound |
| | Joint DOH-DENR Advisory 2010-001 | Ban on Silver-Jewerly Cleaning Solution-Containing Cyanide and Other Toxic Substances |
| | EMB MC 2019-002 | Clarifications to the Registration and Importation Clearance Requirements for Chemical Control Order (CCO) for Cyanide and Cyanide Compounds Under DENR Administrative Order No 97-39 |
| | EMB MC 2020 | Substances and Compounds that does not dissociate CN ions are not covered by DAO 1997-39 while regulated Cyanide Compounds are listed in the updated Annex A. |
| Asbestos | DAO 2000-02 | Chemical Control Order (CCO) for Asbetos |
| Polychlorianted Biphenyls | DAO 2004-01 | Chemical Control Order for Polychlorinated Biphenyls (PCBs) |
| | DAO 2007-19 | Suspension and/or Deferment of the Deadline for the Storage of all existing Decomissioned Polychlorinated Biphenyls (PCBs), PCB Equipments and PCBs Oil/Fluids |
| | EMB MC 2014-007 | Guidelines for the Registration of Laboratories to Perform Analysis of Polychlorinated Biphenyls (PCBs) in Transformer Oil, Waste Oil and Non-Porous Surface Materials |
| | EMB MC 2015-004 | Clarifications to the Chemical Control Order (CCO) for Polychlorinated Biphenyls (PCBs) |
| | EMB MC 2015-007 | Technical Guidance Document on Polychlorinated Biphenyls (PCBs) Management |
| | EMB MC 2022-01 | Guidelines and Recognition on the Use of Chloride Ion Specific Electrode (CISE) Method as Additional Technology Option in Screening PolyChlorinated Biphenyls (PCBs) in Oil. |
| Lead and Lead Compounds | DAO 2013-24 | Chemical Control Order (CCO) for Lead and Lead Compounds |
| | EMB MC 2015-005 | Clarifications on the Prohibited Uses of Lead and Lead Compounds under DAO 2013-24, "Chemical Control Order (CCO) for Lead and Lead Compounds |
| | EMB MC 2016-010 | Clarification on the Prohibition of Paints with Lead and Lead Compounds Used for Children's Toys and Related Products |
| Chromium (VI) | DAO 2021-09 | Chemical Control Order (CCO) for Chromium VI Compounds |
| Cadmium | DAO 2021-08 | Chemical Control Order (CCO) for Cadmium Compounds |
| Ozone Depleting Substances | DENR MC 2002-02 | Withdrawal of the Announcement to the Public Signed on 24 July 2001 Regarding the Ban of Carbon Dioxide Found in Fire Extinguishers, Suppressors, Fire Fighting Paraphernalias, Refrigerants and the Like |
| | DAO 2004-08 | Revised Chemical Control Order for Ozone Depleting Substances (ODS) |
| | EMB MC 2005-03 | List of Alternatives to Ozone Depleting Substances |
| | DENR MC 2005-23 | Registration of Dealers, Re-sellers, and Retailers of ODS |
| | DAO 2013-25 | Revised Regulations on the Chemical Control Order for Ozone Depleting Substances (ODS) |
| Hydrofluorocarbons | DAO 2021-31 | Chemical Control Order for Hydrofluorocarbons (HFCs) |
| Other related CCO policies | DAO 2005-05 | Toxic Chemical Substances for Issuance of Chemical Control Orders |
| | EMB MC 2015-002 | Harmonization of Registration Forms, Issued Certificates and Procedures for Chemical Control Orders (CCOs), and Small Quantity Importation (SQI) |
| | EMB MC 2016-011 | Instructions on the Implementation and Enforcement of the Devolved Functions Under the DENR Memorandum Circular 2002-12 |
| Source: | Chemical Control Orders (CCOs) \| Chemical Management Section (emb.gov.ph) | |

## Programs and Projects

### Development of Capacity for the Substitution and the Environmentally Sound Management (ESM of Mercury-Containing Medical Measuring Devices

The project aims to assist the Philippines, an ASEAN Member State, in achieving its obligations as a Party to the Minamata Convention of Mercury, through the promotion of the environmentally sound management of used thermometers and sphygmomanometers in the region. The two main outputs of the project are the Inventory of Mercury-containing Medical Measuring Devices and the Policy Gap Analysis and Guideline Development.

### Implementation of Polychlorinated Biphenyl (PCB) Management Programs for Electronic Cooperatives (ECS) and Safe E-Waste Management (PCB-WEE)

The increased slippage comes from the disposal of PCB-contaminated equipment and oil and PBDE-contaminated plastics. By this time, 150 of the 300 tons target for PBDE-contaminated plastics should have already been disposed. On the other hand, 300 of the 600 tons of PCB-contaminated equipment and oil should have already been disposed (based on the scheduled extension of the project). At this point, there is no disposal yet for PBDE and PCB. For this quarter, the project focused more on resolving the issue of the entry of PCB equipment into the PNOC industrial park. This issue also led to other problems, such as the transport permit's expiration and the hauler's contract.

On the other hand, for component 1, coordination with TSD facilities on the possible co-processing agreement for the disposal of PBDE-contaminated plastics was the focus during the second quarter, whereas to ensure monitoring of brominated compounds during co-processing, coordination with laboratories was also undertaken. The TOR for the disposal of plastic casings was developed during this period. In parallel with this, the collection of WEEE and its segregation and analysis are ongoing. During the 2nd quarter, the TWG also reviewed technical specifications and proposals for XRF spectrometers as the project will procure five (5) units of XRF spectrometers. Further, upgrading the existing MRF of Barangay Dampalit was completed, and EMB NCR issued the facility's ECC.

Similarly, while the project team was resolving the issue of the entry of PCB-contaminated equipment, two Electric Cooperatives were validated: GUIMELCO and CENECO. As of the 2nd quarter of 2022, 193 Tons have already been contracted from 18 Electric Cooperatives (ECs).
314.04 PCB equipment and oil tons have already been identified pending contract signing. The project teams and the Chemical Management Section are currently coordinating with the Regional Offices on other Electric Cooperatives that may be interested in availing of the project subsidy to dispose the PCB- contaminated equipment and oil.

Component 3 met its targets this quarter. Regular coordination and consultation meetings were conducted for the sustainability of the TSD facilities and in support of EMB policies on managing hazardous wastes. One (1) collection event from April to June 2022 was held to supplement the collection of WEEE for the two pilot sites in Brgy. Bagong Silang and Dampalit. Earth Day Celebration was also part of the output of component 3 in April 2022. Information and education campaigns on PCB and WEEE continue through different media.

Component 4 has likewise met the target. The 14th PSC meeting was held this quarter to seek guidance from the members onthe issue of the entry permit with PNOC.

### Component No. 1: Management of POPs in Waste Electrical and Electronics (WEE)

A total of 41.68% target this quarter was accomplished. This translates to a total slippage of 1.79%. This is an increase in slippage from 0.54% in the 1st quarter. Among the contributing factors to the increased slippage are (a) training

and technical assistance to customs officers. Three (3) training/workshops were planned, and two were targeted by this quarter; however, no workshops have been conducted yet. This is about 0.9% of component 1's activities; (b) At least 2122 tons of E-Wastes which may be contaminated with PBDE, were expected to have been collected and delivered to recycling factories. However, as of this quarter, about 49,173 units of CRT monitors were collected. This is about 1229 tons of CRT monitors piled. This contributed to about0.38% of the total slippage of the component; (c) about 150 tons of PBDE-contaminated plastics containing about 0.56 tons of PBDEshould have been disposed of this quarter. However, no disposal has yet been done.

The project has identified at least 1.150 tons of PBDE per project document and is expected to dispose of the PBDEs in 3 months through co-processing. For this quarter, engagement with possible co-processing companies was done. As of this reporting, the TOR for Holcim has already been drafted and for signing of EMB and Holcim. Other sources of slippage are the activities for CCTFI; however, since they will no longer be part of the project, it was compensated by the TSD activities in Brgy. Dampalit, which is already in operation.

Based on the correlation study of bromine and PBDE undertaken by the project, the project reported that 22,372 casings had bromine content higher than 1000 ppm (based on XRF readings), it was calculated that the project collected 563 kg of PBDE. The project's target is 1.12 tons, coming from 50,000 CRT units. The Expert's Report was prepared with findings and recommendations: a. analysis of PBDE using an XRF spectrometer resulted in a calculated 563 kg of PBDE in 22,372 samples of plastic casings. b. environmental limits for PBDE in the environment in other countries. It further recommended that plastic casings with bromine content lower than 500 pm could be disposed of or recycled, while those higher should be safeguarded for further disposal.

In April 2022, UNIDO contracted IRI to support the operations of the project's 2nd TSD facility located in Barangay Dampalit, Malabon City, and the MRF/TSD facility in Barangay Bagong Silang Caloocan City. UNIDO also engaged the EcoWaste Coalition to prepare for the transition/sustainability phase of the MRF/TSD facility in Bagong Silang. The sustainability plan includes approving several resolutions by the barangay and engaging otherbarangays/groups to organize e-wastecollection events. E-waste collection events organized during this period led to the collection of e-wastes other than CRTs.

As an associated benefit, the project will ensure the safe disposal, through encapsulation, of around 225 tons of lead-containing glass from CRTs and picture tubes. As of this quarter, about 536.95 tons were already collected and disposed of through encapsulation. This lead-containing glass usually end up in creeks before the project intervention, which poses a risk of contaminating water bodies and residents' exposure.

One issue encountered in the TSD operation is broken XRF units. In addition to the unit sent by IRI, two (2) other teams were sent back by Brgy. Bagong Silang due to some defects encountered. The project plans to procure five units of XRF, and during this quarter, the project team evaluated those companies that submitted proposals. This may be a potential issue for the sustainability of the WEEE TSD facility operation if the equipment does not have a reliable build quality. The project XRF evaluation team ensures that the XRF to be procured will be better than the previous Skyray units.

The project aims to achieve effective management of Persistent Organic Pollutants – Polybrominated Diphenyl Ethers (POPs-PBDE) from WEEE, PCB-wastes, and PCB-contaminated equipment, assisting the Philippines to meet its obligation to the Stockholm Convention.

The project is expected to consistently accomplish the National Implementation Plan (NIP) by supporting the segregation and disposal of PBDE-contaminated plastic from the general e-waste stream and reviewing technologies that can be adopted to address PBDE management by subsidizing the disposal of PCBs from rural cooperatives and enhancing the suitability of the existing facility to treat PCB-contaminated materials including solids and metallic parts.

### Current Status

Three major components of the project include i) management of POPs in waste electrical and electronic equipment; ii) Sound Management of PCB-contaminated Equipment, PCB Waste, and Stockpiles from Electric Cooperatives; iii) Institutional strengthening, capacity building, and awareness-raising. It aims to dispose of 600 metric tons of PCB-contaminated oil and equipment and 1.125 tons of PBDEs from plastic casings of WEEE

The project is nearing its completion with an overall accomplishment of 83.80% as of June 2022. Despite its hurdles, out of the ten (10) expected outputs seven (7) are on schedule, two (2) are behind schedule, and one (1) is completed.

### On its Component I

Management of POPs in Waste Electrical and Electronic Equipment (WEEE), we have expanded the capacities of our two LGU partners, namely Brgy. Bagong Silang and Brgy. Dampalit to convert its material recovery facilities into registered Treatment, Storage and Disposal Facilities at the same time formalize their collection, dismantling, and recovery activities. The personnel were given training that capacitated and allowed them to recover valuable resources from WEEE that were generated from households. Consequently, the environmentally sound management of these wastes through the project has reduced the illegal disposal of WEEE along the streets and esteros in the area, diverted these wastes from sanitary landfills and recovered high-value resources.

Also, the PBDE from the plastic casings must not be reintroduced into the recycling system and must be disposed of in an environmentally sound manner. Currently, the co-processing of these wastes through the cement kiln allows the destruction of these POPs wastes, and at the same as an alternative energy resource. The project is in the process of procuring the service of an industry partner for themanagement of these plastic casings as well as the environmental monitoring of the said destruction activity.

Furthermore, relevant policies are being reviewed and updated to complement these activities for their sustainability. The DENR have issued DAO 2021-14 allowing the treatment of PBDE-contaminated plastic casings through cement kiln co-processing. A correlation study of bromine content through XRF analysis was also conducted which will serve as an important input to the monitoring of PBDE-contaminated waste and policy on waste management guidelines for bromine and PBDE in plastic casings.

### Component No. 2: Sound Management of PCB-contaminated equipment, PCB wastes, and stockpiles from electric cooperatives

Component 2 has the highest slippage at 6.73%. This was an increase in slippage from 3.77% during the 1st Qtr of 2022. 28.55% was accomplished from the target of 35.28%. The focus for the second quarter for this component is on resolving the issue of the recoupment of the Php 172 M investment of PNOC and the issuance of an entry permit for the PCB-contaminated equipment and oil. In this regard, there was still no production or processing in the Bataan Non-Com POPs facility during the second quarter. With the guidance of the PSC Chair, an MOA was drafted to pay the Php 172 million in 5 years, which will be sourced from the revenue of operations of the Non-Com POPs facility. Other sources are also being considered.

Along with the signing of the MOA is the signing of the Locator's Agreement between NRDC and PNOC. These two were the pre-requisites for the issuance of an entry permit. At this point, the MOA has already been approved by DENR and PNOC. However, for the locator's agreement, NRDC board resolution was required by PNOC before signing. At this point, 300 tons of PCB-contaminated equipment should have already been treated. However, no treatment has been provided due to the issues pointed out. This accounts for 3.31% of the total slippage of the component. While there are no operations yet, the project team continues to interface with the Regional Offices for other ECs which may be interested in the project subsidy.

193 Tons of PCB-contaminated equipment and oil have been contracted from 18 Electric Cooperatives, and 314.04 Tons from 33 ECs are still pending contracts. This totals 507.04 tons of identified PCB-contaminated equipment and oil for disposal.

The project team continues its validation activities for ECS. Two (2) ECs were validated this quarter from Region 6. These are GUIMELCO and CENECO. CENECO has already signed a contract but requested sampling since they are considering having additional distribution transformers for disposal. GUIMELCO, on the other hand, would like to have their units tested first before they sign the contract. Ten samples each were analyzed from both ECs. Out of the 20 samples, only one sample from CENECO yielded "ND" or non-detectable results. This "ND" unit will have to undergo confirmatory testing to conclude that it is PCB-free while the remaining samples are already for disposal.

Other sources of slippage related to the disposal activities of PCB is the development of a production plan and transport management plan by NRDC. They were a development of production plan and transport management plan. There were also pending ECs for validation (Region 9) and those new ECs expressing interest in the subsidy of the project. Moving forward, the project team is targeting in July 2022 or early August 2022 for the resumption of operation of the Bataan Non-com POPs facility.

### Component 3: Institutional Strengthening, Capacity Building, and Awareness Raising

Component 3 hits the target with no slippages. This means that the target 6.29% of activities planned in quarter 2 were all accomplished. EcoWaste Coalition coordinates with the pilot sites (Bagong Silang and Damplalit). They have conducted four consultative meetings this quarter with the *Samahan ng Mangangalakal* and the Barangay community to monitor dismantling activities and address potential issues that may hamper production. One collection event was held to supplement the WEEE / CRT / Monitors collection to be processed at the TSD facility. Specifically, 219 types of e-waste (3 old TV sets and 2 LCD TV sets) from the San Agustin Collection last April 2022 were obtained.

Further, as part of their IEC program, the Earth day celebration event was held last April 22, 2022. Multi-media approach was being implemented in the IEC of the project. Aside from print and video materials, EcoWaste Coalition also conducts online discussions/forums through a podcast. This attracts younger generations and has a wider geographical reach.

### Component 4: Project Monitoring

Component 4 likewise achieved its Q2 target. The PSC was crucial in guiding the project team on its issues. Specifically on the entry permit and MOA with PNOC. In this regard, 14th PSC was held this quarter to discuss the issues and strategies in relation to the MOA and Locator's Agreement. During the 14th PSC, the payment schedule for the recoupment of the Php 172 M was discussed and consulted with the Project team and PSC members. The project team meets every two weeks or as needed to monitor the progress of the planned activities and formulate strategies for emerging issues.

## Partnerships and Initiatives

### Technical Committee 85 on Nanotechnology (TC 85)

The Environmental Management Bureau is part of TC-85 Sub-Committee 2, Health, Safety, and Environmental Aspects of Nanotechnologies. There are 18 items in the work program of TC-85 SC-2, three (3) of which were to be re-programmed for 2022. Seven (7) were already published, three (3) have already been endorsed to DTI-BPS, three (3) were approved for circulation, one (1) for TC-85 (parent committee) consideration, and one (1) was deferred due to ongoing ISO review.

### Technical Committee on Additive Manufacturing (AM)

The DOST-ITDI has established the TC on Additive Manufacturing (AM). The Advanced Additive Manufacturing R&D Program of the DOST has included the adoption of International Standards for Additive Manufacturing as one of the activities of this program. The ITDI has two ongoing (2) projects under this program, namely the Development of Multiple Materials Platform for Additive Manufacturing (MATDEV) and Research on Advanced Prototyping and Product Innovation and Development using Additive Manufacturing Technologies (RAPPID-ADMATEC). The standardization work of TC 88 will potentially benefit the supplier of medical devices and implants, original equipment manufacturers (OEMs) in aerospace, automotive and high-tech equipment, universities and research and development (R&D) organizations, additive manufacturing equipment and material suppliers, as well as the fabrication laboratories (Fablab). TC 88 was organized last March 09, 2020, and is the National Mirror Committee of ISO/TC 261 on Additive Manufacturing.

The TC 88 oversees the standardization in the field of AM concerning their processes, terms and definitions, process chains (Hard- and Software), test procedures, quality parameters, supply agreements, and all kinds of fundamentals. The EMB, through the Chemical Management Section, is a member of WG 5 that reviews the local applicability of the standards in the aspect of environment, health, and safety. It is currently headed by representatives from the DOST MIRDC with active members including national government agencies from the BWC, BFP, and DOTr; academic institutions from the UP Diliman, Adamson University, USP, MSU-IIT, SLSU, and Mapua University; and from the private sector namely MicrosPhil, Manly Plastics, and the Zamboanga City Medical Center.

### Subcommittee on Technical Reachback (SCTR)

The development and proliferation of weapons of mass destruction (WMD) are among the most critical security challenges countries face today. Some of these WMDs and conventional arms which enhance military programs (goods, software, and technologies) have peaceful applications and are called "dual-use items."

The international community has responded to WMD and arms proliferation challenges by calling upon countries to manage and control trade in military and dual-use items, termed "strategic goods." The SCTR will have the following functions:

- Assist the Strategic Trade Management Office (STMO) in classifying strategic commodities during authorization determination through laboratory testing and experts' advice;
- Assist law enforcement agencies in identifying strategic goods in the performance of enforcement functions; and,
- Respond to STMO and enforcement agency queries within the timeframe agreed upon by the sub-committee member

### Inter-agency Committee on Globally Harmonized System (GHS) of Classification and Labelling

The DTI-BOI heads this Inter-agency with DENR-EMB, DOLE-OSHC, and DOH- FDA as its immediate members (other members are those agencies identified in the GHS JAO). This inter-agency aims to synchronize the implementation of GHS among the different agencies and align this with the other ASEAN Economies.

In 2015, DENR-EMB published the DAO 2015-09, "Rules and Procedures for the Implementation of the Globally Harmonized System (GHS) of Classification and Labelling of Chemical Substances in Preparation of Safety Data Sheet (SDS) and Labelling Requirements of Toxic Chemicals." Discussed in the DAO is the implementation of GHS: 2016 for CCO and PCL-listed chemicals, 2017 for High Volume Toxic Chemicals, 2018 for Toxic Chemicals under IATA and IMDG, and 2019 for mixtures.

Under the Inter-agency, three areas are being discussed: (1) the version of Purple Book to be used (currently, EMB is using the 4th edition), (2) the building block, and (2) the cut-off concentration limit.

The DOLE-OSHC has aligned with EMB's implementation since both deal with industrial chemicals. However, DOH-FDA, implementing GHS on consumer products, proposed differently from the other two. At this point, no resolution has yet been finalized, but there are impacts on the industry if industrial chemicals and consumer products are not aligned. Further on the Regional level (ASEAN), there will also be impacts since EMB is aligned with what has been agreed upon in the ASEAN Regulatory Cooperation Project (ARCP).

Several GHS training was initiated by this inter-agency in cooperation with AOTS and METI Japan.

### Technical Committee 25 on Paints, Coatings, and Varnishes (TC 25)

TC-25 comprises multi-sectoral stakeholders (DTI, EMB, ITDI, PAPM, PiChe, and Adamson University). The Committee is tasked with updating the different paint standards. The new paint standards will incorporate the 90 ppm threshold limit based on the Chemical Control Order for Lead and Lead Compounds. All the paint standards have been updated; some are for circulation to be reviewed by other stakeholders.

There were only three meetings for the year. The table shows the items to be discussed by the TC-25 members. The list is as of Q2 of 2021. In prior sessions of the TC-25 members, the standards are already being pre-discussed by the paint industry. As of the last meeting on November 25, 2021, the plan's focus was on the formulation of paints and varnishes.

## International Partnerships

### International E-Waste Management Network (IEMN)

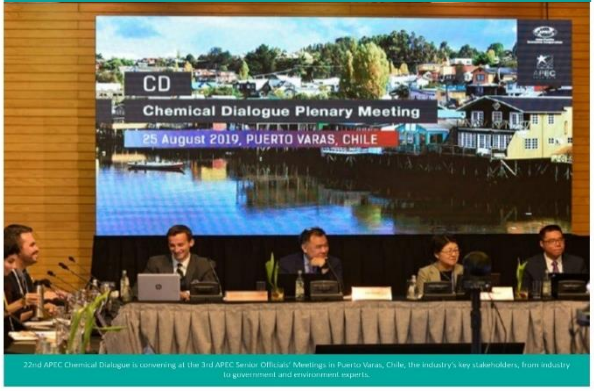
IEMN has been the platform for the exchange of information and best practices on e-waste management among its member countries and organizations. The Philippines' participation in IEMN has contributed to EMB's formulation of its proposed policy on the Technical Guidelines on the ESM of WEEE which will institutionalize the EPR principle. IEMN also provided the opportunity for DENR-EMB to share with the other members their experience in e-waste management. It was during the 8th IEMN Workshop hosted by the Philippines in 2018, that DENR-EMB launched its E-waste Project Video and E-waste Collection Event.

## ASEAN Working Group on Chemicals and Wastes (AWGCW)

The ASEAN Working Group on Chemicals and Waste (AWGCW) was established to serve as a consultative platform among the ASEAN Member States to strengthen further regional coordination and cooperation in addressing chemicals-related issues under relevant multilateral environmental agreements such as the Basel Convention, Rotterdam Convention, Stockholm Convention, and Minamata Convention, as well as internationally agreed-upon systems such as the Globally Harmonized System of Classification and Labeling of Chemicals (GHS).

The 6th meeting of the AWGCW was held on July 1, 2021, via video conference. The items discussed during the meeting were the progress and implementation of the AWGCW Action Plan. Updates on cross-sectoral activities, precisely initiatives on marine debris. Then there was also a proposal for developing Technical Guidelines for the Transboundary Movement Control of Plastic Waste in the ASEAN Region. The ASEAN Joint Statement on Chemicals and Wastes was also discussed. The Philippines also provided input on this. The full report was provided to the Philippine delegation.


Participants of the 3rd Meeting of the ASEAN Working Group on Chemicals and Waste (AWGCW) on 2 May 2018 in Putrajaya, Malaysia. [Regional Resource Centre for Asia and the Pacific]




22nd APEC Chemical Dialogue is convening at the 3rd APEC Senior Officials' Meetings in Puerto Varas, Chile, the industry's key stakeholders, from industry to government and environment experts.

## POPsEA Project

This is another on-going project, though there was a long delay due to the pandemic. The objective of the POPSEA project is a contribution to the effectiveness evaluation of SC, Article 16 by implementing sub-regional background air monitoring of POPs chemicals. The target media is background air. This project is in collaboration with the Ministry of Environment of Japan and the EMB-ERLSD. The roles of the Philippines as a participating country in this project are:

- Establishment of their infrastructures for sampling, analysis, data evaluation, and data management
- Implementation of individual monitoring after completing this project
- Conducting technical assistance and promotion to the non-member countries.

In previous years, air samples have been taken at Sto. Tomas in Baguio. In 2021, the EMB has accepted that the ERLSD laboratory will be the core laboratory for the POPSEA project. This means that POPs analysis will be done in our Laboratory. The 14th POPSEA workshop is scheduled for March 22, 2022, and will be held online. Activities will be discussed during the workshop and the role of EMB as the Core Laboratory for the POPSEA project.

## APEC-Chemical Dialogue (APEC-CD)

The Chemical Dialogue (CD) is a forum for regulatory and trade officials and industry representatives to find solutions to challenges facing the chemical industry in the Asia- Pacific region. It reflects APEC members' recognition of the importance of engaging with the private sector and building public-private dialogue and sustained cooperation for the benefit of both sectors. The CD focuses on chemical-sector trade liberalization and facilitation by improving trade and regulatory policies and practices. It seeks workable programs that ensure regulatory, safety, and environmental

goals can be implemented by governments and businesses.

In 2021, there were three meetings in which the CMS participated. One was in February when the Risk Assessment Training was also conducted. Another one was in August 2021; a CMS representative presented the chemical regulatory updates for the Philippines (i.e., EMB, FDA regulatory updates). Further, the EMB, through the CMS, has provided points of intervention to the head of the delegation (BOI). Regulatory Cooperation in ASEAN was reported. This is connected with the activities of the ARCP. The third meeting this year was last November 2021. GHS activities of the Virtual Working Group of the ARCP were reported. Projects under the APEC-CD were also discussed, and updates were provided.

## Highlight Events

### Future Policy Awards

One of the milestones of the Chemical Management Section in its policy development program is the recognition of one of its policies by the World Future Council. The Chemical Control Order for Lead and Lead Compounds was recognized and given a special award for the Future Policy Award. Out of the 55 policies from 36 countries that were nominated, the DENR's Administrative Order (DAO) 2013-24, or the Chemical Control Order for Lead and Lead Compounds, was chosen as one of the 12 policies from five continents that was recognized with one of the special awards.

A video message was provided by the DENR Secretary to thank the World Future Council for the Recognition and emphasized that the award will inspire the Department to further strengthen its policies to protect human health and the environment. The CCO for Lead and Lead Compound is one of the policies of the government to eliminate Lead in products most especially in children's toys and products. In some cases, it also served as the local catalyst for other agencies to develop their policies on lead in paints or Lead products. Among the lead related policies of the Government are:

- Memorandum No. 2013-058, "Guidelines on the Manual Notification of Toys and Childcare Articles (CCAs)"(DOH-FDA)
- Bureau of Product Standard using Philippine National Standards (PNS)/BHDT ISO 8124 Part 3 relating to the Safety of Toys shall be implemented and enforced.
- Inclusion of the 90ppm lead threshold in the Philippine National Standards for paints through the Technical Committee 25 (TC-25) of the Bureau of Product Standards under the Department of Trade and Industry.
- DepEd Order 2017-04 – Mandatory Use of lead-safe Paints in Schools

### Canada-Philippines Waste Dispute

In July 2013, illegal shipments of garbage or municipal solid wastes that arrived at the Port of Manila declared as recyclable plastic materials were discovered by the Environmental Management Bureau Central Office-DENR. The shipments, contained in a total of one hundred three (103) fifty-footer container vans, were shipped by the exporter Chronic, Inc. Ontario, Canada to its consignees Chronic Plastic in Valenzuela City and Live Green Enterprises in Angeles City, Pampanga. Alert Orders were issued, by the Bureau of Customs Environmental Protection Unit, upon the request from EMB since the shipments contain heterogeneous scrap plastic materials that prohibit their importation for recycling purposes.

An Interagency Technical Working Group (ITWG) was initially convened and chaired by the American Affairs-Canada Division of the Department of Foreign Affairs in August 2014 composed of representatives from the Bureau of Customs (BOC) and the DENR to thresh out the most appropriate solution recognizing the

potential impact on diplomatic relation between the Philippines and Canada. Ultimately, the DFA-OAA relinquished the chairing of the IATWG to DENR which conducted a series of meetings to resolve the issue. The membership of the IATWG was expanded to include the Department of Justice in relation to the prosecution if the Administrative and Criminal cases filed against the consignee and its brokers. The main concern of the IATWG was to decide whether wastes will be locally disposed of or shall be shipped back to Canada through diplomatic channels.

With the standing order from Manila RTC Branch 47 to immediately dispose of the wastes, it was not fully complied with due to the several protests from the Provincial Government of Tarlac as well as with the outcry from Environmental Non-Government Organizations (NGOs) opposing its disposal at the Metro Clark Waste Management Corporation's (MCWMC) Landfill in Tarlac. However, in June 2016, the Environmental Court issued an order to send back the waste to the country of origin at the expense of the importer.

The information given by the Bureau of Customs (BOC), showed that of the fifty (50) container vans consigned to Chronic Plastic, only sixteen (16) vans remain in their custody and the others were already disposed of at the landfill. Fifteen (15) were stored at the Port of Subic and one (1) at the Manila International Container Port (MICP).

About the forty-eight (48) container vans consigned to Live Green Enterprise, are stored at the Port of Subic Container Terminal. The said shipment has not been issued with Importation Clearance by theEMB-DENR.

During the Bilateral (Canada-Philippines) Technical Working Group meeting held in Ottawa on 21 March 2019, the Philippine government was informed that the Canadian government is now considering accepting the waste once they arrive at its port and shall be dealing with the waste from that point onward. On the matter of shipping costs to be incurred for its return, there was no commitment from Canada in taking responsibility. However, in their letter dated 24 April 2019, Canada informed the Philippines of their readiness to cover all the costs including the necessary arrangements for the return of the remaining sixty-nine (69) containers and to manage their disposal in Canada.

On 10 May 2019, as a requirement from the Canadian Government to fully address its commitment, transfer of ownership documents such as the Re-Exportation Orders from BOC, Collection District XIII, Port of Subic, and Collection District II-B, MICP are required to be issued for them to proceed with the perfecting the contract with a freight forwarder that will handle and finalize arrangements for reshipment. Likewise, a report of inspection from the shipping lines indicating that the container vans are still seaworthy must be transmitted to Canada. Furthermore, Canada requires, before shipment of the wastes, fumigation, and washing of container vans.

Immediately after compliance with all the requirements, on 31 May 2019, all the containers were successfully shipped out and arrived at the Canadian Delta Port in Vancouver on 29 June 2019.

## Training and Workshops

### Hazardous Waste Management

#### Virtual Orientation Workshops for Hazardous Waste Generators, Transporters, and TSD Facilities (during the pandemic)

During the training, the presentation of the Online Hazardous Waste Management System (HWMS) was presented to the different EMB Regional Offices. Furthermore, an orientation on the online application processes was also conducted to improve the knowledge of the EMB employees the client's and stakeholders,

lastly, during the activity, DENR-EMB also gathered the client feedback as well as policy issues and concerns from stakeholders regarding the Hazardous Wastes Generators, Transporters, and TSD Facilities during the pandemic times.

### Annual Capacity Building with EMB Regional Offices (Virtual)

The EMB Regional Offices assist in the development and delivery of the EMB Programmes. The HWMS-CMS division is also responsible for coordinating activities with all other stakeholders that support the achievement of the objectives of the Programme, as well as implementing specific activities.

The Annual Capacity Building Workshop was designed to provide an opportunity for EMB Regional Offices to present the additional or new features of the Online HWMS, to collate the EMB Employees' observations, suggestions, and feedback to improve the system, to harmonize the procedures in the review, evaluation, and processing of applications for registrations (Generators, Transporters, and TSD) and Permit to Transport and to provide updates on recently issued policies and proposed foreign assisted projects on hazardous waste management.

### First Responders Awareness Level Training for EMB Central Office and EMB Regional Offices personnel

The First Responder Awareness Level Training Program was intended to provide designated firstresponders with initial training. Through this training, the EMB personnel will be competent at the Hazardous Materials First Responder - Awareness Level. They should be able to first analyze the incident and then take appropriatesteps to call for assistance, shelter in place, or evacuate.

### Annual Capacity Building with EMB Regional Offices (In-person)

The EMB Regional Offices were seeking comments and recommendations on the amendment of DAO 2013-22 (Regional Hazardous Waste Management Implementation Guidelines, Guidelines, and Standards) which is currently under review by the Environmental Management Bureau (EMB) of the Department of Environment and Natural Resources (DENR).

The proposed amendments to DAO 2013-22 seek to update and streamline existing guidelines and standards on hazardous waste management. The proposed amendments aim to ensure that all hazardous wastes are properly managed and disposed of in accordance with national guidelines. This will include a requirement for all EMB Regions to have a solid waste management plan among other things. It was also noted that there is currently no standard operating procedure (SOP) for the proper storage of hazardous wastes in Region 3. The EMB Regional Offices are therefore seeking comments from all stakeholders on how best we can improve our approach towards managing such wastes.

The EMB intend to update this document regularly as our regional offices implement their respective SOPs specifically for their respective regions

## Chemical Management

Table 5.5 List of Training and Workshops on Chemical Management Conducted in 2016

| Training / Workshops | Activities |
|---|---|
| PMPIN Stakeholders Consultation | Updated stakeholders on the OPMS system. |
| | Discussed PMPIN and Polymer Exemption procedures, including Confidential Business Information |
| | Requested information on whether new chemicals be published publicly or as CBI |
| Bureau of Customs Examiner's Orientation Seminar | Trained and updated Custom examiners on the different chemical permitting systems and procedures. |
| | Clarified/settled procedural issues on the chemicals permitting system. |
| Globally Harmonized System (GHS) Guidance Manual Training (Visayas and Mindanao) | Trained industry on the primary and intermediate concepts of GHS |
| | Discussed the DENR policy on GHS |
| Regional workshop on new Chemical Management policies and Online Permitting and Monitoring System (OPMS) | Discussed with the Regional Officers new policies under Title II of RA 6969. |
| | Clarifications and issues on existing policies such as Confidential Business Information, and Small Quantity Information, among others, were also discussed. |
| | Trained Regional Officers on key concepts of Chemical Management from an industry and government perspective. |
| | Discussed and reviewed the draft amended CCO for Cyanide and Cyanide Compound, including a procedure for issuing a License to Transport, License to Store, and License to Use. |
| | Oriented and Trained the Regional Officers on OPMS. |
| Prior Informed Consent (PIC) Procedure and Final Regulatory Actions for the Rotterdam Convention | Discussed and trained stakeholders on the PIC procedure and notification system of the Rotterdam Convention for chemicals included in Annex III. |
| PCB Management Workshops for PCB Owners<br><br>(Conducted in Regions 1,2,3,5,6,12 as part of the IPOPs Project) | In relation to the Phase-out of PCBs, the IPOPs PMU, in collaboration with the Chemical Management Section, conducts workshops for PCB owners to assist them in complying with MC 2015-004 (Clarifications to the CCO for PCBs) and MC 2015-007 (Technical Guidance Document on PCBs Management). |

Table 5.6 List of Training and Workshops on Chemical Management Conducted in 2017

| TITLE OF TRAINING | OBJECTIVES / OUTCOME |
|---|---|
| Globally Harmonized System Implementation for Regulated and Controlled Chemicals and Recyclable Materials (March 1-3, 2017) | This CMS seminar was designed for the Bureau of Customs' selected examiners. It included Customs Officers from different major ports in the country. The seminar trained the Customs officers with the implementation of DAO on GHS for CCO list as well as policies on the importation of chemical substances and recyclable materials. |
| Regional Training on Globally Harmonized System – Intermediates (March 20-24, 2017) | The Regional Officers who were already trained on the basics of GHS in 2016 have undergone the GHS-Intermediate Training. With the implementation of the DAO for GHS, Regional Officers need to be capacitated on the building blocks, classification, and SDS Development as well.<br>This is essential knowledge necessary to be able to implement the DAO for GHS. |
| Seminar / Workshop on OPMS Implementation for CCO and SQI (May 2-5, 2017) | The OPMS Phase 2 covers the implementation of CCO and SQI permitting. This includes permitting processed by the Regional Offices (SQI, CCO Asbestos, Cyanide, Mercury, ODS Dealers) and Central Office (CCO forLead, ODS Certificate of Registration, and PSIC). The Regional Officers were trained on the operations and maintenance of the system. |
| Green Chemistry and Sustainable Development Goals (May 30, 2017) | Green Chemistry is the design of chemical products and processes that reduce or eliminate the use and generation of hazardous substances. The seminar covered alternatives and alternatives assessment. Cases and examples were presented. Mainstreaming of Green Chemistry was also discussed. This involves 5 strategic processes: *Enhance Market Dynamics, Support Smart Policies, Foster Collaboration, Inform the Marketplace, and Track Progress.* Also discussed are the benefits of Green Chemistry in the implementation of Sustainable Development Goals (SDGs). |
| Training on Monomers and Polymers (June 7, 2017) | The training was attended by industry and EMB personnel to understand the technical aspect of polymers, a polymer of low concern, policies of the government, policies of other governments, and review the draft polymer policy. The training also included a discussion of the position of SPIK on the draft polymer policy. |
| A seminar on Regulatory Updates was held for Industries (21-22 September 2017) | The training was conducted to understand the technical aspect of polymers, a polymer of low concern, policies of the government, and policies of other governments, and review the draft polymer policy. The training also included a discussion of the position of SPIK on the draft polymer policy. It also provided clarifications on the different policies for chemical management |

| | |
|---|---|
| Regional Training on Updates on Chemical Management and OPMS on 6-10 November 2017 | The Regional Training aims to update the Regional Officers/Focal Points on Chemical Management approved and proposed policies. This was also the venue to solicit inputs for the revisions of CCO for Cyanide, Code of Practice for Asbestos, and Confiscation Procedure.<br><br>OPMS issues were also discussed in preparation for the Online processing of CCO and SQI in 2018. |

Table 5.7 List of Training and Workshops on Chemical Management Conducted in 2018

| Training / Workshops | Activities |
|---|---|
| Capacity Building | Two Regional Capacity Building seminars were conducted by the Chemical Management Section to the Regional Officers, one in Region 7, the other in Region 8 |
| Lectures Conducted | PCAPI Region 4A: Sectoral Meeting for Chemical / Pharmaceutical /Cosmetics and Warehousing/Logistics Sector |
| | Updates of PCCS, PMPI, PCL, and CCOs including GHS at the Bureau of Customs (BOC) |
| | Lecture at Asian Terminals on Chemical Management, Globally Harmonized System (GHS), and permitting under Title II of RA6969. |
| | Title II of RA 6969 presented during the ENR Frontline Course for employees of the DENR |
| | 3rd General Membership Meeting of the Chamber of Cosmetics Industry of the Philippines (CCIP) lecture on RA 6969 |
| | Training of PCOs of PEZA in Rosario Cavite –lecture on Chemical Management and permitting and policies |
| | Training of Industries on Chemical Management Policies to Industry practitioners |
| | Integrated Chemists of the Philippines' Symposium on Chemistry Profession Act |
| | Speaker on the Training for DENR-CENRO and PENRO at Caranglan |
| | Speaker on the Training for the Chief, Engineers, and Architects of Arm Forces of the Philippines |
| | Yearly Training for Bureau of Customs Examiners |
| | NSI Training for consulting Center re: Legal Framework of Chemical Management |

Table 5.8 List of Training and Workshops on Chemical Management Conducted in 2019

| TRAINING / WORKSHOPS | ACTIVITIES |
|---|---|
| Capacity Buildings | 3 Capacity building for 2019 for the CPD and EMED Representatives |
| | Facility Visit on Industry with Best Practices |
| | EMB Regional Training-Workshop on the Updates of Chemical Rules and Regulations |
| | EMB Regional Training-Workshop on the Updates of Chemical Rules and Regulations under Republic Act 6969 |
| | Discussion on changes and improvements in the OPMS particularly for CCO registration, importation certificate, and chemical tracking for Sodium Cyanide |
| | Training on OPMS to Regional Officers. |
| | Discussion on the required material balance for the use of Sodium Cyanide in gold mining facilities |
| | Discussion on the PICCS validation tool and system-generated evaluation of RA 6969 requirements |
| | PCO Advance Training Module for chemical Management |
| Globally Harmonized System | The training on GHS and its implementation on Mixtures (DTI and AOTS) |
| Myanmar Learning Mission to the Philippines | Learning mission to the Philippines on the management of POPs. |
| | Lecture on the chemical management policies of the government provided |
| | Discussion on POPs program and project |
| | Discussion of the operation of a TSD facility –Integrated Recycling |

Table 5.9 List of Training and Workshops on Chemical Management Conducted in 2020

| Training / Workshops | Activities |
|---|---|
| Capacity Building | About 14 Training/ webinars were attended by CMS staff, including international training on Risk Assessment and Infectious Wastes Management. |
| | 2 Training of stakeholders on Chemical Management policies and procedures |
| | Regulatory Impact Assessment (RIA) –no online training available |
| Note: | Not all planned Training and workshops were implemented in 2020 due to COVID-19, a significant and considerable number of Training were attended for capacity building of CMS staff and Regional Offices staff. |

Table 5.10 List of Training and Workshops on Chemical Management Conducted in 2021

| Training/Workshop | Activities |
|---|---|
| Seminars | 2nd Session of Online Training Program for Fluorocarbons Life-Cycle Management and High Energy Efficiency Fluorocarbons Appliances. |
| | Seminar on COVID and other health matters |
| | Webinar on Legal Research and Writing |
| | Webinar Training on the Prevention and Control of COVID-19 Infection in the Work |
| Global Harmonized System | Virtual Seminar for the Classifications of Mixtures and Labelling in the Philippines |
| | Seminar on GHS Practices of ASEAN Countries as well as chemical inventory experience of Chinese Taipei |
| | Training and Orientation on the updated EMB Training Module for GHS Capacity Building |
| | Chemical Management by GHS and Risk Assessment in the Philippines |
| Training and Workshops | Risk Challenge Virtual Workshop (RCVW) Organized by the APEC Chemical Dialogue (CD) Day 2 |
| | CCI-HUB Technical Training |
| | UNEP Training regarding Minamata/Mercury |
| | Training on Upgraded CCO for OPMS |
| | Technical Writing Course |
| | Training on contact tracing with QC Epidemiology |
| | Training on ISO 9001:2015 Risk-Based Thinking (Day 3) |
| | OECD Workshop/Training |
| | UNDP HACT Framework Training |
| | Thematic training on the Development and Enforcement of Safety Standards for Handling Flammable and Toxic Alternatives |
| | Training on Comprehensive Meteorology and its Impacts on Air Quality |
| | Thematic Training of South Asia and Southeast Asia Networks of National Ozone Officers on Integration of GSP into TVET System |
| | Training Program for Fluorocarbons Life-cycle Management and High Energy Efficiency Non-Fluorocarbons Appliances |

## Education and Information Awareness

As part of the extensive information drive conducted by the DENR-EMB. The Hazardous and Chemical Waste Management partake in spreading awareness through the dissemination of IEC Materials. Some of the IEC Materials that they have produced talk about the common hazardous waste that the public sees inside of their households and how to properly throw and/or store them. Furthermore, additional information about the categories of hazardous waste generators was also discussed in their IEC Materials.

In 2020, DENR-EMB Central Office have produced the "Toxic and Hazardous Waste Management Learning Bundle" which the public can access and download to gain information about the proper handling of the aforementioned wastes.

For 2021, two capacity buildings were conducted, one was held in May 2021 for EMB Regional Offices. This included discussion of new policies and consultation of upcoming policies. This capacity building also included a virtual tour and presentation of the Bataan Non-Com Pops facility. A facility tour has been a part of the CMS capacity building. This will showcase the best chemical management practices of industries that may not be found in other Regions. Due to travel restrictions, this year's facility tour was done virtually.

Another capacity building was conducted for the industry in July 2021. This industry capacity building included a presentation of new policies for chemical management. This activity also served as consultation on existing and draft policies being developed. The outcome of this capacity building is a better understanding of the policies under chemical management and how they are being implemented. Likewise, it serves as a venue to discuss issues encountered by stakeholders as well as regulators (ROs) in the implementation of policies.

## Pandemic Highlights

### Memorandum Circulars Issued during ECQ Period

- EMB MC No. 2020-14: Interim Guidelines on Issuance of Special Permit to Transport (SPTT) for the Transport of Hazardous Waste within the Community Quarantine Period
- EMB MC No. 2020-15: Addendum to the Interim Guidelines on Issuance of Special Permit to Transport (SPTT) for the Transportation of Hazardous Wastes within the Community Quarantine Period
- EMB MC No. 2020-16: Amendment of the Interim Guidelines on Issuance of Special Permit to Transport (SPTT) for the Transportation of Hazardous Wastes within the Community Quarantine Period
- EMB MC No. 2020-20: Provisional Guidelines on the Hazardous Wastes Management during the Extended Enhanced Community Quarantine Period

### Highlights of Policy Issuances During Pandemic

- Exemption on travel ban or facilitation in passing through checkpoints.
- Simplification of procedures in securing permits to transport by registered transporters through onlinesubmission of required documents which are processed within five (5) days upon receipt of the application.
- Automatic Extension of registrations for both transporter and TSD for sixty (60) days should it expire during the ECQ period.
- Suspension of payment of permit fee that will only be collected once the ECQ has been lifted.
- Wearing Personal Protective Equipment (PPEs) such as gloves, coveralls, full face shields and mask/respirators for equivalent to level C PPEs must be provided to transporter's staff directly exposed in the collection of healthcare wastes.

## Way Forward

### Chemical Management

- There are two (2) DAOs planned to be submitted in 2022. These are the CCO for VCM and CCO for Benzene. These two chemicals were cited in DAO 2005-27 as two of the chemicals for issuance of CCO. The other 3 chemicals, Lead, Chromium (VI), and Cadmium were already issued a CCO. Lead in 2013 while Chromium and Cadmium this year (2021).
- Policy review and evaluation were started in November 2021 through hiring of a consultant. The objective of this policy review is to engage stakeholders (government, industry, academe, NGOs) and review existing policies to identify gaps, conflicts, overlaps, and/or obsolete policies that need to be canceled or updated. This may become a regular activity of the Chemical Management Section and intervals for policy review will also be determined during this project. Further, part of the output of the consultant will be to develop a template for Regulatory Impact Analysis that would guide stakeholders in evaluating new policies to be developed under Title II of RA 6969. The outcome of this project will identify other policies to be developed or to be revised or updated which will be programmed in 2022 or 2023.
- Linkages with local industries and other stakeholders continue as well as with international organizations and institutions to be updated with emerging local and global issues on chemical management.

### Hazardous Waste Management

- Issuance of the DAO on the Technical Guidelines on the ESM of WEEE and the DAO on the Amendment of DAO 2013-22
- Implementation of the Extended Producer Responsibility Scheme
- Strengthen collaboration with Local Government Units (LGUs) in the collection of household hazardous wastes
- Replicate with other barangays the activities of the UNIDO Project on E-waste such as establishing a Brgy. E-waste TSD facility for household hazardous wastes and linking the informal recyclers to the formal sector
- Continuous cooperation and networking with relevant organizations such as the IEMN and other development partners to further improve waste management in the country.

## VI. Environmental Impact Assessment

The Philippine Environmental Impact Statement System (PEISS) takes its roots in the provision of the Philippine Constitution, which declares, “The State shall protect and advance theright of the people to a balanced, healthful ecology in accord with the rhythm and harmony of the nature.”

PD 1151, also known as the Statutory Framework of the Environmental Code, requires the preparation of the Environmental Impact Assessment (EIA) for all projects that will affect the environmental quality. Establishing the systematic EIS System embodied in PD 1586 ensures that the Filipino people will enjoy a “balanced and healthy ecology.”

Furthermore, AO 42 specifies that the DENR Secretary has the power to grant or deny ECCs on behalf of the President and further

designates the EMB and RDs as approving authorities for ECC Applications.

### Guidelines for PEISS

Environmental Impact Assessment or EIA is a process that involves predicting the likely impacts of a project and the following preventive, mitigating, and enhancement measures to protect the environment and the community's welfare.

Article III of the DENR Administrative Order No. 30, series of 2003, provides for the "strengthening the implementation of the Philippine Environmental Impact Statement (EIS) System under the PD no. 1586. The DENR-EMB is tasked to amend or update the guidelines to cover the activities or undertakings, which should be included based on EMB's experiences.

Consistent with the principles of sustainable development, it is the policy of the DENR to implement a system-oriented and integrated approach to the EIS system to ensure a rational balance between socio-economic development and the environmental protection of present and future generations. The following are the key operating principles in the implementation of the Philippine EIS System:

- The EIS System is concerned primarily with assessing the direct and indirect impacts of a project on the biophysical and human environment and ensuring that these impacts are addressed by appropriate environmental protection and enhancement measures.
- The EIS System aids proponents in incorporating environmental considerations in planning their projects as well as in determining the environment's impact on their projects.
- Project proponents are responsible for determining and disclosing all relevant information necessary for a methodical assessment of the environmental impacts of their projects.
- The review of EIA Reports by EMB shall be guided by three (3) general criteria:
    - Environmental considerations are integrated into the overall project planning;
    - The assessment is technically sound and the proposed environmental mitigation measures are effective; and
    - The EIA process is based on timely, informed, and meaningful public participation of potentially affected communities.

### The EIA Process

Presidential Proclamation 2146 was issued in 1981, defining Environmentally Critical Projects (ECPs) and Environmentally Critical Areas (ECAs) to define the coverage of the Philippine government's requirement for an EIA Study for Environmental Compliance Certificate (ECC) Application. The general EIA process consists of six stages: (1) Project Screening, (2) EIA Study Scoping, (3) Conduct of EIA Study and Report Preparation, (4) Review and Evaluation, (5) Decision-Making, and (6) Environmental Impact and Monitoring. The proponent begins the first three (3) steps, while the EMB leads the final three.[67]

https://www.adb.org/sites/default/files/project-document/61638/44140-01-reg-dpta-09.pdf

[7] https://ap.fftc.org.tw/article/1194

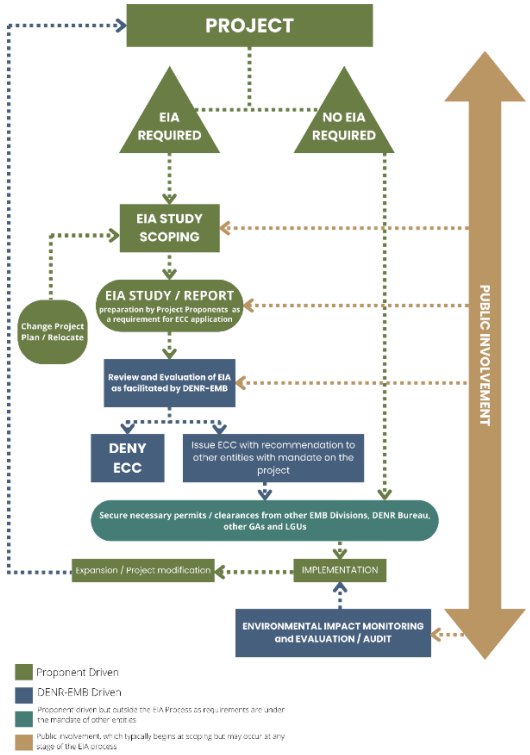


Figure 6.1 EIA Process

### First Step: Screening

The screening process decides whether a project is covered by the PEISS. The primary screening criterion is influenced by the sort of project or activity to be done, as well as its location. The sort of report presented by the proponents will be determined through screening.

### Second Step: Scoping

Scoping is an activity that the proponent undertakes in collaboration with the community and other relevant stakeholders. It is seen as critical since here is where the communities are informed about the project and allowed to provide input.

### Third Step: EIA Study and/or Report

The EIA research, which culminates in the EIA Report, is led by the proponent and contains a description of the proposed project and its alternatives, as well as the Environmental Management and Monitoring Plan (EMoP). Decision makers, either the proponent or the regulatory agency, will make decisions based on a set of criteria, their knowledge and skills, and other reasons; EIA findings will be compared to these criteria.

### Fourth Step: EIA Review and Evaluation

Facilitated by the DENR-EMB, in this part, the decision-making includes issuing an ECC or, if the report is deemed wanting, rejection, in which case the proponent may amend the project plan or move the project location. The EMB Central Office analyzes and assesses ECPs, whereas the EMB Regional Office reviews and evaluates non-ECPs in Environmentally Critical Areas (ECA).

### Fifth Step: Decision Making

The EMB oversees environmental impact monitoring and evaluation to guarantee project compliance with environmental elements as well as requirements stipulated in the ECC and EMP, and the efficacy of environmental measures in mitigating actual impacts vs expected impacts. This was also done to ensure that the proponents satisfy the requirements outlined in the ECC and environmental management plan. On a semi-annual basis, the proponent is obliged to generate Self-Monitoring Reports (SMR) for submission to EMB.

### Sixth Step: Environmental Impact and Monitoring

This is the last phase in the EIA process. This step ensures the effectiveness of the suggested preventative and/or mitigation measures as recommended in the EMP. The EMP is reviewed in this stage, particularly in connection to the actual consequences of project execution.

### Legislation and Policies

The DENR through the EMB EIAMD spearheads the implementation of the different policies and preparation and development of manuals for EIA. These undertakings have a common agenda of improving the implementation of the system, especially on the clarification of the scope, streamlining of procedures and standardization, and simplification of requirements.

Aside from the PD 1586 also known as "Establishing an Environmental Impact Statement System including other environmental management related measures and for other purposes" there are other laws and policies that EMB implemented overall for CY 2022. There are already 1 Presidential Decree, 1 Executive Order, 2 Administrative Orders, 11 Department Memorandum Circular and 23 EMB Memorandum Circular implemented.

Table 6.1 Policies Implemented on Environmental Impact Assessment

#### A. Presidential Decree

| Policies Implemented | Description |
|---|---|
| PD 1586 | Establishing an Environmental Impact Statement System including other environmental management-related measures and for other purposes. |

#### B. Executive Order

| Policies Implemented | Subject |
|---|---|
| EO 190 | Abolishing the golf course construction and development committee and transferring its powers and functions to the DENR. |

#### C. Administrative Order

| Policies Implemented | Subject |
|---|---|
| AO 300 | Further strengthening The Environmental Impact Statement System and clarifying the authority to grant or deny the issuance of Environmental Compliance Certificates. |
| AO 42 | Rationalizing the implementation of the Philippine Environmental Impact Statement (EIS) System and giving authority in addition to the Secretary of the Department of Environment and Natural Resources to the Director and Regional Directors of the Environmental Management Bureau to grant or deny the issuance of Environmental Compliance Certificates |

## D. PEEIS System Basic Laws / Policies

| Policies Implemented | Subject |
|---|---|
| Presidential Administrative Order No. 300 | Further Strengthening the PEIS System and Clarifying the Authority to Grant or Deny the Issuance of ECC |
| Presidential Administrative Order No. 42 | Rationalizing the Implementation of the PEISS and giving Authority, in addition to the Secretary of the DENR, to the Director and Regional Directors of EMB to Grant or Deny the issuance of ECCs. |
| Presidential Decree No. 1151 | Philippine Environmental Policy |
| Presidential Decree No. 1586 | Establishing an Environmental Impact Statement System including other Environmental Management related Measures and for other purposes |
| Presidential Proclamation No. 2146 | Proclaiming Certain Areas and Types of Projects as Environmentally Critical and within the scope of the EIS System Established under PD 1586 |
| Proclamation 803 | Declaring the Construction, Development, and Operation of a Golf Course as an Environmentally Critical Project Pursuant to PD1586 |
| Data Source | PEIS System Scope/Coverage Basic Laws/Policies \| Environmental Impact Assessment and Management Division (emb.gov.ph) Philippine EIS System Basic Laws/Policies \| Environmental Impact Assessment and Management Division |

## E. Developed Policies for 2016-2021

| Policies Implemented | Year of Implementation |
|---|---|
| EMB MC 2017-15: Guidelines on Public Participation Under the Philippine Environmental Impact Statement (EIS) System & Template Memorandum of Agreement (MoA) and Manual of Operations (MOO) | 2017 |
| EMB MC 2020-18: Adoption of DAO 2019-16 for ECC Processing of Non-ECP under the Build, Build, Build Program of the Government | 2020 |
| EMB MC 2020-23: Clarification on the Requirements of Waste to Energy (WTE) Projects Relative to ECC Application Pursuant to DAO 2019-21 | 2020 |
| EMB MC 2020-26: Implementation of Enhanced Online Processing of Certificate of Non-Coverage (CNC) Applications for Category D Projects Under the Philippine Environmental Impact Statement System (PEISS) | 2020 |
| EMB MC 2020-27: Project Threshold for Extraction of Non-Metallic Resources Applying for Environmental Compliance Certificate (ECC) | 2020 |
| EMB MC 2020-30: Interim Guidelines on Public Participation in the Implementation of the Philippines Environmental Impact Statement System (PD 1586) During the State of National Public Health Emergency | 2020 |

| | |
|---|---|
| EMB MC 2020-31: Guidelines on the Five (5) Year Validity of Environmental Compliance Certificate (ECC) Pursuant to DENR Administrative No. 30 Series of 2003 | 2020 |
| EMB MC 2021-05: Documentary Requirements for Minor Amendment (Non-Technical) of ECC under the PEISS | 2021 |
| EMB MC 2021-12: Amendment of EMB MC 2021-05 (ANNEX A) Relative to the Reclassification of Steel and Other Steel-Related Projects As Metal Industries | 2021 |

## F. Policies for Update

| Title of the Programs and/or Projects | Short Description | Year Published |
|---|---|---|
| EMB MC 2021-12 Amendment of EMB MC No. 2015-05 (ANNEX A) Relative to the Reclassification of Steel and Other Steel-Related Projects as Metal Industries | To strengthen the implementation of the PEISS under PD 1586, DTI recommended a revision of project thresholds for the iron and steel mills industry to have a local steel industry that is both compliant with product quality and environmental standards. | 2021 |
| EMB MC 2022-05 Adoption of the Use of HazardHunterPH in Generating Initial Hazard Assessment Reports as part of Enhancing the Integration of Disaster Risk Reduction and Climate Change Adaptation into the PEISS | The PHIVOLCS of the DOST has developed platforms and integrated database systems for hazards and risk assessments through the Geospatial Information Management and Analysis Project for Hazards and Risk Assessment in the Philippines (GeoRiskPH). HazardHunterPH is one of GeoRiskPH's products, a tool that can generate indicative hazard assessment reports on the user's specified location. It aims to increase people's awareness of natural hazards and advocates the implementation of plans to prepare for and mitigate the effects of a hazard. The HazardHunterPH was integrated into the EIA Online System to enhance the integration of DRR and CCA into the EIA and for proponents to generate initial hazard assessments and integrate their findings into the formulation of their mitigating measures for their proposed projects. | 2022 |

Table 6. 2 Number and Types of Projects with Issued ECC, 2016-2020

| | CALENDAR YEAR | | | | |
|---|---|---|---|---|---|
| Issued Compliance of Firms | 2016 | 2017 | 2018 | 2019 | 2020 |
| ECC | 3,502 | 4,783 | 5,175 | 6,201 | 5,374 |
| Monitored Firms | | | 16,952 | 16,688 | 18,955 |
| Notices of Violations Issued | | | 4,377 | 4,235 | 3,332 |
| CNC | 7,465 | 13,452 | | | |
| Percentage of Compliance | | | 74% | 75% | 82% |
| Data Source: | Annual Report per CY | | | | |
| Disclaimer | *Presented are the best data available for the Issued Compliance of Firms* | | | | |

Routine activities related to compliance monitoring of ECC-issued ECPs such as the review of Compliance Monitoring Report (CMR) and Compliance Monitoring and Validation Report (CMVR) submissions have been accomplished and documented in Compliance Evaluation Reports (CERs).

Out of eighteen thousand nine hundred fifty-five (18,955) firms/projects monitored in CY 2020, three thousand three hundred and thirty-two (3,332) projects/firms were issued with Notice of Adverse Findings/ show cause orders for failure to comply with their ECC conditions

Site validation activities were canceled due to the community quarantine imposed on various areas of the Philippines brought about by the COVID-19 pandemic. Field investigations were done with the Legal Division for verification of violations made by some of the projects that have undergone Technical Conference. This was done through video conference using Microsoft Teams.

### Publications

The publications prepared by the DENR-EMB EIA seek to help build capacity for key aspects of environmental impact assessment (EIA). This also aims to teach not only EMB staff and employees about the Philippine Environmental Impact Statement System (PEISS) but also other EIA Preparers, Government Agencies, Local Government Units (LGUs), and the public. The following publications were made possible through its partnership with the WorldBank and the Asian Development Bank (ADB).

### Guidelines on Public Participation Under the Philippine Environmental Impact Statement System (PEISS)

The "Guidelines on Public Participation under the Philippine Environmental Impact Statement System" emphasized that environmental issues are best handled with the participation of all concerned citizens as well as with the thrust of the DENR to promote social justice.

### Procedural Manual

The Procedural Manual was used to streamline the implementation of the EIS System, its Procedural Manual is being revised now and then. The latest is embodied under Memorandum Circular issued by Atty. Jonas R. Leones on June 2015 regarding the implementation of online processing of ECC applications for Category B projects requiring Initial Environmental Examination (IEE) Checklist Report Forms under the PEISS.

This is to standardize requirements to ensure focus on the critical environmental parameters as well as to simplify the procedures for processing ECC applications. All provisions in the MC 2007-002 or the Revised Procedural Manual of DAO 2003-30 and other issuances inconsistent therewith are deemed repealed, superseded, and/or modified accordingly.

### Guidelines for Coverage Screening, Standardized Requirements and its Amendments for Waste-to-Energy and Extraction of Non-Metallic Resources Projects

The Guidelines were used to strengthen the Philippine Environmental Statement (EIS) System in the Philippines under the DENR Memorandum Circular No. 2010-14 which provides for the "standardization of requirements in the implementation of the EIS System".

The Guideline tackles the Screening to determine the coverage under the PEEIS, the Standardized Requirements for the ECP, Non-ECPs, and Environmental Enhancement or Direct Mitigation, and lastly the repealing clause which covers all the provisions in the MC 2007-002 or the Revised Procedural Manual of DAO 2003-30 and other issuance.

## Environmental Critical Projects (ECPs)

### Technical Definitions of ECPs

In accordance with Presidential Proclamation No. 2146, series of 1981, and Proclamation No. 83 (Series of 1996), the four (4) main categories of ECPs are the following: i) Heavy Industries, ii) resource extractive industries, iii) infrastructure projects and iv) golf course projects.

The following technical description for the sub-category under each of the ECP categories (as provided in PP No. 2146) is further described below:

Table 6. 3 Sub-categories Under the ECP categories

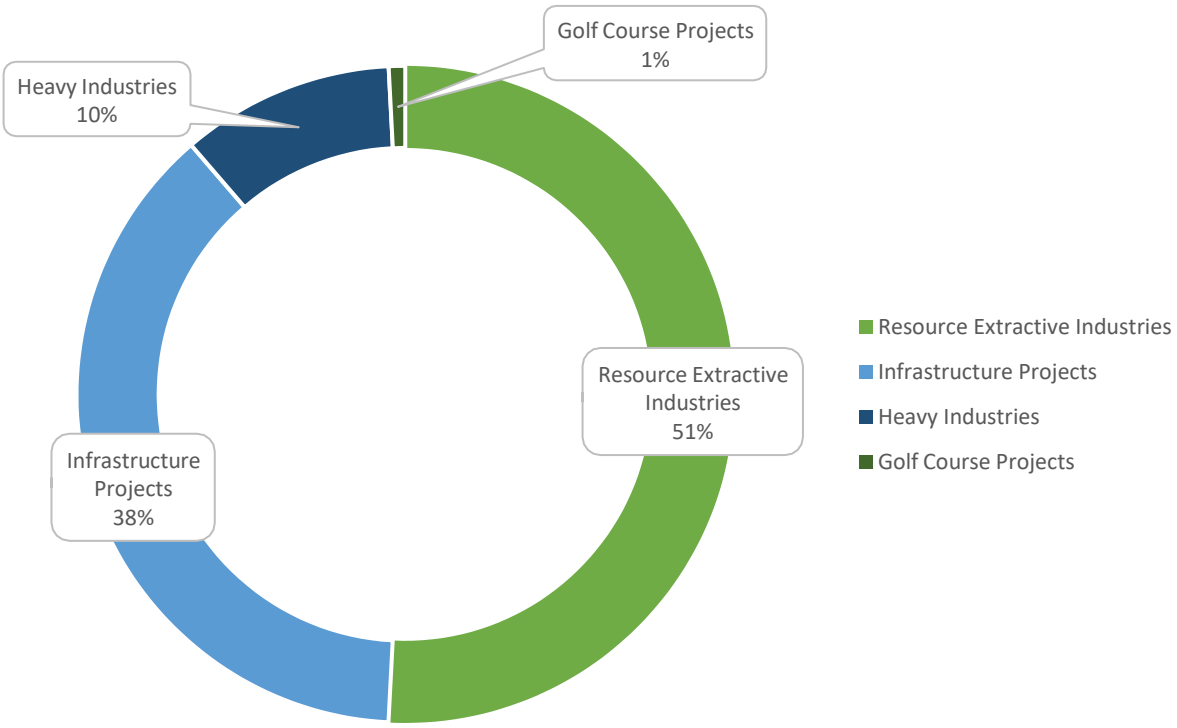
| Heavy Industries | |
|---|---|
| Type of ECP | Description |
| Non-Ferrous Metal Industries | Refers to the organized and coordinated arrangement of manufacturing processes designed to prepare, smelt, process, or recycle non-ferrous metals into marketable products. |
| Iron and Steel Mills | Refers to the organized and coordinated arrangement of manufacturing processes designed to prepare or smelt or process iron ores, steel scraps, or primary iron and steel mill products into marketable products except when the process involves reheating or resizing only. |
| Petroleum and Petrochemical Industries | Refers to the organized and coordinated arrangement of manufacturing processes designed to physically and/or chemically transform petroleum and its derivatives into marketable products |
| Smelting Plants | Refer to the organized and coordinated arrangement of manufacturing processes designed to smelt metals or alloys and cast the same into some special form. |

| Resource Extractive Industries | |
|---|---|
| Type of ECP | Description |
| Mining and Quarrying Projects | Mining and quarrying projects shall refer to the projects involving the extraction and processing of metals, metalliferous ores, fuel, precious stones, clays, fertilizers, and other earth-based materials on a commercial scale. |
| Forestry Projects | Refers to projects involving the extraction, harvesting, and/or processing of timber and other forest products on a commercial scale. |
| Dikes for/and Fishpond Development Projects | This refers to natural or artificial water impoundment involving the construction of dikes, the establishment of fish cages, and similar undertakings for aquaculture purposes or salt production. |

| Infrastructure Projects | |
|---|---|
| Type of ECP | Description |
| Dams | Refers to the impoundment structures and appurtenances |
| Power Plants | Refers to power generating plants, transmission, and distribution systems (substations) utilizing or run by, fossil fuels, geothermal resources, natural river discharge, pondage, or pump storage |
| Reclamation Projects | Refers to projects which involve the filling or draining of areas (foreshore, marshes, swamps, lakes, rivers, etc) and restoration / backfilling projects. |
| Roads and Bridges | Refers to the construction, significant/extension, expansion, widening, or improvement of national roads, railroads/railways, expressways, tunnels, and bridges. |

| Golf Course Projects | |
|---|---|
| Type of ECP | Description |
| Gold Course | Comprises a series of holes, each consisting of a teeing ground, a fairway, the rough and other hazards, and a green with a flagstick (“pin”) and hole (“cup”), all designed for the game of gold. |
| Data Source | Revised-Guidelines_Threshold_MC-2014-005.pdf (emb.gov.ph) |

Status of Environmentally Critical Projects in the Country from 2016-2021




ECPs were issued with Environmental Compliance Certificate (ECC). The activities necessary for the processing of ECC applications such as Project Screening, Public and Technical Scoping, Procedural Screening, EIA Review, and Evaluation through the conduct of EIARC Meetings, and Public Hearing and process documentation were conducted.

Furthermore, in CY 2021, there are an estimated amount of 391 ECPs issued. 31 are Heavy Industries, 146 are Infrastructure Projects, 200 are Resource Extractive Industries, and 33 for Golf Course Projects. Meanwhile, at the regional level, the highest number of ECPs for 2021 was recorded in Region 4A, with 78 ECPs.

Due to the community quarantine imposed in several areas due to the COVID-19 pandemic, site inspections were not done. Instead, proponents were requested to provide the latest drone shots of the proposed project areas for verification of the condition of the area as declared in their EIA reports.

Table 6.4. Number of ECP by Region in CY 2021

| REGION | 1 (Heavy Industries) | 2 (Resource Extractive Industries) | 3 (Infrastructure Projects) | 4 (Golf Course Projects) | Number of ECPs |
|---|---|---|---|---|---|
| Region 1 | 0 | 6 | 7 | 2 | 15 |
| Region 2 | 0 | 13 | 1 | 0 | 14 |
| Region 3 | 9 | 26 | 20 | 15 | 70 |
| Region 4A | 8 | 20 | 45 | 5 | 78 |
| Region 4B | 0 | 11 | 1 | 0 | 12 |
| Region 5 | 0 | 9 | 4 | 0 | 13 |
| Region 6 | 1 | 3 | 7 | 0 | 11 |
| Region 7 | 3 | 26 | 12 | 4 | 45 |
| Region 8 | 1 | 5 | 5 | 0 | 11 |
| Region 9 | 0 | 6 | 2 | 0 | 8 |
| Region 10 | 2 | 5 | 5 | 0 | 12 |
| Region 11 | 1 | 10 | 5 | 2 | 18 |
| Region 12 | 0 | 4 | 3 | 0 | 7 |
| Region 13 | 0 | 44 | 1 | 1 | 46 |
| NCR | 3 | 0 | 18 | 0 | 21 |
| CAR | 0 | 3 | 5 | 2 | 10 |
| TOTAL | 31 | 200 | 146 | 33 | 391 |

Routine activities related to compliance monitoring of ECC-issued ECPs such as the review of Compliance Monitoring Report (CMR) and Compliance Monitoring and Validation Report (CMVR) submissions have been accomplished and documented in Compliance Evaluation Reports (CERs).

Site validation activities were canceled due to the community quarantine imposed on various areas of the Philippines brought about by the COVID-19 pandemic. Field investigations were done with the Legal Division for verification of violations made by some of the projects that have undergone Technical Conferences, which are being done through video conference using Microsoft Teams

## Strengthening the EIA Online Submissions

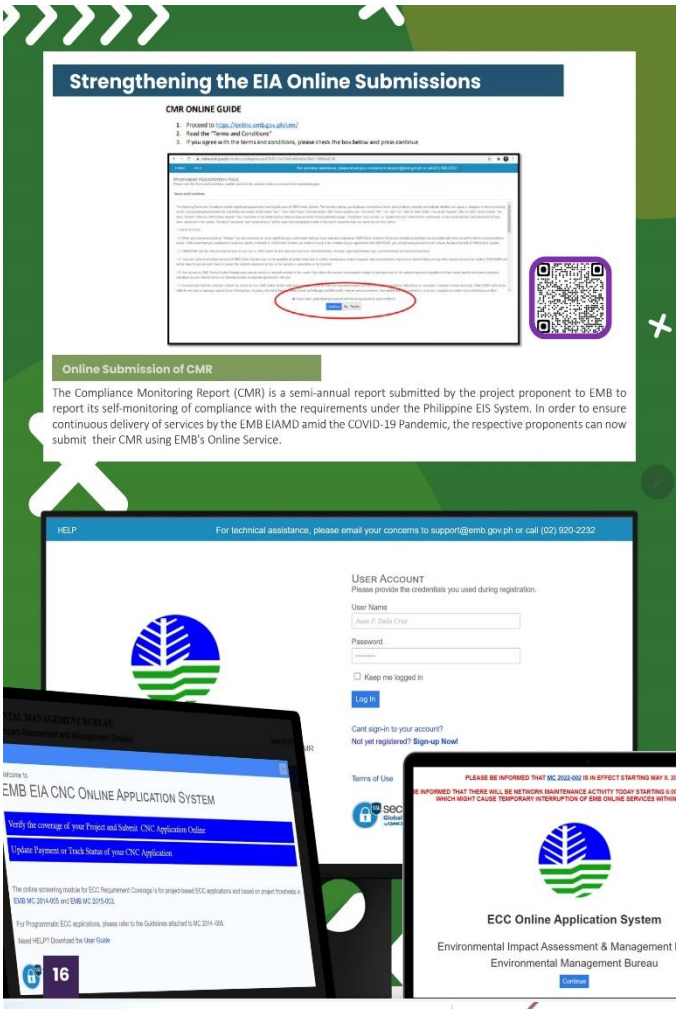
### Online Submission of CMR

The Compliance Monitoring Report (CMR) is a semi-annual report submitted by the project proponent to EMB. This report is a self-monitoring of compliance with the requirements under the Philippine EIS System. To ensure the continuous delivery of services by the EMB EIAMD amid the COVID-19 Pandemic, the respective proponents can now submit their CMR using EMB's Online Service.

In 2021, the Bureau also integrated the maps of Environmentally Critical Projects (ECPs) with Environmental Compliance Certificate (ECC) in the dashboard for ease of locating the projects and included other relevant information therein. This system has enabled the enhancement of the inclusion of all projects/ industries that are covered by environmental laws.

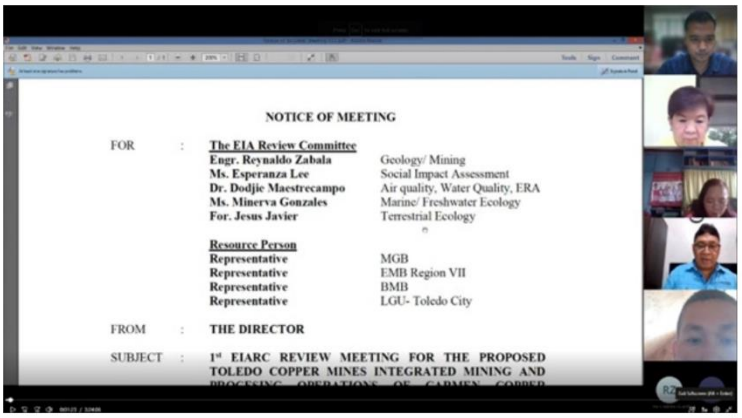
Furthermore, the use of online applications for the Certificate of Non-Coverage (CNC) for EIA was also strengthened during the pandemic. The CNC is the equivalent of an Environmental Compliance Certificate (ECC) for projects that are not expected to have significant impacts on the environment.

In CY 2021 there were six thousand two hundred-four (6,204) ECCs were issued.



## Seminars, Training, and Workshops

The EIAMD successfully conducted several seminars, training, and workshops over the past few years. For the year 2016 to 2021, thereare a total of nine (9) notable orientations and training that EIAMD spearheaded. The seminars that EIAMD conducted were attended by the practitioners, stakeholders, LGUs, and EMB employees from the regional offices to strengthen their knowledge and experience towards EIA. These orientations and training will benefit both of the parties as DENR-EMB will interact directly and are expected not only to be passive recipients of DENR's services but active partners in delivering on DENR's mandate.


## Pandemic Highlights

### EMB MC 2020-30 Interim Guidelines on Public Participation in the Implementation of the PEISS (PD 1586) during the State of National Public Health Emergency

This Memorandum Circular is under Republic Act No. 11469 or the Bayanihan to Heal as One Act and the IATF Resolution No. 11, item B2, "Mass gatherings, defined as a planned or spontaneous event where the number of people attending could strain the planning and response resources of the community hosting the event, shall be prohibited during the said period".

In order not to hamper the economic development of the country, the review and evaluation of all developmental projects within the purview of the Philippine EIS system shall continue to be implemented through the issuance of an Environmental Compliance Certificate (ECC). The Environmental Impact Assessment (EIA) process, including public participation, shall be undertaken with precautionary measures in adherence to DOH Administrative Order Nos. 2020-015 and 2020-016 which prescribe the minimum Public Health Standards for COVID – 19 Mitigation Risk of the Department of Health.

## Way Forward

- In compliance with RA No. 11032 "Ease of Doing Business and Efficient Government Service Delivery Act", the EMB plan to streamline the process of securing an Environmental Compliance Certificate (ECC) for Category B Projects requiring Initial Environmental Examination (IEE) Checklist Report with an auto-approval and/or denial through the Environmental Management Bureau (EMB) Online System.
- Enhancement of the integration of Disaster Risk Reduction (DRR) and Climate Change Adaptation (CAA) concerns into the Environmental Impact Assessment (EIA), we plan to incorporate the platforms and integrated database systems for hazard and risk assessments through the Geospatial Information Management and Analysis Project for Hazards and Risk Assessment in the Philippines (GeoRiskPH) developed by the Philippine Institute of Volcanology and Seismology (PHIVOLCS) of the Department of Science and Technology (DOST).
- The EIAMD plan to amend the resorts and other tourism/leisure projects threshold to strengthen the implementation of the Philippine Environmental Impact Statement system and the Philippine Clean Water Act of 2004.

## VII. Environmental Education and Awareness in the Philippines

Based on RA 9512, the DENR issued Special Order No. 142 in 2009, creating the DENR Environmental Education Committee. The DENR chairs the Inter-Agency Steering Committee on Environmental Education, composed of key government agencies such as the Department of Environment and Natural Resources (DENR), the Department of Education (DepEd), the Technical Education and Skills Development Authority (TESDA), the Commission on Higher Education (CHED), the Department of Science and Technology (DOST), the Department of Interior and Local Government (DILG), and the Department of Social Welfare and Development (DSWD).

The National Environmental Awareness and Education Act of 2008 provides the policy framework for incorporating environmental awareness into the country's educational system. RA 9512 aims to promote environmental education through an inter-agency and multi-sectoral approach. Education for sustainable development in the Philippines is implemented under environmental education.

Also included in the Inter-Agency Steering Committee are other government agencies, such as the Philippine Information Agency (PIA) and the Local Government Academy, as well as private organizations, such as the Philippine Association of Tertiary Level Educational Institutions in Environmental Protection and Management (PATLEPAM), the Philippine Association of Colleges and Universities, the Catholic Educational Association of the Philippines (CEAP) and the Philippine Federation for Environmental Concerns (PFEC).

## National Search for Sustainable and Eco-Friendly Schools

In support of the Republic Act 9512, or the National Environmental Awareness and Education Act of 2008, the Department of Environment and Natural Resources (DENR), through the Environmental Management Bureau (EMB), launched the National Search for Sustainable and Eco-Friendly Schools to recognize environment-friendly schools that have initiated and integrated into their instruction, research, and extension and administration, programs which are environment-related in nature.

The strengthening of sustainable and eco-friendly schools in the country has been enshrined as a priority in the ASEAN Environmental Education Action Plan and the Roadmap for implementing RA 9512 under the National Environmental Education Action Plan.

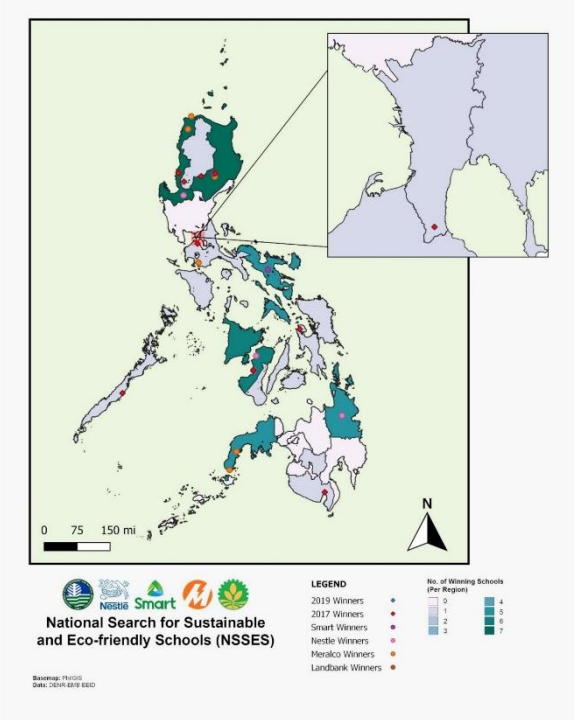
The continued participation of schools in EMB's National Search for Sustainable and Eco-friendly Schools was successfully highlighted in the 2019 year's Search. More schools expressed their desire to join the recognition program. To effectively gauge the success of this Program, EEID, in 2020, will facilitate the evaluation and assessment of previous winners of the Search from 2009 – 2017 to validate if the winning schools have achieved sustainability.

The Search is organized by the DENR through EMB, in collaboration with the Department of Education (DepEd), Commission on Higher Education (CHED), Nestle Philippines, and Landbank of the Philippines to encourage schools/academic institutions to become more actively involved in environmental issues at a practical and local level.

The competition, intended for public and private schools, is divided into three categories: elementary, high school, and college. The candidates from the regional and national levels will be judged by renowned individuals in the area of environmental education, from the government and private sector.

The winners per categoryfor every region will be forwarded to the EMB Central Office in Quezon City, for national judging. The Search will also grant three Special Category Leadership Awards, namely:

- The Nestle Water Leadership Award seeks to recognize and promote solutions, practices, and initiatives of schools in water management and conservation.
- The Meralco Energy Leadership Award whichfocuses on energy efficiency and conservation embedded in school activities; and
- The Landbank Green Leadership Award will be given to the three National First Prize Winners per Category.




National State of the Brown Environment Report

Table 7. 1 List of National Winners of National Search for Sustainable and Eco- Friendly Schools, CY 2017

| SCHOOL NAME | CITY | REGION | SCHOOL LEVEL | Rank |
|---|---|---|---|---|
| Payao Elementary School | Binalbagan, Negros Occidental | 1 | Elementary | 1st place |
| Bintawan South Elementary School | Villaverde, Nueva Vizcaya | 2 | Elementary | 2nd place |
| Katangawan Central Elementary School | Katangawan, General Santos City | 12 | Elementary | 3rd place |
| Divisoria High School | Divisoria, Santiago City, Isabela | 2 | High School | 1st place |
| Muntinlupa National High School | NBP Reservation Road, Poblacion, Muntinlupa City | NCR | High School | 2nd place |
| Pinsao National High School | Pinsao Pilot Project, Baguio City | CAR | High School | 3rd place |
| Don Mariano Marcos Memorial State University – North La Union Campus | Sapilang, Bacnotan, La Union | 1 | College | 1st place |
| Western Philippines University | San Juan, Aborlan, Palawan | 4B | College | 2nd place |
| San Juan, Aborlan, Palawan | Naval, Biliran | 8 | College | 3rd place |

Table 7. 2 List of National Winners of National Search for Sustainable and Eco- Friendly Schools, CY 2019

| SCHOOL NAME | CITY | REGION | SCHOOL LEVEL | YEAR |
|---|---|---|---|---|
| Caranan North Elementary School | Camarines Sur | 5 | Elementary | 1st place |
| Santiago North Central School SPED Center | Santiago, Isabela | 2 | Elementary | 2nd place |
| North Central Elementary School | Dagupan City, Pangasinan | 1 | Elementary | 3rd place |
| Santiago City National High School | Santiago City, Isabela | 2 | High School | 1st place |
| Conception L. Cazenas Memorial School | Antique, Iloilo | 6 | High School | 2nd place |
| Agusan Del Sur National Highschool | Agusan del Sur | 13 | High School | 3rd place |
| Isabela State University - Cabagan Campus | Santiago, Isabela | 2 | College | 1st place |
| Cebu Normal University | Cebu City | 7 | College | 2nd place |
| Batangas State University | Batangas City | 4A | College | 3rd place |
| John B. Lacson Colleges Foundation - Bacolod Campus | Bacolod, Negros Occidental | 6 | College | |

Table 7.3 Nestle Water Leader Leadership Special Category Awardees, CY 2017 and 2019

| SCHOOL NAME | CITY | REGION |
|---|---|---|
| Payao Elementary School | Binalbagan, Negros Occidental | 6 |
| Bayugan National Comprehensive High School | Pan Philippine Highway, Bayugan City, Agusan del Sur | 13 |
| Urdaneta City University | San Vicente Road, Urdaneta City, Pangasinan | 1 |
| Caranan North Elementary School | Camarines Sur | 5 |
| Santiago City National High School | Santiago City, Isabela | 2 |
| John B. Lacson Colleges Foundation - Bacolod Campus | Bacolod, Negros Occidental | 6 |

Table 7.4 Meralco Energy Leadership Special Category Awardees, CY 2017 and 2019

| SCHOOL NAME | CITY | REGION |
|---|---|---|
| Sta. Rosa Elementary School | Sta. Rosa, Santiago City, Isabela | 2 |
| Luzong National High School | Luzong, Pagudpud, Ilocos Norte | 1 |
| Universidad De Zamboanga | Tetuan, Zamboanga City | 9 |
| Pagudpud Elementary School | Ilocos Norte | 1 |
| Diplahan National High School | Zamboanga Sibugay, Zamboanga Peninsula | 9 |
| Batangas State University | Batangas City | 4a |

Table 7.5 Landbank Green Leadership Special Category Awardees, CY 2017

| SCHOOL NAME | CITY | REGION |
|---|---|---|
| Payao Elementary School | Binalbagan, Negros Occidental | 6 |
| Divisoria High School | Divisoria, Santiago City, Isabela | 2 |
| Don Mariano Marcos Memorial State University – North La Union Campus | Sapilang, Bacnotan, La Union | 1 |

Table 7.6 Smart Sustainability Special Category Awardees, CY 2019

| SCHOOL NAME | CITY | REGION |
|---|---|---|
| Caranan North Elementary School | Camarines Sur | 5 |
| Santiago City National High School | Santiago City, Isabela | 2 |
| Isabela State University – Cabagan Campus | Santiago, Isabela | 2 |

## Global Search for Sustainable Schools

The Global Search for Sustainable Schools (GSSS) is an international project run by the Sustainable Lifestyles and Education Programme and part of the 10-year Framework of Programmes on Sustainable Consumption and Production Patterns.

The GSSS aims to mainstream sustainable lifestyles into formal education, make sustainable lifestyles the guiding principle in every learning environment, and mobilize and empower the youth and educators to promote sustainable lifestyles.

The GSSS has collaborated with nine countries, working with schools across the world from Africa, the Asia-Pacific, Latin America, and the Caribbean. Over 40 schools from Brazil, Cambodia, Kyrgyz Republic, Namibia, South Africa, Suriname, Uganda, Vietnam, and the Philippines vied for the grant from the Program to implement sustainable action plans adopted in the school curriculum and in-and-off school activities. The GSSS is funded through the Trust Fund of the Network, administered by the United Nations Environment Programme (UNEP) with a contribution from the Ministry of the Environment of Japan. The Institute for Global Environmental Strategies (IGES) acts as an overall coordinator with the assistance of the multi-stakeholder advisory committee.

To support the implementation of the Action Plan of educational institutions on environmental protection such as greening, energy and water conservation, solid waste management, integration of local and global sustainability issues, and active community engagement. The Program provided a P150,000.00 grant to each school. The GSSS also supported experts worldwide to further strengthen their sustainable and environment-friendly practices.

With the support of the Global Search for Sustainable Schools program being extended to Eco-Schools, it is an aspiration that the schools' sustainable action plans will be implemented the Sustainable Lifestyles and Education (SLE) program and other advisors.

In 2019, the EMB supported the program through the following methods: i) Preparation of an implementation plan and proposed budget for the Global Search for Sustainable Schools, ii) conducted a series of the webinar with Mr. Simon Gilby of IGES regarding the proposed project held last February 6, and 19, 2019, and lastly iii) The EMB facilitated the launching of the Global Sustainable Schools project.

## The GSSS Grants

Out of the 20 elementary and high schools in the country shortlisted for the GSSS award, five emerged as recipients of the grant to implement their outstanding environmental initiatives, as contained in each school's implementation plan. The GSSS grants were awarded to the following schools:

- Agusan Del Sur National High School
- Caranan North Elementary School
- Santiago North Central School-SPEDCenter
- Santiago City National High School
- Concepcion L. Cazeñas Memorial School

## The GSSS International Exchange Program/Study Tour: Philippines

The Philippines, spearheaded by the EMB-DENR with support from the local government of Santiago Isabela and the Department of Education Region 2, hosted the International Exchange Program. The Study Tour showcased best performing Philippine schools as an example and inspiration to countries across the Region. The three most sustainable and eco-friendly schools in the Philippines awarded by the DENR-EMB through its National Search for Sustainable and Eco-friendly Schools program were Divisoria Elementary School, Dubinan Elementary School, and Divisoria High School.

The International Exchange Program was attended by a delegation from the Academy of Education of Kyrgyz Republic, the Environmental Education Department, the Ministry of Environment (EED-MOE) of Cambodia, and the Philippine Center for Environmental Awareness and Sustainability, Inc. (PCEAS, Inc.)

The Study Tour was held in Santiago, Isabela, on March 2-5, 2020, to showcase their sustainable and eco-friendly projects and good environmental practices to the international delegates.

The International Exchange Program's main objectives were the following:

1. To exchange information and experiences from national searches.
2. To visit eco-friendly award-winning schools from the Philippines (NSEES and ASEAN);
3. To deepen understanding of the progress of sustainable schools in the Asia-Pacific region and to consider local programs and projects to bring to the international workshop in South Africa.

## Issues and Challenges in the Implementation of Action Plans for Participating Schools

The COVID-19 pandemic has created various challenges in executing the GSSS in the Philippines. Because of education disruption, the implementation of Action Plans for participating schools was also affected. However, despite the challenges amidst the COVID-19 crisis, the organizers, school administrators, stakeholders, and partners pursued collective efforts and integrated approaches in adapting distance learning solutions to support education continuity.

## Educational Institutions in Environmental Protection and Management

### PATLEPAM

The Philippine Association of Tertiary Level Educational Institutions in Environmental Protection and Management (PATLEPAM) was conceived during the National Consultative Forum of Training Institutions in Environmental Planning and Management on September 21-23, 1995, in Tagaytay City.

The PATLEPAM's vision is for Higher education institutions with educators equipped with knowledge and skills to manage resources for sustaining productivity and ecological integrity. Furthermore, its mission is to network higher education institutions through the PATLEPAM for increased appreciation of the need to integrate environmental concerns in the tertiary education curricula so that local training needs in ecological protection and management in the country's different regions can be addressed.

Moreover, its objectives are the following: i) Enhance information exchange and sharing of environmental protection and management; ii) Enhance environmental awareness and skills of tertiary level students and faculty members; iii) Assist in curriculum development for environmental management among tertiary level educators; iv) Conduct collaborative programs on instruction, research, and development, and extension in Environmental Management; v) Strengthen the overall expertise in the environmental management of the different regions of the country, at the technical, managerial and policy levels, by catering to local training needs and vi) Serve as a link between local and international networks for training in environmental management.

### Research conducted by PATLEPAM during the pandemic

### Study on Face Mask Management in the Philippines

In coordination with the Philippine Association of Tertiary Level Education Institutions in Environmental Protection and Management (PATLEPAM), a study on Face Mask Management in the Philippines was conducted. The study estimates that the Philippines currently disposes of roughly 25 million face masks daily, with pre-disposal practices varying in terms of segregation, temporary storage, disinfection, and mode of collection, among others.

Based on the surveys conducted among the General Public, it was found that:

- 7 in 10 Filipinos throw their disposable face masks after only one use.
- Most households do not have separate garbage bins for used face masks and general waste.
- 1 in 10 respondents reported a separate collection of face mask wastes in their locality.
- Most households do not cut, disinfect, or temporarily store face masks before disposal.

From the survey among Local Government Units, the following are the main findings:

- 1 in 2 LGUs provided complete sets of PPEs to waste collectors
- 7 in 10 LGUs dispose of their face masks and other medical wastes together with municipal wastes.
- Most LGUs have no local policies/ordinances regarding the segregation of face masks and other medical wastes.
- Almost half of the LGUs store collected face masks and other medical wastes before final disposal for up to 8 days.
- Data collection was done through two online surveys - one for the public and another for the LGUs, a focus group discussion with stakeholders, and a review of related literature

### Youth for Environment

The EMB Youth Desk is "a one-stop-shop" for the youth seeking information and consultations on youth and environment/sustainable developmentmatters and a liaison of EMB to school/non-school/community-based youth organizations, academe, other government agencies, non-government organizations, local government units, and other youth-based institutions.

### Youth for Environment in Schools Organization (Yes-O)

DepEd Order No. 73, Series of 2003, establishes YES-O as the only co-curricular environmental club or organization in schools.

Last 2011, DepEd issued two (2) orders: DepEd Order No. 52, Series of 2011 (Strengthening Environmental Education in Public and Private Schools) and DepEd Order No. 93, Series of 2011 (Mandated Programs, Projects and Activities under the Youth for Environment in Schools Program).

### Philippine Youth Environment Network

PhilYEN is the umbrella network of all youth organizations, individuals, and networks that are either based in or originated from the Philippines and are involved in environmental and developmental-related advocacies. It is currently connected with Earth Day Network Philippines, UNEP TUNZA Southeast Asian Youth Environment Network (SEAYEN), and Batas Kalikasan Foundation. Recognized by the Department of Environment and Natural Resources (DENR), Environmental Management Bureau (EMB), Climate Change Commission (CCC), and National Youth Commission (NYC) as the national youth for environment network in the Philippines.

The said environmental youth network responds to the Green Generation Campaign of Earth Day Network International, UNEP TUNZA Strategy, and Republic Act No. 9512, also known as the National Environmental Awareness and Education Act of 2008.

### Other Youth Programs and Activities conducted by EMB Central and Regional Offices

- Act as a facilitator and resource person on the annual youth camp of Tullahan Kids Patrol
- Resource persons for the following event: DENR's Strategic Communications and Initiatives Service Youth Camp and Learning Event, Youth for Environment in Schools Program.
- Drafted communications to the members of the Inter-Agency for the upcoming meeting of the National Inter-Agency Committee on Environmental Education.
- Youth and Climate Change Lecture
- Walk the Talk Seminar- Workshop
- "Kalikasan at Saribuhay" conversation – discussion on the war on deforestation and the ongoing efforts to rehabilitate Ipo Watershed and connected mountains as well as plastic pollution and rapid urbanization.
- Project street – tree growing activity that aims to teach about the importance of trees and forests in relation to the air we breathe and help them become an environmentally conscious generation.
- NSTP Module on Environmental Awareness and Education – youth are emphasized and are highly valuable in challenging the dominant narratives about the pressing environmental concerns of our generation.
- #Techtoprotect: Taking Advantage of Digital Technology for a Clean and Green Environment Webinar Series – aimed to encourage the use of digital tools and technology in strengthening environmental advocacy. Featured the use and positive impact of digital technology on environmental management and protection.
- Nurture Nature for Sustainable Future: Webinar on Climate Action for the Youth and by the Youth – appealed to the youth sector for them to effectively communicate the concepts of climate change adaptation and mitigation to others.

## Public Information and Environmental Awareness Program

### Special Environmental Events

The EMB-DENR, thru its Environmental Education and Information Division (EEID) and 16 Regional Environmental Education and Information Units (EEIUs), are synchronized in the nationwide conduct of several environmental events year-round, beginning from Zero Waste Month (January), World Water Day (March 22) and Philippine Water Week (third week of March), International Earth Day (April 22), Philippine Earth Month (April), World Environment Day (June 5), Philippine Environment Month (June), National Clean Up Month, International Coastal Clean Up Weekend (third weekend of September), World Environmental Health Day (September 25), National Clean Air Month, and National Environmental Awareness Month (November), Global Warming and Climate Change Consciousness Week (November 21-25).

There has been increasing environmental consciousness affected by EMB EEID's IEC programs. There is also an increasing trend in likes and shared posts on EMB's official Facebook pages. The EMB Central Office likewise guides EEIUs on the continued strengthening of their social media presence through capacity-building activities and guidelines on how to effectively reach out to growing audiences on various social media platforms.

## Recognition and Documentation of Good Environmental Practices

### Bayanihan sa Daan Award- Philippine Walkable-Bikeable Communities Award

Various organizations and government agencies worked together to create the Bayanihan sa Daan Awards: The Share the Road (Bayanihan sa Daan) Movement. This includes the Department of Environment and Natural Resources (DENR), the Department of Public Works and Highways (DPWH), the Metropolitan Manila Development Authority (MMDA), the Department of Transportation and Communications (DoTC), the National Anti-Poverty Commission (NPC), the Pasig City Government, the Climate Change Commission, the Partnership for Clean Air (PCA), Clean Air Asia, the Inclusive Mobility Network, and others.

The 2016 Bayanihan sa Daan Awards were presented in a ceremony on January 29 at the Kalayaan Hall of Malacanang Palace to honor the country's foremost advocates for "walkable and bikeable" communities. The Bayanihan sa Daan Awards are already in their second year, and they seek to honor the best work done by local and national government agencies, civil society, media, academia, the commercial sector, bike groups, and bus operators.

Atty. Juan Miguel Cuna, Assistant Secretary of the DENR and Director of the Concurrent Environmental Management Bureau, spoke on the agency's efforts to combat air pollution and climate change. The EMB, the Land Transportation Office, the Land Transportation and Franchising Regulatory Board (LTFRB), and the Coalition of Clean Air Advocates in the Philippines (C-CAAP) have all signed an agreement to promote and campaign for healthier air. To further the country's efforts to reduce air pollution and help address climate change, the DENR is also advocating for low-carbon options in non-motorized transport, such as bicycling and walking.

Several people and bicycle groups were also honored as part of the Bayanihan sa Daan Movement's efforts to encourage bikeable neighborhoods. Examples include the Firefly Brigade, the National Biking Organization, the Bayawan Bamboo Bike Initiative, and iFold Philippines.

### K5 Award: Kilos sa Klima at Kalamidad Tungo sa Kaligtasan at Kaunlaran

The Environmental Education and Information Division (EMB-EEID) and the DENR Climate Change Service (DENR-CCS), in cooperation with the Department of Interior and Local Government – National Capital Region Office, have launched the *K5: Kilos at Klima at Kalamidad tungo sa Kaligtasan at Kaularan* (Metro Manila search for Climate and Disaster Resilient Communities) last November 20, 2017, at the EMB Conference Room A.

This Program aims to provide an avenue to identify and feature good practices in climate and disaster resiliency among communities and inspire/encourage other communities to do likewise. Furthermore, this would develop skills and understanding among barangay leaders in empowering stakeholders to be more climate- and disaster-resilient. This would encourage communities to become more involved in climate change adaptive mechanism(s) and climate-resilient strategies at a practical and local level.

The Awardees of the K5 were recognized in November 2018 as part of the celebration of Climate Change Consciousness Week.

K5 Award: Kilos sa Klima at Kalamidad Tungo sa Kaligtasan at Kaunlaran

## EMB Game Changer Communities Award

To recognize regional champions on solid waste, air quality, water quality management, and climate change mitigation; to compile and update a database of good practices for DENR management; and to encourage innovation in these areas, the Environmental Management Bureau of the Department of Environment and Natural Resources (EMB-DENR) launched an award called the Game Changer Communities Award in April 2021.

Overall, the EMB received 46 submissions after the nomination period. A live stream of the Game Changer Communities Awards Ceremony was broadcast on September 1, 2021, through the Zoom app and Facebook Live. First place was awarded to San Carlos City Environmental Management Office; second place to the Provincial Government of South Cotabato; third place to the City Government of Santiago, Isabela; and the seventh place goes to a group of winners who received consolation prizes.

## Luntiang Puso Awarding Ceremony

The Luntiang Puso Awarding Ceremony aims to honor and recognize the Youth Sector and Micro, Small, and Medium Enterprises for their outstanding contribution to environmental management and protection and in promoting sustainable living. The ceremony also featured the winners of the various environmental education contest conducted by the Bureau, such as Greenviro Games Quiz Bee 2021, Digital Poster Making Contest, Pagkaing Lokal Plant Based Recipe Contest: Healthy Food from Scrap, Earthpreneaur Award 2021 and 2021 EMB Youth Envi Icon.

## Youth Icon

After the success of the 2020 "Youth Envi Icon," the EMB through the EEID recognizes young people who have made significant contributions to protecting the environment. The purpose of the event was threefold: (1) to honor young people who have made significant contributions to environmental management and protection; (2) to shine a light on the many positive environmental initiatives spearheaded by young people; and (3) to motivate and inspire even more young people to take on leadership roles in environmental conservation.

The Environmental Education and Information Division received 40 nominees from the EMB Regional Offices with projects focused on water quality management, solid waste management, climate change, environmental education, and environmental policy formulation. From 40 nominees, five youth champions were awarded – Clarence Almoite, Steven Angelo, Aprille Roselle Vince Juanillo, Franco Rino Apoyon, and Raxiey Adolfo.

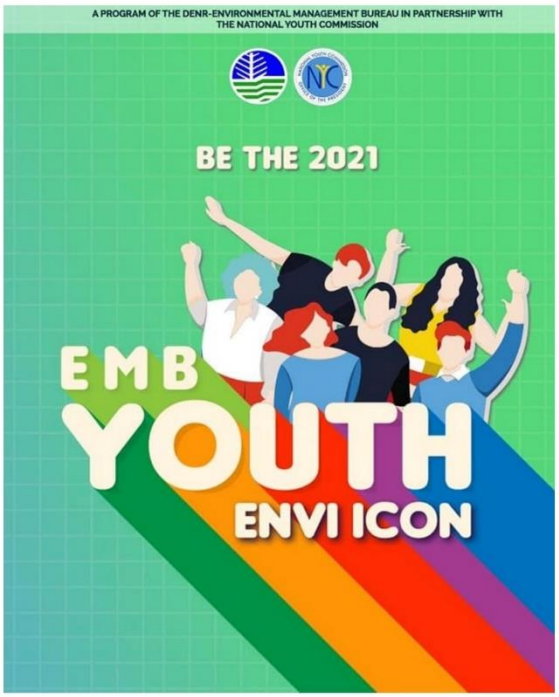


Table 7.7 List of Environmental Events

| Name of Event or Celebration | Date Celebrated | Legal Basis | Brief Description of the Event or Celebration |
|---|---|---|---|
| National Zero Waste Month | January | Presidential Proclamation No. 760, Series of 2014<br><br>Republic Act No. 9003 – Ecological Solid Waste Management Act of 2000 | The Ecological Solid Waste Management Act of 2000 promotes environmental awareness and action among the citizenry and institutionalizes public participation in the development of national and local integrated, comprehensive, and ecological waste management programs. |
| World Wetlands Day | February 2 | Ramsar Convention on Wetlands | This is an annual celebration of the vital importance of international wetlands to ecological and human health. It marks the date of the adoption of the Convention on Wetlands on 2 February 1971, in the Iranian city of Ramsar on the shores of the Caspian Sea. Government agencies, non-government organizations, and community groups have celebrated World Wetlands Day by undertaking actions to raise public awareness of wetland values and benefits and promote the conservation and wise use of wetlands.<br><br>These activities include seminars, nature walks, festivals, launches of new policies, announcements of new Ramsar sites, newspaper articles, radio interviews, and wetland rehabilitation. |
| World Wildlife Day | March 3 | United Nations General Assembly dated December 20, 2013 | In its resolution, the General Assembly reaffirmed the intrinsic value of wildlife and its various contributions, including ecological, genetic, social, economic, scientific, educational, cultural, recreational, and aesthetic, to sustainable development and human well-being and recognized the important role of Convention on International Trade in Endangered Species of Wild Fauna and Flora in ensuring that international trade does not threaten the species' survival. |
| International Day of Forests | March 21 | United Nations General Assembly dated February 14, 2013 | The occasion is intended to be one of the world's leading global platforms for people with an interest in forests and climate change to share their views and work together to ensure forests are suitably incorporated into any future climate change mitigation and adaptation strategies. |
| World Water Day / Philippine Water Week | March 22/ 4th Week of March | 1992 United Nations Conference on Environment and Development (UNCED) in Rio de Janeiro | This world day for water was observed starting in 1993, in conformity with the recommendations of the United Nations Conference on Environment and Development contained in chapter 18 (Fresh Water Resources) of Agenda 21.<br><br>States were invited to devote the Day to implementing the UN recommendations and set up concrete activities as deemed appropriate in the national context. |

| Name of Event or Celebration | Date Celebrated | Legal Basis | Brief Description of the Event or Celebration |
|---|---|---|---|
| International Earth Day/ Month of Planet Earth | April 22/ April | Presidential Proclamation Nos. 1481 and 1482 | Earth Day Network was founded on the premise that all people, regardless of race, gender, income, or geography, everyone, gender, income, or geography is to broaden and diversify the environmental movement worldwide and mobilize it as the most effective vehicle for promoting a healthy, sustainable environment. We pursue our mission through a combination of education, public policy, and consumer activism campaigns. Our campaign and programs are predicated on the belief that an educated, energized population will take action to secure a healthy future for itself and its children. Earth Day Network has a global reach witha network of more than 17,000 partners and organizations in 174 countries. More than 1 billion people participate in Earth Day activities, making it the largest secular civic event in the world. |
| The month of the Ocean | May | Presidential Proclamation No. 57, series of 1999 | Proclamation No. 57 dated January 9, 1999, declares the Month of May as the Month of the Ocean in the Philippines. |
| The International Day for Biological Diversity | May 22 | Convention on Biological Diversity | The United Nations proclaimed May 22 as International Day for Biological Diversity to increase understanding and awareness of biodiversity issues. |
| World Environment Day/ Philippine Environment Month | June 5/ June | Presidential Proclamation No. 237 | World Environment Day (WED) was established by the UN General Assembly in 1972 to mark the opening of the Stockholm Conference on the Human Environment. Commemorated yearly on 5 June, WED is one of the principal vehicles through which the United Nations stimulates worldwide awareness of the environment and enhances political attention and action. |
| Philippine Eagle Week | June 4-10 | Proclamation No. 79 | Said Proclamation aims specifically i) to strengthen public awareness of the significant role of the Philippine Eagle in the forest ecosystem, and its importance as a national symbol and unique heritage, among others; ii) to generate unified and concerted efforts among all sectors of the society to ensure the protection and perpetuation of the species; and iii) to encourage non-government organizations, private companies or corporations, people's organizations, academic and scientific organizations, and all other interested parties to participate in the annual celebration of the Philippine Eagle Week. |
| World Day to Combat Desertification | June 17 | 1994 United Nations Convention to Combat Desertification | In 1994, the United Nations General Assembly declared June 17 the World Day to Combat Desertification and Drought to promote public awareness of the issue, and the implementation of the United Nations Convention to Combat Desertification (UNCCD) in those countries experiencing serious drought and/or desertification, particularly in Africa. |
| National Arbor Day | June 25 | Proclamation No. 643 amended Proclamation No. 396 of June 2, 2003 | The "active participation of all government agencies, including government-owned and controlled corporations, private sector, schools, civil society groups and the citizenry in tree planting activity. |

| Name ofEvent or Celebration | Date Celebrated | Legal Basis | Brief Description of the Event or Celebration |
|---|---|---|---|
| National Disaster Consciousness Month | July | Executive Order No. 137 dated August 10, 1999 | National Disaster Consciousness Month aimed to increase awareness of every Filipino the ever-threatening disasters for a better appreciation of the government's disaster preparedness program. |
| National Clean-Up Month / International Coastal Clean-Up Weekend | September/ 3rd Weekend of September | Presidential Proclamation No. 244 – National Clean-Up Month Presidential Proclamation No. 470 – International Coastal Clean-Up Weekend | This event was just the beginning of a movement for cleaner beaches and marine habitats. In a few years, what had been a local clean-up grew to encompass the 25 U.S. states and territories. In 1989, the Clean-Up the World weekend, officially became an international event, with the involvement of responsible citizens of Canada and Mexico. Today, half a million citizens from almost 100 countries participate in the Clean-Up, and it has grown into an annual event, motivating people the world over to get outside and do something for their coastal environment. |
| National Ozone Protection Month/ International Ozone Day | September / September 16 | Montreal Protocol | The Montreal Protocol on Substances that Deplete the Ozone Layer came into force on 1 January 1989 when it had been ratified by 29 countries and the European Economy Community (EEC).<br><br>As of February 2007, 191 countries have ratified the Protocol, representing an international effort to safeguard the ozone layer through controls on the production, consumption, and use of ozone-depleting substances (ODS). |
| National Tamaraw Month | October | Presidential Proclamation No. 273 | Under said Proclamation, all government offices, agencies, and instrumentalities in the whole Island of Mindoro are urged to implement activities geared toward the conservation of the Tamaraw and its habitats at least during the month of October. |
| International Lead Poisoning Prevention Week | 3rd Week of October | 2012 International Conference on Chemicals Management | The United Nations Environment Programme (UNEP) and the World HealthOrganization (WHO) were invited to establish a global partnership topromote phasing out the use of lead in paints, i.e., the Global Alliance to Eliminate Lead Paint (GAELP). The Alliance aims to catalyze efforts to prevent children's exposure to lead from paints and to minimize occupational exposure to lead paint. |
| Philippine Clean Air Month | November | Presidential Proclamation No. 1109, s. 1997 – Clean Air Month<br><br>Republic Act No. 8749 – Philippine Clean Air Act of 1999 | A continuing air quality information and education campaign shall be promoted by the Department, the Department of Education, Culture and Sports (DECS), the Department of the Interior and Local Government (DILG), the Department of Agriculture (DA) and the Philippine Information Agency (PIA). Consistent with Sec. 7 of this Act, such a campaign shall encourage the participation of other government agencies and the private sector including nongovernment organizations, people's organizations, theacademe, environmental groups, and other private entities in a multi-sectoral information campaign. |

| Name of Event or Celebration | Date Celebrated | Legal Basis | Brief Description of the Event or Celebration |
|---|---|---|---|
| National Environmental Awareness Month | November | Republic Act No.9512 – National Environmental Awareness and Education Act of 2008 | Pursuant to the policy outlined in this Act, the month of November of everyyear shall be known as Environmental Awareness Month throughout the Philippines. |
| National Climate Change Consciousness Week | November 19-25 | Presidential Proclamation No.1667 – Global Warming and Climate Change Consciousness Week<br><br>Republic Act No.9729 – Climate Change Act of 2009 | The Philippines has declared and confirmed its commitment to the goals ofthe United Nations Framework on Climate Change Convention. |
| National Day for Youth in Climate Action | November 25 | Presidential Proclamation No.1160, s. 2015 – National Day forYouth in ClimateAction | The National Youth Commission and the Climate Change Commission, in cooperation with other government agencies, non-governmental organizations, and international partners, have launched the #NowPH (Noton our Watch) campaign, a comprehensive advocacy on climate action, which aims to empower the youth in raising public consciousness on the science of climate change and on ways to lead a climate-resilient and climate-smart lifestyle. |

## Pandemic Highlights

### COVID 19 Information Drive

Due to the heightened threat of COVID-19, the Environmental Education and Information Division needed to cope with and re-channel information dissemination, environmental activities, and celebration using social media platform using the EMB Official Facebook account.

As part of the national observance of World Environmental Health Day last September 25, 2020, a webinar on Environment and Health with the theme: "SA PANAHON NG PANDEMYA, MALUSOG NA KAPALIGIRAN ANG BIDA" was conducted.

The Department of Environment and Natural Resources and the Department of Health jointly conducted the said Webinar to highlight the importance of addressing COVID-19 through environmental health measures, especially in preventing the transmission of the COVID-19 virus amid the global pandemic.

Recognizing the importance of having health and the environment at the center of sustainable development and protecting and advancing the right of the Filipino people to a balanced and healthful ecology, the Webinar became a venue for sharing best practices and promoting advocacies on relevant issues such as ensuring good Water, Sanitation and Health (WASH) and waste management practices in communities, homes, schools, marketplaces, prisons, and health care facilities.

The national celebration of WEHD through Presidential Proclamation 595 in 2018 was stamped out as one of the legacies of the Philippines as the Chair of the Asia-Pacific Regional Forum on Health and Environment from 2017 until 2019.

For the past couple of months, we have been concerned with the dangers of the COVID-19 pandemic; as our need for face masks and gloves increases, our waste increases.

The Bureau assisted in the e-learning webinar with Vibal Printing Inc. on how to properly manage our waste with speaker Mr. Geri- Geronimo Sañez (Section Chief, Hazardous Waste Management).

The Environmental Management Bureau of the Department of Environment and Natural Resources (EMB-DENR) is enjoining everyone to observe proper waste segregation in their homes. Furthermore, the COVID-19 pandemic generates enormous volumes of infectious healthcare waste from medical centers and healthcare institutions composed of personal protective equipment such as gowns or coveralls, masks, gloves, and other contaminated materials.

### Webinar Series and Infographics amidst COVID

One of the tasks of EMB-EEID is to produce webinars and training to capacitate not only the EMB Employees but also the public to know more about the environment.

### Training for the General Public during the Pandemic

- Series of Plant-Based Infographics
- Plant-Based Food Webinar
- #UOTD: Ulam of the Day Food Photo Contest
- 2nd Pagkaing Lokal, Plant-Based Recipe Contest Healthy Food from Scrap: Plant-Based Food Leftovers and Vegetable Scraps
- Tech To Protect Green Apps for Sustainable Living

### Training for the EMB Employees (Central Office and Regional Offices) during the Pandemic

- Creative Webinar Design and Development Training Course for the Environmental Management Bureau: How to Create and Facilitate Your Own Webinar Series
- Training on Electronic Book Development for EMB Central and

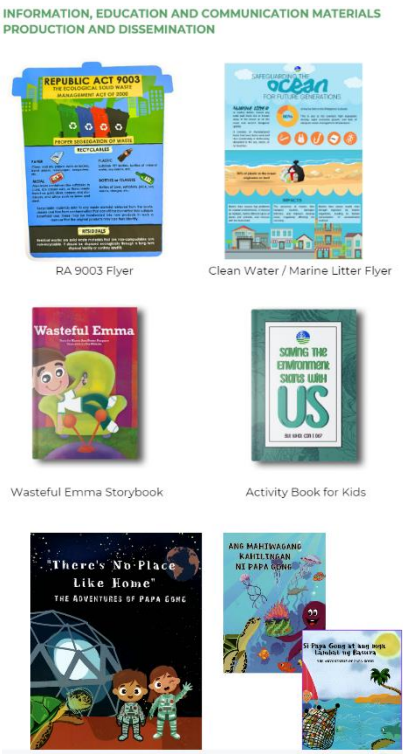
Regional Environmental Education and Information Officers

## Youth Programs during the Pandemic

- #Techtoprotect: Taking Advantage of Digital Technology for a Clean and Green Environment Webinar Series
- Nurture Nature for Sustainable Future: Webinar on Climate Action for the Youth and by the Youth

## Production and Dissemination of IEC

In the 21st century, people are becoming more aware of their actions' impact on the environment, and as part of the mandate of the EMB, the EEID responded to the need to act to address this problem.




RA 9003 Flyer | Clean Water / Marine Litter Flyer

Wasteful Emma Storybook | Activity Book for Kids

EMB can help combat environmental destruction through education and communication (IEC). Information, education, and communication (IEC) materials provide information about reducing pollution, building sustainable products, and encouraging others to be more environmentally conscious.

From 2016 to 2021, the EMB-EEID and EEIU facilitated the production and dissemination of the IEC to the public. This was made possible through the events with the Local Government Units (LGU) or other government and private agencies. However, the dissemination of the IEC was put on hold as the COVID-19 pandemic happened in the Philippines, wherein due to the implementation of the ECQ and lockdowns, public gatherings and face-to-face interactions were halted.

The decrease in the dissemination of the IEC materials was due to the closing of the borders and limited face-to-face, wherein several IEC distribution events were stopped.

In CY 2021, the dissemination was mainly performed during the activities such as clean-up drives, free emission testing of cars, and distribution of IEC materials and other promotional materials in the form of storybooks, drawing books, puzzles, flyers, booklets on environmental laws, eco-washable facemasks, eco-bags, plantable, etc.

In addition, in 2021, the EMB-EEID printed 3000 copies of Solid Waste Management Modules for Grades 1-10. These modules were developed by Nestle Philippines and approved by the National Solid Waste Management Commission.

## Intensify the IEC campaign using the website and social media platforms

Since restriction because of COVID-19 was lifted in most countries, some countries still have not fully recovered. With this in mind, IEC materials must continue to be created and distributed as soon as possible so that people can continue learning about the environment. Hence in CY 2021, the EMB intensified the usage of social media platforms.

## EMB Facebook Page and Youtube

As part of an effort to maintain a presence in the lightning-fast world of today's technology, the DENR EMB established a Facebook profile in October 2010. Since the social media industry has flourished over the last few years and the significance of being accessible online has risen, EMB has established a Facebook page and a YouTube channel. Because it was designed to aid those who depend on assistive technology to utilize social media, one of its goals is to increase the accessibility of online material.

The Bureau mainstreamed its information distribution, environmental initiatives, and celebration via the EMB website and social media channels, mainly the Official Facebook Page for the EMB Central Office. This was done since the danger posed by COVID-19 was at an all-time high. There has been a massive growth in the number of people following or seeing the EMB's Facebook Page, which went from 32,600 in 2020 to 57 870 in December 2021. Additionally, the EMB Central YouTube Page now has 552 subscribers

## Spotify

Music, like art, creative writing, and poetry, maybe a robust environmental education and activism tool. The DENR-Environmental Management Bureau's Environmental Education and Information Division hosted an Environmental Songwriting Competition in June 2018 that resulted in the "KANTAKALIKASAN" Album. Songwriters from the Metro Manila area, Central Luzon, and CALABARZON participated in the competition.

The "KANTAKALIKASAN" Album may be watched on many social media platforms, including Spotify, and EMB and DENR Central Office Facebook sites to raise public awareness and foster long-term environmental stewardship. The Department of Environment and Natural Resources (DENR) of the Philippines has released an album with accompanying lyric videos on YouTube, which use official government footage from Philippine Protected Areas.

## VIII. Environmental Administration

The DENR-EMB is mandated to formulate, integrate, coordinate, supervise and implement all policies, plans, programs, projects, and activities relative to the prevention and control of pollution and management and enhancement of the environment. It is also mandated to provide research and laboratory services and serve as a secretariat in adjudicating pollution cases under Executive Order 192.

The EMB as a line bureau has a Central Office, sixteen (16) regional offices, and forty-six (46) Provincial Management Units (PEMUs) nationwide.

The Central Office is composed of nine (9) divisions, while each regional office has three (3) divisions. The EMB Central and Regional Offices work in close coordination with each other.

### Capacity Buildings

The training attended by the EMB employees is categorized into technical and non-technical. Technical training concerns implementing environmental laws and related programs and activities locally or internationally sponsored. On the other hand, non-technical training is generally in management, supervisory and environmental education programs

Even with the COVID-19 pandemic, In CY 2020, the EMB Central Office capacitated its employees through web conferencing or webinars, and contingent upon the IATF guidelines, if allowed to, EMB personnel were authorized to attend face-to-face seminars with limited participants by observing proper health protocols. The list of the Capacity Buildings conducted by the EMB is listed in the table below:

[10] EMB-Approved-Budget-and-Corresponding-Targets-FY-2021.pdf

[11] FINAL-EMB-ANNUAL-NARRATIVE-REPORT-FOR-CY-2021.pdf

Table 8.1. List of the Capacity Buildings conducted for EMB Personnel, 2016--2021

| | Event Title | Duration (dd/mm/yyyy) | | Training Hours | Venue |
|---|---|---|---|---|---|
| | | FROM | TO | | |
| 2016 | | | | | |
| 01 | Effective Resource Officers Reorientation Workshop | 12 April 2016 | 15 April 2016 | 32 | BSA Twin Towers, Ortigas, Mandaluyong City |
| 02 | Supervisory Development Course Track 1 (Batch 5) | 12 September 2016 | 16 September 2016 | 40 | Oasis Hotel and Resort, Tanza, Cavite |
| 03 | Training Program on the Environmental Management Laws and Processes for Environmental Management Specialists | 26 October 2016 | 28 October 2016 | 24 | Quezon City |
| 2017 | | | | | |
| 01 | Training Program on Enhancing Environmental Management Skills for Supervisors | 26 April 2017 | 28 April 2017 | 24 | La Breza Hotel, Mother Ignacia Avenue, Quezon City |
| 02 | Communication Skills Training | 06 February 2017 | 09 February 2017 | 32 | Xenia Hotel, Clark Freeport, Angeles, Pampanga |
| 03 | On-Boarding Course on CSC Regulations and Organizational Mandates | 27 November 2017 | 29 November 2017 | 24 | Best Western Plus Hotel, Subic Freeport, Olongapo City |
| 04 | Administrative Officers and Human Resource Officers Retooling Workshop | 05 December 2017 | 08 December 2017 | 32 | Bayview Park Hotel Manila, United Nations Avenue, Manila |
| 05 | Strategic Leadership and Management Course for Executives | 22 November 2017 | 24 November 2017 | 24 | Tagaytay City |
| 06 | Training Workshop on the Updating of the Personal Services Itemization and Plantilla of Personnel (PSIPOP) | 18 April 2017 | 20 April 2017 | 24 | Metro Manila |
| 07 | Supervisory Development Track 2 and 3 (Batch 5) | 16 October 2017 | 20 October 2017 | 40 | The A Venue Hotel, 7829 Makati Avenue, Makati City |
| 08 | Values Orientation Workshop (Batch 15) | 18 July 2017 | 21 July 2017 | 32 | Ciudad Christhia Resort, San Mateo, Rizal |
| 2018 | | | | | |
| 01 | Basic Occupational Safety and Health (BOSH) Course | 03 December 2018 | 07 December 2018 | 40 | Metro Manila |
| 02 | Fire Safety and Prevention Seminar | 22 May 2018 | 23 May 2018 | 16 | EMB AQMTC Building, Conference Room A, Metro Manila |
| 03 | Workshop on the Preparation of the 5-Year Learning and Development Plan and PRIME-HRM Compliance of Regional Offices | 05 November 2018 | 09 November 2018 | 40 | Metro Manila |
| 04 | Orientation-Seminare on the Revised Omnibus Rules and Other Human Resource Action (ORAOHRA) | 20 November 2018 | 23 November 2018 | 32 | Blulane Hotel, Sta. Cruz, Manila |
| 05 | Supervisory Development Course (Track 1) | 03 April 2018 | 06 April 2018 | 32 | BSA Twin Towers, Ortigas Center, Mandaluyong |
| 06 | Supervisory Development Course (Tracks 2 and 3) | 08 October 2018 | 12 October 2018 | 40 | Grand Lewis Hotel, Angeles City, Pampanga |
| 07 | Strategic Leadership and Management Course for Executives | 11 April 2018 | 13 April 2018 | 24 | Ace Hotel and Suites, Pasig City |
| 08 | Communication Skills Training Program | 05 June 2018 | 08 June 2018 | 32 | Sulo Riviera Hotel, Matalino St., Quezon City |
| 09 | Training on Communication Skills (Visayas and Mindanao Cluster) | 26 November 2018 | 29 November 2018 | 32 | Grand Legal Hotel, Lanang, Davao City |

| | Event Title | Duration | | Training Hours | Venue |
|---|---|---|---|---|---|
| | | FROM | TO | | |
| 2019 | | | | | |
| 01 | Basic Occupational Safety and Health (BOSH) Course | 18 March 2019 | 22 March 2019 | 40 | AQMTC, Conference Room A |
| 02 | DENR Personal Information System | 14 May 2019 | 17 May 2019 | 32 | Hive Hotel, Sct. Tuazon, Diliman, Quezon City |
| 03 | Occupational-Industrial First Aid Training For First Aid Unit | 01 October 2019 | 04 October 2019 | 32 | AQMTC, Conference Room B |
| 04 | Training Program for the Workshop on Learning Needs Assessment | 18 February 2019 | 20 February 2019 | 24 | Upper Story, Centro Tower, Quezon City |
| 05 | Series Capability Building for PENRO and CENRO on Envi Laws and Mandates of EMB | 24 June 2019 | 28 June 2019 | 40 | Metro Manila |
| 06 | | 15 July 2019 | 19 July 2019 | 40 | Metro Manila |
| 07 | | 22 July 2019 | 26 July 2019 | 40 | Davao City |
| 08 | | 05 August 2019 | 09 August 2019 | 40 | Iloilo City |
| 2020 | | | | | |
| 01 | Basic Occupational Safety and Health Course | 19/10/2020 | 23/10/2020 | 40 | Zoom |
| 02 | Authorizing the Conduct of the EQMS Orientation for EMB Employees | 24/09/2020 | 24/09/2020 | 8 | Microsoft Teams |
| 03 | Webinar on Career Development Plan and Succession Bench | 9/6/2020 | 10/6/2020 | 16 | Microsoft Teams |
| 04 | Advanced Training for Internal Auditors on ISO 9001:2015 | 1/4/2020 | 1/4/2020 | 8 | Metro Manila |
| 05 | Authorizing the Conduct of the Fire Safety and Prevention Seminar for EMB Employees | 7/10/2020 | 9/10/2020 | 24 | EMB AIR Quality Management Training Center – Conference Room C |
| 06 | On-Boarding Course on CSC Rules and Regulations, GSIS, and Pag-ibig Claims and Benefits | 13/08/2020 | 14/08/2020 | 16 | MS Teams |
| 07 | Administrative Officers and Human Resource Management Officers Retooling Workshop | 18/11/2020 | 19/11/2020 | 16 | Microsoft Teams |
| 08 | Supervisory Development Course (Track 1) | 25/02/2020 | 28/02/2020 | 32 | Microsoft Teams |
| 09 | Supervisory Development Course Track 2 and 3 (Batch 2) | 7/12/2020 | 11/12/2020 | 40 | Zoom |
| 10 | Supervisory Development Course Track 2 and 3 (Batch 2) | 9/11/2020 | 13/11/2020 | 40 | Zoom |
| 2021 | | | | | |
| 01 | Seminar/Workshop on Complete Staff Work (CSW) | 22/04/2021 | 22/04/2021 | 8 | Zoom |
| 02 | EQMS Orientation | 15/07/2021 | 15/07/2021 | 8 | Microsoft Teams |
| 03 | EQMS Remote Audit Training | 30/06/2021 | 30/06/2021 | 8 | Microsoft Teams |
| 04 | Individual Development Plan Course | 12/7/2021 | 12/7/2021 | 8 | Microsoft Teams |
| 05 | Emergency Preparedness on Fire/Evacuation Workshop and Fire Drill | 19/07/2021 | 21/07/2021 | 24 | AQMTC Building, Conference Room A |
| 06 | Webinar on Mental Health and Stress Management | 9/12/2021 | 10/12/2021 | 16 | Microsoft Teams |
| 07 | Capacity Building of New Employees of EMB Central Office and Regional Offices on the Mandates of the EMB and Environmental Laws | 21/07/2021 | 21/07/2021 | 8 | Microsoft Teams |
| 08 | | 18/08/2021 | 18/08/2021 | 8 | Microsoft Teams |
| 09 | | 22/09/2021 | 22/09/2021 | 8 | Microsoft Teams |
| 10 | ISO 9001:2015 and 14001:2015 Risk-Based Thinking | 19/10/2021 | 19/10/2021 | 8 | Microsoft Teams |

| | | | | | |
|---|---|---|---|---|---|
| 11 | Supervisory Development Course (Track 1, Batch 8) | 26/10/2021 | 29/10/2021 | 32 | Microsoft Teams |
| 12 | Technical Writing Course | 14/04/2021 | 16/04/2021 | 24 | Zoom |
| 13 | Coaching Course | 14/04/2021 | 16/04/2021 | 24 | Zoom |
| 14 | Construction Occupational Safety and Health (COSH) Course | 8/3/2021 | 12/3/2021 | 40 | Zoom |

## IX. Legal Division and Pollution Adjudication Board

### Pollution Adjudication Board

The Pollution Adjudication Board (PAB) is a quasi-judicial body created under Section 19 of Executive Order 192 for the adjudication of pollution cases.

The PAB is under the supervision of the Office of the DENR Secretary while the EMB is the one mandated by law to provide Secretariat support to the PAB. The DENR Secretary acts as the Chairman of the Board. Furthermore, The PAB's Organizational Placement is co-equal with the Regional Trial Court under Section 7 (c) of PD 984 - Execution of decision.

*Any decision or order of the Board, after the same has become final and executory, shall be enforced, and executed in the same manner as decisions of Courts of First Instance.*

### Legal Division

The Legal Division directs the Bureau's legal services such as, but not limited to, the provision of legal service counsel and/or advice; review of contracts, Memoranda of Agreement (MOA)/Memoranda of Understanding (MOU), and other similar commitments. It also reviews licenses, permits, clearances, and other authorizations issued by the Bureau (of clients with pending cases).

The Legal Division is also mandated to lead the conduct of an investigation of allegations of violation of environmental laws. It shall draft Notices of Violations (NOVs) upon recommendation of the technical divisions; adjudication of cases filed within the jurisdiction of the Bureau; draft Orders, Decisions, and Resolutions; and initiate the filing of cases against violators ofenvironmental laws.

The Division is, likewise, authorized to investigate administrative complaints against the Bureau's officials/personnel and adjudicate administrative cases involving personnel who are non-Presidential appointees.

It assists in the formulation of policies, programs, guidelines, memorandum circulars, standards and rules, and regulations, render a legal opinion on certain issues; and conducts capacity-building activities and continuing legal studies and research.

The Division is composed of the following sections: i) Legal Research and Advisory Section and ii) Prosecution, Legal Enforcement, Hearing and Investigation Section.

### Jurisdiction of PAB

#### General Jurisdiction

The Board shall have exclusive jurisdiction over the adjudication of pollution cases, and all

other matters related thereto, including the imposition of administrative sanctions. Pursuant to Sec 19 of EO 192, the powers and functions may be delegated to the Regional Officers of the Department in accordance with rules and regulations to be formulated by the Board.

### Specific Jurisdiction

#### Clean Air Act

- For actual exceedance of air quality standards or limitations provided under the Clean Air Act;
- Any order, rule, or regulation issued by the DENR concerning such standard or limitation

#### Clean Water Act

The PAB has the exclusive and original jurisdiction concerning adjudication of pollution cases based on exceedance of the DENR Effluent Standards and other acts defined as prohibited under Sec 27 of RA 9275, except in the delegated cases enumerated under PAB Resolution No. 1 series of 2019, by which Regional Offices have original jurisdiction and the PAB Central Office has appellate jurisdiction.

#### Ecological Solid Waste Management Act (RA 9003)

The PAB has jurisdiction to hear cases of unauthorized transport and dumping of solid wastes as defined in RA 9003.

#### Toxic Substances and Hazardous Wastes Act (RA 6969)

The PAB has jurisdiction over cases of:

- Illegal transport or dumping or discharge of prohibited chemicals, substances, or pollutants listed under RA 6969; and
- Operating facilities that discharge hazardous substances into water bodies

#### Establishing an Environmental Impact Statement System (PD 1586)

The PAB has the exclusive and original jurisdiction concerning adjudication of pollution cases based on exceedance of theDENR Effluent Standards and other acts definedas prohibited under Sec 27 of RA 9275, except in the delegated cases enumerated under PAB Resolution No. 1 series of 2019, by which Regional Offices have original jurisdiction and the PAB Central Office has appellate jurisdiction.

### Legal Research and Advisory Section (LRAS)

The Legal Division, through the Legal Research and Advisory Section (LRAS), provides legal guidance to all agency actions and concerns relative to all laws and regulations, with special attention to the mandated laws designated with EMB. Apart from the mandated laws, the LRAS also provides inputs and comments on the proposed legislation coursed through the legislative focal persons of this Office with the DENR Legislative Liaison Office. It is also responsible for the following activities:

1. Review of proposed policies relative to the enforcement of environmental laws and pollution control laws, rules, and regulations.
2. Provide legal comments and/or legal opinions to ensure the legality of actions being executed by the Bureau, such as but not limited to administrative concerns, procurement matters, harmonization of policies, etc.
3. Conduct research on proposed international treaty matters, government contracts, Memoranda of Agreement/Memoranda of Understanding, and other similar

documents to find support for a legal issue or decision; and

4. Perform other functions as may be required by the Director

Prior to the execution of any agency action, such as multilateral agreements, undertakings, and contractual agreements, the LRAS provides a review of the engagements, provides forecasts, and harmonizes the legal instruments to be in accord with the agency's objectives and mission.

The Legal Research and Advisory Section has been instrumental to most of the agency's actions, especially in these critical times, providing inputs and guidance to navigate through the spontaneous queries posed by the pandemic and abrupt digitalization of transactions. In the CY 2021 alone, the Legal Research and Advisory Section has generated about 114% more than its target accomplishment for the year.

In 2022, various inquiries have led to 138% more than the prescribed target, addressing a wide range of concerns, either on the Office's environmental mandate, legislative and policy actions, or administrative concerns.

### Prosecution, Legal Enforcement, Hearing and Investigation Section (PLEHIS)

This Section shall undertake the following:

1. Maintain records of docketed cases in the Bureau.
2. Conduct of investigation on complaints or motu proprio;
3. Draft and recommend the issuance of Notices of Violation (NOVs);
4. Conduct technical conference(s) where concerned parties are officially summoned to appear before duly appointed Hearing Officers and/or Investigators.
5. Assess the findings of violations and the corresponding controverting evidence that may

have been produced and presented by parties (respondents) and draft the necessary decision/order regarding that matter and shall forthwith, upon the concurrence of the concerned Head of the Technical Division(s) to recommend to the Head of Agency (EMB) for the approval, disapproval or modification of said decisions/orders;

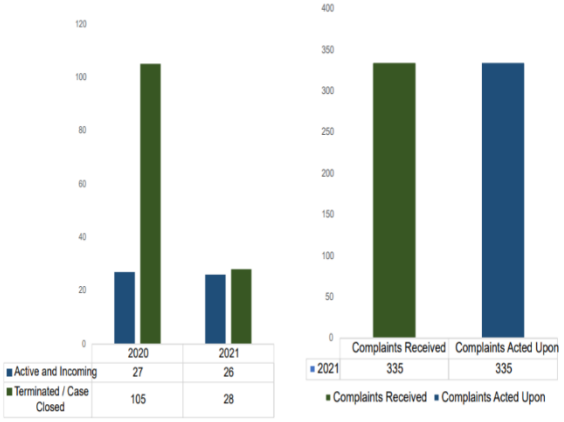
6. Adjudicate administrative cases involving EMB personnel.
7. Initiate the filing of cases and assist the public prosecutors and/or the Office of the Solicitor General in prosecuting violators of environmental laws; and
8. Perform other functions as may be required by the Director.

The Legal Division has been steadfast to be in service of the Filipino people, especially in accommodating complaints and seeking assistance to address environmental grievances due to activities by one or several entities. This has been intensified through the opening of channels that provide accessibility to stakeholders. This includes the establishment of linkage with the Presidential Complaint Center, CSC Contact Center ng Bayan, the DENR Aksyon Center, and the complaint desk of this Office. Several complaint channels are also acknowledged to assist the agency in reaching out to grievances, which are immediately acted through this Office, or through coordination with the Regional Offices for the conduct of site investigation.

## Complaints and Cases

The complaints lodged usually involve environmental and pollution concerns, especially those which pertain to the mandate of the Office. However, the Legal Division, through the Prosecution, Legal Enforcement, Hearings, and Investigation Section, accommodates administrative complaints whichare within the realm of its jurisdiction.

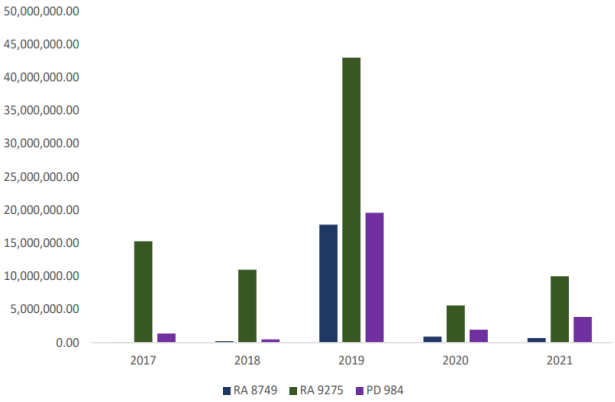
In ensuring that the matters initiated as a case attain their objectives, tedious investigation and fact-finding activities, document review, and procedural due process were observed. Once a complaint is lodged, steps are taken with duecare, albeit immediately, to address the concern of the complainant, without compromising the rights of the complained entities, to the end that they may still harmoniously attain their respective concerns.




## Cases Handled (2017-2021)

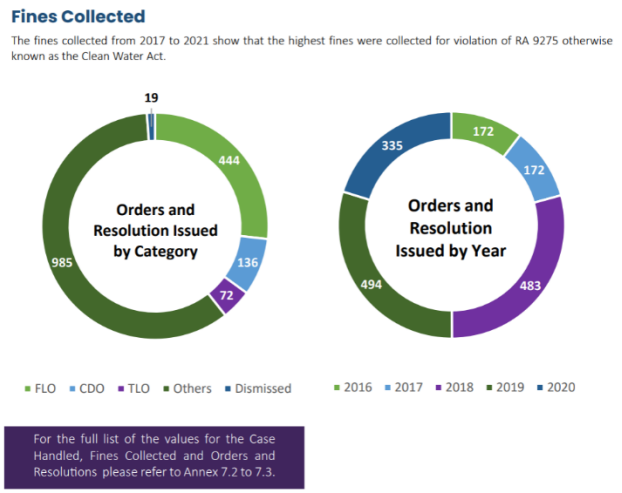
Six Hundred Thirty-Eight (638) PAB Orders Were Issued During the Calendar Year 2021. There was a total of 439 establishments that were given FLOs, 29 establishments were given CDOs, 31 establishments were given TLOs, 43 institutions were given penalties, 22 establishments were given denial/non-denial of motions, and 33 establishments were given PAB Clearances.

Cases lodged with this Office emanate from the complaints filed, through the conduct of investigations, and the results of regular conduct of monitoring activities with environmental enforcement. For this Office's jurisdiction, cases involving possible violations of Republic Act No. 6969 (both for Chemical Management and Hazardous Waste Management), and Presidential Decree No. 1586 are processed, particularly those projects that are categorized as environmentally critical. As a result of these activities, fines and penalties are imposed and collected. This, in turn, contributes to various programs for monitoring environmental compliance, as well contributes to funds of the national treasury.




## Fines Collected

The fines collected from 2017 to 2021 show that the highest fines were collected for the violation of RA 9275 otherwise known as the




For the full list of the values for the Case Handled, Fines Collected and Orders and Resolutions please refer to Annex 7.2 to 7.3.

## Approved Resolutions

For 2019 to 2021, the Pollution Adjudication Board has approved seven (7) Resolutions. Furthermore, these resolutions were passed despite the ongoing Enhanced Community Quarantine (ECQ) in the Philippines. Additionally, these resolutions were used as guidelines to continue the process and implementation of laws despite the ongoing COVID-19 pandemic.

Table 9.1 . List of Resolutions of the Pollution Adjudication Board, 2019-2021

| Document No. | Title |
|---|---|
| PAB Resolution 2019-01 | Delegation of the Pollution Adjudication Board to the Regional Offices the Determination of Permitting Violations and Imposition of Fines Thereto |
| PAB Resolution 2020-01 | Guidelines in the Interruption of Periods in the Processes of the Pollution Adjudication Board Pursuant to Administrative Order No. 30, series of 2020 |
| PAB Resolution 2020-02 | Interim Guidelines of the Pollution Adjudication Board during the Public Health Emergency due to COVID -19 |
| PAB Resolution 2021-02 | Procedure on the appeals filed with the PollutionAdjudication Board by virtueof PAB Resolution No. 1 Series of 2019 |
| PAB Resolution 2021-03 | Guidelines for Payment of Fines and Penalties for Permitting and Administrative Violations of R.A. 8749 and R.A. 9275 Imposed during the Implementation of the Community Quarantine |
| PAB Resolution 2021-04 | 2021 Revised Rules on Pleadings, Practice and Procedure of the Pollution Adjudication Board in the Adjudication of Pollution cases |
| PAB Resolution 2021-05 | Guidelines on the Graduated Schedule of Penalty under R.A. 9275 and its Implementing Rules and Regulations |

Programs and Projects

2019

The PAB was able to finalize the PAB Resolution on delegating the authority to impose fines to the Regional Director, and it was published according to the law. The workshop was conducted on the said resolution at Xenia Hotel, Pampanga, attended by representatives from the legal and technical divisions of EMB.

2020

Pursuant to the Resolutions issued by the Inter-Agency Task Force for the Management of Emerging Infectious Diseases imposing Community Quarantine on certain areas starting from 15 March 2020 and Section 4(z) of R.A. No. 11469, otherwise known as the "Bayanihan to Heal As One Act," and as recommended by IATF-EID to issue new guidelines to provide policy direction for the public and stakeholders in complying with government regulations, the Pollution Adjudication Board issued two (2) Resolutions which are the following:

1. Guidelines in the interruption of periods in the processes of the Pollution Adjudication Board (PAB) pursuant to Administrative Order no. 30, series of 2020; and
2. Interim guidelines of the Pollution Adjudication Board (PAB) during the public health emergency due to COVID-19.

2021

In relation to the implementation of PAB Resolution No. 1 Series of 2019, Delegation of the Pollution Adjudication Board to the EMB Regional Offices, the Determination of Permitting Violations and Imposition of Fines thereto, in connection to the current situation due to the pandemic, the PAB issuedresolutions on the policy and new guidelines ofprocedures in the adjudication of pollution cases and in the imposition of fines, which are the following:

- Procedure on the appeals filed with the Pollution Adjudication Board by virtue of PAB Resolution No. 1 Series of 2019; and
- Guidelines for Payment of Fines and Penalties for Permitting and Administrative Violations of R.A. 8749 and R.A. 9275 Imposed during the Implementation of the Community Quarantine (C.Q.).

Also, the PAB was able to finalize and publish the revised rules on pleadings, practice, and procedure of PAB in the adjudication of cases, the graduated penalty schedule under RA 9275, and its implementing rules and regulations.

Relative to the function and mandate of the Pollution Adjudication Board (PAB), the following were the other significant accomplishment for C.Y. 2021

1. TWG Assessment Workshop for the Establishment of Number of Sampling Days of Sewage Treatment Plants (STP) and Wastewater Treatment Facilities for PAB Issuance of Temporary Lifting Orders (TLO).
2. 2nd Technical Working Group Workshop on Sampling Protocols for Manufacturing, Sewerage Waste Management for PAB Issuance of Temporary Lifting Orders (TLO)
3. Regional inventory thru virtual or online conferences.
4. Assessment/Evaluation of Pollution Cases; and
5. PAB Resolutions 1-5 Series of 2021

## Training and Workshops

### Pollution Adjudication Board

A workshop on Sampling Protocols for manufacturing and sewage system for PAB issuance of Temporary Lifting Orders was held in Bataan on 17-20 September 2021. Participants were the Secretariat and the EMB- Region III personnel. The workshop objective was to evaluate and interpret information pertaining to the nationwide technologies used in manufacturing and sewage management as an indicator in the decision-making of pollution cases especially in granting the number of days for the issuance of a TLO. The workshop included the site visit in Anvaya Cove, Bataan of a used water treatment operation with a capacity of 800 CMD SBR STP and three (3) sitesin Subic Water, Boton Sewage Treatment Plantwith a capacity of 2.3 MLD.

## Legal Division

- Training Workshop on Environmental Cases for Legal and Technical Personnel
- Review and Impact Assessment on Citizen's Charter and ARTA Compliance Training Workshop
- Workshop on Strengthening of Investigation, Presentation, and Conviction of Environmental Laws Violations
- Training-Workshop on Administrative Laws (Investigation and Disposition of Administrative Cases)
- Webinar on Legal Research and Writing
- Capacity Building for Effective Monitoring and Enforcement of Environmental Laws in EMB
- ARTA Workshop in Updating Citizen's Charter
- Updating of Manual of Uniform Procedure in EMB
- Seminar-Workshop on Updating of Issues and Concerns in Regional Legal Units
- Advance Legal and Technical Writing

## Pandemic Highlights

The COVID-19 pandemic makes it impossible for large groups of people tocongregate in one place, the PAB was able to hold regular hearings and issue orders via the use of virtual or online meetings. In addition to that, the PAB was able to carry out a combined workshop for the issue of TLO and CDO as well as a regional inventory of cases that are now pending before the PAB.

## Regular Hearing

The adjudication of cases was conducted either in the Central Office or at the Regional Offices where pollution cases have been endorsed to the PAB. The regular hearing was conducted in Coron, Palawan for face to face and virtual at the Central Office. The activity also included site inspection of priority cases with endorsed Cease and Desist Orders and Temporary LiftingOrders.

## Preliminary Conference / Summons

The preliminary conferences and summonses were arranged and carried out by the PAB Secretariat to provide the respondent with information on the preliminary appraisal of the total number of days in violation.

## Establishment of the Number of Sampling Days for the Issuance of Temporary Lifting Order (TLO)

The issuance of the proposed TLO guideline was conducted through an evaluation and assessment of existing wastewater treatment facilities (WTF) nationwide through the discharge permits issued for the year 2020. The firms were selected randomly for inspection and checked the processes and types of WTF. These types of technologies and the amount of wastewater discharge per day were checked for the number of installations and efficiency for the establishment of a uniform number of days of TLO.

## Way Forward

To effectively manage and facilitate the immediate resolution of pollution cases, there is a need to develop an information database of wastewater technologies to describe the processes' applicability, advantages and disadvantages, design criteria, and among others.

The Pollution Adjudication Board of the Department of Environment and Natural Resources through the Secretariat-Environmental Management Bureau will procure consulting services for the activity to develop an information database of air and wastewater treatment technologies and establish steps in the case management process to facilitate the effective resolution of the case such as screening, evaluation, implementation and evaluate outcomes of the case. Governments around the globe are in a fast pace of making efforts to establish and utilize the full capacity of advancement in software and tools for more efficient and manage respondent data to become accessible.

## X. Multilateral Environmental Agreements

### Basel Convention on the Control of Transboundary Movement of Hazardous Wastes and their Disposal

The Basel Convention on the Control of Transboundary Movements of Hazardous Wastes is a multilateral environmental agreement that obligates the Party States to reduce the generation and illegal traffic of hazardous waste from one State to another. Specifically, it aims to prevent the transfer of hazardous wastes from developed countries to developing and less developed countries (LDCs). It was adopted on March 22, 1989, by the Conference of Plenipotentiaries in Basel, Switzerland, in response to a public outcry on the discovery of deposits of toxic wastes imported to Africa and other parts of the developing world.

The Convention aims to ensure the Environmentally Sound Management (ESM) of hazardous materials, including their storage, transport, treatment, reuse, recycling, recovery, and disposal. Under the Convention, parties may enter into agreements with parties or non-parties (bilateral, regional, or multilateral), authorizing the transboundary movement of hazardous wastes into their respective jurisdictions with the condition that such agreements or arrangements do not violate the ESM of hazardous wastes under the Convention. The Convention includes a protocol on liability and compensation for damages resulting from the transboundary movement and disposal of hazardous wastes.

#### Status of the Philippines' Compliance with the National Commitments under the MEA

The Philippines submitted its 2017 National Report to the Basel Convention on December 27, 2018. The report contained appropriate national strategies and policies, legislation, regulations, and guidelines issued to realize the reduction or elimination of the generation of hazardous waste and other wastes and the removal of the number of hazardous wastes and other wastes subject to transboundary movement.

At the Basel Convention Conference of Parties (COP) 13 held in 2017, marine litter was included in the work program of the Open-ended Working Group, and a new Partnership Program on Household Waste was established as the Partnership for Action on Computing Equipment came to an end.

The EMB continues to issue importation clearances for recyclable materials containing hazardous substances and export clearances for dangerous wastes for final recovery and disposal as specified in DENR Department Administrative Order (DAO) 1994-28, on Interim Guidelines for the Importation of Recyclable Materials Containing Hazardous Substances and DAO 2013-22 on Revised Procedures and Standards for the Management of Hazardous Wastes.

The amendment of existing laws and regulations on hazardous wastes and the development of "Guidelines on the Environmentally Sound Management (ESM) of Waste Electrical and Electronic Equipment" is ongoing. The guidelines will provide a compliance framework for producers, manufacturers, consumers, distributors, retailers, and treatment facilities.[13]

## Meetings Attended

- Workshop of the Asian Network for Prevention of Illegal Transboundary Movement of Hazardous Wastes, 6–8 November 2018; Akita, Japan
- 8th International E-Waste Management Network (IEMN) Workshop, 24–29 September 2018; Manila, Philippines – hosted by DENR–EMB
- 13th Meeting of the Committee Administering the Mechanism for Promoting Implementation and Compliance of the Basel Convention (ICC-13), 8–10 September 2018; Geneva, Switzerland
- Workshop on the Environmentally Sound Management (ESM) of E-waste for the Asia and Pacific Region and Forum on their Transboundary Movements under the Basel Convention, 21–24 January 2018; Beijing, China
- Workshop of the Asian Network for Prevention of Illegal Transboundary Movement of Hazardous Waste, 28–30 November 2017; Hanoi, Vietnam
- 7th International E-waste Management Network (IEMN) Workshop, 2–7 October 2017; Jakarta, Indonesia
- Meetings of the Conferences of the Parties to the Basel, Rotterdam, and Stockholm Conventions (BC COP-13, RC COP-8, SC COP-8), 24 April–5 May 2017; Geneva, Switzerland
- Asia Pacific Preparatory Meeting of the Conferences of the Parties to the Basel, Rotterdam, and Stockholm Conventions, 6–10 March 2017; Bangkok, Thailand
- Study Tour in Japan as part of the "Project Establishing Mercury Waste Treatment and the Processing Scheme in the Philippines, 30 January – 3 February 2017; Hokkaido, Japan
- Project Meeting on Environmentally Sound Management of Mercury Waste, 15– 16 November 2016; Bangkok, Thailand
- 6th International E-waste Management Network (IEMN) Workshop, 4–7 October 2016; Kuala Lumpur, Malaysia
- Workshop 2016 of the Asian Network for Prevention of Illegal Transboundary Movement of Hazardous Wastes and Small Group Brainstorming Meeting on the Implementation of Takeback Procedures in Asia, 5–8 September 2016; Semarang, Indonesia

10th Meeting of the Open-Ended Working Group of the Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and their Disposal(OEWG-10) and 12th Meeting of the Committee Administering the Mechanismfor Promoting the Implementation andCompliance of the Basel Convention (ICC- 12), 30 May to 2 June and 4–6 June 2016; Nairobi, Kenya

Mr. Geri-Geronimo R. Sanez of EMB delivered the Philippine intervention of support to the "Proposal to Amend Annexes II, VIII and IX of the Basel Convention on Listing of Plastic Materials as Waste" in Geneva, Switzerland, on September 8, 2018. [Geri Sanez]

[13] Basel Convention - UN Conventions - DENR Int'l ENR Agreements

## Way Forward

- Review and/or revise the bilateral agreement of the Government of the Philippines with the Government of the USA
- Programs to encourage e-waste collection
- Development of "Guidelines on the Environmentally Sound Management (ESM) of Waste Electrical and Electronic Equipment (WEEE)" to be released as a DENR Administrative Order
- Cost-benefit analysis on banning of importation of second-hand electronic equipment
- Intensify monitoring of the importation of recyclable materials
- Review of the current policy on accepting entry of recyclable materials into the country

## Montreal Protocol

The 1985 Vienna Convention for the Protection of the Ozone Layer was the first framework for cooperative activities to protect the ozone layer. Here, parties agreed to cooperate in scientific research to improve the understanding of the atmospheric processes, share information on ODS production and emissions, and implement preventive measures to control ODS emissions. The Vienna Convention, adopted in March 1985 and signed by 21 states, does not contain legally binding controls or targets.

Upon discovering the seasonal "ozone hole" in Antarctica in 1985, governments recognized the need for stronger measures to respond to the ozone depletion problem. Thus, the Montreal Protocol on Substances the Deplete the Ozone Layer was signed on September 16, 1987, and entered into force on January 1, 1989. This international agreement, signed by 188 developed and developing countries to date, committed to phase out or gradually stop their production and consumption of ozone-depleting substances like chlorofluorocarbons or CFCs (CFC-11, 12, 113, 114, and 115) and Halons (1211, 1301, 2402).

The Montreal Protocol is dynamic, so it has had several amendments and adjustments. The Protocol was adjusted to accelerate the phaseout schedules in London in 1990, Copenhagen in 1992, Vienna in 1995, Montreal in 1997, and Beijing in 1999. It has been amended to introduce other kinds of control measures and to add new controlled substances to the list:

- 1990 London Amendment included additional CFCs (CFC-13, 111, 112, 211, 212, 213, 214, 215, 216, 217) and two solvents (carbon tetrachloride and methyl chloroform)
- 1992 Copenhagen Amendment added methyl bromide, HBFCs and HCFCs
- 1997 Montreal Amendment finalized the schedules for phasing out methyl bromide
- 1999 Beijing Amendment included bromochloromethane in the list of ODS for phaseout and introduced production controls on HCFCs andrules on trade with non-Parties

Developing countries have a grace period of ten (10) years before they must start their phaseout schedules. The phaseout schedules cover both the production and consumption of the target substances.

The Philippines signed the Montreal Protocol on September 14, 1988, and ratified it on March 21, 1993. The Philippines' commitment to the Montreal Protocol is to phase out its consumption of all ODS. The Montreal Protocol defines consumption as production plus import minus export. Since the Philippines is neither a producer nor an exporter of ODS, its consumption is equal to its importation. As part

of its monitoring and regulatory function, it has been charged with issuing clearances for all ODS importations.

The Philippine Ozone Desk (POD) of the Department of Environment and Natural Resources (DENR) – Environmental Management Bureau (EMB) is the national coordinator of programs for the implementation of the Montreal Protocol. It is also known as the country's National Ozone Unit (NOU).

The mission of POD is to ensure the country's compliance with the Montreal Protocol and promote the protection of the ozone layer among Filipinos. POD is a government project under the DENR-EMB funded by the Multilateral Fund. There are currently three projects under the POD which are all implemented by the World Bank: The Institutional Strengthening Project (ISP), the National Chlorofluorocarbon Phase-out Project (NCPP), and the National Methyl Bromide Phase-out Strategy (NMBPS). The NMBPS is co-supervised by the Fertilizer and Pesticide Authority (FPA) of the Department of Agriculture.

## Status of the Philippines' Compliance with the National Commitments under the MEA

## Programs and Projects Conducted by EMB

### Philippines-Chillers Energy Efficiency Project (PCEEP) (2011-2017).

It aimed to reduce greenhouse gas (GHG) emissions by replacing inefficient chillers, including old chlorofluorocarbon (CFC) chillers and non-CFC-based chillers. At the end of the project, 45,687 tons of refrigeration (TR) of cooling capacity were transformed into energy-efficient cooling. Cumulative carbon emission was reduced to 151.4 kilo tons of CO2 equivalent (kTCO2). Moreover, energy consumption was reduced to 35 Gigawatt hours (GW) a year.

Table 10.1. ODS Phase-out Compliance and Targets

| Year | ODS Phase-out Compliance (1996–2015) and Targets (2020–2040) |
|---|---|
| 1996 | Carbon tetrachloride and Methyl Chloroform, 100% phased-out |
| 1999 | Halon, 100% phased-out |
| 2005 | CFC-11, 100% phased-out |
| 2009 | Methyl Bromide (Non-Quarantine Pre-shipment or QPS), 100% phased-out |
| 2010 | CFC-12, 100% phased-out |
| 2013 | HCFC, Freeze from baseline (quota) - compliant |
| 2015 | HCFC, 10% reduction compliant |
| 2020 | HCFC, for a 35% reduction |
| 2025 | HCFC, for a 67.5% reduction |
| 2030 | HCFC, for a 97.5% reduction |
| 2040 | HCFC, for 100% phase-out |

### ODS-Institutional Strengthening Project (ISP) (1993-2019; Phase I to XI)

Funded by UNEP, this aims to operationalize the National Ozone Unit or the Philippine Ozone Desk (POD) of the DENR-Environmental Management Bureau to support the country in meeting its obligations under the Protocol.

The project assists the DENR EMB-POD in its functions, to wit: implement the country program; design and implement the legal and financial measures to facilitate ODS phase-out; coordinate country activities; consult with industry and other relevant organizations; represent the country's point of view at the Meeting of the Parties and within working groups and committees; organize awareness and training programs for industry and the public; implement the licensing system for monitoring and reporting national consumption; monitor past and present investment and non-investment projects, and create a strategy and plan of action for future projects.

Accomplishments under Phase X (January 2016–December 2017) include the continued implementation of the licensing scheme for the importation of ODS and alternatives, monitoring of cases of illegal trade, and initiation of the ratification process for the Kigali Agreement which is an Amendment to the Protocol. In June 2017, the Online Permitting and Monitoring System (OPMS) for ODS and ODS Alternatives were developed and integrated into the EMB permitting system. Moreover, a draft Memorandum of Understanding between the Bureau of Customs and DENR-EMB was prepared for the implementation of the Montreal Protocol commitment to help combat illegal ODS trade. However, the MOU may be expanded to include other multilateral environmental agreements. In Phase XI (January 2018–December 2019), the POD continues to work with other stakeholders on the enforcement of the national ODS import and export licensing system, ensures the implementation of the quota system, and strictly monitors the quota allocation of the ODS registered importers, coordinates with the stakeholders on the implementation of other national policies, submitted the 2017 mandatory annual Country Program and Article 7 Data reports, and organized the 2018 International Ozone Day celebration.

### HCFC Phase-out Management Plan Stage 1

The POD implemented Stage 1 from January 2013 to December 2017. Policy, investment, and non-investment activities (training, capacity building, and public awareness) were done to completely phase-out HCFC-141b in the foam sector and control growth in the consumption of HCFC-22 in the refrigeration, air conditioning, and servicing sectors, and consumption of HCFC-141b in solvent/ servicing usages.

### HCFC Phase-out Management Plan Stage 2

This shall be implemented beginning in the latter half of 2019 and its preparatory activities are part of ODS-ISP Phase XI. During this stage, 25.73 ODP tons of HCFCs will be phased out; the total phase-out of HCFC-22 used in manufacturing domestic and commercial air-conditioners will be achieved, and HCFC consumption in the refrigeration servicing sector will also be reduced.

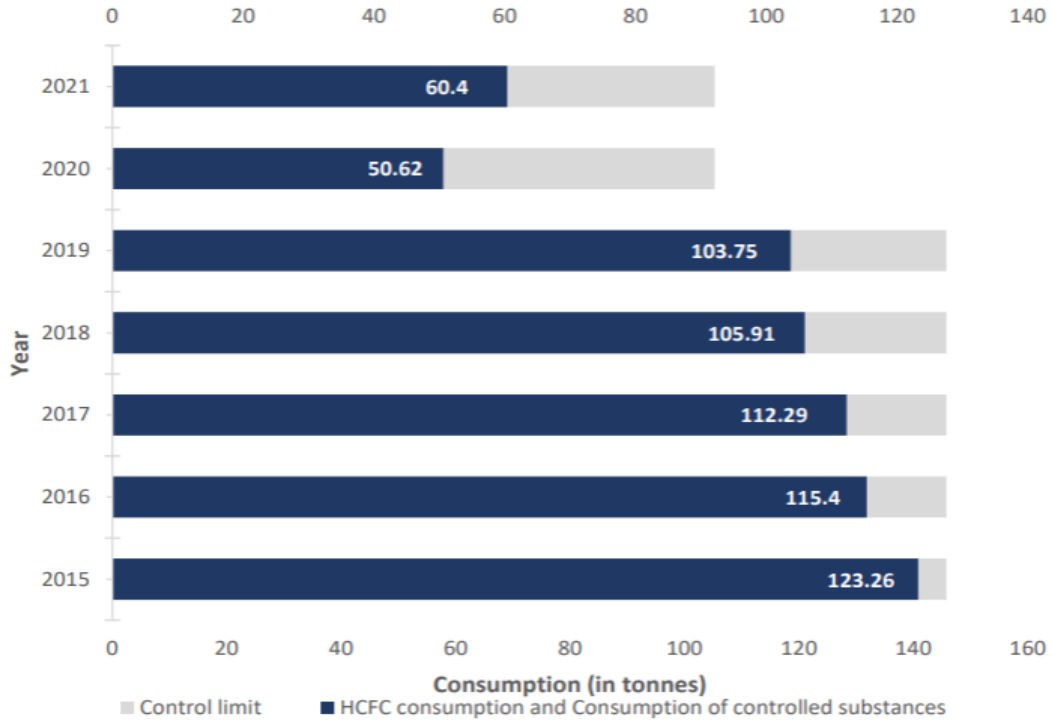
### Reported Data

According to the latest report for the Montreal Protocol, Ozone-Depleting Substances (ODS) Consumption, Hydrofluorocarbons (HFC), and Hydrochlorofluorocarbons (HCFC) decreases in 2020. The main reason why there is a decrease in terms of HFC is due to the heightened efforts of phasing out the HFC Refrigerants in the past decades. These efforts were done due to the nature of HFCs being potent greenhouse gases with high global warming potential (GWP) and

long lifetimes. At the international level, this action was spearheaded by the Environmental Protection Agency in the United States and the DENR Environmental Management Bureau (EMB) through the Philippine Ozone Desk (POD) in the Philippines. The act was done in after the full implementation of banning CFCs two decades ago.

In 2021, As part of its climate change mitigation efforts, the Department of Environment and Natural Resources-EnvironmentalManagement Bureau (DENR-EMB) in partnership with the United Nations Industrial Development Organization (UNIDO) recently launched the second phase of the implementation plan for the phase-out of the ozone-depleting hydrochlorofluorocarbons (HCFCs) by 2040. The second phase is part of the Hydrochlorofluorocarbons Phase-out Management Plan (HPMP).

Furthermore, as reported on the status of the Philippines' compliance with the Montreal Protocol showed that there has been a 68.75% reduction in Hydrochlorofluorocarbons (HCFCs) consumption compared to its target of 35% for the year 2020.




NOTE: Graphs depicting 'all controlled substances in aggregated form' include data reported on all controlled ozone-depleting substances. All these substances, except for HCFCs and HFCs, have been phased out to date, except where the parties have provided specific exemptions.

## Legislations and Policies

Table 10.2 List of Legislations and Policies on ODS

| | |
|---|---|
| **DENR Administrative Order** | |
| DAO No. 2013-25 | Revised Regulations on the Chemical Control Order for Ozone Depleting Substances (ODS) |
| DAO No. 2021-31 | Chemical Control Order (CCO) for Hydrofluorocarbons (HFCs) |
| **Joint Administrative Order** | |
| JAO No. 03, Series 2006 | Enforcement of Regulation on the Implementation of the NCPP on Motor Vehicles under the Revised Chemical Control Order (CCO) for Ozone Depleting Substances (ODS) |
| **Memorandum Circular** | |
| MC No. 2002-02 | Withdrawal of the Announcement to the Public Signed on July 24, 2001, regarding the Ban of Carbon Dioxide found in Fire Extinguishers, Suppressors, Fire Fighting, Paraphernalia, Refrigerants, and the like |
| MC 2005-03 | List of Alternatives to Ozone Depleting Substances (ODS) |
| MC 2005-23 | Registration of Dealers, Re-Sellers, and Retailers of Ozone Depleting Substances (ODS) |
| MC 2020-22 | Clarification on the importation and use of recycled, recovered or reclaimed Halons 1211 and 1301 in the local aviation industry as an essential use exception under section 5 of DAO 2013-25 |
| MC 2021-11 | Registration of Service Providers of Ozone-Depleting Substance (ODS) using Equipment |
| Memorandum of Understanding | Collections, Transport, and Storage of Recovered Refrigerants Nationwide Pursuant to the United Nations Environment Program/DENR-Environmental Management Bureau ODS Phase-out Project |
| | Memorandum of Understanding (MoU) between DENR-Environmental Management Bureau and Bureau of Customs |
| | Ban for the importation and consumption of Chlorofluorocarbons (CFCs), Halon, identified as among the major ozone-depleting substances (ODS) |

## Commitments and Roadmaps

The treaty calls for the phase-out of Ozone Depleting Substances (ODS) and provides a timetable for the ban and elimination of their production. The specific commitments of the country to the Protocol are as follows:

- Article 4 bans imports/exports of ODS between Parties and Non-Parties (i.e. countries that have not ratified the Protocol or relevant Amendments). The Article also bans imports from non-Parties of products made with or containing ODS, as decided by the Meetings of the Parties to theMontreal Protocol. Annex D specifies a list of products containing CFCs and halons which cannot be imported from non-Parties.
- Article 4A controls trade between Parties, under certain specific circumstances. Article 4B makes it mandatory for all Parties to implement a system for licensing the import and export of ODS, for both new and used ODS.
- Article 5 mentions that the timetable takes into consideration the allowance for developing countries to delay their compliance with the prescribedcontrol measures by 10 years.
- Article 7 requires all Parties to report ODS data to the Ozone Secretariat through annual reports on the production and consumption of ODS.
- Article 9 requires Parties to cooperate in promoting public awareness of the environmental effects of ODS, conduct research and development (R&D), and information exchange on technologies to reduce emissions and destroy ODS, ODS alternatives, and control strategies.

## Information, Education, and Communication Materials

Together with the United Nations Environment Programme (UNEP), the DENR EMB thru the Philippine Ozone Desk (POD) disseminated educational materials to the general public to raise awareness about ozone levels, their effects on human health, and the steps that can be taken to improve air quality. A publicly accessible online database of ozone-related information will also be developed by the EMB.

## Celebration of World Refrigeration Day

World Refrigeration Day celebrates the people and technologies responsible for creating and maintaining the world we live in, a world dependent upon temperature-controlled environments. Centered around June 26, the event is supported globally by industry, professional groups, scientific and engineering associations, as well as by governments and individuals.

The WRD 21 campaign will focus on careers in the refrigeration, air-conditioning, and heat pumps industry and is titled “Cooling Champions: Cool Careers for a Better World”. The goal of the campaign is to inspire students and young professionals – both men and women – in all countries, encouraging them to meet the challenges faced in their communities.

## Meetings Attended

- Training Workshop for the New National Ozone Officers of South Asia and Southeast Asia Network Countries, 17–22 February 2019; Bangkok, Thailand
- 40th Meeting of the Open-ended Working Group (OEWG) of the Parties to the Montreal Protocol on Substance that Depletes the Ozone Layer and Workshop on Energy Efficiency Opportunities while phasing down Hydrofluorocarbons (HFCs), 8–14 July 2018; Vienna, Austria

- 59th Meeting of the Implementation Committee for Consultation, 11th Meeting of the Conference Meeting of the Parties to the Vienna Convention for the Protection of the Ozone Layer, and the 29th Meeting of the Parties to the Montreal Protocol on Substances that Deplete the Ozone Layer, 18–24 November 2017; Montreal, Canada
- Workshop on Safety Standards Relevant to the Use of Low-Global-Warming Potential Alternatives to Hydrofluorocarbons (HFCs) and the 39th Meeting of the Open-ended Working Group (OEWG) of the Parties to the Montreal Protocol on Substance that Depletes the Ozone Layer, 10–14 July 2017; Bangkok, Thailand
- 79th Meeting of the Executive Committee of the Multilateral Fund for the Implementation of the Montreal Protocol, 5–7 July 2017; Bangkok, Thailand
- Kigali Amendment - Vienna Talks on Opportunities, Challenges, and Key Action for the Phase-down of Hydrofluorocarbons (HFCs), 13–15 June 2017; Vienna, Austria
- 28th Meeting of the Parties (MOP 28) to the Montreal Protocol on Substance that Depletes the Ozone Layer, 10–14 October 2016; Kigali, Rwanda
- 3rd Extraordinary Meeting of the Parties to the Montreal Protocol, 21–26 July 2016; Vienna, Austria
- 38th Meeting of the Open-ended Working Group, 18–21 July 2016; Vienna, Austria
- 37th Open-ended Working Group, 15–16 July 2016; Vienna, Austria
- Thematic Workshop for ASIA and the Pacific National Ozone Officers, 14 – 20June 2016; Suva, Fiji

## Strategic Approach to International ChemicalsManagement (SAICM)

The Strategic Approach to International Chemicals Management (SAICM) is a policy framework that recognizes the valuable contribution brought about by chemicals to society and the need for their sound management by the year 2020 to minimize their adverse impacts on human health and the environment. The “2020 goal” was adopted by the World Summit on Sustainable Development in the year 2002 as part of the Johannesburg Plan of Implementation. In the International Conference on Chemicals Management in Dubai, United Arab Emirates, in February 2006, ministers, heads of delegation, and representatives of the private sector and civil society adopted the SAICM. The SAICM includes environmental, economic, social, health and labor aspects of chemical safety and agricultural and industrial chemicals at all stages of their life cycle, including in-products, except those regulated by domestic food or pharmaceutical authorities. It is related to the Montreal Protocol, the Basel-Rotterdam-Stockholm Conventions, and the International Labor Organization Convention No. 170 on the safety of the use of chemicals at work. It is a voluntary global initiative.



## Status of the Philippines' Compliance with the National Commitments under the MEA

The 2015 meeting of the International Conference on Chemicals Management (ICCM4) endorsed the Overall Orientation and Guidance for achieving the 2020 goal of sound management of chemicals. This identifies 11 basic elements that have been recognized as critical to the attainment of sound chemicals and waste management. They are:

- Legal frameworks that address the life cycle of chemicals and waste;
- Relevant enforcement and compliance mechanisms;

- Implementation of chemicals and waste-related multilateral environmental agreements, as well as health, labor, and other relevant conventions and voluntary mechanisms;
- Strong institutional frameworks and coordination mechanisms among relevant stakeholders;
- Collection and systems for the transparent sharing of relevant data and information among all relevant stakeholders using a life cycle approach, such as the implementation of the Globally Harmonized System of Classification and Labelling of Chemicals;
- Industry participation and defined responsibility across the life cycle, including cost recovery policies and systems as well as the incorporation of sound chemicals management into corporate policies and practices;
- Inclusion of the sound management of chemicals and waste in national health, labor, social, environmental, and economic budgeting processes, and development plans;
- Chemicals risk assessment and risk reduction through the use of best practices;
- Strengthened capacity to deal with chemicals accidents, including institutional strengthening for poison centers;
- Monitoring and assessing the impacts of chemicals on health and the environment and;
- Development and promotion of environmentally sound and safer alternatives.

Taking these elements into account, six core activity areas identified for implementing the objectives set out in the Overarching Policy Strategy towards the achievement of the overall 2020 goal are:

(a) Enhance the responsibility of stakeholders: promoting and reinforcing commitment and multisectoral engagement;
(b) Establish and strengthen national legislative and regulatory frameworks for chemicals and waste: improving capacity to address the basic elements of the sound management of chemicals and waste and encouraging regional cooperation;
(c) Mainstream the sound management of chemicals and waste in the sustainable development agenda: advancing risk reduction and enhancing the link between the sound management of chemicals and waste and health, labor, and social and economic development planning, processes, and budgets;
(d) Increase risk reduction and information sharing efforts on emerging policy issues: continuing to promote actions on issues not currently addressed in existing agreements, complementing initiatives taken by other bodies;
(e) Promote information access: increasing the accessibility of relevant information and making it understandable for all levels of society; and
(f) Assess progress towards the 2020 goalof minimizing the adverse effects of chemicals on human health and the environment. Identifying, understanding the gaps in implementation, and prioritizing actions for achievement by 2020.

## Policy Issuance

- EMB MC 2017-010 - Guidelines in the Implementation of Globally Harmonized System(GHS)Classification and Labelling Requirements for High Volume Chemicals (HVCs)
- EMB MC 2017-009 - Clarifications on Permitting Regulations for Small Quantity Importation (SQI), Pre ManufacturePre-Importation Notification (PMPIN), Priority Chemical

List (PCL), and Chemical Control Orders (CCO)

- EMB MC 2016-003 - Clarification onthe Prohibition of Paints with Lead and Lead Compounds Used for Children's Toys and Related Products

## Updates And Related Projects

### Lead

Lead in architectural, decorative, and household paint and in products for children was phased out on 1 January 2017. The Philippines will phase out leaded paint used for industrial purposes by 1 January 2020. The Technical Committee 25 (TC-25) is currently updating the Philippine Standards on paint and varnishes such as paint properties, paint application and film formation, optical properties, mechanical properties, durability, and chemical requirements. TC-25 incorporated the 90 parts per million (ppm) limit stipulated in DAO 2013-24 for paints and varnishes. The committee, which meets once a month, is composed of the Department of Trade and Industry (DTI)-the Bureau of Philippine Standards, the Philippine Association of Paint Manufacturers, the DOST Industrial Technology Development Institute, DENR EMB, the Philippine Institute of Chemical Engineers, and the academe. In 2016, the NGO EcoWaste found that some giveaway items from a local fast-food chain contained high levels of lead. The products were immediately recalled by the firm. The Department of Education issued Department Order 4 Series of 2017 for the mandatory use of lead-safe paints in schools.

The Philippine Association of Paint Manufacturers conducts monitoring, inspection, and sampling of paint products. The project Reducing Environmental and Health Risks to Vulnerable Communities from Lead Contamination from Lead Paint and Recycling of Used Lead Acid Batteries (ULAB) Project in the Philippines was conducted from October 2015 to December 2017. The project developed a national supply chain report, a National Inventory/Registry of Potential Lead-Contaminated Sites, and a National Action Plan to address unsafe ULAB recycling practices.

### Globally Harmonized System of Classification and Labelling (GHS)

The DENR-EMB released Memorandum Circular 2017-010 on the Guidelines in the Implementation of GHS Classification and Labelling Requirements for HVCs, which was published in January 2018. Training and orientation seminars for regulators and industry representatives on GHS for the chemical industry were held in Visayas in April 2016 and Mindanao in June 2016. To harmonize building blocks among government agencies implementing GHS, meetings with industry groups are being conducted.

### Mercury

In 2017, the DENR-EMB Online Permitting and Monitoring System (OPMS) was established for the Chemical Control Order (CCO) for Mercury and Mercury Compounds and other regulated chemicals under RA 6969. This provides easier access to data and the exchange thereof between the EMB regional offices and the EMB central office.

## Way Forward

1. Globally Harmonized System of Classification and Labelling (GHS) implementation
   The development of guidelines for Chemicals under the International Air Transport Association and the International Maritime Dangerous

Goods Code list of dangerous goods (chemicals) is ongoing.

2. Institutionalization and Integration of a Chemical Management Program across all agencies regulating chemicals
   There are six (6) agencies regulating chemicals in the Philippines and they implement their programs and policies. In some agencies, chemical management is not part of their regular programs but is just part of their activities. Other agencies, such as the Department of Labor do not have chemical management policies but have activities that involve the management of chemicals in firms that the agency regulates. Another issue is the implementation of the GHS in High Volume Chemicals (HVCs) for industrial chemicals regulated by the Philippine Drug Enforcement Agency (PDEA) and the Philippine National Police (PNP); these are not regulated by the DENR-EMB.

3. Computerization of all permitting systems for chemicals
   This is to address the lack of readily available data by linking different chemical regulators. It will supplement the current DENR-EMB's online permitting and monitoring system (OPMS) for new chemicals (Pre-Manufacture and Pre-Importation Notification) and regulated (PCL Compliance Certificate) chemicals and the Small Quantity Importation (SQI) Clearance and Chemical Control Orders (CCOs) currently being processed by the DENR-EMB regional offices.

4. Strengthen cooperation with other countries regarding border control in the import and export of restricted substances
   The archipelagic nature of the Philippines makes it nearly impossible to patrol all possible entry points of restricted or banned substances. Hence, more focused capacity building of DENR staff and Bureau of Customs port of entry examiners and inspectors, coordination and partnership efforts of the DENR EMB on Ozone Depleting Substances (ODS), Globally Harmonized System (GHS), and on the policies and guidelines on chemical management are needed.
5. Increase involvement of Small and Medium Enterprises (SMEs) in the chemical management programs of government agencies
   The DENR EMB started to inspect SMEs alleged to be using toxic substances and found out that these were not compliant with environmental regulations.
6. Creation of a regulatory mechanism on chemical management for the informal sector at the level of the local government units (LGUs)
   Local ordinances anchored on national policies can be developed to reduce the risk of chemical exposure and contamination of the environment from the use of chemicals by enterprises

## Meetings Attended

- Conference at Chemical Watch–Asia Hub Summit Europe, 27–28 September 2018; Brussel, Belgium
- Seminar and Workshop on the Latest Trends in Chemical Substance Management in Asia – India and the Philippines, 22 February 2018; Tokyo, Japan
- Asia Pacific Regional Meeting in preparation for the Second Meeting of the Intersessional Process for Considering SAICM and the Sound Management of Chemicals and Waste Beyond 2020, and the Third Meeting of Open-Ended Working Group (OEWG3), 23–25 January 2018; Bangkok, Thailand
- ChemCon Asia 2017, 19–23 June 2017; Beijing, China
- 2016 U.S. Chemical Sector Security Summit, 19–21 July 2016; United

States of America
- Global Summit on Chemical Safety and Security (CHEMSS), 18–20 April 2016; Poland

## Rotterdam Convention

The Rotterdam Convention operates through two mechanisms: (1) Prior Informed Consent (PIC) procedure which formally obtains and disseminates decisions of Parties who would wish to receive future shipments of chemicals listed under Annex III of the convention (pesticides and industrial chemicals that have been banned or severely restricted for health or environmental reasons), and the (2) Information Exchange which provides the venue for notification on hazardous waste regulation and problems caused by hazardous pesticide formulation.

### Status of the Philippines' Compliance with the National Commitments under the MEA

The Fertilizer and Pesticides Authority of the Philippines has banned 11 pesticides from 1989 to 2005 and the Philippines has committed to subject these to PIC according to Annex III of the Rotterdam Convention. These pesticides are (1) 2,4,5-T; (2) Aldrin; (3) Chlordane; (4) Chlordimeform; (5) DDT; (6) Dieldrin; (7) HCH/BHC; (8) Heptachlor; (9) Mercuric Fungicides; (10) Parathion-Ethyl and (11) Parathion-Methyl.

The Philippines has submitted 27 Import Responses[17]. In 2017, during the 8th Conference of Parties (COP-8) of this Convention, three of the chemicals proposed were included in Annex III, bringing the total number of chemicals under the Convention to 51. These include two pesticides—carbofuran and trichlorfon— and an industrial chemical, short-chain chlorinated paraffin (SCCP). Also, tributyltin which has been listed under the category of pesticide is now listed under industrial chemicals. The latter has been on the Philippine Priority Chemical List under DAO 1998-58. The Philippines also expressedsupport for the inclusion of SCCPs and expressed the need for enhancing information exchange on trichlorfon.

The DENR-EMB annually updates the Philippine Inventory of Chemicals and Chemical Substances (PICCS). This is a list of all existing chemicals and chemical substances used, imported, distributed, processed, manufactured, stored, exported, treated, or transported in the Philippines. Chemicals and chemical substances not included in PICCS cannot be manufactured or imported unless the proponent follows the Pre-Manufacture Pre-Importation Notification (PMPIN) assessment process. The first PICCS was published in 1995 and the succeeding PICCS updates were published in 2000, 2002, 2005, 2008, 2011, 2013, 2015 and 2017[18]

### Way Forward

- Enhance capacity-building activities and improve information exchange through technical assistance (TA) plans and support in the chemical listing process and the prior-informed-consent (PIC) procedure
- Improve national capacities to generate and use information on health and environmental impacts, such as national reporting mechanisms on specific cases of health-related diseases attributable to exposure to toxic chemicals.
- Capacity building for government staff such as those in the Bureau of Customs to prevent the illegal entry of unregistered pesticides used in the agricultural sectors

[17] http://www.pic.int/Procedures/ImportResponses/Database/tabid/1370/lan guage/en-US/Default.aspx through the Rotterdam database.

[18] http://chemical.emb.gov.ph/?s=+PMPIN

- Address issues related to the cases of failure to transmit a response for certain chemicals (2006 to 2018)
- The UNIDO Roadmap Towards Sustainable Chemicals and Hazardous Waste Management by 2030 identified priority policy actions and projects for the country to comply with the Conventions (UNIDO, May 2018). It proposes the amendment of Presidential Decree 1144 on the regulation of agricultural chemicals to streamline the regulatory scope of the Fertilizer and Pesticide Authority (FPA). Another suggestion is that the FPA shall regulate household pesticides and organic agricultural chemicals while the DENR shall regulate pesticide and fertilizer wastes. The revision of PD 1144 also needs to provide for an increase in the penalties for violations and the establishment of a monitoring system for the presence and contamination of hazardous agricultural chemicals. The Roadmap also put forth infrastructure-related needs such as the (a) installation of a transport system for hazardous agricultural chemicals; (b) building of a warehouse or storage facility for hazardous chemicals that shall serve as a holding area for confiscated agri-chemicals and (c) treatment facilities for hazardous chemicals.

### Minamata Convention

The Minamata Convention (MC) is an international treaty that aims to protect human health and the environment from the adverse effects of anthropogenic emissions and releases of mercury (Hg) and mercury compounds. The Convention is named after Minamata Bay in Japan, contaminated by industrial wastewater containing methylmercury (MeHg) discharged from a local chemical factory from 1932 to 1968. People who ate fish and shellfish contaminated by MeHg acquired the Minamata disease. Its symptoms were neurological, sensory,auditory, and visual disturbances, lack of muscle coordination, and speech disorder, leading to paralysis and death. The disaster wasthe first large-scale mercury poisoning incident that affected thousands of human lives in Minamata City, Kumamoto Prefecture, in Japan.

### Status of the Philippines' Compliance with the National Commitments under the MEA

The ratification process of the Minamata Convention by the Philippine Senate is ongoing. To further facilitate the ratification of the Convention, the DENR-EMB implemented the project "Development of Minamata Initial Assessment (MIA) in the Philippines" from January 2016 to September 2019. Its purpose is to strengthen institutions and improve national capacities to regulate mercury with a life cycle approach. One national and four regional consultations were conducted in 2017. Three mercury-contaminated sites were visited and assessed, and an initial mercury inventory was made. Awareness raising activities were held in the DENR regional offices. Workshops for DENR-EMB technical field staff on using the UNEP Toolkit for Mercury Inventory were conducted.

The MIA Final Report contains the latest mercury inventory of the country using the UNEP Toolkit and an assessment of the country's preparedness to implement the Minamata Convention (MC) provisions. It includes recommendations needed by the government to realize the goals of the MC. The MIA will formulate the country's frameworks for Mercury's National Action and Implementation Plan.[19]

[19] Minamata Convention - Database UN Conventions - DENR Int'l ENR Agreements

To further facilitate the ratification of the Convention, the DENR-EMB implemented the project “Development of Minamata Initial Assessment (MIA) in the Philippines” from January 2016 to September 2019. Its purpose is to strengthen institutions and improve national capacities to regulate mercury with a life cycle approach. One national and four regional consultations were conducted in 2017.

DENR Administrative Order 1997-38 or the Chemical Control Order for mercury and mercury compounds is being amended to incorporate provisions of the MC. The DENR Policy Working Group has prepared a final draft for endorsement to the DENR Secretary.

The GEF-UNIDO project with DENR, DOH, and Ban Toxics, “Improve the Health and Environment of Artisanal Gold Mining Communities in the Philippines by Reducing Mercury Emissions” which was conducted from March 2013 to June 2016 aimed to reduce the impacts of mercury on the health and environment of artisanal gold mining communities in the Philippines. It introduced mercury-free technology in two small-scale mining areas, namely, Labo in Kalinga and Barangay Mt. Diwata or Diwalwal inCompostela Valley. It also provided health training to rural healthcare workers in the proper diagnosis of mercury poisoning.

### Ratification of Minamata Convention

Preventing its emission and release from anthropogenic sources is the most effective way to limit the danger of mercury exposure. As a result, the ratification of the Convention by the Philippines would close loopholes in the country's current domestic regulatory framework and bring about major advantages for human health and the environment on a global scale.

In 2013, the Philippines signed the Minamata Convention on mercury, and on July 8, 2020, they ratified it. As a result of the ratification, the Philippine government may participate in the treaty's decision-making procedures and get access to resources to help it carry out its commitments under the Convention.

Since 1997, mercury has been subject to a chemical control order (CCO) in the Philippines. Chemical control organizations (CCOs) are responsible for regulating, limiting, phasing out, or outright banning chemicals that pose unacceptable dangers to human health and the environment. To import, you must first have approval from the DENR. They must also comply with the requirements for GHS safety data sheets (SDSs) and labeling. To conform to the Convention, the Department of Environment and Natural Resources (DENR) announced a new Chemical Control Order for mercury and its compounds in November 2019. The modification defined the phase-out timeframes and expanded the CCO to include "mercury-added items."

Products or product components that contain mercury or a mercury compound after being purposefully added are considered "mercury-added products" by the DENR.

The import, manufacture, use, distribution, and storage of the following mercury-added products will be phased out by 2022:

- some batteries;
- switches and relays;
- lamps;
- cosmetics with mercury above 1ppm;
- pesticides, biocides, and topical antiseptics; and
- non-electronic measuring devices.

Additional dates for other products are: chlor-alkali production – phase out by 2025; and acetaldehyde production, in which mercury or mercury compounds are used as a catalyst – phase out by 2018.

### Vienna Convention for the Protection of the Ozone Layer

The Vienna Convention was created inresponse to advancements in the understanding of ozone depletion and its

impacts on human health and the environment. It took effect in 1988 and was universally ratified in 2009. The Convention calls on Parties to promote cooperation via systematic observations, research, and information exchange on the impacts of human activities on the ozone layer and to adopt legislative or administrative measures to deal with activities likely to have adverse effects on the ozone layer. However, the Convention does not contain legally binding controls or targets.[20]

### Status of the Philippines' Compliance with the National Commitments under the MEA

#### Celebration of the 35 years of the Vienna Convention

Last September 16, 2020, the Philippines celebrated World Ozone Day and 35 years of Ozone Layer Protection (Vienna Convention). In its 35th year, it was emphasized that big global problems can only be resolved via collaborative decision-making and action, informed by scientific knowledge.

The ozone treaties' message of working together in peace and for the general benefit is more vital than ever this year, given the coronavirus pandemic's impact on society and the economy. Since the Ozone is essential for life on Earth, today's motto, "Ozone for life," serves as a reminder that we must preserve the ozone layer for the sake of future generations.

### Kyoto Protocol

The Kyoto Protocol makes the United Nations Framework Convention on Climate Change operational by obligating industrialized countries and economies in transition to restrict and reduce greenhouse gas (GHG) emissions following individually agreed-upon targets. The Convention itself only requires these nations to implement mitigation policies and actions and to submit periodic reports.

The Kyoto Protocol is founded on the ideas and provisions of the Convention, and its structure is based on its annexes. It only binds developed countries and places a heavier burden on them in accordance with the principle of "common but differentiated responsibility and respective capabilities," because it recognizes that they are primarily responsible for the current high levels of greenhouse gas emissions in the atmosphere.

### Status of the Philippines' Compliance with the National Commitments under the MEA

In 2003, the Philippines ratified the Kyoto Protocol (as a non-Annex I country) to the UNFCCC, having played a leadership role in its negotiations.

The Philippines has been at the forefront of climate policy and climate diplomacy since the late 2000s. The Presidential Task Force on Climate Change was established in response to Administrative Order No. 171, S. 2007, to address and mitigate the effects of climate change on the country via adaptation, mitigation, and technology means.

Under the administration of Duterte, the Philippine Development Plan 2017-2022 acknowledges the pervasive effects of climate change and the necessity for a countrywide climate and disaster vulnerability and risk assessment to mitigate the effects of natural disasters.

However, as of CY 2021, the Philippines is not part of the Annex I countries and therefore, has no targets to reduce its GHG emissions under the Kyoto Protocol.

[20] Vienna Convention for the Protection of the Ozone Layer - Database UN Conventions - DENR Int'l ENR Agreements

### Stockholm Convention on Persistent Organic Pollutants

Adopted in 2001 by 91 countries including the Philippines and having entered into force in 2004, the Stockholm Convention enjoins states to take measures to eliminate or reduce the release of persistent organic pollutants (POPs) into the environment to protect human health and the environment. Persistent organic pollutants (POPs) are chemicals characterized by long-range transport, persistence in the environment, and ability to bio-magnify and bio-accumulate in ecosystems and with significant negative effects on human health and the environment. They are components of products such as flame retardants or surfactants, pesticides, such as DDT, industrial chemicals, most notably polychlorinated biphenyls (PCB), and two unintentional by-products of many industrial processes, known as dioxins and furans.

Through the Convention, parties are required to act on the following classified POPs, accessed at http://chm.pops.int/ through the Stockholm Convention Database:

- Annex A POPs - eliminate the production, use, and import/export of 24 chemicals
- Annex B POPs - restrict the production, use, and import/export of two chemicals
- Annex C POPs - reduce or eliminate releases from unintentional production of two chemicals (plus five listed in Annex A).

Additionally, parties are required to ensure environmentally sound management of stockpiles and wastes/contaminated wastes of POPs. They are encouraged to use the Best Available Techniques (BAT) to reduce releases of chemicals listed in Part I of Annex C and Best Environmental Practices (BEP) in pollution control.

Implementation of the convention, including the production, import, and export of chemicals listed in the Annexes must be reported through a National Report every four years. Parties are also required to prepare a National Implementation Plan (NIP) which is part of the national sustainable development strategy of the implementing party.

Parties to the Stockholm Convention are mandated to cooperate with the appropriate entities of the Basel Convention to (a) establish levels of destruction and irreversible transformation to ensure that the characteristics of POPs specified in Annex D are not exhibited; (b) determine environmentally sound disposal methods; (c) work to establish the concentration levels of the chemicals listed in Annexes A, B, and C to define the low persistent organic pollutant content and (d) information exchange on the reduction and elimination of POPs and alternatives to POPs.

### Status of the Philippines' Compliance with the National Commitments under the MEA

Two new POPs were added to Annex A during COP-8 in 2017. These are decabromodiphenyl ether (DBDE), used as an additive flame retardant, and short chain chlorinated paraffin (SCCPs), a softener and flame inhibitor. Also, a hexachlorobutadiene (most often used as a solvent) already in Annex A was included in Annex C, with the support of the Philippines.

The national reports have been regularly submitted since 2006. The Fourth National Report was submitted on 8 October 2018[21].

[21] http://chm.pops.int/Countries/NationalReports/FourthRoundPartyReports/tabid/6346/Default.aspx

The Philippines' National Implementation Plan (NIP) on Persistent Organic Pollutants (POPs) was submitted to the Secretariat of the Stockholm Convention in 2006. The Updated NIP was submitted on 31 August 2015 to address 10 new chemicals/pesticides, otherwise known as the "Nasty Nine plus one," or the amendments from the fourth and fifth Conference of Parties.

In fulfilling the convention, the EMB has implemented the following projects:

### Integrated Persistent Organic Pollutants Management Project (IPOPs) June 2011 to June 2017 (GEF-World Bank).

This project assisted the Philippines in meeting its obligations under the Stockholm Convention on POPs in minimizing the risk of human and environmental exposure to POPs. The project assisted the country in strengthening the regulatory and monitoring framework and improving capacity for and providing demonstrations of safe management of PCBs, reduction of releases of unintentionally produced POPs, and reduction of exposure to POPs in contaminated sites. The following are some of the accomplishments of the project:

(a) The comprehensive inventory of industrial chemicals under POPs specifically Dioxins and Furans and PCB;
(b) Preparation of Chemicals of Potential Concern (COPC) Management plan including possible remediation measures for COPC-contaminated land (e.g., by polychlorinated biphenyls);
(c) Identification of POPs hotspots or contaminated sites and the formulation of remediation guidelines for the clean-up of contaminated sites and site control measures and the demonstration of actual clean-up and site control in selected contaminated sites.

### Implementation of PCB Management Programs for Electric Cooperatives (ECs) and Safe E-waste Management (UNIDO) - January 2017 to January 2022.

The objective of the project is the protection of human health and the environment through sound management of PCBs, particularly in old electric transformers and polybrominated diphenyl ethers (PBDEs) in Waste Electrical and Electronic Equipment (WEEE), also known as e-waste. Treatment, storage, and disposal (TSD) facilities to adopt BEP for WEEE management for the use of informal e-waste collectors and recycles in Caloocan are being planned.

The ownership of the Non-Combustion Technology POPs facility worth $3,026,848 established by a previous UNIDO/GEF/DENR project (GEF ID 2329) in the PNOC Industrial park in Mariveles, Bataan, was transferred to the DENR-EMB in 2015. While the DENR-EMB is the owner of the facility, the NRDC, the corporate arm of the DENR, is the operating entity that manages the operations of the facility. The facility has a design capacity to destroy 750 tons per year of PCB oil. In 2018, the facility destroyed 100 tons of PCB oil to less than 2 mg/kg. Under the new project, the facility is expected to destroy 600 tons of PCB oil and PCB-containing equipment from 26 Electric Cooperatives, through a financial subsidy scheme. The facility enables the country to treat its PCBs instead of having these exported for incineration.

### Best Available Technology (BAT) and Best Environment Practice (BEP) in Open Burning Activities in Response to the Stockholm Convention on POPs - April 2015 to April 2020 (GEF-UNIDO).

This project's objective is to sustainably reduce the release of Unintentionally Produced Persistent Organic Pollutants (U-POPS) by enhancing guidelines and guidance on BAT/BEP in opening burning practices. It aims to create resource-efficient waste management systems by reducing U-POPS emissions through the

introduction of BAT and BET in open burning sources to attain approximately 90% reduction of the current polychlorinated dibenzo-p-di- toxins (PCCD) and polychlorinated dibenzofurans (PCDF) releases at the pilot demonstration site in General Santos City, Cotabato.

A PHP 35M Central Materials Recovery Facility (MRF) constructed under this project in the city's sanitary landfill was inaugurated on 19 February 2019. It is owned and operated by the City Government of General Santos. As the first large-scale mechanized MRF in the Philippines, the facility can process 40 tons of waste daily with the following components: waste conveyor and segregator, compartments for segregated recyclable waste, plastic shredder, bottle crusher, cement, and plastic mixer, cement bricks maker, biodegradable granulator, gantry mixer, and bio vibrator/separator machine.

It is currently processing segregated municipal solid waste, i.e., high-value waste is recycled or repurposed (e.g. plastic waste into chairs, pavers, and other by-products), biodegradable waste is composted, and residual waste is disposed of in the sanitary landfill.

### Global Monitoring Plan (GMP) for POPs 2 - 2018to 2020

It is a 48-month regional project which aims to strengthen the capacity for implementation of the POPs Global Monitoring Plan and to create conditions for sustainable monitoring of POPs in the Asian Region. For the Philippines, sampling is done on air, human milk, sediments, and fish. EMB conducts passive air sampling for POPs at the AGROMET station in the University of the Philippines (UP) Los Baños, Laguna. The analysis will be performed by a reference laboratory abroad and the designated National Laboratory – the EMB Central Office's Environmental Research and Laboratory Services.

### Legislation and Policy Issued

- EMB Memorandum Circular (MC) 2017-003 – Site Characterization Guidelines (for POPs ContaminatedSites)
- EMB MC 2017-004 – Site Remediation Guidelines (for POPs ContaminatedSites)
- EMB MC 2015-004 – Clarifications to the Chemical Control Order (CCO) for Polychlorinated Biphenyls (PCBs)
- EMB MC 2015-007 – Technical Guidance Document on Polychlorinated Biphenyls (PCBs) Management

### Meetings Attended

- Training Workshop on Monitoring for Unintentional Persistent Organic Pollutants (U-POP) and Greenhouse Gases (GHG) from Open Burning Activities, 20–30 November 2017; Hanoi, Vietnam
- Technical Evaluation of the Proposals Received for Request for Proposal No.7000002385 – Provision of Material Recovery Facility to be Located at General Santos, Philippines in Relation to the Project "Demonstration of Best Available Technology (BAT) and Best Environment Practice (BEP) in Open Burning Activities in Response to the Stockholm Convention on Persistent Organic Pollutants (POPs)," 7–11 August 2017; Vienna, Austria
- 2017 Stockholm Environment Institute (SEI) Science Forum, 30 May 2017; Bangkok, Thailand

- Meetings of the Conferences of the Parties to the Basel, Rotterdam, and Stockholm Conventions (BC COP-13, RC COP-8, SC COP-8), 24 April–5 May 2017; Geneva, Switzerland

- Asia-Pacific Regional Preparatory meetings of the Conference of the Parties to the Basel, Rotterdam, and Stockholm Conventions and Working Session to Address Specific Issues Related to Ratification and Early Implementation of the Minamata Convention,6–10 March 2017; Bangkok, Thailand

# National State of the Brown Environment Report

## ACKNOWLEDGEMENT

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