



# HEALTH & POLLUTION ACTION PLAN



in support of the  
**NATIONAL ENVIRONMENTAL  
HEALTH ACTION PLAN  
2017-2022**

Inter-Agency Committee on  
Environmental Health  
of the  
Republic of the Philippines

March 2019



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## NATIONAL ENVIRONMENTAL HEALTH ACTION PLAN 2017-2022

A project implemented by the  
**United Nations Industrial Development Organization**  
in partnership with the  
**World Health Organization**  
and in collaboration with the  
**Inter-Agency Committee on Environmental Health**  
of the  
**Republic of the Philippines**

Completed as part of the UNIDO global project entitled  
**Mitigating Toxic Health Exposures in Low- and Middle-Income Countries**

Co-funded by the  
**European Union**  
and the  
**United States Agency for International Development**

March 2019

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This publication has been co-funded by the European Union and the United States Agency for International Development.



Republic of the Philippines  
**Department of Environment and Natural Resources**  
Visayas Avenue, Diliman, Quezon City  
Tel Nos. 929-6626 to 29; 929-6633 to 35  
929-7041 to 43; 929-6252; 929-1669  
Website: <http://www.denr.gov.ph> E-mail: [web@denrgov.ph](mailto:web@denrgov.ph)

## FOREWORD

The DENR, as the Vice-Chair of the Inter-Agency Committee on Environment and Health, applauds the completion of the Health and Pollution Action Plan (HPAP) for the Philippines. This is indeed a big step in promoting public health by taking better care of our environment.

The HPAP – which is supported by the United Nations Industrial Development Organization in partnership with the European Commission and World Health Organization – is a perfect complement to the National Environmental Health Action Plan 2017-2012.

DENR is particularly attuned to one of the four major concept notes of the HPAP – “Mitigating Pollution in Manila Bay to Reduce Health Risks to People and Help the Recovery of the Bay’s Coastal and Marine Ecosystems” – given its direct relevance to our “Battle for Manila Bay,” by which we are accelerating the rehabilitation of Manila Bay to restore its water quality to a level fit for bathing, swimming, boating, fishing and other forms of contact recreation.

The three other HPAP concept notes, of course, are also of prime interest to the DENR, given our mandates in clean air and in the management of solid, toxic and hazardous wastes. These concept notes are (1) Mitigating Pollution from the Transport Sector to Reduce Health Risk to People; (2) Supporting the Baseline Knowledge and Actions for the Improvement of Indoor Air Quality from Household Energy Use in Low-Income Communities; and (3) Reducing Lead Exposure in the Philippines.

The HPAP outlines strategies to reduce exposure to pollutants that pose risks to public health. These should guide the Filipino people and persuade everyone that the best way to reduce exposure, ultimately, is to reduce pollution.

  
**ROY A. CIMATU**  
Secretary





Republic of the Philippines  
Department of Health  
**OFFICE OF THE SECRETARY**



### **Message of the Secretary of Health**

The negative impacts of environmental pollution on human health have been well-documented since the beginning of the industrial revolution and still persists today. The health effects of pollution range from increased hospital admissions and emergency room visits to increased risk of premature death.

Pollution disproportionately kills the poor and the vulnerable, with children at high risk. Estimates show that 9 out of every 10 pollution-related deaths occur in low-income and middle-income countries. Diseases caused by environmental pollution had been responsible for about nine million premature deaths in 2015. This number constituted 16% of all deaths worldwide. But by 2016, The World Health Organization (WHO) reported 23% of all global deaths were attributable to living and working in an unhealthy environment, mostly to air pollution. Corollary to this, the Lancet Commission on Pollution and Health in 2017 emphasized the continuing damage caused by pollution to people's health, despite all the mitigation efforts that have been taken.

The Philippines has long been working on reducing the impact of environmental pollution on the health of Filipino citizens. In 1991, an Executive Order was issued to establish the Inter-Agency Committee on Environmental Health (IACEH), with the task of coordinating cross-government actions aimed to "safeguard and make the environment conducive to the improvement and maintenance of the health of the people throughout the country." In 2005, under the guidance of the IACEH, the Government published its first National Environmental Health Action Plan (NEHAP). The NEHAP has since been updated several times, the latest iteration released in 2018.

The Health and Pollution Action Plan (HPAP) initiative, funded by the European Commission and implemented by UNIDO in collaboration with WHO, has developed specific Concept Notes with an extensive set of actions to enhance the situation analysis and action plans of selected sectors of the NEHAP. It addresses five priority risk areas: outdoor air pollution, indoor air pollution, water contamination, soil contamination, and occupational exposure. This document is a valuable reference for the IACEH and partners in their efforts to implement the NEHAP.

We look forward to a safer environment and better health in the near future as we put into action the key activities in the HPAP in furtherance of the government's efforts to meet the relevant targets of the Sustainable Development Goals and Universal Health Care.

  
**FRANCISCO T. DUQUE III, MD, MSc**  
Secretary of Health





## ACKNOWLEDGEMENTS

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This document was developed under the technical cooperation agreement between UNIDO and the Department of Environment and Natural Resources (DENR) through the Foreign Assisted and Special Projects Service (FASPS) and the Environmental Management Bureau (EMB), to complement the National Environmental Health Action Plan 2017-2022 and support the DENR, Vice-Chair of the Inter-Agency Committee on Environmental Health (IACEH), in addressing environmental risks related to health. We thank the DENR for the strong support they have given to the whole process of developing this Health and Pollution Action Plan (HPAP).

Equally important has been the crucial support received from the Department of Health (DOH) through the Bureau of International Health Cooperation (BIHC) and the Disease Prevention and Control Bureau (DPCB). DOH is the Chair of the IACEH, and was key in getting the active involvement of the IACEH members in the development of the HPAP and the extended project concept notes. IACEH members include the Department of Public Works and Highways (DPWH), the Department of Interior and Local Government (DILG), the Department of Agriculture (DA), the Department of Trade and Industry (DTI), the Department of Transportation (DOTr), the Department of Information and Communications Technology (DICT), the Department of Labor and Employment (DOLE), the National Economic and Development Authority (NEDA) and the Philippine Information Agency (PIA).

Our thanks go to our international partners: the European Union (EU) and the United States Agency for International Development (USAID), for providing the financial support; the World Health Organization (WHO), for actively partnering in the initiative; and the United Nations Children's Fund (UNICEF), for the support which it gave to the initiative.

A special thanks to Pure Earth, which brought to bear its previous experience with soil contamination in the Philippines and which accepted to develop one of the extended project concept notes.

We are grateful to all the representatives from the government, development organizations, non-government organizations and academic institutions who participated in the HPAP workshops and meetings, as well as through their assistance in the review and editing of this document. They are listed in Annex 5. We thank you all!

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# ACRONYMS AND ABBREVIATIONS

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ADB	Asian Development Bank
AO	Administrative Order
BFAR	Bureau of Fisheries and Aquatic Resources
BOD	biochemical oxygen demand
CAA	Clean Air Asia
CAR	Cordillera Administrative Region
CNG	compressed natural gas
CWA	Clean Water Act
DA	Department of Agriculture
DALYs	disability adjusted life years
DENR	Department of Environment and Natural Resources
DepEd	Department of Education
DICT	Department of Information and Communications Technology
DILG	Department of the Interior and Local Government
DO	dissolved oxygen
DOE	Department of Energy
DOH	Department of Health
DOJ	Department of Justice
DOLE	Department of Labor and Employment
DOST	Department of Science and Technology
DOTr	Department of Transportation
DPWH	Department of Public Works and Highways
DSWD	Department of Social Welfare and Development
DTI	Department of Trade and Industry
ECN	extended concept notes
EMB	Environmental Management Bureau
EO	Executive Order
EU	European Union
FHSIS	Field Health Service Information System
GAHP	Global Alliance on Health and Pollution
GBD	Global Burden of Disease
GDP	Gross Domestic Product
GES	General Effluent Standards
GHG	Greenhouse Gases
GNI	Gross National Income
HIV/AIDS	human immunodeficiency virus/acquired immunodeficiency syndrome
HPAP	Health and Pollution Action Plan
HCWH	Health Care Without Harm
IACEH	Inter-Agency Committee on Environmental Health
IAQ	indoor air quality
IG	Implementing Guidelines
IHME	Institute for Health Metrics and Evaluation
ILO	International Labour Organization
IRR	Implementing rules and regulations
JAO	Joint Administrative Order
LGU	Local Government Unit
LLDA	Laguna Lake Development Authority
LMIC	low- and middle-income country

LTFRB	Land Transportation Franchising and Regulatory Board
LTO	Land Transportation Office
LWUA	Local Water Utilities Administration
MMDA	Metropolitan Manila Development Authority
MVIC	Motor Vehicle Inspection Center
MWSS	Metropolitan Waterworks and Sewerage System
NAAQS	National Ambient Air Quality Standards
NCR	National Capital Region
NEDA	National Economic and Development Authority
NEHAP	National Environmental Health Action Plan
NESSAP	National Emission Standards for Source Specific Air Pollutants
NGO	non-governmental organization
NSO	National Statistics Office
NSWMC	National Solid Waste Management Commission
NTD	neglected tropical disease
NWRC	National Water Resources Council
OSH/OHS	Occupational Safety and Health/Occupational Health and Safety
OSHC	Occupational Safety and Health Center
OSHS	Occupational Safety and Health Standards
PCB	Polychlorinated Biphenyl
PCL	Priority Chemical List
PD	Presidential Decree
PDP	Philippine Development Plan
PIA	Philippine Information Agency
PM	particulate matter
PO	people's organization
POPs	persistent organic pollutants
PSA	Philippine Statistics Authority
PUV	public utility vehicle
RA	Republic Act
RE	renewable energy
ROP	Republic of the Philippines
SDG	Sustainable Development Goals
TSP	total suspended particulate
TSS	total suspended solids
TWG	technical working group
ULAB	used lead acid battery
UNEP	United Nations Environment Programme
UNICEF	United Nations Children's Fund
UNIDO	United Nations Industrial Development Organization
UP-CPH	University of the Philippines - College of Public Health
UP-IESM	University of the Philippines - Institute of Environmental Science & Meteorology
UPLB	University of the Philippines Los Baños
USAID	United States Agency for International Development
WB	World Bank
WHO	World Health Organization
WPRO	WHO Western Pacific Region
WQMA	Water Quality Management Area



## EXECUTIVE SUMMARY

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Pollution has severe implications for sustainable development, particularly in people's health. It causes lifelong disability and/or death, harms the environment and biodiversity, exacerbates the poverty cycle, and stagnates economic growth. Pollution is now one of the biggest drivers of death and disease in the world, causing 16% of all deaths globally according to the Lancet Commission on Pollution and Health. The overwhelming majority (92%) of the disease burden from pollution falls on people in low- and middle-income countries (LMICs), which are poorly equipped to address the problem and recover from its impacts. The Global Burden of Disease (GBD) study estimates that pollution-related diseases were responsible for 9 million premature deaths in 2015. The same study estimates that diseases caused by all forms of pollution were responsible for 268 million Disability Adjusted Life Years (DALYs) – 254 million years of life lost through early death and 14 million years lived with disability.

According to the GBD study in 2016, ambient air pollution caused some 4.2 million deaths worldwide, while household air pollution from cooking with polluting fuels and technologies caused an estimated 3.8 million deaths in the same period. With respect to water pollution, which includes unsafe water sources, unsafe sanitation, and inadequate handwashing, the GBD study estimated this to have caused 1.8 million deaths. As for soil pollution, it estimated that this puts at least about 61 million people at risk of being exposed to heavy metals and toxic chemicals; this estimate reflects only a fraction of the total number of contaminated sites worldwide. In 2015, toxic occupational risk factors (not including occupational injuries or ergonomic factors) were responsible for 0.88 million deaths globally and for 18.6 million DALYs.

In the Philippines, non-communicable diseases have been steadily increasing and now contribute significantly to total deaths and disabilities: around 70% and 64%, respectively, in 2016. According to the GBD study, exposures to pollution are responsible for a significant fraction of the deaths and DALYs from non-communicable diseases. The study identified air pollution as the leading cause of deaths from pollution in the Philippines. According to national data, the leading causes of mortality attributable to air pollution in the Philippines are diseases of the heart, pneumonia, and chronic lower respiratory diseases, resulting in a total of nearly 206,000 deaths in 2014. In the same year, the main causes of morbidity attributable to air pollution in the country were acute respiratory infection, bronchitis, acute lower respiratory tract infection and pneumonia, resulting in a total of almost 2.8 million cases (PSA, 2017). According to a study done by the Global Alliance for Clean Cookstoves in 2012, the total number of deaths annually in the Philippines from household (indoor) air pollution alone is estimated at about 48,000. The number of child deaths is estimated at about 6,800 annually. With respect to occupational exposure and water pollution, the GBD study estimated that 14,000 persons die from occupational exposure to carcinogens and lead exposure (equivalent to 2% of all deaths), while 6,000 people are estimated to die from unsafe water source and sanitation.

In addition to deaths and disabilities, the health effects of pollution place an economic burden on the country. Diseases resulting from forms of pollution for which data are available are estimated to have cost the Philippines US\$1.0-1.3 billion in 2015 due to lost productivity – the equivalent of 0.3-0.4% of the country's 2015 Gross Domestic Product (GDP). The welfare damages from pollution-attributable diseases were estimated at US\$23 billion, or 6.5% of the gross national income (GNI) for the same year.

In 1991, the Government of the Philippines, recognizing the association between environment and health, created and institutionalized the Inter-Agency Committee on Environmental Health

(IACEH) through the Presidential Executive Order 489. The IACEH is composed of the Secretaries of the Departments of Health (Chair), Environment and Natural Resources (Vice-Chair), Public Works and Highways, Interior and Local Government, Agriculture, Trade and Industry, Transportation, Information and Communications Technology, Science and Technology, and Labor and Employment, as well as the Director Generals of the National Economic and Development Authority and the Philippine Information Authority. Part of the work of the IACEH is formalized through, and driven by, a National Environmental Health and Action Plan (NEHAP). Member countries of the Asia-Pacific Regional Forum on Environment and Health (of which the Philippines was a founding member in 2004) are encouraged to develop and implement a NEHAP as a planning tool that sets the national-level direction to address priority concerns on environment and health. The Philippines's NEHAP for 2017-2022 is the country's fourth update since the IACEH elaborated the first draft in 2005.

The objectives of the process which developed this Health and Pollution Action Plan were twofold: (1) to complement the NEHAP with proposals for mitigation actions to reduce types of pollution, which have significant health effects; and (2) to strengthen the capacity of the IACEH. With respect to the latter, technical assistance was provided in the drafting of the Implementing Guidelines (IG) for Executive Order 489, which institutionalizes the IACEH. The approval of the final IG, through a Resolution has been scheduled for May 2019. With respect to the former, a 10-month process was organized in which stakeholders came together over a total of four consultation workshops. In the first two consultations, the stakeholders decided on the following priority areas requiring mitigation actions to reduce the health impacts of pollution in the Philippines:

- Exposure to ambient (outdoor) air pollution was ranked as highest priority
- Wastewater and unsafe sanitation were ranked as second priority
- Occupational exposure to pollution was ranked as third priority
- Exposure to household (indoor) air pollution was ranked as fourth priority
- Exposure to soil pollution from heavy metals and toxic chemicals was ranked as fifth priority

At these consultations, recommendations on the specific types of actions in each of these priority areas were discussed. From these discussions, initial drafts of the project concept notes were then developed. The draft concept notes were reviewed and finalized through a workshop involving the members of IACEH's technical group.

The first project concept is Mitigating Pollution from the Transport Sector. It was decided to focus on the transport sector because data from the National Emissions Inventory show that mobile sources, such as cars, motorcycles, trucks and buses, are responsible for the majority (67%) of air pollutants. Stationary sources, such as power plants and factories contribute about 22% of air pollutants, while area sources such as construction activities, open burning of solid wastes and slash-and-burn farming account for the remaining 11% of air pollutants (DENR, 2015). The overall objective of this proposed project is therefore to mitigate air pollution from the transport sector and reduce its impacts on human health. The target results and outputs include: (1) strengthened capacity of the government to implement environmental laws and management plans; (2) technical studies on vehicle inspection systems, emission standards, air quality monitoring design, health impact studies, freight operations, and management of decommissioned vehicle scrappage; (3) policy recommendations and advocacy for policy adoption; (4) monitoring and evaluation of pollution impacts and integrated management planning, and; (5) information management and utilization.

The second project concept is Mitigating Water Pollution in Manila Bay. Water pollution in the bay is particularly serious. The bay, home to the country's national capital, is the site of much economic activity. The types of livelihood made directly from Manila Bay are fisheries (67%), tourism (23%), and shipping/navigation (10%) (PEMSEA, 2006). In addition, various developments and intensive economic activities taking place around the shores of Manila Bay and in its catchment area have brought about over-population, heavy pollution, and over-exploitation of natural resources, habitat degradation and biodiversity loss. For instance, the bay absorbs much of the capital's wastewater. Of the 10,168 industries around Manila Bay, 5,228 were served with a Notice of Violation (NOV) for



failure to acquire permits to discharge treated wastewater (MBCO, 2018). These problems cause environmental damage and pose health risks and compromise the well-being of the population. These problems also cause high economic costs (e.g. medical costs for illnesses, environmental rehabilitation costs) and economic losses (e.g. loss of income when sick, reduced income from fisheries/aquaculture livelihood). The overall objective of this proposed project is therefore to mitigate pollution of Manila Bay and reduce its impact on human health and on the coastal and marine ecosystem. The target results and outputs are the following: (1) strengthened capacity of the government to enforce environmental laws and to implement management plans; (2) successful implementation of the Transfer of Environmentally Sound Technology (TEST) approach developed by UNIDO at industrial establishments; (3) establishment of innovative pilot wastewater and solid waste treatment facilities; (4) technical studies conducted on shipping industry pollution and on the carrying capacity of Manila Bay; (5) policy recommendations and advocacy; (6) monitoring and evaluation of pollution impacts and integrated management planning, and; (7) information management and utilization.

The third project concept is the Reduction of Lead Exposure from Used Lead Acid Battery Recycling Activities. This project concept covers the priority areas of occupational exposure and of soil contamination. It focuses on lead because excessive exposure to this heavy metal can result in serious adverse health impacts, including: neurological impact on memory, coordination and speech; intelligence loss in children; higher incidence of heart disease, and; disability and death. Site surveys, undertaken since 2008, have identified approximately 150 lead-contaminated sites in the country where human health is at risk due to lead exposure. Sources of lead emissions at these sites were caused by inappropriate recycling of Used Lead Acid Batteries (ULAB) and lead smelting for casting of recycled lead. It is estimated that these sites are only a small portion of the sites contaminated with lead in the country. The overall objective of this proposed project is therefore to reduce human health risks from ULAB recycling associated with exposure to lead-contaminated soil, air, and water. This project will help reduce these risks in selected residential areas where small scale ULAB recycling is practiced. Target interventions include a multi-faceted and multi-stakeholder collaboration to implement environmental health assessments and lead-exposure-risk-mitigation activities. Efforts to address gaps in policy and regulation, as well as to improve management and control of lead pollution will also be undertaken.

The fourth project concept is Improvement of Indoor Air Quality from Household Energy Use. Currently, there is no national government agency mandated to monitor the exposure of occupants to household air pollution. Yet, 55% of the Philippine population relies on traditional cooking fuels and technologies (PSA, 2016). Smoke from burning of solid fuels contains pollutants of known health hazards, including very small-sized particulate matter ( $PM_{2.5}$ ), carbon monoxide (CO), carbon dioxide ( $CO_2$ ), nitrogen dioxide ( $NO_2$ ) and sulfur oxides ( $SO_2$ , mainly from coal). The overall objective of this proposed project is to improve indoor air quality in selected Philippine cities and rural areas and work towards creating the necessary public policy framework to manage indoor air pollution nationwide, that considers international best practices. This project aims to support the baseline knowledge and actions for the improvement of indoor air quality from household energy use by an assessment of current practice through deskwork, gathering primary and secondary data from the field, stakeholder consultations, field and laboratory surveys in low-income communities in selected Philippine cities and rural areas. These efforts can be strengthened by reviewing the local and international policies related to indoor air pollution and household energy use in the Philippines, and by suggesting control solutions to indoor air quality. Prior to this, indoor air quality will be characterized on the basis of structural, functional and occupant aspects, as will the health risks from exposure to emissions from household energy use. Study communities shall be selected to demonstrate the control solutions, together with interventions on improved household energy use. Policy recommendations on household energy use shall be made to mitigate indoor air pollution and protect the health of families in low-income communities.

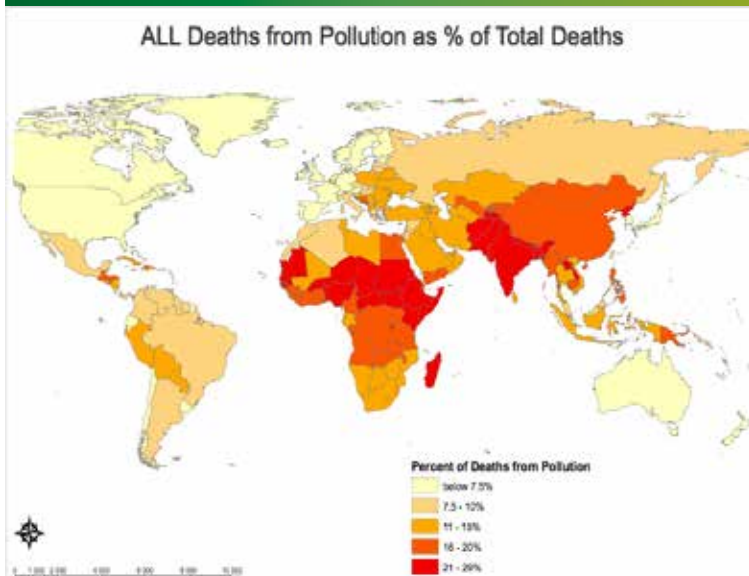


# INTRODUCTION

## Pollution and Health

The impacts of pollution on health have always been recognized, although the size of the impacts has consistently been underestimated. A recent report by the Lancet Commission on Pollution and Health<sup>1</sup> rectifies this erroneous impression and quantifies pollution's impacts on human health. The Commission finds that pollution is now one of the biggest drivers of death and disease in the world, causing 16% of all deaths globally. The overwhelming majority of the disease burden from pollution (92%) falls on people in low- and middle-income countries (LMICs). Pollution's impacts are felt most acutely by communities that are poorly equipped to address the problem and recover from its impacts. Pollution has severe implications for sustainable development, exacerbates the poverty cycle, harms the environment and biodiversity, causes lifelong disability and stagnates economic growth. Some types of pollution, as air or water pollutants or as marine litter, can disperse globally and travel across national boundaries, continents and oceans.

Figure 1: Percentage of all deaths in 2015 that were caused by pollution



The Global Burden of Disease (GBD) study<sup>2</sup> estimates that pollution-related diseases were responsible for 9 million premature deaths in 2015. The GBD study also estimates that diseases caused by all forms of pollution were responsible for 268 million Disability Adjusted Life Years (DALYs) – 254 million years of life lost and 14 million years lived with disability. The pollution risk factors examined were: (1) air pollution [household air pollution, ambient fine particulate pollution {PM<sub>2.5</sub>} and tropospheric ozone pollution]; (2) water pollution [unsafe sanitation and unsafe water sources]; (3) soil pollution [chemical and heavy metal - lead and mercury]; and (4) occupational pollution [carcinogens, particulates, gases and fumes].

<sup>1</sup> Lancet, 2018. The Lancet Commission on Pollution and Health. Lancet 2018; 391:462-512. Link: [http://dx.doi.org/10.1016/S0140-6736\(17\)32345-0](http://dx.doi.org/10.1016/S0140-6736(17)32345-0) free with registration

<sup>2</sup> The GBD study is a multinational study initiated by World Health Organization (WHO) in partnership with the World Bank and the Harvard School of Public Health, and sustained today by WHO and the Institute for Health Metrics and Evaluation (IHME).

Air pollution levels remain at dangerously high levels in many parts of the world. Data reveals that 9 out of 10 people breathe air containing high levels of pollutants like black carbon, which penetrate deep into the lungs and cardiovascular system. Fine particulate air pollution is associated with cardiovascular and pulmonary diseases. Risk factors for cardiovascular disease include myocardial infarction, hypertension, congestive heart failure, arrhythmias and cardiovascular mortality. Risk factors for pulmonary disease include chronic obstructive pulmonary disease and lung cancer<sup>3</sup>. Ambient air pollution alone caused some 4.2 million deaths in 2016, while household air pollution from cooking with polluting fuels and technologies caused an estimated 3.8 million deaths in the same period<sup>4</sup>.

Water pollution, including unsafe water sources, unsafe sanitation and inadequate handwashing, is estimated to cause death in 1.8 million people. The principal diseases linked to water pollution are acute and chronic gastrointestinal diseases, most importantly diarrheal diseases (70% of deaths attributed to water pollution), typhoid fever (8%), paratyphoid fever (20%) and lower respiratory tract infections (2%)<sup>3</sup>. Water contamination in Africa, Asia and Latin America puts up to 323 million people at risk of infection from diseases caused by pathogens in water. This is attributed to population growth, increased economic activity, the expansion and intensification of agriculture and an increase in the amount of untreated sewage discharged into rivers and lakes. In Asia, up to half of all rivers are affected, putting about 134 million people at risk of infections like cholera, typhoid, infectious hepatitis, polio, cryptosporidiosis, ascariasis and diarrheal diseases<sup>5</sup>. Moreover, pollution of rivers, lakes and the oceans is contributing to the collapse of underwater ecosystems and the degradation of underwater habitats, which is resulting in the decline of fisheries, affecting food sources and livelihoods and negatively impacting tourism.

Polluted soil at contaminated sites threatens the environment and human health in communities worldwide. The contaminants that pose the greatest threats to health are environmentally persistent substances such as metals, persistent organic pollutants (including persistent pesticides) and radionuclides. The metals most commonly encountered at polluted sites include mercury, lead, chromium and cadmium. Most contaminated sites are relatively small, but the aggregate number of people affected globally by the many hundreds of thousands of extant sites is large. Polluted sites are most commonly contaminated by informal, small-scale, unregulated local industry or artisanal activity. Based on data from the Blacksmith Institute (2016), it is estimated that about 61 million people in the 49 countries surveyed are exposed to heavy metals and toxic chemicals at contaminated sites. This estimate reflects exposures at only a fraction of the total number of contaminated sites worldwide<sup>6</sup>.

Contamination with lead in particular is of growing concern. In adults, chronic exposure to lead (at even very low blood lead concentrations) is a risk factor for hypertension, renal failure, cardiovascular disease and stroke. In children, exposure to lead (at even the very lowest blood lead concentrations) is a risk factor for neurodevelopmental toxicity. The neurobehavioral sequelae of pediatric lead exposure include cognitive impairment, shortening of attention span with increased risk for attention deficit or hyperactivity disorder and increased risk for antisocial and criminal behaviors. These effects can persist across the entire lifespan and result in decreased school performance, increased risk of drug abuse and incarceration and decreased economic productivity. In 2012, the World Health Organization (WHO) estimated that lead was responsible for 13.9 million DALYs and that childhood lead exposure is responsible for mild to moderate mental retardation in 0.6 million children annually. In 2015, the GBD study estimated that lead was responsible for 0.5 million premature deaths and for 9.3 million DALYs. This estimate is based entirely on adult deaths (15 years and older)<sup>3</sup>.

<sup>3</sup> Ibid 1, p. 1.

<sup>4</sup> WHO website. Link: [https://www.who.int/en/news-room/fact-sheets/detail/ambient-\(outdoor\)-air-quality-and-health](https://www.who.int/en/news-room/fact-sheets/detail/ambient-(outdoor)-air-quality-and-health).

<sup>5</sup> UNEP Website. Link: <https://www.unenvironment.org/news-and-stories/story/hundreds-millions-face-health-risk-water-pollution-rises-across-three>.

<sup>6</sup> Ibid 1, p. 1.

## “Pollution is now one of the biggest drivers of death and disease in the world”

Occupational exposures in high-income countries have now been controlled by legislation and regulation, backed by strong enforcement, and rates of occupational disease are down. By contrast, occupational exposures to toxic pollutants have become highly prevalent in the past 50 years in low-income and middle-income countries. The worst of these exposures tend to occur in informal, small-scale, locally-owned establishments where child labor is also a frequent problem. The GBD study estimates that, in 2015, toxic occupational risk factors (not including occupational injuries or ergonomic factors) were responsible for 0.88 million deaths globally and for 18.6 million DALYs. Carcinogens were responsible for 0.49 million (55%) of the deaths from occupational exposures to toxicants and for 9.8 million DALYs. Asbestos was responsible for nearly 40% (0.18 million) of all deaths caused by occupational carcinogens. Exposures to particulates, gases and fumes in the workplace were responsible for an estimated 0.36 million deaths and for 8.8 million DALYs<sup>7</sup>.

Occupational exposures to hazardous substances, processes and working conditions are among the causes of work-related illnesses such as cancer, cardiovascular diseases, nervous disorders, renal and chronic respiratory diseases, pneumoconiosis and asthma. Work-related cancer and heart diseases account for over half of all occupational fatalities<sup>7</sup>. The International Labour Organization (ILO) estimates that about 2.78 million work-related deaths occur annually<sup>8</sup>. Non-fatal work-related diseases were estimated to affect 160 million annually, for an estimated global work force of 2.8 billion<sup>7</sup>.

## International Normative Context

The linkage between pollution and health has been recognized in the 2030 Agenda for Sustainable Development. Within Goal 3, “Ensure healthy lives and promote well-being for all, at all ages”, target 3.9 aims to “substantially reduce the number of deaths and illnesses from hazardous chemicals and air, water and soil pollution and contamination by 2030.”

In 2004, the Regional Forum on Environment and Health in Southeast and East Asian Countries was established through the assistance of the WHO and the United Nations Environment Programme (UNEP). The original charter envisions to safeguard and enhance health and the environment, thereby promoting development that reduces poverty. The objective of the Regional Forum is to strengthen the cooperation of the ministries responsible for environment and health within the countries and across the region. The forum has grown to include the countries in the Western Pacific region, South East Asia region and countries covered by UNEP in the Asia-Pacific Region, thus changing their name to the Asia-Pacific Regional Forum on Health and Environment. The ministers of health and environment have met every three years since 2007 to set the overall policy direction of the Regional Forum, while their high-level officials have met every 18 months since 2004 to deal with policies, strategies, budgets and plans with the secretariat<sup>9</sup>.

<sup>7</sup> Occupational Safety and Health Center. 2006. National Profile on Occupational Safety and Health. Department of Labor and Employment, Manila. September 2006.

<sup>8</sup> International Labour Organization website. Link: <https://www.ilo.org/global/topics/safety-and-health-at-work/lang-en/index.htm>.

<sup>9</sup> WHO Western Pacific website. Link: [http://www.wpro.who.int/entity/apac\\_rfhe/en/](http://www.wpro.who.int/entity/apac_rfhe/en/).

At the Fourth Regional Forum in 2016, the Manila Declaration on Health and Environment was formulated in accordance with the global commitments to Agenda 21, the 2030 Agenda for Sustainable Development and the Paris Agreement on Climate Change. Through the Manila Declaration, the Ministers of Health, Ministers of Environment and Heads of Delegation in the Regional Forum called on the governments, the international development community, civil society organizations and the private sector to work towards achieving the Sustainable Development Goal (SDG) targets in environment and health, particularly on the following priority actions and emerging policy priorities:

1. *Combat climate change and its impacts (SDG 13) and orient development and public health systems to become more climate resilient*
2. *Improve air quality and reduce the number of deaths and illnesses caused by air pollution. Prevent the recurrence of transboundary haze through the promotion of sustainable management of forests and the prevention of land degradation and biodiversity loss (SDG 15)*
3. *Ensure availability and integrated and sustainable management of water and sanitation for all, especially for women and girls (SDG 6)*
4. *Reduce the number of deaths and illnesses from hazardous chemicals and air, water and soil pollution and contamination (SDG 3.9) through environmentally sound management of chemicals and all wastes throughout their life cycle (SDG 12.4) and substantial reduction of waste through prevention, reduction, recycling and reuse (SDG 12.5)*
5. *Reduce the adverse per capita environmental impact of cities by paying special attention to air quality, sustainable urban design principles that promote healthy lifestyles, integrated management of municipal and other wastes (SDG 11.6) as well as vector-borne diseases (dengue and malaria)*
6. *Protect the health of the working population (SDG 8.8)*

The Manila Declaration identified the following emerging policy priorities:

1. *Transboundary air pollution, including short-lived climate pollutants (SDGs 3, 11, 12)*
2. *Illegal transboundary shipment and dumping of waste (SDGs 3, 11, 12)*
3. *Destruction of coral reefs and marine pollution (SDG 14)*
4. *Antimicrobial resistance, stemming from, among other things, unsafe management of healthcare wastes and wastewater (SDG 3, 6)*
5. *Promotion of environment and health impact assessments as one of the tools for achieving a more sustainable and equitable development, including valuation of economic costs of health and environmental impacts due to pollution*

## Health and Environment Framework in the Philippines

### Background

In 1991, the Republic of the Philippines (ROP), recognizing the connectivity between environment and health, created and institutionalized the Inter-Agency Committee on Environmental Health (IACEH) through the Presidential Executive Order 489. The IACEH is composed of the Secretaries of the Departments of: (1) Health, who serves as Chair; (2) Environment and Natural Resources, who serves as Vice-Chair; (3) Public Works and Highways; (4) Interior and Local Government; (5) Agriculture; (6) Trade and Industry; (7) Transportation; (8) Information and Communications Technology; (9) Science and Technology; (10) Labor and Employment; and the Director Generals of (11) National Economic and Development Authority; and (12) Philippine Information Authority.

In 2004, ROP was a founding member of the Regional Forum on Environment and Health in Southeast and East Asia. Member countries are encouraged to develop and implement a National Environmental Health Action Plan (NEHAP). As well as being a planning tool used for reporting to the Regional Forum, the NEHAP is the country's comprehensive national plan that sets the national-level

direction to address priority concerns on environment and health. It covers: (1) a situation analysis of the priority sectors; (2) associated priority issues and challenges; (3) target goals and objectives; (4) recommended strategies and activities; (5) monitoring and evaluation; (6) implementing arrangements; and (7) action plan. The ROP drafted its first NEHAP in 2005 through the IACEH and it was updated three times prior to the current NEHAP 2017-2022. The drafting of the current NEHAP was chaired by the Department of Health (DOH) and vice-chaired by the Department of Environment and Natural Resources (DENR) and was completed in coordination with all the IACEH-member departments and other relevant agencies, academic institutions, NGOs and development partners.

The current NEHAP highlights four priority issues and challenges on achieving targets and goals for environment and health:

1. *Policies and regulatory framework: Weak enforcement of existing policies/regulations and absence of relevant technical guidelines and standards. Some of these policies are outdated.*
2. *Data and information: Lack of relevant data/information and weak data management system. There is a need for a database integrating all relevant data from various participating national agencies.*
3. *National sector programs: Many programs by various sector agencies need enhancement by taking into consideration health impacts, climate change, marginalized and vulnerable populations, as well as integration of monitoring and evaluation systems, emergency response and proper documentation and utilization of outputs in Information-Education-Communications (IEC) and advocacy campaigns.*
4. *Capacity building: Lack of an integrated and collaborative mechanism for capability building. Among the priority concerns are the lack of competent regulators and implementers at the Local Government Unit (LGU) level and the lack of competent analytical laboratories in regions outside the National Capital Region (NCR).*

## Basic legal and regulatory framework

Table 1: List of overarching basic legal and regulatory framework of the Philippines to address pollution

Policies	Brief Description
Presidential Decree (PD) 1151 of 1979: Philippine Environmental Policy	Declares the continuing state policy (1) to create, develop, maintain and improve conditions under which man and nature can thrive in productive and enjoyable harmony with each other, (2) to fulfill the social, economic and other requirements of present and future generations of Filipinos and (3) to ensure the attainment of an environmental quality that is conducive to a life of dignity and well-being.
PD 1586 of 1978: Environmental Impact Statement (EIS) System	Mandates the conduct of environmental impact assessment studies for all investments undertaken by the government and private sector.
PD 1152 of 1977: Philippine Environmental Code	Establishes specific environment management policies and prescribes environment quality standards on air, water, land use, natural resources and waste management.
Republic Act (RA) 3931 of 1964: Creation of the National Water and Air Pollution Control Commission / PD 984 of 1976 Revision of RA 3931	Declares a national policy to maintain reasonable standards of purity for the waters and air of the country with their utilization for domestic, agricultural, industrial and other legitimate purposes.
RA 9513 of 2008: Renewable Energy Act	Declares the state policy (1) to accelerate the exploration and development of renewable energy (RE) resources in order to achieve energy self-reliance, (2) to increase the utilization of RE by institutionalizing the development of national and local capabilities in the use of RE systems and promoting its commercial application, (3) to encourage the development and utilization of RE resources as tools to effectively prevent or reduce harmful emissions and balance the goals of economic development with the protection of health and the environment and (4) to establish the necessary infrastructure and mechanism to carry out the mandates specified in this Act and other existing laws.
Executive Order (EO) 292: Instituting the “Administrative Code of 1987”	<p>States that the DENR shall be the primary government agency responsible for the conservation, management, development and proper use of the country’s environment and natural resources, specifically forest and grazing lands, mineral resources, including those in reservation and watershed areas, and lands of the public domain, as well as the licensing and regulation of all natural resources as may be provided for by law in order to ensure equitable sharing of the benefits derived therefrom for the welfare of the present and future generations of Filipinos.</p> <p>States that the DOH shall be the primary government agency responsible to protect and promote the right to health of the people and instill health consciousness among them; adopt an integrated and comprehensive approach to health development, with priority for the underprivileged sick, elderly, disabled, women and children; endeavor to make essential goods, health and other social services available to all the people at affordable cost; establish and maintain an effective food and drug regulatory system; and undertake appropriate health manpower development and research, responsive to the country’s health needs and problems.</p>
RA 7160 of 1991: Local Government Code	Decentralizes governance from the national government to the LGUs. LGUs are given local autonomy, responsibility and resources for them to attain development as self-reliant communities. They are given the power and duty to discharge the functions and responsibilities of national agencies and offices devolved to them. The LGUs share with the national government the responsibility of managing and ensuring the ecological balance within their territorial jurisdiction.



**Table 2: List of basic legal and regulatory framework of the Philippines to address outdoor air pollution**

<b>Policies</b>	<b>Brief Description</b>
RA 8749 of 1999: Philippine Clean Air Act	Comprehensive air quality management policy and program, which aims to achieve and maintain healthy air for all. All potential sources of air pollution (mobile, point and area sources) must comply with the provisions of this Act. Its implementation is a multi-sectoral undertaking, spearheaded by DENR.
RA 8794 of 2000: Imposes a Motor Vehicle User's Charge	Enacted to impose a Motor Vehicle User's Charge on owners of all types of motor vehicles and provides that 7.5% of the funds raised be placed in the Special Vehicle Pollution Control Fund. The fund is to be used exclusively (1) for road maintenance and improved road drainage, (2) for the installation of adequate and efficient traffic lights and road safety devices and (3) for air pollution control. This is jointly implemented by the Department of Transportation (DOTr) and the Department of Public Works and Highways (DPWH).

**Table 3: List of basic legal and regulatory framework of the Philippines to address indoor air pollution**

<b>Policies</b>	<b>Brief Description</b>
RA 8749 of 1999: Philippine Clean Air Act	Stipulates the creation of a regulation that bans smoking in enclosed public buildings and areas.
RA 9211 of 2003: Tobacco Regulation Act	Enacted to ban smoking in public places and regulate the packaging, use, sale, distribution and advertisement of tobacco products. This Act creates an Inter-Agency Committee – Tobacco (IAC-Tobacco), mandated to administer and implement its provisions. It is chaired by the Secretary of the Department of Trade and Industry (DTI) and vice-chaired by the Secretary of the DOH. Members include the Secretaries of the Department of Agriculture (DA), Department of Justice (DOJ), DENR, Department of Science and Technology (DOST), Department of Education (DepEd), Administrator of the National Tobacco Administration (NTA) and representatives from the Tobacco Industry and NGOs.
RA 10351 of 2012: Sin Tax Reform Act	Primarily a health measure and a governance measure to deter people from buying cigarettes (as well as alcohol) by making it more expensive through higher excise taxes.

**Table 4: List of basic legal and regulatory framework of the Philippines to address contamination of water**

<b>Policies</b>	<b>Brief Description</b>
RA 9275 of 2004: Philippine Clean Water Act (CWA); DENR Administrative Order (AO) 2005-10: Implementing Rules and Regulations of the Philippine CWA	Enacted to protect and promote the sustainable use of water resources. The law sets the water quality standards in all water bodies. This Act primarily intends to abate and control pollution mainly from land-based activities. The DENR is primarily responsible for the implementation of the CWA.
DENR AO 2016-08: Water Quality Guidelines and General Effluent Standards	Issued to provide guidelines for the classification of water bodies; determination of time trends and the evaluation of stages of deterioration/enhancement in water quality; evaluation for the need to take actions in preventing, controlling or abating water pollution and designation of water quality management areas and setting of the General Effluent Standards.
RA 8041 of 1995: National Water Crisis Act	Addresses issues of water supply, privatization of state-run water facilities, protection and conservation of watersheds and the waste and pilferage of water.
RA 198 of 1973: Creation of Provincial Water Utilities	Authorizes the creation of local water districts to operate and administer water supply and wastewater disposal systems in the provincial areas.
PD 856 of 1975: Code on Sanitation	Compiles all existing policies related to public health laws on utility services, facilities, business enterprises and establishments and updates them to ensure that they are based on modern standards of sanitation. It outlines the roles and responsibilities at various stages of various government departments, civic societies and professional societies. The DOH is responsible to undertake the promotion and preservation of the health of the people and raise the health standards of individuals and communities throughout the country. The LGUs through their Health Officers and Sanitary Engineers, shall administer and enforce the provisions of this code.
PD 424 of 1974: Creation of the National Water Resources Council (NWRC); EO 124-A of 1987: Reorganizing the DPWH	Provides the NWRC with powers to coordinate and integrate water resources development to meet the present and future water needs of the country. The NWRC has been renamed and reorganized as the National Water Resources Board. All of its technical functions have been transferred to the Bureau of Research and Standards and other offices as deemed appropriate by the Secretary.
Commonwealth Act 383 of 1938: Anti-Dumping Law	Prohibits dumping of refuse, waste matter or other substances into rivers.
PD 979 of 1976: Marine Pollution Decree	Declares it to be a national policy to prevent and control the pollution of seas by the dumping of wastes and other matter which create hazards to human health, harm living resources and marine life, damage amenities or interfere with the legitimate uses of the sea within the territorial jurisdiction of the Philippines.

**Table 5: List of basic legal and regulatory framework of the Philippines on chemicals control**

<b>Policies</b>	<b>Brief Description</b>
RA 6969 of 1990: Toxic Substances & Hazardous & Nuclear Wastes Control Act	Provides the legal framework to control and manage the importation, manufacture, processing, distribution, use, transport, treatment and disposal of toxic substances and hazardous and nuclear wastes. The DENR is primarily responsible for implementing the provisions of this Act.
RA 9003 of 2000: Ecological Solid Waste Management Act	Provides the legal framework for a systematic, comprehensive and ecological solid waste management program that shall ensure protection of public health and the environment. The Act stipulates the establishment of reclamation programs and buy-back centers for recyclable and toxic materials. This law provides the guidelines/criteria for the establishment of controlled dumps and sanitary landfills. The DENR chairs the National Solid Waste Management Commission (NSWMC), which is responsible for overseeing the implementation of solid waste management plans and prescribing policies to achieve the objectives of this Act.
PD 20-01 of 1985: Program to Gradually Withdraw the Use of Tetraethyl Lead in Gasoline	Established a program to gradually withdraw lead in gasoline as a measure to protect and safeguard the health of the people against lead poisoning. The Philippine National Alcohol Commission, under the DTI is responsible for the phase out.
DAO 97-38: Chemical Control Order for Mercury and Mercury Compounds	Policy of DENR to minimize hazards to human health and the environment from the improper use, management, disposal and subsequent release and exposure to harmful substances.
DAO 97-39: Chemical Control Order for Cyanide and Cyanide Compounds	Policy of DENR to minimize hazards to human health and the environment from the improper use, management, disposal and subsequent release and exposure to cyanide and cyanide compounds.
DAO 2000-02: Chemical Control Order for Asbestos	Policy of DENR to minimize the hazard to human health and the environment from the improper use, management, disposal and subsequent release and exposure to asbestos.
DAO 2000-18: Chemical Control Order for Ozone Depleting Substances	Policy of the State/DENR to regulate, restrict or prohibit the import, export, use, manufacture, transport, processing, storage, possession or sale of ozone-depleting substances to abate or minimize their risks and hazards to the stratospheric ozone, public health and the environment.
DAO 2004-01: Chemical Control Order for Polychlorinated Biphenyls (PCBs)	Policy of the State/DENR to reduce and eliminate the importation, manufacture, sale, transfer, distribution and use of PCBs, PCB equipment, PCB-contaminated equipment, non-PCB equipment, PCB articles and PCB packaging and to regulate the transport, treatment and disposal of PCBs and PCB wastes, to protect human health and the environment.
DAO 2005-27: Revised Priority Chemical List	Requires all users, importers and manufacturers of listed chemicals (1) to submit an annual report to the Environmental Management Bureau (EMB), (2) to submit a Hazardous Wastes Registration form to EMB's regional office and (3) to pay the prescribed fees.
DAO 2007-23: Additional Requirements for the Issuance of the Priority Chemical List Compliance Certificate	Requires all importer-distributors and importer-user-manufacturers/user manufacturers of chemicals listed under the Revised Priority Chemical List (PCL) to secure the PCL Compliance Certificate from the DENR-EMB-Central Office.
DAO 2013-24: Chemical Control Order for Lead and Lead Compounds	Policy of the State/DENR 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 the Philippine territorial limits for whatever purpose; and to provide advancement and facilitate research and studies on toxic chemicals.

The following international treaties and agreements on toxic chemicals and hazardous wastes have been ratified by the Philippines:

- Globally Harmonized System: Classification and labeling of chemicals (2002/2008)
- Rotterdam Convention on PIC Procedure: Certain hazardous chemicals and pesticides in international trade (1998/2006)
- Stockholm Convention: Persistent organic pollutants (POPs) (2001/2004)
- Basel Convention: Control of transboundary movement of hazardous waste & disposal (1989/1993)
- Chemical Weapons Convention: Prohibition of the development, production, stockpiling and use of chemical weapons and destruction (1992/1997)
- Montreal Protocol and Vienna Convention: Ozone Depleting Substances (1988/ 1991)
- Kyoto Protocol: Greenhouse Gases (GHG)/Climate Change (1994/1997)
- Minamata Convention: Mercury. Initiatives for its ratification by ROP are under way.

**Table 6: List of basic legal and regulatory framework of the Philippines on occupational exposure**

<b>Policies</b>	<b>Brief Description</b>
1987 Constitution of the Republic of the Philippines	Occupational Safety and Health (OSH) is a constitutional objective described as “just and humane terms and conditions of work”.
RA 11058 of 2018: Strengthening Compliance with Occupational Safety and Health Standards	Enacted to ensure the safety and health of workers in the workplace by providing them full protection against all hazards in their work environment. This Act ensures that the provisions of the Labor Code of the Philippines, all domestic laws and internationally-recognized standards on occupational safety and health are enforced and complied with by employers. The Department of Labor and Employment (DOLE) is responsible to oversee the implementation of this Act.
PD 442 of 1974: Philippine Labor Code	Promotes adequate occupational health and accident prevention policies, enforcement of OSH standards and compensation for work-related injuries and illnesses. The DOLE is responsible to oversee the implementation of this Code.
PD 856 of 1975: Code on Sanitation	Outlines the sanitary requirements for operating an industrial establishment. It enumerates environmental provisions for the health of workers. The DOH is responsible to undertake the promotion and preservation of the health of the people and raise the health standards of individuals and communities throughout the country. The LGUs, through their Health Officers and Sanitary Engineers, administer and enforce the provisions of this code.

The following international treaties and agreements on worker protection have been ratified by the Philippines:

- ILO Convention 138: Convention concerning Minimum Age for Admission to Employment
- ILO Convention 182: Convention concerning the Prohibition and Immediate Action for the Elimination of the Worst Forms of Child Labor
- ILO Convention 017: Workmen’s Compensation (Accidents) Convention
- ILO Convention 019: Equality of Treatment (Accident Compensation) Convention
- ILO Convention 176: Convention concerning Safety and Health in Mines

Initiatives are under way to consider ratification by the Senate of ILO Convention 155 on Occupational Safety and Health and Working Environment and ILO Convention 161 on Occupational Health Services.

# HPAP METHODOLOGY IN THE PHILIPPINES: ACTIVITIES AND TIMELINE

The Health and Pollution Action Plan (HPAP) methodology was modified for the Philippines because at the time of project implementation, the ROP was already finalizing its 4<sup>th</sup> NEHAP for 2017-2022 (see pp. 4–5).

The project’s interventions for the Philippines are intended to complement the NEHAP and strengthen the capacity of the IACEH. Thus, for the Philippines, the three target outputs include: (1) this HPAP document, which focuses on how to reduce the health impacts of pollution from priority sectors in the Philippines; (2) four extended concept notes based on pollution priority issues affecting health and; (3) assistance to the drafting of the Implementing Guidelines of the Presidential Executive Order 489 of 1991 that institutionalizes the IACEH (see Annex 1).

## HPAP and Extended Concept Notes

Implementation of the project methodology was led by representatives of the DENR and DOH, and was facilitated by UNIDO, in partnership with the WHO.

Adapting the general process outlined in Annex 2, the project methodology in the Philippines used the following six-step process. The aim was to focus on supplemental efforts to address some of the priority issues highlighted in the NEHAP and emerging priorities that resulted from the project’s Core Group Meetings and Technical Group Meetings.



Dark smoke coming out from an ULAB recycling facility  
*Courtesy of Pure Earth*

**Table 7: Outline of HPAP methodology adopted process in the Philippines, with UNIDO-WHO partnership**

	<b>Activities</b>	<b>Date</b>	<b>Partners</b>
<b>1</b>	Collation and analysis of available information on health impacts from pollution	April – December 2018	United Nations Children’s Fund (UNICEF), Pure Earth, Clean Air Asia (CAA), GIZ, IACEH member department/agencies
<b>2</b>	Inception meetings to prioritize pollution issues and collaboration plan for the project	10-13 April 2018	DENR, DOH, DTI, DOLE, Pure Earth, University of the Philippines Manila – College of Public Health (UP-CPH), World Bank (WB), United States Agency for International Development (USAID), GIZ, Asian Development Bank (ADB), European Union (EU) and CAA
<b>3</b>	Core Group Meeting	5 June 2018	DENR, DOH, DTI, DOLE and Pure Earth
	Technical Group Meeting	7 June 2018	DENR, DOH, DTI, DOLE, NEDA, Pure Earth, ADB, GIZ and CAA
	Bilateral consultations for the development of the concept notes	July to October 2018	DENR, DOH, DOTr, Pure Earth, CAA, GIZ, UP - Institute of Environmental Science & Meteorology (UP-IESM)
	Drafting and finalization of outputs: HPAP; extended concept notes (ECNs); and Implementing Guidelines of EO 489	October 2018 to January 2019	DENR, DOH, DOTr, DOLE, DTI, ILO, Pure Earth, CAA, GIZ and UP-IESM
<b>4</b>	Consultation workshop for the drafts: HPAP; ECNs; and Implementing Guidelines of EO 489	23 November 2018	DENR, DOH, DTI, DOLE, DOTr, DILG, DA, DOST, DPWH, DICT, NEDA, PIA, Philippine Statistics Authority (PSA), Metropolitan Manila Development Authority (MMDA), Laguna Lake Development Authority (LLDA), Climate Change Commission, UNICEF, Pure Earth, CAA, Health Care Without Harm (HCWH), UP-CPH, UP-IESM and Mapúa University
	Presentation of the HPAP and ECNs to IACEH members; validation of the draft Implementing Guidelines of EO 489	13 December 2018	DENR, DOH, DTI, DOLE, DOTr, DOST, DPWH, DICT, NEDA, PIA, MMDA, Pure Earth, CAA and UP-IESM
<b>5</b>	Turnover of the HPAP, ECNs and the Implementing Guidelines of EO 489 to the IACEH	26 February 2019	IACEH member department/agencies, development organizations
<b>6</b>	Dissemination, fundraising, implementation, monitoring and review of the ECNs	March 2019 onwards	IACEH

**PHASE 1: Collection, compilation and analysis of available information on health impacts from pollution and existing pollution management programs.** Philippine data from the Global Burden of Disease (GBD) study for 2015, coordinated by the Institute of Health Metrics and Evaluation (IHME), was consistent with local country data collected by WHO.

**PHASE 2: Inception meetings to prioritize pollution issues, define next steps, including roles and responsibilities of stakeholders through a participatory process.** Inception meetings were conducted on 10-13 April 2018 with key government partners, development partners, NGOs and academe.

Meetings with the Undersecretaries of key government partners, such as DENR, DOH, DTI and DOLE, were held to seek implementation support as core government partners to lead the prioritization of pollution concerns based on health impacts. Meetings with development partners, NGOs and academe were conducted to seek support through participation in the Technical Experts meeting.

The project partnered with WHO to conduct the project's activities in the country. The project closely collaborated with the Secretariat of the IACEH. To determine the country's priorities for health and pollution, the project conducted a Core Group Meeting and a Technical Group Meeting.

The Core Group Meeting was headed by the Undersecretaries and/or their representatives from DENR, DOH, DTI and DOLE. The meeting was facilitated by UNIDO, while WHO and Pure Earth provided additional technical inputs. The important output of the meeting was the identification of pollution priorities based on global and national health and pollution data.

The Technical Group Meeting was headed by Directors and/or their representatives from DENR and DOH. It was attended by five government agencies, two development partners and two NGOs. The meeting was facilitated by UNIDO and additional technical input was provided by ADB and GIZ. The same prioritization exercise was conducted for this group. In-depth discussions on the project's focus pollution sectors were discussed more thoroughly, with focus on the identified pollution priority issues.

The government ranked outdoor air pollution as the top priority, followed by wastewater & sanitation and occupational exposure. Indoor air pollution ranked as 4<sup>th</sup> priority and soil pollution ranked as 5<sup>th</sup> priority. The ranking results by development partners were slightly different. It can be noted that their vote was based on the trust of their respective organizations and their response to the information that indoor air pollution is responsible for the high mortality and morbidity rate in low- and middle-income countries. The development partners also ranked outdoor air pollution as the top priority, followed by indoor air pollution and soil pollution. Wastewater & sanitation was 4<sup>th</sup> priority and occupational exposure was 5<sup>th</sup> priority.

**PHASE 3. Preparation of a draft report describing priority pollutants, pollution sources, health impacts, cost-effective interventions to reduce exposures, resources needed and potential sources of funding by a joint National Working Group.** The preparation of the report used various national status monitoring reports, development roadmaps and management/operational work plans by the DENR, DOH, DOLE, DPWH, DOTr and PSA. Extended concept notes covering all the five priority pollution sectors were developed based on the inputs and suggestions gathered from the consultation meetings and workshops participated in by IACEH members and its technical working groups (TWGs).

**PHASE 4. Consultation and validation of the draft report and discussion of next steps toward implementing suggested actions.** Additional actions and recommendations specific for mitigating pollution as reflected in the HPAP document will be incorporated into the next updating exercise of the NEHAP. IACEH may wish to check with NEDA if the relevant government agency/ies can fund and operationalize components in the extended concept notes, if what is proposed is in accordance to their roadmaps/development plans/work plans.



Core Group Meeting, 5 June 2018



Technical Group Meeting, 7 June 2018



IACEH Year-End Meeting, 13 December 2018

**PHASE 5. Turnover of documents.** At a formal ceremony, the HPAP document, the ECNs and the Implementing Guidelines of EO 489 were turned over to the IACEH.

**PHASE 6. Dissemination, promotion, fund raising, implementation, monitoring and review of the extended concept notes.** This final phase will be undertaken in accordance with the agreements between the IACEH and NEDA. If desired by the government, the Global Alliance on Health and Pollution (see Annex 2) can support the process of identifying international collaborators for the implementation of the extended concept notes. Monitoring and review of the implementation of the ECNs will be carried out by the IACEH as part of its monitoring of the NEHAP.

**Table 8: Philippine government agencies and organizations that provided technical input in report drafting**

<b>Key government partners</b>	DENR, DOH, DTI, DOLE, DOTr, DILG, DA, DOST, DPWH, DICT, NEDA, PIA, PSA, MMDA, LLDA and Climate Change Commission
<b>Development partners</b>	UNIDO, WHO, UNICEF, EU, USAID, ADB, GIZ and WB
<b>NGOs</b>	Pure Earth, CAA and HCWH
<b>Academe</b>	UP-CPH in Manila, UP-IESM in Diliman and Mapúa University

A basic objective of the project is to help to achieve real action and measurable outcomes for some of the high priority health-pollution challenges. Therefore, in addition to describing the pollution challenges and associated health impacts that were identified as priorities through the consultative and analytical process, this report also includes brief recommended actions, programs and projects in the form of extended project concept notes that would reduce the impacts on public health from priority pollution issues.

## Support to the IACEH

Section 3 of the 1991 Presidential EO 489 which institutionalizes the IACEH, called for the development of implementing guidelines, but none has been drafted yet. At the request of the government, the project provided the necessary technical assistance in the drafting, consultation and validation of EO 489 Implementing Guidelines. The latest version of the Implementing Guidelines was edited by DOH-DPCB and was reviewed by their legal office. This version shall be presented in the next IACEH meeting for adoption through a resolution (see Annex 1).



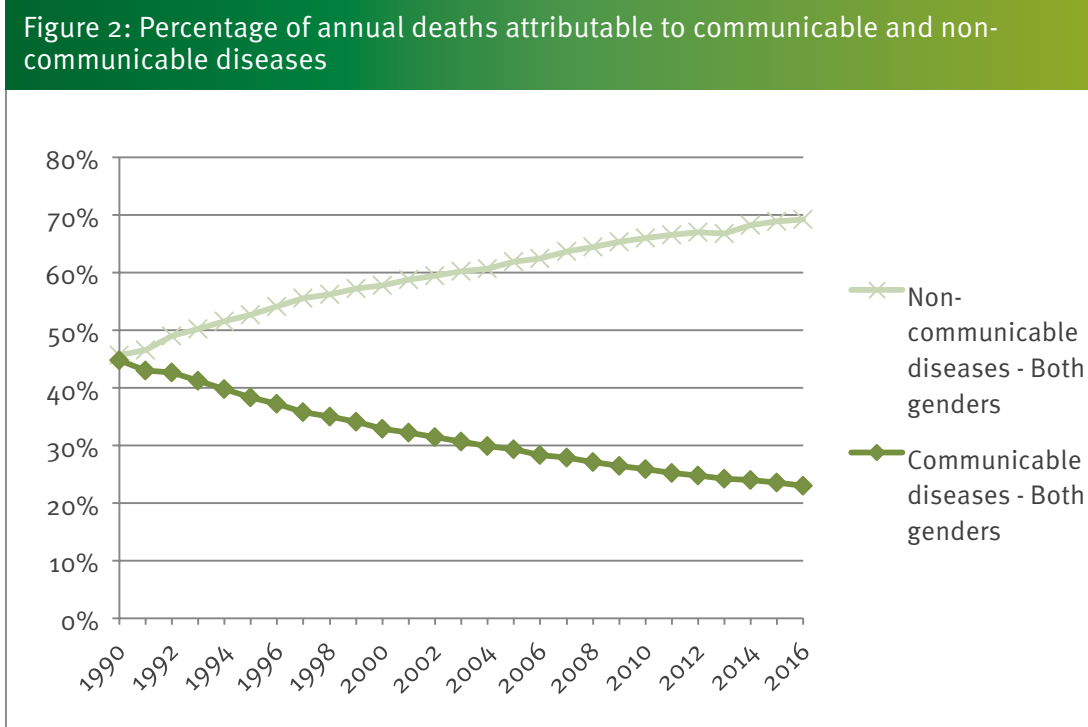
# SUMMARY OF HEALTH IMPACTS FROM MAJOR POLLUTION CHALLENGES IN THE PHILIPPINES

The following summary is based on inputs from national agencies, national and international data on pollution sources and impacts and on an analysis of existing studies and reports describing pollution challenges in the Philippines and the resulting burden of disease. A description of available national data is given in Annex 3.

## Pollution Impacts Data from IHME 2016 GBD Study

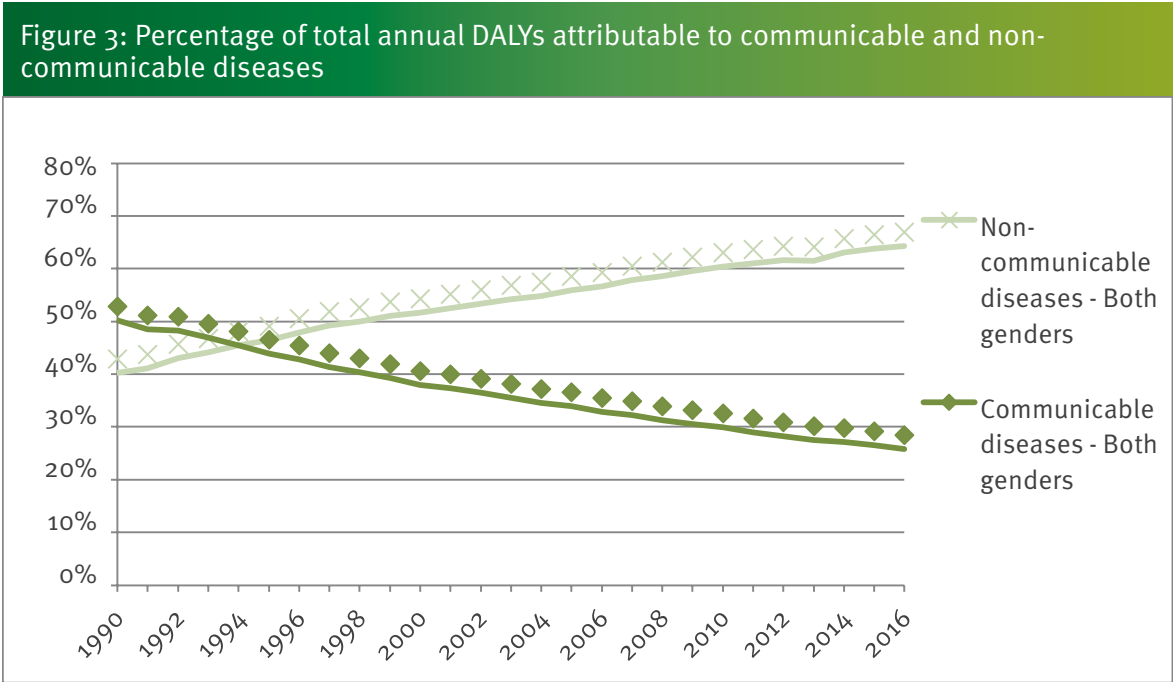
The assessment of health impacts from pollution in the Philippines relies in part on estimates of deaths and DALYs from Global Burden of Disease studies conducted by the IHME and the WHO (see Annex 4).

An analysis of the types of diseases causing mortality in the Philippines shows that death due to communicable diseases is being managed well and has decreased to around 22% in 2016 (Figure 2). The concern is now the rising trend of annual deaths attributed to non-communicable diseases, which is about 70% in the same year.



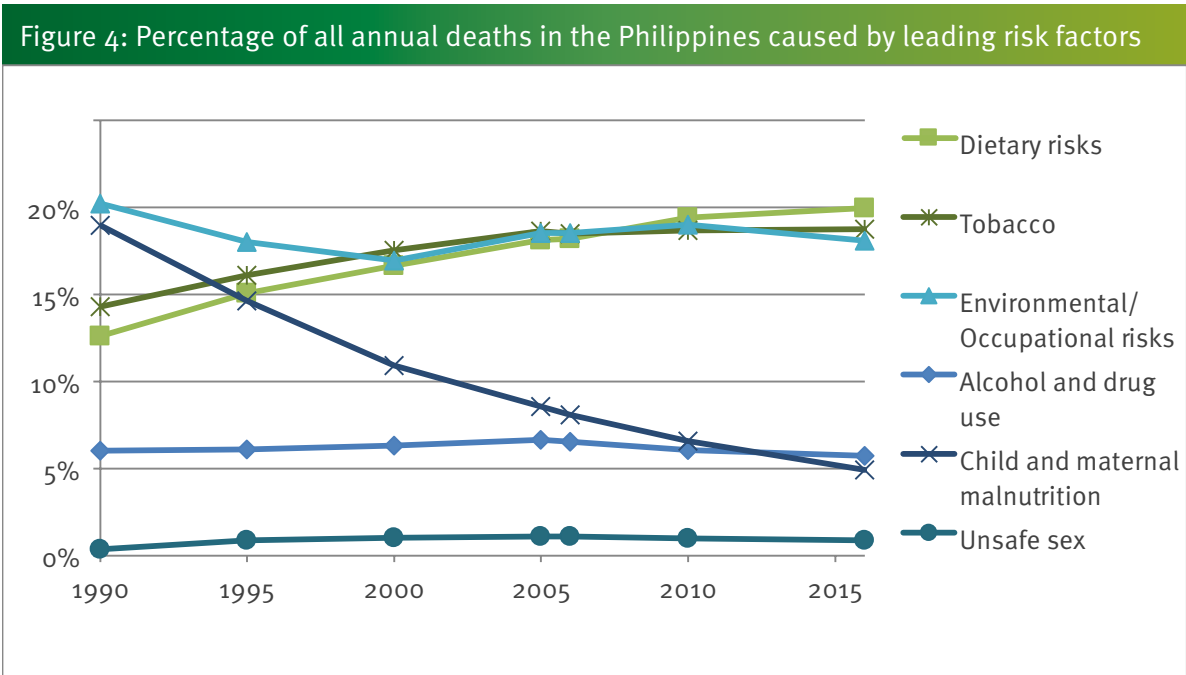
Source: IHME 2016 GBD Study

The same trend is observed for the annual DALYs attributable to communicable and non-communicable diseases (Figure 3). There has been a steady increase in the annual DALYs for non-communicable diseases to about 64% in 2016, while the DALYs for communicable diseases is decreasing to about 28% in the same year.



Source: IHME 2016 GBD Study

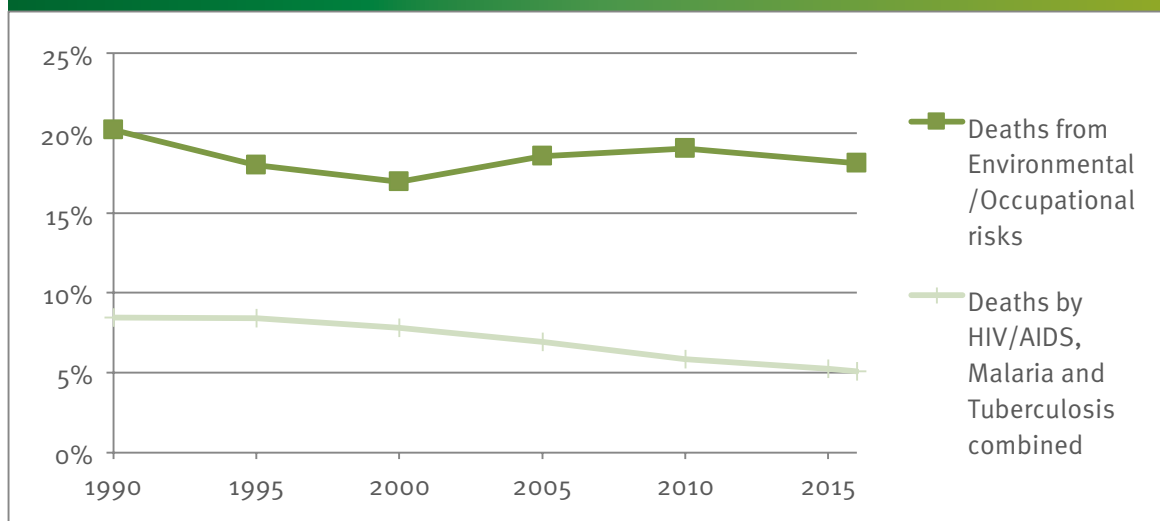
Exposures to pollution contribute significantly to deaths and disabilities from non-communicable diseases in the Philippines. Environmental pollution/occupational risks account for about 18% of all annual deaths. To put that in perspective, tobacco and dietary risks account for 19% and 20%, respectively (Figure 4).



Source: IHME 2016 GBD Study

When deaths attributable to pollution exposures are compared with the combined deaths from such high-profile communicable diseases as HIV/AIDS, malaria and tuberculosis, pollution's impact is observed to be more significant in the Philippines (Figure 5).

Figure 5: Percentage of annual deaths attributable to pollution vs HIV/AIDS, Malaria and Tuberculosis (combined)



Source: IHME 2016 GBD Study

Note that this chart compares a risk factor (pollution exposures) to diseases

The following table summarizes the annual deaths in the Philippines from various sources of pollution, in total and as a percentage of all deaths, as estimated in the Global Burden of Disease study.

Table 9: Summary of annual deaths from pollution in the Philippines

Pollution Type	Annual Deaths*	As % of all Deaths
<b>Air</b>		
Household air pollution from solid fuels	55,926	8.92%
Ambient particulate matter pollution	44,389	7.08%
<b>Total Air</b>	<b>100,315</b>	<b>16.00%</b>
<b>Water</b>		
Unsafe water source	4,478	0.72%
Unsafe sanitation	1,520	0.24%
<b>Total Water</b>	<b>5,998</b>	<b>0.96%</b>
<b>Chemicals</b>		
Lead exposure	5,080	0.81%
Occupational carcinogens	8,926	1.42%
<b>Total Chemicals</b>	<b>14,006</b>	<b>2.23%</b>
<b>Subtotal – All Pollution</b>	<b>120,319</b>	<b>19.19%</b>

\*All ages and both sexes

Source: IHME 2016 GBD Study

According to GBD, air pollution is by far the leading cause of deaths from pollution in the country. Deaths due to household air pollution from the burning of solid fuels is slightly higher than deaths due to ambient air pollution. The next leading cause of death due to pollution is exposure to chemicals such as lead and occupational carcinogens. This is followed by pollution of water, particularly from unsafe water sources and unsafe sanitation.

The following tables show more details from the GBD study in the five areas covered by the project.

## Burden of disease from outdoor air pollution

The following table summarizes the annual deaths and DALYs attributed by the Global Burden of Disease study solely to the presence of particulate matter (PM) in outdoor air, in total and as a percentage of all deaths. Results show that the number of deaths and DALYs is slightly higher for males than females. The age disaggregation data shows that the number of deaths and DALYs for children is higher at ages <5 years, as compared to ages 5-14 years. The number of deaths and DALYs is highest at ages 50-69 years.

**Table 10: Annual deaths and DALYs from ambient particulate matter pollution as estimated in the GBD study in 2016**

Demographics	Deaths	As % of all Deaths	DALYs	As % of all DALYs
<b>Sex</b>				
Male	26,994	7.35	816,945.7	4.71
Female	17,395	6.69	447,585.4	3.52
<b>TOTAL</b>	<b>44,389</b>	<b>7.08</b>	<b>1,264,531.2</b>	<b>4.21</b>
<b>Age</b>				
<5 years	1,902	3.28	163,200.7	3.03
5-14 years	316	2.17	24,790.5	1.17
15-49 years	7,158	5.72	357,280.9	3.15
50-69 years	16,502	8.21	489,340.3	6.29
70+ years	18,510	8.12	229,918.8	6.79
<b>TOTAL</b>	<b>44,389</b>	<b>7.08</b>	<b>1,264,531.2</b>	<b>4.21</b>

Source: IHME 2016 GBD Study

It can be expected that the actual number of deaths and DALYs attributable to air pollution will be higher, since these data only consider exposure to PM.

## Burden of diseases from indoor air pollution

The following table summarizes the annual deaths and DALYs attributed by the Global Burden of Disease study to indoor air pollution, in total and as a percentage of all deaths. Data shows that the percent of deaths in females is slightly higher than males, while the percent of DALYs for males is slightly higher than for females. The age disaggregation data shows that the numbers of deaths and DALYs for children is higher at ages <5, as compared to ages 5-14. The number of deaths and DALYs is highest at ages 50-69 years.

**Table 11: Annual deaths and DALYs from indoor air pollution from solid fuels as estimated in the GBD study in 2016**

Demographics	Deaths	As % of all Deaths	DALYs	As % of all DALYs
<b>Sex</b>				
Male	30,985	8.44	939,191.9	5.42
Female	24,941	9.59	644,619.5	5.07
<b>TOTAL</b>	<b>55,926</b>	<b>8.92</b>	<b>1,583,811.4</b>	<b>5.28</b>
<b>Age</b>				
<5 years	2,971	5.12	254,880.3	4.73
5-14 years	517	3.55	40,567.3	1.91
15-49 years	8,397	6.71	418,067.0	3.69
50-69 years	19,604	9.75	572,128.4	7.35
70+ years	24,438	10.72	298,168.5	8.81
<b>TOTAL</b>	<b>55,926</b>	<b>8.92</b>	<b>1,583,811.4</b>	<b>5.28</b>

Source: IHME 2016 GBD Study

## Burden of diseases from wastewater

Table 12 summarizes the annual deaths and DALYs from unsafe water, poor sanitation and poor handwashing, in total and as a percentage of all deaths, as estimated in the Global Burden of Disease study.

**Table 12: Annual deaths and DALYs from unsafe water, sanitation and handwashing as estimated in the GBD study in 2016**

Demographics	Deaths	As % of all Deaths	DALYs	As % of all DALYs
<b>Sex</b>				
Male	4,672	1.27	276,985.0	1.60
Female	3,434	1.32	181,599.4	1.43
<b>TOTAL</b>	<b>8,106</b>	<b>1.29</b>	<b>458,584.5</b>	<b>1.53</b>
<b>Age</b>				
<5 years	2,518	4.34	237,129.4	4.40
5-14 years	547	3.75	55,942.8	2.63
15-49 years	1,116	0.89	90,980.2	0.80
50-69 years	1,312	0.65	44,168.9	0.57
70+ years	2,613	1.15	30,363.2	0.90
<b>TOTAL</b>	<b>8,106</b>	<b>1.29</b>	<b>458,584.5</b>	<b>1.53</b>

Source: IHME 2016 GBD Study

The data shows that the number of deaths and DALYs in this case is slightly higher for males than females. The age disaggregation data shows that the percentage of deaths and DALYs is highest for children ages <5 years and 5-14 years, but in absolute terms highest for ages <5 years, which shows that very young children are most affected by poor water quality and poor sanitation.

## Burden of disease from soil contamination

The GBD study does not have similar national data in detail for the burden of disease due to soil contamination.

## Burden of disease from occupational exposure

The following table summarizes the annual deaths and DALYs from exposure of workers to a limited set of carcinogens common in the workplace, in total and as a percentage of all deaths, as estimated in the Global Burden of Disease study. Since these data are limited to a handful of carcinogens, they underestimate the true extent of exposure to toxic and hazardous chemicals in the workplace.

The data shows that the number of deaths and DALYs is significantly higher for males than females. This suggests that many of the jobs for men are more hazardous than jobs for women. The age disaggregation data shows that the number of deaths is highest for ages 50-69 years, while the number of DALYs is highest for ages 15-49 years.

**Table 13: Annual deaths and DALYs from occupational risks as estimated in the GBD study in 2016**

Demographics	Deaths	As % of all Deaths	DALYs	As % of all DALYs
<b>Sex</b>				
Male	12,471	3.39	705,655.0	4.07
Female	4,051	1.56	280,349.9	2.20
<b>TOTAL</b>	<b>16,522</b>	<b>2.63</b>	<b>986,004.9</b>	<b>3.28</b>
<b>Age</b>				
<5 years	0	0	0	0
5-14 years	0	0	0	0
15-49 years	4,991	3.98	512,847.1	4.51
50-69 years	8,055	4.00	397,948.8	5.11
70+ years	3,476	1.53	75,209.0	2.22
<b>TOTAL</b>	<b>16,522</b>	<b>2.63</b>	<b>986,004.9</b>	<b>3.28</b>

Source: IHME 2016 GBD Study

## Impacts of Pollution on Health from Available National and Regional Data

### Outdoor air pollution

The National Air Quality Status Report for 2008-2015 cites studies of the WB, the Philippine Health Statistics and the Philippine Cancer Society on the impacts of air pollution on health. In 2001, WB reported that exposure to PM<sub>10</sub> in Metro Manila, Baguio City, Cebu City and Davao City caused 2,000 premature deaths and led to 9,000 people suffering from chronic bronchitis. In 2009, the WB estimated that annually, more than 1 million people were getting sick and 15,000 were dying prematurely due to outdoor air pollution in the Philippines.

The Philippine Statistics Authority has reported that the leading causes of mortality attributable to air pollution in the country are diseases of the heart, pneumonia and chronic lower respiratory diseases, resulting in a total of 205,897 deaths in 2014. In the same year, the main causes of

morbidity attributable to air pollution in the country were acute respiratory infection, bronchitis, acute lower respiratory tract infection and pneumonia, resulting in a total of 2,791,767 cases<sup>10</sup>.

The Philippine Cancer Society has reported that lung cancer cases and deaths attributable to air pollution were 2,930 and 2,700, respectively, in 2005, and that these values decreased to 1,948 and 1,561, respectively, in 2010.

## Indoor air pollution

Indoor air pollution in industrial settings is being monitored by the Department of Labor and Employment, while the development of indoor air quality (IAQ) standards in offices inside industrial facilities as well as protocols for monitoring are in the pipeline as well.

In the case of household air pollution, currently, there is no national government agency mandated to monitor the exposure of occupants. Yet, 55% of the Philippine population relies on traditional cooking fuels and technologies<sup>11</sup>. Smoke from burning of solid fuels contains pollutants of known health hazards, including particulate matter (PM<sub>2.5</sub>), carbon monoxide (CO), carbon dioxide (CO<sub>2</sub>), nitrogen dioxide (NO<sub>2</sub>) and sulfur oxides (SO<sub>2</sub>, mainly from coal). Aside from indoor air pollution, household emissions from cookstoves also affects thermal comfort that depends on the occupancy. Neither of these (thermal comfort and occupancy) are being monitored by relevant national governmental agencies.

Exposure to household air pollution from burning of solid fuels has been implicated, with varying degrees of evidence, as a causal agent of several diseases, and has been reported to cause 4.3 million premature deaths yearly, globally<sup>12</sup>. According to a study done by the Global Alliance for Clean Cookstoves in 2012, the total number of deaths annually in the Philippines from household/indoor air pollution is estimated at about 48,221. The number of child deaths is estimated at 6,833 annually.

## Wastewater and sanitation

A significant portion of the country's surface waters and groundwater, which are the predominant sources of potable water supply in the Philippines, are contaminated due to low levels of treatment of wastewater and improper sewage management. This contamination of domestic water supply sources is a main cause of cases of diarrhea. In 2017, diarrhea ranked 7th among the ten leading causes of morbidity in the country, affecting 132,783 people. In 2017, the number of diarrhea cases for children aged 0-5 years totals to 200,344<sup>13</sup>.

Furthermore, the continuing practice of open defecation, along with improper seepage management in almost all rural areas of the country, contributes to both contamination of domestic water supply and the ongoing endemic prevalence of neglected tropical diseases (NTDs) such as Schistosomiasis, Lymphatic Filariasis, or soil-transmitted helminths in many of the poorest provinces in the Philippines.

## Contamination of soil/sites

No national or regional data exist on levels of mortality and morbidity which are attributable to soil contamination.

<sup>10</sup> PSA, 2017. Philippine Statistical Yearbook 2017. Philippine Statistics Authority, Quezon City, Philippines.

<sup>11</sup> PSA, 2016, Highlights of the Philippine Population 2015 Census of Population. Link: <https://psa.gov.ph/content/highlights-philippine-population-2015-census-population>.

<sup>12</sup> Lim, S.S., Vos, T., Flaxman, A.D., Danaei, G., Shibuya K., Adair-Rohani, H., et al. A comparative risk assessment of burden of disease and injury attributable to 67 risk factors and risk factor clusters in 21 regions, 1990–2010: a systematic analysis for the Global Burden of Disease study 2010. *Lancet*. 2012; 380:2224–2260.

<sup>13</sup> DOH, 2017. Field Health Service Information System (FHSIS), 2017 Annual Report.

**“ Diseases resulting from pollution and for which data are available are estimated to cost Philippines between US\$1.0 billion and US\$1.3 billion ”**

## Occupational exposure

Based on records from 1997-2000, the compensation claims share for occupational accidents is 91% (11,729 cases) and 9% (1,070 cases) for work-related illnesses. The top three diseases claimed for were (1) diseases of the genito-urinary system (renal failure), (2) circulatory system (hypertensive heart disease and stroke) and (3) skin and subcutaneous tissue (allergic and irritant type of contact dermatitis). Most of the claimants were in their early 40s and were mostly trade workers, professional employees and laborers<sup>14</sup>.

A study on occupational hazards in the industrial sector around the country showed the various health and safety risks of workers. In nine cement plants, workers were noted to be exposed to hazards such as heat, noise and dust. In a semiconductor manufacturing industry, 399 female workers reported abnormal health effects of exposure such as abortion, ectopic pregnancy or stillbirth. In four textile establishments, working area showed high concentration of cotton dust and high level of noise and toxic chemicals in bleaching, dyeing, printing and finishing processes. Women in the garment industry were found to be exposed to extreme heat, dust from textile fibers and ergonomic hazards. In a study conducted in major leather tanneries, results showed that tanneries were unhygienic, damp, with pungent odor, had poor housekeeping and practiced improper disposal of chemicals. Workers were not given personal protective equipment even when handling toxic chemicals such as sulfuric and formic acids, ammonia and chromium. In the mines, workers reported of being hit by falling objects, suffocation from chemical fumes and crushing injuries<sup>15</sup>.

## Economic Costs of Pollution in the Philippines

Diseases resulting from pollution and for which data are available are estimated to cost the Philippines between US\$1.0 billion and US\$1.3 billion in 2015 due to lost productivity - the equivalent of 0.3% to 0.4% of the country's 2015 Gross Domestic Product (GDP). The welfare damages from pollution-attributable diseases equal US\$23 billion, or 6.5% of the gross national income (GNI) for the same year. The national data on direct healthcare spending used to treat pollution-attributable diseases is not available in the Philippines. These figures were based on estimated data from the Lancet Report 2016; a complete description of the cost estimate methodology can be found in the Supplementary Appendix of the Lancet Report 2017<sup>16</sup>.

Premature death and disease due to pollution impose great costs on national budgets and healthcare spending, especially in industrializing lower-middle-income countries such as the Philippines. Diseases caused and exacerbated by pollution result in medical expenditures and in pain and suffering. Pollution-related disease can reduce labor force participation, labor market productivity and economic output. In children, pollution-related diseases can impact health and cognitive development, contributing to failure in school and the perpetuation of intergenerational

<sup>14</sup> Ibid 6, p. 3.

<sup>15</sup> Lu, Jinky Leilanie, 2016. An investigation of the State of Occupational Safety and Health in the Philippines Injury Prevention 2016. 22:A139-A140.

<sup>16</sup> Ibid 3, p. 2.



poverty. Early life exposures to neurotoxic pollutants such as lead and mercury can impair cognition, diminish the ability to concentrate, and disrupt behavior, thus reducing lifetime earnings. The costs of disease and premature death caused by pollution, especially the more modern forms of pollution, are rising rapidly.

The costs of pollution-related disease are often overlooked and undercounted because they are associated with non-communicable diseases that appear and extend for many years after the initial exposure, are spread across large populations and are not captured by standard economic indicators. These costs are much more difficult to calculate than the costs of pollution control, which are usually tangible and concrete. Although the costs of pollution-related disease can have large effects on the budgets of health ministries and increase spending in health systems, they are typically buried in general health expenditures and hospital budgets, hidden in productivity reports, do not affect the budgets of environment ministries and are not attributed to pollution.

The costs of pollution-related disease include: (1) direct medical expenditures, including hospital, physician and medication costs, long-term rehabilitation or home care and non-clinical services such as management, support services and health insurance costs; (2) indirect health-related expenditures, such as time lost from school or work, costs of special education and the cost of investments in the health system (including health infrastructure, research and development and medical training); (3) diminished economic productivity in persons whose brains, lungs and other organ systems are permanently damaged by pollution; and (4) losses in output resulting from premature death.

Pollution-related disease is responsible also for intangible costs, such as those of poor health in people made ill by pollution, disruption of family stability when a person of working age becomes disabled or dies prematurely as a result of pollution and the loss in years of life to the person themselves.

# SUMMARY OF PRIORITY POLLUTION MANAGEMENT CHALLENGES & RECOMMENDATIONS

## NEHAP Thematic Priority Areas

For the period of 2017-2022, the NEHAP has identified seven priority thematic areas: (1) Water Supply, Sanitation and Health; (2) Air Quality and Health; (3) Solid Waste Management and Health; (4) Chemical Safety and Health; (5) Food Safety and Health; (6) Occupational Health and Safety (OHS); and (7) Climate Change and Health.

## HPAP Priority Pollution Sectors

The focus pollution sector areas of the project are well aligned with NEHAP's priority thematic areas. Through a series of consultations with the government, development partners, and NGOs, the project's focus pollution sectors were ranked based on their health impacts. The following is the result of the ranking/prioritization:

1. Outdoor air pollution
2. Wastewater and sanitation
3. Occupational exposure
4. Indoor air pollution
5. Soil pollution

Since the project is intended to complement the NEHAP, initiatives were identified that will support the objectives of the NEHAP, as described under the section "Further actions proposed".

### PRIORITY ISSUE 1

## OUTDOOR AIR POLLUTION

### Sources and characteristics of outdoor air pollution

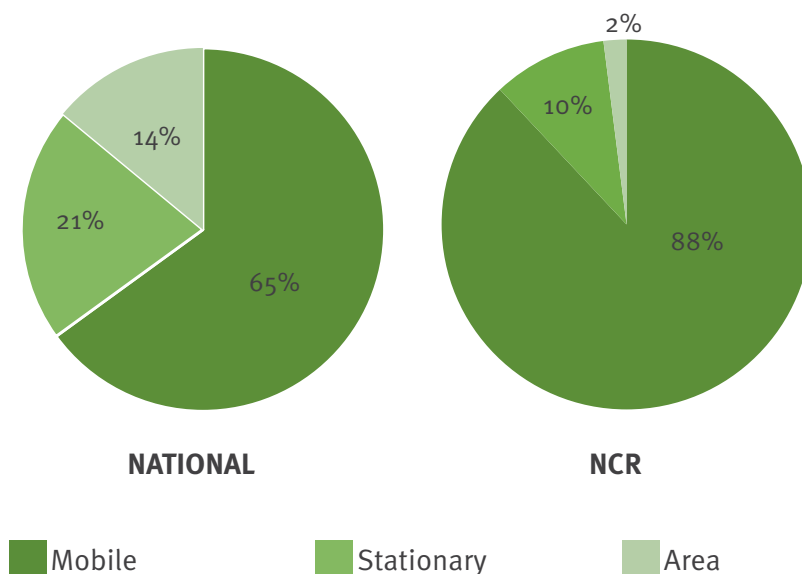
Based on the latest national emissions inventory by DENR in 2015<sup>17</sup>, mobile sources such as cars, motorcycles, trucks and buses are responsible for the majority (65%) of air pollutants. Stationary sources such as power plants and factories contribute about 21% of air pollutants. Area sources such as construction activities, open burning of solid wastes and slash-and-burn farming in the uplands account for 14% of air pollutants. Looking more closely at the case of the NCR, where about 16 cities are located, it was estimated that about 88% of air pollution is due to mobile sources. The remaining 10% is from stationary sources and 2% from area sources.

<sup>17</sup> DENR-EMB, 2015. National Air Quality Status Report, 2008-2015. Visayas Avenue, Quezon City. Department of Environment and Natural Resources, Environmental Management Bureau.

For the mobile sources, data from 2010 to 2014 indicates a 22% increase in the number of registered motor vehicles. This increase in the volume of vehicles on the road aggravates the heavy traffic situation in urban areas, especially in the major urban cities. Heavy traffic results in more vehicle emissions, especially from old and/or ill-maintained vehicles.

For the stationary sources, the combustion of coal, natural gas and oil is the primary source of pollution. Coal is responsible for 38.76% of total energy production, natural gas for 26.93% and oil for 5.63%.

Figure 6: Outdoor air pollution sources



DENR-EMB’s regional monitoring stations routinely take measurements of criteria air pollutants. There is sampling equipment located all over the Philippines, classified according to type of monitoring and criteria pollutants monitored. The established National Ambient Air Quality Guideline Values for the country are shown in Table 14.

Table 14: National Ambient Air Quality Guideline Values (NAAQGV) based on the Clean Air Act

Parameter	Averaging Time	NAAQGV (µg/NCM*)
TSP	Annual	90
	24-hour	230
PM <sub>10</sub>	Annual	60
	24-hour	150
PM <sub>2.5</sub>	Annual	25
	24-hour	50
Sulfur Dioxide (SO <sub>2</sub> )	Annual	80
	24-hour	180
Nitrogen Dioxide (NO <sub>2</sub> )	Annual	-
	1-hour	-
	24-hour	150
Ozone (O <sub>3</sub> )	8-hour	60
	1-hour	140
Carbon Monoxide (CO)	8-hour	10
	1-hour	35
Lead (Pb)	Annual	1
	3 months	1.5

- \*NCM stands for ‘normal cubic meter’, assuming that the samples were collected under normal conditions or at standard temperature and pressure
- SO<sub>2</sub> and suspended particulate matter (TSP and PM) are sampled once every six days when using the manual methods. A minimum of twelve sampling days per quarter or forty-eight sampling days each year is required for these methods. Daily sampling may be done in the future once continuous analyzers are procured and become available.
  - For short term values, maximum limits represented by 98 percentile values not to exceed more than once a year.
  - Annual values of TSP and PM<sub>10</sub> are reported as geometric mean. Geometric mean is used because the annual mean pollutant level in a year is dependent of the pollutant level from the previous year.
  - Evaluation of the guideline for lead is carried out for 24-hour averaging time and averaged over three moving calendar months. The monitored average value for any three months shall not exceed the guideline value.

## Roles and responsibilities in addressing outdoor air pollution

According to the Clean Air Act, the DENR is the primary government agency responsible for the implementation and enforcement of the Act. The DENR should nevertheless consult, collaborate and partner with other government agencies, non-governmental (NGOs) or people’s organizations (POs) and private enterprises to achieve the objectives of the Act. The Local Government Units (LGUs) share the responsibility in the management and maintenance of air quality within their territorial jurisdiction. For LGUs to do this, the DENR should provide them with technical assistance, training and continuing capacity building to prepare them to undertake full administration of the air quality management and regulation within their territorial jurisdiction. Other main government agencies responsible for the implementation of the Act are DOTr and Department of Energy (DOE). The DOTr is responsible for the implementation of emission standards for motor vehicles and establishment of roadside inspection systems. The DOE is responsible for setting the specifications for all types of fuel and their additives. Table 15 describes in more detail the roles and responsibilities of various government entities and stakeholders in addressing outdoor air pollution.

**Table 15: Roles and responsibilities in addressing outdoor air pollution**

<b>Roles</b>	<b>Responsible departments/agencies</b>
<b>1. Mitigation of air pollution from mobile sources</b>	
Motor Vehicle Inspection System	- Land Transportation Office (LTO) - DOTr - Private sector groups
Private Emissions Testing Centers	- DOTr-LTO - DTI - DENR - Private sector groups
<b>2. Reduction of emissions from vehicular use</b>	
Introducing emission control technologies	- DENR - DOTr - DTI - DOST - Automotive industry
Regulating the importation of second-hand vehicles	- Bureau of Customs-DOF - Bureau of Import Services-DTI - DOTr-Land Transportation Franchising and Regulatory Board (LTFRB)-LTO
<b>3. Mitigation of air pollution from stationary sources</b>	
Stack monitoring and related permitting	- DENR-EMB and its regional offices - Authorized/recognized private sector groups
Adjudication of air pollution cases	- Pollution Adjudication Board
Funds for the installation of air pollution control facility	- Land Bank of the Philippines - Development Bank of the Philippines
<b>4. Strengthening of ambient air monitoring, reporting and management</b>	
Cooperation with concerned government agencies	- DENR-EMB
EMB Regional Offices	
<b>5. Improvement of fuel quality</b>	
Change in composition of fuel quality	- DOE - DENR - DTI-Bureau of Product Standards - DOST - Chamber of Automotive Manufacturers of the Philippines, Inc. - Oil companies - NGOs

Table 15: (Cont.) Roles and responsibilities in addressing outdoor air pollution

Roles	Responsible departments/agencies
Examination of potential for alternative fuels	<ul style="list-style-type: none"> <li>- DOE</li> <li>- DOST</li> <li>- Private sector groups</li> </ul>
<b>6. Reduction in traffic congestion and improvement in traffic flow</b>	
Road rehabilitation program	<ul style="list-style-type: none"> <li>- DPWH</li> </ul>
Traffic engineering and management	<ul style="list-style-type: none"> <li>- DOTr</li> <li>- MMDA</li> <li>- LGUs</li> <li>- Concerned government agencies</li> </ul>
Transport policy studies	<ul style="list-style-type: none"> <li>- MMDA</li> <li>- DOTr-Light Railway Transport Authority</li> <li>- Philippine National Railway</li> <li>- LGUs</li> </ul>
Increasing public awareness	<ul style="list-style-type: none"> <li>- DENR Public Affairs Office and the Environmental Education and Information Division-EMB, with Partnership for Clean Air</li> <li>- Private sector</li> <li>- Civil society</li> </ul>

Source: DENR-EMB, undated

## Actions taken to date to address outdoor air pollution

Since the enactment of the Clean Air Act in 1999, several projects and programs have been implemented to reduce the degree of air pollution, especially in highly urbanized centers, with particular emphasis on the use of public transport and alternative energy sources.

### DENR/EMB

**Air quality monitoring:** A total of 51 real-time ambient air quality monitoring stations have been established nationwide. The air quality indicators being monitored are TSS, PM, sulfur dioxide (SO<sub>2</sub>), nitrogen dioxide (NO<sub>2</sub>), ozone (O<sub>3</sub>), carbon monoxide (CO), and lead (Pb). An inventory of emission sources has been prepared and is updated every three years.

**Management of stationary sources:** All stationary sources are required to get a Permit to Operate (PTO) from DENR, which the Agency will issue upon compliance with the National Emission Standards for Source Specific Air Pollutants (NESSAP). Pollution Control Officers (PCOs) are required to be designated by companies to oversee all operations related to air pollution sources and control facilities, and to submit to the DENR a Quarterly Self-Monitoring Report. A total of 19 firms were accredited by EMB to conduct regular emissions monitoring of stationary sources with a potential to cause air pollution. In case of violations, a Notice of Violation (NOV) is issued and the necessary fines are imposed.

**Management of mobile sources:** All new vehicles are evaluated for their compliance with emission standards to get a Certificate of Conformity (COC) before they are introduced into the market for sale. DENR together with DOE issued a directive for the adoption of EURO 4/IV standards for all fuels and vehicles in the country by 2016.

**Table 16: Accomplishments of other government agencies mandated under the Clean Air Act**

Agency	Accomplishments
DOE	<ul style="list-style-type: none"> <li>- Promoted the shift from gas-fueled tricycles to electric tricycles (Lithium-ion battery-powered e-vehicles)</li> <li>- Works toward the establishment of associated EV support industries (charging stations, motor and parts supply chain, with maintenance and repair services)</li> <li>- Through the Oil Industry Management Bureau, created the Technical Committee on Petroleum Products and Additives (responsible for the issuance of petroleum standards based on EURO 4/IV)</li> <li>- Promoted the use of natural gas in the transport sector through EO 290, the “Natural Gas Vehicle Program for Public Transport”</li> <li>- Improvement of fuel standards: In 2007, RA 9367 or the “Biofuels Act of 2006” has been signed and mandated that in the same year, diesel fuel should have a 1% Biodiesel blend which increased to 2% by 2009. Aside from this, it is also mandated that all gasoline should have a 10% ethanol blend by 2011</li> </ul>
DOTr	<ul style="list-style-type: none"> <li>- Philippine Clean Vehicles Program is funded through SVPCF which constitutes 7.5% of the total collection from MVUC: Nationwide establishment of the motor vehicle inspection centers (MVICs) complete with equipment and software capable of inspecting current and future motor vehicle population throughout the country. The target is to install automated system check for roadworthiness and providing at least one operational MVIS center at each LTO site. A feasibility study to implement the project through PPP is on-going.</li> <li>- Undertaken activities related to the importation and pilot testing in Metro Manila and selected provincial cities of alternative public utility vehicles (auto-LPG conversion of LTRB taxis)</li> <li>- SVPCF-funded project, “Public Utility Jeepney Modernization and Conversion Program”, which seeks to encourage jeepneys to re-fleet and retrofit their units from diesel engines to electric-LPG powered/or other alternative fuels</li> <li>- Pushed for the Natural Gas Vehicle Program for Public Transport</li> <li>- As of June 2012, acquired 61 compressed natural gas (CNG) buses; got 7 bus operators to commit 200 vehicles for piloting CNG buses</li> <li>- Existing CNG infrastructures are upgraded (e.g. Malampaya Gas Field and several refueling stations)</li> <li>- Promotion of high occupancy transport modes through the mass transit system like BRT, MRT/LRT and PNR Commuter Rail</li> <li>- Ortigas Greenways Project: Has been included in the CY2014 SVPCF for final deliberation by the Road Board</li> <li>- Integrated terminal system which will reduce the air pollution from motor vehicles will be constructed to connect provincial buses with other modes of transportation. The project aims to maximize road usage by reducing vehicle volume and improving traffic flow along Manila’s major thoroughfare, particularly EDSA. Three proposed terminals and their statuses are: South West terminal (awaiting NEDA approval of changes in project terms), South Terminal (movement of NFA warehouses from FTI location is on-going), and North Terminal (site selection is on-going)</li> </ul>
DTI	<ul style="list-style-type: none"> <li>- Through its Regional and Provincial Offices and the Bureau of Philippine Standards (BPS), DTI implements the Accreditation of Private Emission Testing Centers (PETCs) scheme. As of December 2013, there are 1,168 accredited centers nationwide with 1,417 accredited stationary lanes</li> <li>- BPS has also initiated meetings with BPS recognized calibration laboratories. The laboratories were encouraged to apply for accreditation by the DTI Philippine Accreditation Bureau for conformance to PNS ISO/IEC 17025. To date, three laboratories have applied for accreditation</li> </ul>
DepEd	<ul style="list-style-type: none"> <li>- Provides public information and education to encourage participation of an informed and active public in air quality planning and monitoring</li> <li>- Curriculum integration approach: topics on clean air are integrated into the teaching of Science, Health and Social Studies</li> <li>- Alternative Learning System is also used as a mechanism for information dissemination on clean air initiatives through transforming modules into a Radio script: “Hangin Pumapatay” or digital format: “Wanted: Clean and Fresh Air”</li> </ul>

Table 16: (Cont.) Accomplishments of other government agencies mandated under the Clean Air Act

Agency	Accomplishments
Philippine Nuclear Research Institute (PNRI)	<ul style="list-style-type: none"> <li>- Has undertaken research monitoring of PM<sub>2.5</sub> range using nuclear and related analytical techniques (NATs) to generate multi-element data for use in receptor modelling</li> <li>- Generated black carbon and organic carbon/elemental carbon data</li> <li>- Carbonaceous particulate matter characterization in an urban and a rural site in the Philippines</li> <li>- Air pollutant source identification and apportionment studies</li> <li>- Preliminary characterization of carbonaceous aerosol emissions of different combustion sources</li> </ul>
MMDA	<ul style="list-style-type: none"> <li>- Reduced vehicle volumes through the UVVRP and eliminated smoke belching vehicles through ASBUs</li> <li>- Planted <i>ficus</i> trees in sidewalks to decrease CO<sub>2</sub></li> <li>- Established bicycle lanes to promote the use of non-motorized transport</li> <li>- Reduced billboard signages believed to trap smoke and air pollutants</li> </ul>

Source: (NAQSR 2008-2015)

## Further actions for addressing outdoor air pollution

### A. Based on the NEHAP 2017-2022

According to the NEHAP 2017-2022, the objectives and strategies of the IACEH for the Air Quality and Health Sector are as follows:

- (a) Strengthen the enforcement of laws and standards on air pollution and GHG emissions.
- (b) Documentation and analysis of air pollution and health data and dissemination of information based on findings.
- (c) Improve the current air quality monitoring program.

The strategies to achieve the objectives for the sector include: (1) review EO 489 to identify areas to improve the functionality of IACEH; (2) establish better collaboration and partnership arrangements among IACEH members to improve responsiveness to issues and concerns; (3) establish an enforcement monitoring system and incentive scheme; (4) develop a capacity building program for the relevant personnel; (5) develop an advocacy plan on environment and health risks of pollution and GHG emissions; (6) create a database program that will support a real-time health-risk warning system that will be disseminated through EMB's air quality website, and; (7) review and evaluate the air quality monitoring program design in terms of the number and location of monitoring stations and the process of data collection, reporting and utilization.

### B. Additional proposed actions based on the project's consultation activities

**Assess sufficiency of the country's current air quality standards and policies:** Review and evaluate if the current air quality standards and policies are sufficient to successfully control air pollution levels.

**Improve policy implementation and enforcement of laws on air quality:** Review and update existing (outdated and outmoded) laws and policies across the relevant government departments. Harmonize policies and standards on air quality across all relevant departments/agencies. This will facilitate improved cooperation and complementarity between the various departments/agencies in implementing policies and programs on mitigating air pollution. Provide adequate monitoring tools and equipment for enforcement agencies.

**Develop a policy and program to address emerging air pollutants:** New pollutants (black carbon, lithium ion, etc.) have no regulations. Conduct studies on emerging air pollutants to serve as a basis for corresponding policy recommendations.

**Establish a clearinghouse of data and information:** Improve capability for data management and data synthesis on health and pollution.

### C. Extended Concept Notes

The project has supported this sector of the NEHAP through the following initiatives:

1. For NEHAP Priority Issue 1 - Weak enforcement of emission laws and standards related to air quality resulting to increased emissions from mobile and stationary sources including GHG: Technical assistance has been provided in the drafting of the Implementing Guidelines for the accomplishment of the objectives of EO 489. This has helped clarify the arrangements for interdepartmental/inter-agency collaboration and partnership.
2. An extended concept note on mitigating outdoor air pollution from the transport sector was drafted (see Extended Concept Note #1), which considers the NEHAP and the following inputs and suggestions from the project’s consultation meetings on concept development:

Issues	Suggested Project Activities
<ul style="list-style-type: none"> <li>- Weak enforcement of emission laws and standards on mobile and stationary sources</li> <li>- Air emission standards as stipulated by the law are too low</li> <li>- Transportation sector accounts for 88% of air pollution in Metro Manila</li> <li>- Outdoor air pollution is an issue in urban areas, indoor air pollution is an issue in rural areas</li> </ul>	<ul style="list-style-type: none"> <li>- Control emissions from the transport sector, which is the main source of outdoor air pollution</li> <li>- Support existing government programs: PUV Modernization Program; shift to electric jeeps; shift to energy-efficient engines; shift to better fuel; use of biofuel; adoption of traffic management solutions</li> <li>- Improve vehicle inspection and maintenance systems</li> <li>- Study the experience of other countries (e.g. Turkey) to see how they solved their pollution problem</li> <li>- Provide better, safer, and convenient public transportation services</li> <li>- Improve public transportation infrastructure to help control emissions</li> <li>- Study in more detail the various sources of outdoor air pollution, to see where the pollutants are coming from and where they actually end up (e.g. look at industrial sources/power plants outside of Metro Manila)</li> </ul>

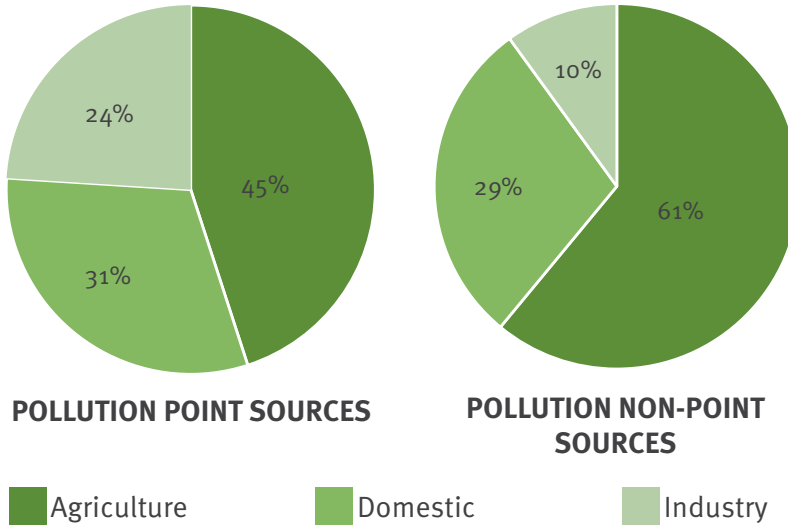
The concept note will be submitted to potential funders and/or partners. Should it be funded, its implementation will help to reduce the level of outdoor air pollution and reduce its health impacts on the population.



## WASTEWATER AND SANITATION

### Sources and characteristics of wastewater and sanitation

Figure 7: Wastewater pollution sources



The National Water Quality Status Report estimated that nearly 4.5 million metric tons of biochemical oxygen demand (BOD) was generated by pollution point sources, and about 465,595 metric tons of BOD from non-point sources. For point sources, the estimated pollution load contributions were 45% by agriculture source, 31% by domestic sources, and 24% by industry sources. For non-point sources, the estimated pollution load contributions were 61% from agricultural run-off, 29% from urban run-off, and 10% from forest runoff<sup>18</sup>.

The agriculture sector is the biggest contributor for both pollution point and non-point

sources. Agricultural activities include production of hogs, chicken, cattle, and dairy farming activities. Wastewater from this sector is high in organic content. Most of the farms, especially backyard animal farms, do not have proper wastewater treatment facilities<sup>19</sup>.

The next biggest pollution contributor is the domestic sector. Based on national statistics, only 76% of households in the Philippines use improved sanitation facilities<sup>20</sup>. 24% of households use unimproved sanitation<sup>21</sup>: this includes 17% of households with a shared toilet; 3% with an unimproved facility; and 5% having no facilities at all<sup>22</sup>.

Of the total households, 78.5% use septic tanks. The Water and Sanitation Program (WSP) Sustainable Sanitation for East Asia study reported that most septic tanks do not conform to the standards prescribed by the DOH. Many septic tanks are undersized, many are single-chambered, the bottom is commonly open/“unlined”, and regular desludging is not practiced. The open bottom-septic tanks are linked to contamination of groundwater due to septic leachate<sup>23</sup>. A study on the groundwater of Panglao, Bohol, showed high levels of fecal coliform bacteria in all the 12 groundwater sampling sites due to infiltration of wastes from septic tanks into the groundwater<sup>24</sup>. In a study on nitrates in the groundwater of Laguna<sup>25</sup>, nitrate concentrations were observed to be higher in areas where there are septic tanks.

<sup>18</sup> DENR-EMB, 2014. National Water Quality Status Report 2006-2013. Visayas Avenue, Quezon City. Department of Environment and Natural Resources, Environmental Management Bureau.

<sup>19</sup> Ibid.

<sup>20</sup> Improved sanitation facilities: flush to piped sewer system; flush to septic tank; flush to pit latrines; Ventilated improved pit latrine; pit latrine with slab; and composting toilet.

<sup>21</sup> Unimproved facilities: Facilities shared by two or more households; Flush not connected to sewer/septic tank/pit latrines; open pit; bucket; and hanging toilet/latrine

<sup>22</sup> Philippine Statistics Authority (PSA) and ICF. 2018. Philippines National Demographic and Health Survey 2017: Key Indicators. Quezon City, Philippines, and Rockville, Maryland, USA: PSA and ICF.

<sup>23</sup> DPWH, 2013. Program Operations Manual. Support for the Nationwide Roll-out of the National Sewerage and Septage Management Program.

<sup>24</sup> Husana, Edison and Kikuchi, Tomohiko. 2013. Concealed Environmental Threat in the Coastal Region Requires Persistent Attention: The Panglao Island, Philippines Example. Journal of environmental Protection (4): 1149-1156, October 2013.

<sup>25</sup> Mendoza, Mia Ann Sara C. et al. 2012. Assessing Nitrate Contamination on Groundwater Sources in an Agro-Ecosystem in Laguna, Philippines. Journal of Applied Technology in Environmental Sanitation. Vol 2.No.4:205-210, November 2012.

The other pollution contributor is the industry sector. There has been an increase in industrial activities in the country in the past years, which has resulted in an increase in the generation of industrial wastewater. In 2012, a total of 28,275 industrial establishments were recorded (12.9% of the total). As of October 2017, the Philippines has 379 operating economic zones: 261 Information Technology Parks; 74 Manufacturing Economic Zones; 22 Agro-Industrial Economic Zones; 20 Tourism Economic Zones; and 2 Medical-Tourism Centers. A total of 3,398 companies are located in the Philippine Economic Zones (Overview of Industrial Wastewater Management in the Philippines, Unpublished). Disposal of inadequately treated/untreated industrial wastewater is responsible for 15% of the organic pollution load in rivers.

Analyses show that up to 58% of the country's groundwater intended for drinking water is contaminated with coliform and about 64% of the rivers fail the BOD drinking water standard. Only one priority river (Cagayan de Oro River in Region 10) exhibited compliance to BOD Water Quality Guideline (WQG), as well as the dissolved oxygen (DO) WQG. Priority rivers in heavily populated areas located in NCR, the Cordillera Administrative Region (CAR), and Region 3 had the lowest DO and BOD conformance ratings<sup>26</sup>.

There has been limited monitoring of water bodies for toxic chemicals such as cyanide and heavy metals (mercury, lead, cadmium, etc.); monitoring has focused only on those water bodies with known sources of these pollutants. Data shows that half of the eight water bodies monitored for cyanide achieved a 100% conformance rating. Of the water bodies monitored for heavy metals, 83%, 44%, and 39% showed 100% conformance rating to the criterion for mercury, cadmium, and lead, respectively<sup>27</sup>.

With respect to the quality of coastal and marine waters, 38% meet the DO WQG. Most of these are Class SB and Class SC, i.e., zones which are intended for recreational and fishing activities, respectively. Only 13% were in conformance with the criteria for Fecal Coliform and Total Coliform. These are Puerto Princesa Bay in Region 4B and the coastal waters of Boracay in Region 6, both of which are Class SB. In contrast, Coron Bay in Region 4B failed to meet both the Fecal Coliform and Total Coliform criteria throughout the entire monitoring period<sup>28</sup>.

## Roles and responsibilities in addressing wastewater and sanitation

The DENR is primarily responsible for regulating pollution of water bodies, formulating standards for the transport and disposal of effluent, sewage and septage. The Department of Agriculture (DA) is responsible for the guidelines on the re-use of wastewater for irrigation purposes or as soil conditioner or fertilizer. Table 17 describes in more detail the roles and responsibilities of various government entities in addressing wastewater and sanitation.



Domestic solid wastes end up in rivers, polluting and clogging the water ways

*Courtesy of Pure Earth*

<sup>26</sup> Ibid 17, p.32

<sup>27</sup> Ibid 17, p.32

<sup>28</sup> Ibid 17, p.32

Table 17: Roles and responsibilities in addressing wastewater and sanitation

DENR	Primarily responsible for the implementation of the CWA. Is also tasked to lead the preparation, implementation and enforcement of the following: (1) National water quality status report; (2) Integrated Water Quality Management Framework; (3) Action plans for each Water Quality Management Areas; (4) Groundwater vulnerability mapping; (5) Classification of groundwater sources and classification of water bodies; (6) Water quality guidelines; (7) Effluent standards; (8) Accreditation system of laboratories; and (9) Information and dissemination campaigns.
LGUs	Responsible for the management and improvement of water quality within their territorial jurisdictions. The LGU's Environment and Natural Resources Office (ENRO) has the following functions: (1) Monitoring of water quality; (2) Emergency response; (3) Compliance with the framework of the Water Quality Management Action Plan; (4) Active participation in all efforts concerning water quality protection and rehabilitation; and (5) Coordination with other government agencies and civil society and the concerned sectors in the implementation of measures to prevent and control water pollution.
DOH	Promulgation, revision and enforcement of drinking water quality standards; Development of plans, policies, programs and strategies to manage health hazards and risks associated with environmental and work-related factors.
NEDA	Ensures that the direction set for the sector is carried out in accordance with the sector plan; Coordinates sector monitoring as well as conducts periodic review, evaluation and assessment of the sector; Coordinates and/or advises on the conduct of studies, researches, policy analysis and policy recommendations; Formulates areas of cooperation and coordination among the various agencies and instrumentalities of the government; Serves as a clearinghouse of sector information
DPWH	Through its attached agencies, such as the Metropolitan Waterworks and Sewerage System (MWSS), Local Water Utilities Administration (LWUA), as well as other urban water utilities, is responsible for the provision of sewerage and sanitation facilities and the efficient and safe collection, treatment and disposal of sewage
DA	Formulation of guidelines for the re-use of wastewater for irrigation and other agricultural uses, and for the prevention, control and abatement of pollution from agricultural and aquaculture activities. The Bureau of Fisheries and Aquatic Resources (BFAR) is responsible for the prevention and control of water pollution for the development, management and conservation of the fisheries and aquatic resources;
DOST	In coordination with other agencies and academic research institutions, responsible for preparing an R&D program for the evaluation, verification, development and public dissemination of pollution prevention and cleaner production technologies
Philippine Coast Guard	Enforcement of water quality standards in marine waters, specifically from offshore sources
DepEd, CHED, DILG and PIA	Assist and coordinate in the preparation and implementation of a comprehensive program pursuant to the objectives of the Clean Water Act.

## Actions taken to date to address wastewater and sanitation

The country now has a National Sustainable Sanitation Plan (NSSP) and a Philippine Sustainable Sanitation Roadmap (PSSR), which are the overarching frameworks that cover sanitation challenges such as ending open defecation and treating sewage from markets, agriculture, industry and other point and non-point sources of water pollutants. The PSSR was prepared through a multi-stakeholder and inter-agency technical working group headed by DOH together with NEDA.

A National Sewerage and Septage Management Program (NSSMP) was prepared by an interagency committee led by the Department of Public Works and Highways and was approved by the NEDA Board on May 30, 2010. The NSSMP aims to address domestic sources of water pollution, with a focus on the larger infrastructure projects that local implementers (mainly LGUs, water districts and private service providers/utilities) will develop to collect and treat domestic wastewater from densely populated urban centers. A 50% national government cost share is available for sewage projects for all cities and 1st class municipalities/ LGUs.

DOH has issued DOH AO 2010-0021 on Sustainable Sanitation as a National Policy and a National Priority Program of the DOH. This policy aims to achieve zero open defecation (ZOD) status by 2022 and to attain universal access to safe and adequate sanitary facilities by 2028. Guided by the policy targets of the AO 2010-21, the Phased Approach to Sustainable Sanitation (PhATSS) has been piloted in Masbate, North Cotabato, Maguindanao, Leyte, Eastern Samar, Northern Samar, Capiz, and Sultan Kudarat since 2014. PhATSS assists local governments to convert the NSSP goals into doable steps, where a barangay could easily identify their contribution to the sanitation targets. As a result, about 2,147 barangays and 24 municipalities have been certified as having achieved ZOD status, while around 293 barangays have been declared with the status of Basic Sanitation and are on their way towards achieving the next service level of PhATSS. In consultation with relevant NGAs (including DILG, DENR, DPWH, NEDA, DepEd, DSWD) and representatives from subnational levels of government, the DOH is in the process of adopting PhATSS as the implementation strategy of the national policy on sustainable sanitation.

The review and approval process of DENR on the guidelines for the transport, treatment, storage and disposal of effluent, sewage and/or septage offsite is ongoing.

The implementation of the Wastewater Charges System and Discharge Permits by DENR are ongoing. Proceeds from these fees will go into the Area Water Quality Management Funds (AWQMF) and National Water Quality Management Fund (NWQMF), respectively, as stipulated by the Clean Water Act. DENR has issued DENR AO 2012-06 on the Implementing Guidelines for the Operationalization of the AWQMF and NWQMF, respectively. The Manual for the Operationalization of these funds was issued through EMB MC 2016-007.

To monitor the effectiveness of enforcement of the Clean Water Act, DENR has designated a total of 37 Water Quality Management Areas (WQMAs) around the country, 19 in Luzon, 8 in Visayas and 10 in Mindanao. The purpose of WQMAs is to ensure that water bodies meet the water quality guidelines under which they have been classified or to improve their classification so that they meet their potential use. A total of 26 WQMAs now have their respective 10-year Action Plan.

The DENR-EMB has provided financial support for the preparation of the Feasibility Study for the Construction of Sewage/Septage Treatment Plants in the following 10 WQMAs: (1) Balili River in CAR; (2) Sinocalan-Dagupan River System in Region 1; (3) Calao-Deliquente-Diadi River System in Region 2; (4) Calapan River in Region 4B; (5) Lake Buhi Watershed in Region 5; (6) Tagoloan River Basin in Region 10; (7) Cagayan de Oro River Basin and Adjacent Rivers in Region 10; (8) Silway River in Region 12; (9) Sarangani Bay in Region 12; and (10) Taguibo River in Region 13.

DAO 2016-08, containing the Water Quality Guidelines and a new set of General Effluent Standards (GES), was issued by DENR in 2016 to address all point sources of pollution, regardless of volume, that discharge into receiving bodies of water or onto land. The new GES shall be used by all industry

categories. It has more stringent values for heavy metals and includes additional parameters. The new GES now requires nutrient removal from wastewater in addition to reduction in BOD.

The DA has issued DAAO 2007-26 on the Guidelines on the Procedures and Technical Requirements for the Issuance of a Certification Allowing the Safe-Re-use of Wastewater for Purposes of Irrigation and other Agricultural Uses. The guideline is under-going review.

A joint DENR-DOST AO 2006-01 has been issued on Adopting Environmental Technology Verification Protocol. This ensures that new and modified technologies are environmentally sound (DENR-EMB, 2014).

The Philippine Water Supply Roadmap 2008-2025 sets as its target that all municipalities will have improved water supply for 100% of their population by 2025. The development of the new Philippine Water Supply and Sanitation Master Plan is underway, which will operationalize the attainment for the water and sanitation targets in the PDP 2022 and SDG 2030. It aims to set the direction in helping the country address the water supply and sanitation challenges and attain desired short-term, medium-term and long-term targets in water supply and sanitation.

## Further actions for addressing wastewater and sanitation

### A. Based on the NEHAP 2017-2022

Although the focus on the water sector of the project are not exactly the same as the NEHAP's, both have the goal of reducing morbidity and mortality associated with poor water quality.

According to the NEHAP 2017-2022, the main goal for the IACEH in the Water Supply, Sanitation and Health Sector is to reduce the incidence of water- and sanitation-related diseases, with the specific objectives being:

1. To increase access to safely-managed and resilient water supply and sanitation services.
2. To strengthen governance mechanisms for water and sanitation sector/services.
3. To increase demand and prioritization for safely-managed water and sanitation services.

The strategies to achieve the objectives for the sector include: (1) amend and/or develop harmonized policies, standards and guidelines; (2) update/develop and ensure coordinated implementation of integrated plans; (3) increase access of LGUs to financing; (4) strengthen the capacities of LGUs to plan, budget, manage and provide technical assurance; (5) strengthen the capability of service providers in developing and protecting water sources and in providing safely-managed and resilient sanitation services; (6) implement a coordinated sector assessment, monitoring and reporting system, and; (7) strengthen advocacy and demand-creation for safely-managed water supply and sanitation services.

### B. Additional proposed actions based on the project's consultation activities

**Preventive management for priority pollutants and emerging contaminants:** Ensure that industrial discharges containing priority pollutants and emerging contaminants such as antibiotic residues and bio-plastics are treated and disposed accordingly.

**Closely monitor and support the industry sector to meet the new set of effluent standards:** The new set of General Effluent Standards has more stringent values for heavy metals and additional parameters. Many of the enterprises/establishments are having difficulties in meeting this new set of effluent standards. Provision of support to enterprises/establishments in identifying necessary measures to meet effluent standards would be helpful.

**Protection of potable water sources:** Strong law enforcement and preventive management must be in effect to protect water bodies that are being used as a potable water source.

### C. Extended Concept Notes

An extended concept note on mitigating wastewater pollution in Manila Bay and its associated major rivers by addressing wastewater from priority industry sector based on impact to human health and to the environment was drafted (see Extended Concept Note #2), which considers the NEHAP and the following inputs and suggestions from the project’s consultation meetings on concept development:

Issues	Suggested Project Activities
<ul style="list-style-type: none"> <li>- Wastewater from domestic, industries, commercial, volcanic (arsenic), mining (mercury)</li> <li>- Many low-income local governments cannot afford to put up wastewater infrastructure</li> <li>- Contamination in soil and groundwater in Bulacan</li> <li>- Water scarcity in islands. Long-term estimates for water scarcity is still being studied.</li> </ul>	<ul style="list-style-type: none"> <li>- Need support in putting up necessary infrastructure</li> <li>- On water scarcity issue, the communities in the Mountain Province must be given an incentive for protecting the watershed</li> </ul>

The concept note will be submitted to potential funders and/or partners. Should it be funded, its implementation will help in reducing the level of wastewater pollution and related health impacts on the population.

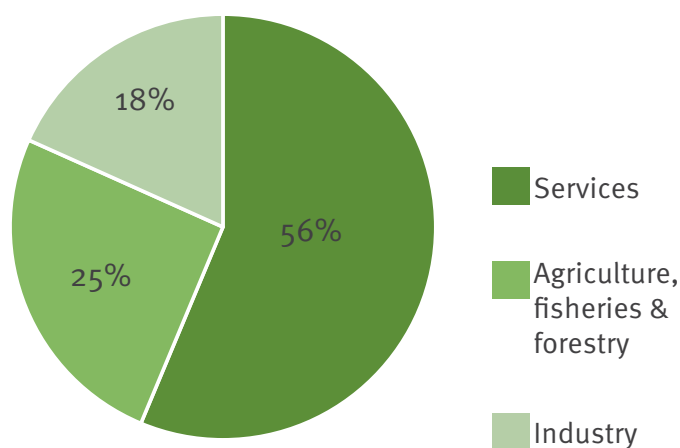
## PRIORITY ISSUE 3 OCCUPATIONAL EXPOSURE

### Sources and characteristics of occupational exposure

In the most recent labor statistics for the Philippines (2017), about 42.8 million Filipinos are in the workforce, distributed between services sector (56.3%), agriculture sector (25.4%), and industry sector (18.3%)<sup>29</sup>.

In an earlier compendium of labor statistics (2006), out of the 32.4 million Filipinos in the workforce, only 2.2 million workers in medium and large enterprises were found to enjoy effective occupational safety and health (OSH) protection and services. This is only about 6.8% of total workers.

Figure 8: National workforce



Over 93% of the workforce are in the small enterprises, the informal economy and agriculture, where working conditions are saddled with risks and hazards. A few examples of such dangers include exposure to chemicals, substandard equipment and unhygienic working environment.

<sup>29</sup> PSA, 2017. Annual Labor and Employment Status. Social Sector Statistics Service, Philippine Statistics Authority, Quezon City, Philippines. Link: <https://psa.gov.ph/content/2017-annual-labor-and-employment-status>.

## “ Exposure to chemicals is widespread in Philippine workplaces ”

In the Work Accident/Illness Report of 2000, a total of 4,585 work accident cases were reported, 54% of which caused disabling injuries and 46% caused work-related illnesses. Based on reports, exposure to toxic substances are among the most common types of accidents in the workplace.

Non-farming sources of disabling cases were in construction, wholesale, retail, repair of vehicles and transportation, storage and communication. Two out of five reported work accident cases resulted in death. The most frequent sources of fatal cases were in construction, mining, quarrying, manufacturing, electricity, gas and water.

Exposure to chemicals is widespread in Philippine workplaces, in particular in agriculture and manufacturing. Firms in the Philippines deal with chemicals under ten classifications, including agrichemicals and fertilizers, chemical service providers, industrial gases, inorganic chemicals, oleochemicals and surfactants, petrochemicals, petroleum, plastics, specialty chemicals, surface coatings. The chemical industry is an intermediate activity with much downstream and upstream links with other workplaces including agriculture, mining, manufacturing especially electronics, construction, metals and engineering, packaging, health care, textile, food processing, and in national defense<sup>30</sup>.

### Roles and responsibilities in addressing occupational exposure

DOLE is the lead government agency on OSH, with several DOLE units and agencies dealing with different aspects of OSH in particular prevention, enforcement, rehabilitation and compensation.

The Occupational Safety and Health Center (OSHC) is mandated to upgrade the capability of Government to prevent, eliminate or reduce work-related injuries, illnesses and deaths; implement effectively occupational health and safety programs that will promote the health, efficiency and general well-being of the Filipino workers; and maintain an expert intelligence and training center for industrial diseases and occupational safety.

The Civil Service Commission is the central personnel agency of the Philippine government and an independent constitutional commission with adjudicative responsibility in the national government structure. It has issued policies on working conditions in the workplace.

The DA, in accordance with the Magna Carta for Farmers (RA 7607), is mandated to formulate policies on the judicious use of pesticides and fertilizers for the safety of farmers/users of pesticides, among others. DA is also tasked to promote the use of organic fertilizers and integrated pest management.

The DENR is working with OSHC for the implementation of the Toxic Substances Act (RA 6969) and the Stockholm Convention on Persistent Organic Pollutants (POPs) in industries and workplaces. Moreover, DENR, in accordance with the Philippine Mining Act (RA 9742), stipulates the strict compliance with all mines safety rules and regulations concerning the safe and sanitary upkeep of the mining operations.

The Employers' Confederation of the Philippines (ECOP) is the officially recognized representative of employers in the field of labor relations and associated areas including labor and social policy. ECOP has over 500 corporate members and is representing Philippine Employers vis-à-vis ILO and other multilateral bodies. To the extent that these bodies cover occupational exposure, ECOP will have responsibilities in the development of international standards on occupational exposure.

<sup>30</sup> Ibid 6, p.3

The Philippines has a number of workers' organizations. The most important are:



Stacks of lead slags inside a former ULAB recycling facility  
*Courtesy of Pure Earth*

- Trade Union Congress of the Philippines
- Philippine Government Employees Association
- Public Services Labor Independent Confederation of the Philippines
- Alliance of Asian Trade Unions of International Financial Institutions
- Federation of Free Workers

Their work can, among other things, focus on issues of occupational exposure.

## Actions taken to date to address occupational exposure

Based on the Philippine Labor Code, the Occupational Safety and Health Standards (OSHS) were promulgated for the guidance and compliance of those covered. The DOLE administers and enforces the provisions of the standards, albeit with a small number of inspectors.

The OSHC Strategic Plan of 1998-2004 has provided the framework for concerted action and preventive occupational safety and health initiatives by stakeholders, in particular government, employers and workers.

Due to the lack of OSH data, OSHC has carried out studies and research, which has provided insight into OSH issues and served as basis for policy formulation and for development of programs as a means to address solution of specific problems.

The OSHC is providing technical assistance and services on occupational safety and health. There are five laboratories on occupational health, industrial hygiene and testing of Personal Protective Equipment (PPE). The OSHC staff members are composed of occupational health physicians, safety engineers, industrial hygienists, laboratory technologists, radiologist, information technology assistants, training and information officers, audiovisual and support staff.

OSH trainings for the private and public sectors have been conducted by OSHC. However, the numbers of accredited OSH practitioners, trainers and training providers has remained relatively small. In response to increasing training demand by the public and private sector, OSHC has developed partnerships with local as well as international networks – ILO, FES, JICA, UNEP, UNAIDS, TUCP, FFW, ECOP and others – to increase the outreach of OSH services.

The OSHC offers the following programs for chemical safety management: (1) Fundamentals of Industrial Hygiene; (2) Work Environment Measurement; (3) Ventilation; (4) Chemical Safety; and (5) Globally Harmonized System of Labelling Chemicals (GHS).

The OSHC serves as the clearing house of information and innovative methods, techniques and approaches in dealing with OSH problems. Mechanisms have been developed for information dissemination and exchange among workers, employees, the public, and the stakeholders through mass media, electronic media, publications, conferences, or consultations<sup>31</sup>.

<sup>31</sup> Ibid 6, p.3



## Further actions for addressing occupational exposure

### A. Based on the NEHAP 2017-2022

According to the NEHAP 2017-2022, the objectives of the IACEH for the Occupational Health and Safety Sector are as follows:

1. To have a national occupational safety and health management system and program that address needs of all stakeholders.
2. To create an information management system for occupational safety and health that is accessible to all stakeholders in the country.
3. To update and review existing policies and regulatory framework for occupational health and safety.

The strategies to achieve the objectives for the sector include: (1) establish the mandate and organization of the IACEH Occupational Safety and Health Sector in the development, implementation, monitoring, and quality assurance of the National OHS Management System and Program; (2) identify and engage relevant national agencies, local governments and NGOs in the management system and program development and implementation; (3) align the Philippine OHS system and program with international and local standards, guidelines and initiatives including sectoral agency strategies and programs; (4) determine the information and data needs of major occupational safety and health stakeholders in the country from a regulatory, technical, program implementation, compliance, and educational perspective; (5) implement a project that will develop, roll-out, and provide technical support in the implementation of the OHS information management system; (6) integrate the information management system with the overall OSH management system and program; (7) conduct a review and analysis to streamline, harmonize, identify and address gaps in Philippine OHS policies and regulatory framework; (8) advocate for the acceptance and implementation of the output of the review and analysis by government and NGOs and entities, and; (9) identify champions in the executive, legislative, and judicial branches of government to support the implementation of the harmonize OSH policies and regulatory framework.

### B. Additional proposed actions based on the project's consultation activities

**Raise awareness on OSH and the risks of occupational exposure to hazardous chemicals and fumes:** There is a need for a comprehensive information/education campaign that promotes the adoption of health considerations and safe practices in workplaces for employers, workers and the public through the effective use of multimedia. DOLE-OSH should also provide guidelines for employees/workers on adopting a healthy lifestyle and discourage habits that are harmful to health as these affect a worker's productivity. A culture of safety must be developed starting at home and in schools early on, in coordination with DepEd, DOH, DOLE, LGUs, among others.

**Strengthen the public health system to allow coverage of small-scale enterprises:** Build the capacity of the government to include the coverage of small-scale enterprises under the public health system e.g. PhilHealth and Social Security System. Provide access for support services and other infrastructures needed for development of multidisciplinary OHS. Establish partnerships with expert institutions that can provide expert services to OSH when needed.

**Establish a national occupational safety and health monitoring program:** Establish a national OSH research program for surveying the occupational health and safety situation to serve as basis for developing competence and methodology in occupational health, and for addressing national occupational health concerns (e.g., health impacts of agricultural chemicals, toxic chemicals, and coal). Encourage collaboration with agencies, organizations, and training and education institutions on OSH.

**Gradual development of OHS for all workers:** Include in the national OSH policy and program an objective and actions for the development of OSH for all workers starting from those at highest

risk and those in underserved groups. Give priority to the provision of OSH services for workers in the following underserved sectors: agriculture; informal transport; small-scale mining; and public health care workers. OSH services can be provided by primary health care units specially trained in occupational health. Actively engage the LGUs to help ensure that OSH policies and programs are properly observed and implemented within their area of jurisdiction, with support from DOH, DOLE, PhilHealth, SSS and other relevant agencies. LGUs could encourage/require informal groups to form cooperatives.

### C. Extended Concept Notes

An extended concept note was developed for a project that pilots reducing exposure to lead to assist selected small enterprises comply with environmental standards and reduce/eliminate occupational exposure to hazardous chemicals and fumes (see Extended Concept Note #3), which considers the NEHAP and the following inputs and suggestions from the project’s consultation meetings on concept development:

Issues	Suggested Project Activities
<ul style="list-style-type: none"> <li>- Lack of compliance in small enterprises with OHS</li> <li>- Lack of occupational exposure data</li> </ul>	<ul style="list-style-type: none"> <li>- Demonstration of health risks to workers and communities through health risk assessments in small scale ULAB processing enterprises and neighboring communities</li> <li>- Promotion and enforcement of Occupational Safety and Health standards; increase awareness on responsibilities inside the workplace</li> <li>- Capacity building of inspectors</li> <li>- Capacity building of relevant government departments and units</li> <li>- Livelihood assistance to informal enterprises to pursue alternative activities, as relevant</li> <li>- Implement a reporting system on occupational safety and health</li> </ul>

The concept note will be submitted to potential funders and/or partners. Should it be funded, its implementation will help in policy development of managing occupational exposure and reducing related health impacts on workers and the population.

## PRIORITY ISSUE 4 INDOOR AIR POLLUTION

### Sources and characteristics of indoor air pollution

Cooking and lighting with traditional fuels such as wood, dung, crop waste or coal, in poorly ventilated homes, emits substantial amounts of harmful pollutants, such as particulate matter (PM), carbon monoxide, and nitrogen and sulfur oxides. It has been estimated that indoor cooking using traditional fuels can generate smoke that can exceed acceptable levels for small particles in outdoor air by 100-fold. Women are highly exposed since they work in the kitchen every day. They are at high risk of acute lower respiratory infections (ALRI) and chronic obstructive pulmonary disease (COPD), but also of lung cancer and tuberculosis. Since young children often stay close to their mothers and so to frequent cooking areas, they, too, are at risk from these same diseases<sup>32</sup>.

<sup>32</sup> Desai, M., Mehta, S., & Smith, K., 2004. Indoor Smoke from Solid Fuels: Assessing the Environmental Burden of Disease at National and Local Levels Environmental Burden of Disease Series, No. 4. Geneva: World Health Organization.

In 1999, it was estimated that the use of traditional fuels was about 23% of the national total energy consumption<sup>33</sup>. According to a study done by the Global Alliance for Clean Cookstoves in 2012, about 49% of the country's population are using solid fuels for cooking<sup>34</sup>. It is estimated that around 26% of the urban population are using solid fuels and about 70% of the rural population are using solid fuels. The estimated number of people affected by household air pollution is around 47.4 million.

## Roles and responsibilities in addressing indoor air pollution

At this point, it is not clear which government department/agency is tasked with the responsibility to oversee, regulate and manage household/indoor air pollution.

## Actions taken to date to address indoor air pollution

With the magnitude of population exposed and the lack of documentation on the extent of impacts in the Philippines, the issue of household air pollution has reached the attention of the Climate Change Commission, with the help of DENR. The Commission recently launched a support program on short-lived climate pollutants, in which black carbon from household fuel use are intended to be studied and inventoried. This will be part of the climate change report on the Nationally Determined Contribution (NDC) of household pollution to climate change.

Although projects that aim to provide cleaner cooking solutions and create cleaner cookstoves have been initiated in the Philippines by private entities, levels of indoor air pollution in households in the Philippines, as well as the potential for its reduction through usage of cleaner cooking technologies and fuels, have not been mapped. In addition, evidence on the impact of zoning on indoor air quality, based on the land-cover and land-use change have not yet been established.

## Further actions for addressing indoor air pollution

### A. Based on the NEHAP 2017-2022

According to the NEHAP 2017-2022, the objective of the IACEH for indoor air pollution (categorized in the Air Quality and Health Sector) is to develop health-based standards for indoor air quality, and the strategy is to draft a set of standards/guidelines based on WHO Guidelines, international research and local situation in the rural and urban areas.

### B. Additional proposed actions based on the project's consultation activities

**Designate the responsible agency for indoor air quality:** It is important to identify the mandated agency in the Philippines that would promulgate, execute and monitor compliance with the guidelines. Indoor air quality may be classified based on the use of the infrastructure (e.g., commercial, industrial, medical, academic, domestic, etc.). It was suggested that the DOH and the DILG take the lead in the development of the household IAQ standards/guidelines with the help of other relevant departments (DOLE, DTI, DepEd, CHED, DOT, etc.). Having staff located in the majority of the municipalities and barangays in the country, the DOH is in the better position to monitor household IAQ, but they will need guidance and capacity building. There are local agencies that may be able to assist DOH and DILG, such as the Housing and Land Use regulatory Board (HLURB) to coordinate on the issuance of certificates of occupancy and compliance with the building code to assess the density, thermal heat and ventilation in the prospective households to be built. It is however anticipated that the existing and old households may also need to be monitored for IAQ.

<sup>33</sup> Saksena, S., Subida, R., Buttner, L., and Ahmed, L. 2007. Indoor Air Pollution in Coastal Houses of Southern Philippines. SAGE Publications.

<sup>34</sup> Clean Cooking Alliance website. Link: <http://cleancookingalliance.org/country-profiles/61-philippines.html>.

**Establish a set of standards and guidelines for indoor air quality:** The government agencies that should handle the development of standards on household fuel use and household cookstoves must also be identified, as currently there is an apparent disjoint. When pertaining to the use of kerosene for cooking, the DOE is mandated on the standards, since kerosene is a fossil fuel. However, if agricultural biomass such as rice husk or rice hull is used, it should be the Department of Agriculture to develop the standards. Cookstoves, if running on electricity, may be monitored by the Department of Trade and Industry for quality assurance on equipment specifications. However, for cement/clay cookstoves, no authority is mandated to monitor their quality. Hence, these are aspects that need to be further looked into.

**Massive information campaign on the hazards of biomass burning to indoor air quality and health:** Awareness on IAQ needs to be raised and reinforced through the use of quad media (radio, print, TV and social media), making use of several avenues in the government such as the PIA, the electronic display boards of the MMDA, and the public information offices of the LGUs, that may be supported by the City or Municipal Environment Officers.

### C. Extended Concept Note

An extended concept note, which considers the NEHAP and the inputs and suggestions from the project's consultation meetings, to initiate efforts to mitigate indoor air pollution was developed to strengthen the knowledge-base and actions for the improvement of indoor air quality from household energy use, by assessment of current practices and deskwork, gathering primary and secondary data, stakeholder consultations, field and laboratory surveys in low-income communities in Metro Manila and rural areas of the Philippines (see Extended Concept Note #4). This concept note will be submitted to potential funders and/or partners. Should it be funded, its implemented will help in policy development to mitigate indoor air pollution and reduce its health impacts on the population.

## PRIORITY ISSUE 5 SOIL CONTAMINATION

### Sources and characteristics of soil contamination

Many locations around the country are degraded due to the accumulation of various types of wastes and toxic materials from the industry, mining, households and agricultural activities.

Mining has been a principal source of soil contamination. As of 2004, the total number of mining rights issued by the government was 632, covering an area of nearly half a million hectares. Since the country has a total land area of about 9 million hectares, this means that about 5% of the land could be at risk of soil contamination due to mining activities. Many environmental degradation and pollution cases due to mining have been reported. For example, it was reported in 2006 that the abandoned Bagacay open pit mine in Samar has physically destroyed the surrounding forest landscape and polluted the soil and nearby surface waters with high levels of heavy metals. Another well-known case is the 1996 Marcopper mining disaster in Marinduque. An estimated 1.5 million cubic meters of mine tailings were discharged into the Makulapnit and Boac rivers, causing flash floods in the downstream area particularly along the western coast of the island. An elevated concentration of copper, manganese, lead, and zinc were observed in the offshore sediments<sup>35</sup>. Seven years after the spill, it was observed that contaminants in the surface sediments still persisted. Although no detailed study of soil contamination by heavy metals has been carried out yet, it is expected that the area affected by the flash flood will contain high amounts of heavy metals.

<sup>35</sup> David, C.P. 2002. Heavy Metal Concentrations in Marine Sediments Impacted by a Mine-Tailings Spill, Marinduque Island, Philippines. *Environmental Geology* 42: 955-965.

The Toxic Sites Identification Program (TSIP) conducted by Blacksmith Institute/Pure Earth, through DENR and UPLB from 2009-2012, identified 120 sites as polluted due to artisanal gold mining (hand mining) and ore processing, used lead-acid battery recycling and other large-scale industrial operations<sup>36</sup>.

Excessive use of pesticides in agriculture has also led to hotspots of soil contamination. In Benguet (Cordillera Administrative Region), for instance, high levels of the pesticide Endosulfan have been detected. The highest concentration of technical Endosulfan in soil was detected at 0.025 mg/kg, while Endosulfan sulfate was found at 0.015 mg/kg.

Unauthorized and/or badly managed dump sites can also be a source of soil and groundwater contamination. For instance, an analysis of contaminants in the leachate from two dumpsites in Metro Manila showed the presence of polybrominated diphenyl ethers (PBDEs) (penta BDEs, hexa BDEs, hepta BDEs, octa BDEs and nona BDEs). These are used as flame retardants in a large number of products<sup>37</sup>.

Proliferation of used lead acid battery (ULAB) recycling and lead smelting activities are among the causes of lead contamination in soil. A study revealed that there were elevated concentrations (greater than 25 mg/kg) of lead in the soils of five urbanized areas in central Luzon<sup>38</sup>.

## Roles and responsibilities in addressing soil contamination

The Philippines does not have a specific statute on land contamination. Nevertheless, there are related statutes that provide for a sound mechanism in the control of land, air and water pollution which can be used to ensure the protection of public health and of the environment from soil contamination: the Philippine Environment Code, Pollution Control Law, Toxic Substances and Hazardous and Nuclear Wastes Control Act, Solid Waste Management Act, and Clean Water Act, among others. The DENR is the main agency responsible for implementing these environmental laws.

Under Philippine law, the general rule is that any person (polluter) who violates the law and disobeys orders and directives of the proper authorities should be responsible for the cleanup. If the polluter refuses to control or abate the pollution made, he or she shall be subject to criminal and civil penalties<sup>39</sup>.



Untreated organic wastes from a slaughter house directly draining in the river  
*Courtesy of Pure Earth*

<sup>36</sup> Blacksmith Institute. 2012. The Philippine Report. Global Inventory Project.

<sup>37</sup> Kwan, C.S., Takada, H., Mizukawa, K. et al. Environmental Science and Pollution Research (2013) 20: 4188. Link: <https://doi.org/10.1007/s11356-012-1365-3>.

<sup>38</sup> Ona, Louella, Alberto, A., Prudente, J.A., and Sigua, G. (2006). Levels of Lead in Urban Soils from Selected Cities in a Central Region of the Philippines (7 pp). Environmental Science and Pollution Research International. 13. 177-83. Link: <https://www.ncbi.nlm.nih.gov/pubmed/16758708>.

<sup>39</sup> Conventus Law website. Philippines - Guide to Contaminated Land. Link: <http://www.conventuslaw.com/report/philippines-guide-to-contaminated-land/>.

## Actions taken to date to address soil contamination

Guidelines for site remediation have been developed to address sites contaminated with POPs. These aim to present currently available remediation technologies. They also aim to provide advice on the environmental management of on-site remediation activities, monitoring programs, and administrative or regulatory approaches that could be employed to facilitate a successful remediation program.

## Further actions for addressing soil contamination

### A. Based on the NEHAP 2017-2022

According to the NEHAP 2017-2022, the objectives of the IACEH for the Chemical Safety and Health Sector, wherein soil pollution falls under, are as follows:

1. To strengthen data management, information generation, and dissemination on chemicals and chemical safety.
2. To strengthen regulatory measures pertaining to chemical safety.
3. To develop/strengthen mechanism for inter-agency (including LGUs) and intersectoral action for chemical incidents and emergencies.
4. To develop appropriate technology for alternatives to hazardous chemicals and treatment for chemical wastes.
5. To develop harmonized approach in capability building initiatives (training and research).
6. To develop technical guidelines for accreditation of laboratories for analysis of environmental and biological samples.

The strategies to achieve the objectives for the sector include: (1) development and implementation of research and training programs on chemical safety; (2) development of mechanism methods/procedures for disseminating information on chemical safety to stakeholders [regulatory agencies, industry, NGOs, academe, and the general public]; (3) strengthening of data collection and management and data sharing policy; (4) development of programs for policy review and possible updating of regulatory measures on chemical safety; (5) development of program for the policy review and possible updating of regulatory measures on chemical safety; (6) establishment of program/project on inventory of sites where chemicals are extensively used or abandoned sites for hazardous chemicals; (7) development of technology for chemical alternatives/substitute, and treatment of chemical waste; (8) development of technology for chemical alternatives/substitute, and treatment of chemical waste; (9) establishment of training program on chemical management; (10) conduct training on environmental and clinical toxicology and epidemiology and; (11) strengthening of existing capacities of laboratories on chemical safety.

### B. Additional proposed actions based on the project's consultation activities

**Develop national remediation standards:** Under Philippine law, the general rule is that any person (polluter) who violates the law and disobeys orders and directives of the proper authorities should be responsible for any necessary cleanup. However, this provision is difficult to enact since the Philippines is yet to have a specific law on land contamination and land remediation, and there is no regulation yet that specifies the allowed limits of polluting substances in soil.

**Conduct studies on potential pollutants as a result of the PUV modernization program:** One of the identified possible pollutants as a result of the shift to e-vehicles is the wastes from lithium batteries. There is a need to study the pros and cons of the use of lithium batteries in terms of availability of raw materials, energy requirement, waste processing, and overall emission and pollution impacts. If the use of lithium batteries will proceed, there should be a waste management policy that includes a return to manufacturer scheme, proper recycling facility, and sound waste disposal plan.

**Extended producer responsibility as a national policy:** Currently, an extended producer responsibility (EPR) program is being developed for the electronics sector. This should be applied for more sectors.

**Integration of health and pollution in local plans:** Develop the necessary policy and guidelines on how to integrate health and pollution considerations in local plans (development, land use, health, investments, etc.).

### **C. Extended Concept Note**

An extended concept note, which considers the NEHAP and the inputs and suggestions from the project's consultation meetings, was developed for a project aimed at mitigating soil pollution in communities hosting small scale ULAB processing enterprises and populated mainly by poor households (see Extended Concept Note #3). This proposal will support NEHAP objective #4 for the Chemical Safety and Health Sector, specifically on the development of risk-based standards for chemicals in soil as well as addressing OHS of workers in the small scale ULAB recycling facilities. This concept note will be submitted to potential funders and/or partners. Should it be funded, its implementation will help in policy development of managing soil pollution and related health impacts on the population.



# EXTENDED CONCEPT NOTES

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Action plans to mitigate the impact of outdoor air pollution, indoor air pollution, unsafe water and sanitation, occupational exposure and soil pollution were developed in the form of Extended Concept Notes, which are aligned with the priorities of the government, the NEHAP, and are responsive to emerging issues raised during the series of bilateral meetings and consultation workshops with concerned government agencies, academe, NGOs and development partners, which made up the HPAP process.

The concept notes will be submitted to potential funders and/or partners. Should they be funded, their implementation will help in policy development to support the management and reduction of pollution risks, especially their impacts on human health, on environment and on the national economy.

## Extended Concept Note 1

Project title:	<b>Mitigating Pollution from the Transport Sector</b>
Location(s):	TBD
Planned start date:	End 2019
Duration:	Five years
Proposed government coordinating agency:	Department of Transportation
Budget (in EUR):	3,999,450

## Project Summary

The overall objective of this proposed project is to mitigate air pollution from the transport sector and reduce its impacts on human health. The target results and outputs are the following: (1) strengthened capacity of the government to implement environmental laws and management plans; (2) technical studies on vehicle inspection systems, emission standards, air quality monitoring design, health impact studies, freight operations and management of decommissioned vehicle scrappage; (3) policy recommendations and advocacy for policy adoption; (4) monitoring and evaluation of pollution impacts and integrated management planning; and (5) information management and utilization.



## Relevant Background

The leading causes of mortality attributable to air pollution in the Philippines are diseases of the heart, pneumonia and chronic lower respiratory diseases, resulting in a total of 205,897 deaths in 2014. In the same year, the main causes of morbidity attributable to air pollution in the country are acute respiratory infection, bronchitis, acute lower respiratory tract infection and pneumonia, resulting in a total of 2,791,767 cases<sup>40</sup>.

Based on the latest National Emissions Inventory by the Department of Environment and Natural Resources in 2015, mobile sources such as cars, motorcycles, trucks and buses are responsible for the majority (67%) of air pollutants. Stationary sources such as power plants and factories contribute about 22% of air pollutants. Area sources such as construction activities, open burning of solid wastes and slash-and-burn farming in the uplands account for the remaining 11% of air pollutants. Looking more closely at the case of the National Capital Region (NCR), where about 16 cities are located, it was estimated that about 88% of air pollution is due to mobile sources. The remaining 10% is from stationary sources and 2% from area sources<sup>41</sup>.

In 2010, the number of registered vehicles in the Philippines was 6.6 million motor vehicles, of which about 3.5 million vehicles (52%) were motorcycles and tricycles while about 1.7 million vehicles (26%) were utility vehicles such as jeepneys<sup>42</sup>. The remaining 22% were cars. In terms of transport mode usage, road transport is predominantly used among the four modes of transport: road, rail, water and air. Road transport carried approximately 1.71 billion passengers and 25.9 million tons of freight in 2006, representing a 98% share in passenger traffic and a 58% share in cargo traffic<sup>43</sup>.

According to DENR, in 2008, utility vehicles, motorcycles/tricycles and trucks are the top three emitters of PM<sub>10</sub>. They also emit high levels of volatile organic compounds (VOCs), carbon monoxide (CO), nitrogen oxides (NO<sub>x</sub>) and sulfur oxides (SO<sub>x</sub>). The National Implementation Plan (NIP) on Environment Improvement in the Transport Sector calls for control measures to address these emissions. The NIP emphasized the need for improving the regulations on the operations of trucks and other freight-carrying vehicles, which are steadily growing in number.

To help reduce air pollution, DOTr is implementing the Public Utility Vehicle Modernization Program (PUVMP) through DOTr Administrative Order 2017-011 “Omnibus Guidelines on the Planning and Identification of Public Road Transportation Services”, as well as the DENR Administrative Order 2015-04 “Implementation of Vehicle Emission Limits for Euro IV/4 and In-Use Vehicle Emission Standards.”

## Project Description

### A. Project beneficiaries

The proposed project is expected to benefit the following groups:

**Vehicle drivers and the general public:** By ensuring that emission from vehicles are within allowable limits, the health risks to drivers and to the population from exposure to air pollutants that cause chronic illnesses and deaths, will be reduced.

The general public’s awareness and knowledge will be raised on the health implications of air pollution and how to prevent them through the adoption of technological initiatives combined with preservation of natural ecosystems with its life sustaining properties.

**Government:** Among the benefits that the government would gain from this proposed project is a strengthened capacity to implement environmental laws through: harmonized policies; establishment of management systems; demonstration facilities and; development of long-term sustainability plans.

<sup>40</sup> PSA. 2017. Philippine Statistical Yearbook. Philippine Statistics Authority. Quezon City, Philippines.

<sup>41</sup> DENR. 2015. National Emissions Inventory. Department of Environment and Natural Resources. Quezon City, Philippines.

<sup>42</sup> LTO. 2010. Land Transportation Office. Number of Registered Vehicles by type of vehicles in the Philippines.

<sup>43</sup> AusAID. 2008. National Transport Planning and Policy, Report. The Australian Agency for International Development.

The proposed project is well-aligned with the targets in the Philippine Development Plan (PDP) and supports the priority programs of DOTr, DENR, DOH and other departments.

**Transport sector:** The transport sector will benefit economically from the technical assistance on the development of a management program that will promote efficiency in the operations of freight/logistics transport. Assistance will include improved collaboration arrangements with government and relevant stakeholders for a multi-sectoral sustainable development partnership.

## B. Overall project objective

The overall objective of the project is to reduce impacts of poor air quality on human health by mitigating air pollution from the transport sector.

The specific objectives of the project are:

1. To improve the management, implementation and monitoring of vehicle standards through harmonized policies, clear operational guidelines and an improved monitoring program.
2. To improve the capacity of the Local Government Units to identify and fine vehicle emission violators on the road.
3. To ensure the effectiveness and efficiency of air quality monitoring stations in providing useful data as the basis for air quality warning/updates and for management action.
4. To support the development of a management program and draft policy recommendations for the freight sector and for vehicle scrapping.
5. To advocate for the inclusion of the green agenda in developing urban areas as a mitigating measure for air pollution.

## C. Intervention strategy

To attain these objectives, a multi-prong strategy will be adopted to implement the project.

**Creation of an inter-agency project partners group to support project implementation.** Given that mitigating pollution from the transport sector is the focus of multiple, overlapping mandates of many government agencies, both national and local, it is essential for the project's success that all the relevant agencies work closely together on it. To this end, an inter-agency project partners group (IAPPG) will be created to bring together all the relevant government agencies and LGUs for the implementation of the project (the role of the local governments will be particularly crucial in compliance monitoring and law enforcement). The IAPPG will act as the project's Steering Committee. Inception and planning meetings will therefore be conducted with the IAPPG at the beginning of the project. The IAPPG will also review and approve an annual work plan. Periodic meetings of the IAPPG will also be held, at which progress on project implementation will be reviewed and the work plan updated/adjusted based on lessons learned and findings on the ground.

**Harmonization of policies.** The project will focus in particular on improving inter-agency cooperation by helping to harmonize the relevant policies on standards and thresholds across agencies. In this way, government agencies will be observing similar standards in their requirements, which would allow for a more efficient implementation of "pollution-prevention" strategies.

**Development of the necessary capabilities.** For the project to succeed, it will be necessary to develop the capabilities needed by the people/sectors involved in the project to achieve the project objectives in the short term. Thus, the project will build the knowledge, competencies and skills expected from the key players so that they can perform according to the work performance indicators expected from them. It will also be necessary to build the capabilities in these same stakeholders which are required to ensure that the project results can be sustained, expanded and replicated in national programs in the long term.

In particular, governance capacities will be built through the establishment of management procedures, technical studies and data analysis, improved inter-agency collaboration, development of integrated management plans and drafting of policy recommendations. The project will identify the necessary policy tools to institutionalize this under the local governments.

**Adoption of new approaches.** The freight/logistics transport sector is unregulated and their emissions are not monitored. Procedures for handling decommissioned vehicles are non-existent. These are among the gaps that will be addressed through the development of the necessary management program and regulatory measures.

Emphasis will be put on the life-sustaining benefits of nature/ecosystems. The establishment of parks heavily planted with trees in every urban area will be advocated. The trees in these parks will help improve air quality as well as improve carbon sequestration. These parks will have the added advantage of serving as evacuation areas during earthquakes, as a co-benefit for disaster risk management.

**Use of strong data for policy advocacy and awareness-raising campaigns.** Sound and strong data are essential for ensuring the credibility of any recommendations being put forward by the project. Thus, technical studies will be undertaken, the results of which will serve as the basis for management action, policy recommendations and development of awareness and advocacy campaigns. The studies will include: (1) an assessment of the Motor Vehicle Inspection Centers (MVICs); (2) a review of the current vehicle emissions standards; (3) a review of the current inspection system of imported vehicles; (4) an assessment of the mobile inspection networks on the road; (5) an evaluation of the country’s air quality monitoring network design; (6) health impact studies; (7) an assessment of freight operations and emissions and; (8) an assessment of the country’s programs to manage scrapped vehicles.

#### D. Implementation partnerships

Implementing Partner	Role/Responsibility
DOTr	DOTr’s principal role in the project will be to oversee all of the activities linked to the transportation sector. Since it will play such an important role in the project, it will also have the role of Government Coordinating Agency.
DENR	DENR will play a role in the harmonization of the rules and regulations governing vehicle emissions, where it has a mandate. DENR also has the mandate for performing (outdoor) air quality monitoring and checking compliance to national ambient air quality standards.
DOH	DOH will be responsible for the specific output regarding the studies of the health effects of air pollution and the development of programs to monitor these health effects.
Bureau of Customs (BOC)	Within its overall mandate of controlling imports of goods into the Philippines, the BOC will be responsible for activities related to the import of vehicles into the country
Land Transportation Offices (LTOs)	Responsible for the implementation of the Motor Vehicle Inspection Centers for road worthiness testing.
LGUs	Since the LGUs have the mandate to control the operation of vehicles on the roads, LGUs will play the role of bringing the on-the-ground reality to the policy dialogues and developing the necessary policies to ensure proper implementation of vehicle emissions standards.

## E. Project results/outputs

To meet its objectives, implementation will be built around four major components, each of which will have several outputs. The following table summarizes these.

<b>Major components</b>	<b>Detailed outputs</b>
I. Improved Vehicle Standards Management	1. Improved national vehicle inspection and maintenance system
	2. Harmonized policies on vehicle environmental standards
	3. Ensured compliance to standards of imported vehicles
II. Strong Implementation of Regulations	4. Improved inspection of emission violators on the road
III. Air Quality Monitoring Capacity	5. Improved air quality monitoring network design
	6. Health Impact Study
IV. Addressing Emerging Concerns and Developing New Programs	7. Regulations on freight operations and emission control are in place
	8. Adequate programs are in place for vehicle scrapping
	9. Establishment of a “Trees for Health Program”

## F. Key project activities

Activities	Locations	Timing	Partners
<b>COMPONENT I. IMPROVED VEHICLE STANDARDS MANAGEMENT</b>			
<b>1. Improved national vehicle inspection and maintenance system</b>			
1.1. Support the national implementation of the Motor Vehicle Inspection Centers for road worthiness testing. <i>(The MVIC was pilot tested by the Land Transportation Office in Manila and in Laguna in 2013. DOTr has plans for its national implementation.)</i>	TBD	Year 1-5	DOTr, LTO, LGUs, private sector
1.1.1. Conduct an assessment of the effectiveness and efficiency of the MVIC pilots.			
1.1.2. Organize a study tour to [one/several] countries with well-working vehicle emissions standards, to study how they operate and identify best practices that can be adopted by the Philippines (identify the most successful strategies to minimize potential corruption in the vehicle emissions testing system).			
1.1.3. Support the drafting, adoption and implementation of a national MVIC expansion program.			
1.2. Support the transition of Private Emission Testing Centers (PETCs) into Motor Vehicle Inspection Centers.			
1.2.1. Consolidate the small PETCs into one MVIC through accreditation.			
1.2.2. Ensure that private MVICs follow the same regulations and standards as government operated MVICs.			
1.2.3. Establish pilot private MVICs as demonstration sites.			
1.2.4. Support the development of an operational and management framework between DOTr and private MVICs.			

Activities	Locations	Timing	Partners
<b>2. Harmonized policies on vehicle environmental standards</b>			
2.1. Review and assess the need to upgrade the current vehicle emissions standards in light of the latest health and environmental data, as well as the availability of emissions abatement technology. If it is deemed necessary to upgrade vehicle emissions standards, work towards amending relevant laws and regulation to upgrade vehicle emissions standards.	TBD	Year 3-4	DTI, DENR, DOE, DOTr
2.2. Review and amend relevant laws and regulations, in light of existing or upgraded vehicle emissions standards.			
2.2.1. Review and undertake any upgrade of relevant laws and regulations governing fuel quality and technical requirements for vehicles.			
2.2.2. Review and undertake any upgrade of the regulations governing import of vehicles. <ul style="list-style-type: none"> <li>a. Benchmark international practices on emissions.</li> <li>b. Advocate the use of alternative and natural fuels.</li> </ul>			
2.2.3. Review and undertake any upgrade of laws and regulations governing the forced scrapping of any vehicles found to not meet emissions standards and not capable of being technologically upgraded			
<b>3. Ensured compliance to standards of imported vehicles</b>			
3.1. Develop guidelines for approval and compliance to standards before importation. Monitor and compile data on compliance.	TBD	Year 2-3	DTI, BOC
3.2. Evaluate the status of the customs office responsible for the inspection of imported vehicles, in terms of its equipment, manpower and procedures. Provide any immediate technical assistance deemed necessary.			
3.3. Organize a study tour to [one/several] countries with well-working customs offices to study how they operate.			
3.4. Develop the necessary laws and regulations to implement the policy recommendations for improving the work of the customs office in a sustainable manner.			
3.4.1. Make the necessary policy recommendations.			
3.4.2. Ensure that the required budgetary allocations are made in the national budget.			
3.4.3. Support the national procurement process for any further equipment required by the customs office and provide the necessary technical assistance in their use.			

Activities	Locations	Timing	Partners
<b>COMPONENT II: STRONG IMPLEMENTATION OF REGULATIONS</b>			
<b>4. Improved inspection of emission violators on the road</b>			
<i>This is to help ensure that vehicles on the road are compliant to standards</i>			
4.1. Evaluate the status of a representative sample of mobile inspection networks in Metro Manila, Luzon, Visayas and Mindanao, in terms of its equipment and manpower. Provide any immediate technical assistance deemed necessary.	TBD	Year 1-3	LGUs
4.1.1. Use of technology to ensure standards compliance.			
4.1.2. Use of computer for assessment.			
4.2. Organize a study tour to [one/several] countries with well-working mobile inspection units to study how they operate.			
4.3. Develop the necessary laws and regulations to implement the policy recommendations for improving the mobile inspection network in a sustainable manner.			
4.3.1. Make the necessary policy recommendations.			
4.3.2. Ensure that the required budgetary allocations are made in the national budget.			
4.3.3. Support the national procurement process for any further equipment required for mobile inspection and provide the necessary technical assistance in their use.			
<b>COMPONENT III: AIR QUALITY MONITORING CAPACITY</b>			
<b>5. Improved air quality monitoring network design</b>			
5.1. Evaluate the status of the country's air quality monitoring network, in terms of its coverage (geographic coverage and coverage of pollutants monitored), equipment and manpower. Provide any immediate technical assistance deemed necessary.	TBD	Year 1-5	DENR
5.2. Develop the necessary laws and regulations to implement the policy recommendations for improving the reach and the depth of the monitoring network in a sustainable manner.			
5.2.1. Make the necessary policy recommendations.			
5.2.2. Ensure that the required budgetary allocations are made in the national budget.			
5.2.3. Support the national procurement process for any further equipment required in the air quality monitoring network and provide the necessary technical assistance in their use.			

Activities	Locations	Timing	Partners
<b>6. Health Impact Study</b>			
6.1. Undertake a baseline monitoring of health impacts that can be imputed to the pollution from the transport sector	TBD	Year 1-5	DOH, academic institutions
6.2. Put in place the necessary mechanisms to ensure regular monitoring of health impacts, with public reporting to the relevant authorities through the use of technology			
6.3. Develop an information campaign on health impacts to raise awareness and encourage active support of the various stakeholders on mitigating air pollution			
<b>COMPONENT IV: ADDRESSING EMERGING CONCERNS AND DEVELOPING NEW PROGRAMS</b>			
<b>7. Regulations on freight operations and emission control are in place</b>			
7.1. Conduct a study on how to improve the energy consumption efficiency of freight operations and evaluate emissions from this sector.	TBD	Year 1-5	DTI, DOTr
7.2. Organize a study tour to [one/several] countries with well-working environmental controls on freight operations to study how they operate.			
7.3. Develop the necessary laws and regulations to implement the policy recommendations for improving the environmental footprint of freight operations in a sustainable manner and in particular manage emissions to meet environmental standards.			
7.3.1. Make the necessary policy recommendations.			
7.3.2. Ensure that the required budgetary allocations are made in the national budget.			
7.3.3. Support the national procurement process for any further equipment required in the freight operations monitoring and provide the necessary technical assistance in their use.			
<b>8. Adequate programs are in place for vehicle scrapping</b>			
8.1. Evaluate the country's programs to manage scrapped vehicles and its capacity to properly operate vehicle scrapping facilities as a result of the transition to vehicles with lower emissions. Provide any immediate technical assistance deemed necessary on the operation of vehicle scrapping facilities, including the safe disposal of toxic chemicals and hazardous wastes.	TBD	Year 2-5	DOTr, DTI, Development Bank of the Philippines, private sector
8.2. Develop the necessary laws and regulations to implement the policy recommendations for improving the country's network of vehicle scrapping facilities in a sustainable manner.			
8.2.1. Make the necessary policy recommendations.			
8.2.2. Ensure that the required budgetary allocations are made in the national budget			



Activities	Locations	Timing	Partners
<b>9. Establishment of a “Trees for Health Program”</b>			
9.1. Put in place a program to plant trees on the roadsides and establish heavily wooded parks in cities/ municipalities. For the parks, set up the minimum requirement of land area based on population and extent of local air pollution. <i>In case of earthquakes, these parks can also serve as evacuation areas.</i>	TBD	Year 2-5	DILG, DepEd, LGUs
9.2. Develop a long-term sustainability plan and incentive program for LGUs.			
9.2.1. Environmental fees and penalties collected from polluters can be used for the maintenance of the parks.			
9.2.2. Encourage school children to care for tree seedlings and to plant them in the parks			
9.3. Develop the necessary laws and regulations to implement the policy recommendations for the Trees for Health Program.			

## G. Gender mainstreaming

Gender equality means creating equal opportunities for women and men by allowing them to contribute on equal terms economically, politically, socially and culturally. It means that no one will be prevented from reaching her or his full potential because of their gender and puts equal value on the varying roles played by women and men in society<sup>44</sup>. Equality does not mean that women and men will become the same, but that women’s and men’s rights, responsibilities and opportunities will not depend on whether they are born male or female. Gender equality implies that the interests, needs and priorities of both women and men are taken into consideration, recognizing the diversity of different groups of women and men<sup>45</sup>.

The proposed project will analyze the roles and needs of women and men and will promote equal access to project resources and services, equal participation in project activities and decision-making processes and equal benefit from trainings or other capacity building activities offered by the project. In addition, the project will adopt the “Inclusivity Principles” that highlight the importance of responding to the needs of vulnerable groups. These principles embody the fulfillment of the needs of women and men, the youth, the elderly and persons with disabilities.

<sup>44</sup> UNIDO. 2015. Guide on Gender Mainstreaming. Montreal Protocol Projects. English, Publishing and Library Section, United Nations Office at Vienna.

<sup>45</sup> UN Women. 2001. Gender Mainstreaming: Strategy for Promoting Gender Equality.

## H. Project financing and indicative budget (in EUR)

Budget line	Total	Year 1	Year 2	Year 3	Year 4	Year 5
Project staff:	1,002,060	200,412	200,412	200,412	200,412	200,412
International	421,920	84,384	84,384	84,384	84,384	84,384
National	580,140	116,028	116,028	116,028	116,028	116,028
Project consultants:	527,400	101,085	127,455	109,875	109,875	79,110
International	175,800	30,765	39,555	39,555	39,555	26,370
National	351,600	70,320	87,900	70,320	70,320	52,740
Sub-contracts (survey, sample analysis, etc.)	351,600	43,950	79,110	79,110	87,900	61,530
Meetings	175,800	30,765	39,555	35,160	39,555	30,765
Transportation	175,800	39,555	35,160	35,160	35,160	30,765
Equipment	1,590,111	158,220	435,105	332,262	316,440	348,084
Other direct costs	176,679	17,580	48,345	36,918	35,160	38,676
<b>Total</b>	<b>3,999,450</b>	<b>591,567</b>	<b>965,142</b>	<b>828,897</b>	<b>824,502</b>	<b>789,342</b>

## I. Sustainability of project results

### Leadership, partnership and collaboration

The DENR, DOTr and the LGUs are mandated to implement air pollution prevention laws. The strengthening of their capacities to lead the inter-agency implementation of environmental laws, which they will receive through the project's technical assistance, will help to sustain the activities launched by project after the project ends, by enhancing their management processes/systems and enhancing the enforcement arrangements.

### Policy and budget allocation

The project will develop policy recommendations and support development of urban development plans and management plans to address air pollution. To ensure their continued implementation in the future, it will work with the government to start the process of turning these recommendations and plans into laws and regulations and securing the necessary budget allocations.

### Monitoring and evaluation

The project will create a database on health impacts of air pollution. A monitoring and evaluation plan and a reporting program will be developed. To ensure their sustainability after the project ends, the project will work with the government to ensure that these are adopted into official government programs to allow continuous reporting to policymakers and stakeholders in the future. This will allow policymakers to monitor the trends as a basis for further legislation and budgetary support.

## J. Risks to project implementation

Project assumptions	Risk of failure	Mitigation actions
Government authorities responsible for mitigating air pollution from the transport sector are supportive of the project.	Risk of failure is low. These government authorities, as part of the HPAP process, identified mitigating air pollution from the transport sector as top priority.	Closely work with the relevant government departments/agencies at the project development stage to ensure ownership of the project concept. Seek a formal letter from the main government coordinating agency requesting to begin the drafting of the project proposal.
Other relevant government departments/agencies that has mandate to support mitigation of air pollution from the transport sector participate in project activities (planning, target setting, monitoring, assessment).	Risk of failure is low. The proposed interventions will support the government's mandate on ensuring good air quality for a healthy environment and protect the health of people.	Get the support of CSOs and NGOs to support the initiatives of the project and support the work of the partner government departments/agencies.

## K. Monitoring, reporting and evaluation

The overall objective of the M&E process is to ensure successful and quality implementation of the project by:

- Tracking and reviewing project activities execution and actual accomplishments;
- Leading the project processes so that the implementation team can take early corrective action if performance deviates significantly from original plans;
- Adjust and update project strategy and implementation plan to reflect possible changes on the ground, results achieved and corrective actions taken; and
- Ensure linkages and harmonization of project activities with that of other related projects at national, regional and global levels.

## L. Communication and visibility

Support from donor(s) will be highlighted and emphasized during all relevant project activities. The project anticipates the following communication and visibility activities: issuing press releases, distributing fact sheets/brochures and newsletters, publicizing project activities on websites, making presentations at workshops, conferences and/or other events and education/awareness campaigns.

All communication and visibility activities will be conducted in accordance with the donor(s)' communications and visibility manual (if any). For example, awareness about the project will be promoted at different levels (national, local, etc.). All workshops and training courses will be made aware of the donor financing. Their logos, along with those of major partners and associates will be noticeably visible on all printed materials and presentations. Reports will prominently feature all logos. Press releases or other media products will reference project partner names and logos, including source and amount of funding.

## Extended Concept Note 2

Project title:	<b>Mitigating Water Pollution in Manila Bay</b>
Location(s):	Manila Bay area
Planned start date:	2019
Duration:	Five years
Proposed government coordinating agency:	Department of Environment and Natural Resources, Environmental Management Bureau
Budget (in EUR):	86,345,000

### Project Summary

Metro Manila is the Philippines' national capital and the major center of government, commerce, culture and education. It is densely populated and is considered one of the most polluted urban areas in the world. The Manila Bay absorbs much of the capital's water pollution. With the various developments and economic activities taking place, Manila Bay is facing overpopulation, heavy pollution, over-exploitation of natural resources, habitat degradation and biodiversity loss. These problems pose health risks and compromise the wellbeing of the population. These problems also cause high economic costs (e.g. medical cost for illnesses, environmental rehabilitation cost) and economic losses (e.g. loss of income when sick, reduced income from fisheries/aquaculture livelihood).

The overall objective of this proposed project is to mitigate pollution of Manila Bay and reduce its impact on human health and impact on the coastal and marine ecosystem. The target results and outputs are the following: (1) strengthened capacity of the government to enforce environmental laws and to implement management plans; (2) successful implementation of the Transfer of Environmentally Sound Technology (TEST) approach developed by UNIDO at industrial establishments; (3) establishment of innovative pilot wastewater and solid waste treatment facilities; (4) technical studies conducted on shipping industry pollution and on the carrying capacity of Manila Bay; (5) policy recommendations and advocacy; (6) monitoring and evaluation of pollution impacts and integrated management planning; and (7) information management and utilization.

The proposed project intends to help the government implement the laws that will result in the mitigation of the pollution caused by the industry sector (i.e. manufacturing, fisheries/aquaculture, agriculture, shipping). The proposed project will provide a system to assist the industry sector to meet environmental standards. At the moment, the Operational Plan for the Manila Bay Coastal Strategy 2017-2022 does not have a specific program for the industry sector. The proposed project will also support the government in establishing wastewater and solid waste treatment facilities to service the domestic sector and small establishments.

### Relevant Background

Manila Bay is a semi-enclosed estuary with an estimated coastline of 190 km, a surface area of 1,994 km<sup>2</sup> and an average depth of 17 m<sup>46,47</sup>. It is located at the southwestern part of Luzon Island and is directly connected to the West Philippine Sea, which shares common sea and ocean borders with the countries of the East Asian Region. Manila Bay harbors a rich marine flora and fauna in the form

<sup>46</sup> DENR-MBCO and NAMRIA, 2015. Manila Bay Area Environmental Atlas - 2nd Edition. Quezon City, Philippines: Manila Bay Coordinating Office and the National Mapping and Resource Information Authority.

<sup>47</sup> Jacinto, G.S., Velasquez, I.B., San Diego-McGlone, M.L., Villanoy, C.L., Siringan, F.P., 2006. Biophysical Environment of Manila Bay - Then and Now. In: Wolanski, E. (Ed.), The Environment in Asia Pacific Harbours, Springer, Netherlands, pp. 293 - 307

of coral reefs, seagrass beds and mangroves. These marine habitats are important to ensure marine biodiversity and the viability of the bay's fishery sector (the bay is a source of food and livelihood for the fishing communities living along its edges). These habitats are also important in building resiliency against climate change because they serve as natural barriers for storm surges and other extreme weather events. A healthy ecosystem will recover faster from climate disturbances.

The Manila Bay watershed has a 19,268 km<sup>2</sup> catchment area that spans eight provinces in three regions (National Capital Region, the Central Luzon Region and the Southern Tagalog Region). Manila Bay area is home to about 30% of the country's population, or over 34 million people<sup>48</sup>. The bay's population is projected by NSO to increase to around 39 million by the year 2020<sup>49</sup>. The sources of livelihood around Manila Bay are fisheries (67%), tourism (23%) and shipping/navigation (10%)<sup>50</sup>. Fishing activities in the bay include municipal fishing, commercial fishing and aquaculture. There are numerous fishponds, fish pens and shellfish growing areas in Nueva Ecija, Bulacan, Pampanga, Tarlac, Cavite, Bataan, NCR and Laguna Lake. The total aquaculture areas is almost 600 km<sup>2</sup>.<sup>51</sup> Mercury analysis of fishpond water samples showed that 3 out of 46 sampling sites, all taken in Southern Bataan during the wet season, and 14 out of 47 sampling sites (three from Eastern Bulacan, one each in Western Bulacan, Northern Bataan and Southern Bataan, and eight in Cavite) during the dry season, failed to meet the DENR regulatory limits (DAO 34, 1990). For lead, 3 out of 46 samples exceeded the regulatory limit, all from Bataan during the wet season. For cadmium, all sites were below the regulatory limit. Mercury analysis in fish showed that 1 out of 12 milkfish and 1 out of 13 oyster samples, collected from Pampanga and Cavite, respectively, were found to exceed the regulatory limit (EC 1881/2006). Analysis of lead in aquaculture commodities showed that 2 out of 12 milkfish samples, collected from Eastern Bulacan and Pampanga, and 1 out of 9 tilapia samples, from Pampanga, failed to meet the regulatory limit. Total coliform, fecal coliform and *Escherichia coli* were also detected in these waters with levels ranging from <1.8 to >160,000 MPN/mL, <1.8 to 54,000 MPN/100mL, and <1.8 to 49,000 MPN/100mL, respectively. Moreover, 6.67% of the milkfish samples, 16% of the tilapia samples, 24.44% of the shrimp samples, 8.89% of the crab samples, 14.67% of the oyster samples and 25% of the mussel samples exceeded the standards for *E. coli* concentration in seafood<sup>52</sup>.

In 2013, the combined contribution of the regions of the Manila Bay area to the country's GDP was 62.7%, 36.3% of which was from NCR alone. The NCR harbors 16 highly urbanized cities (HUCs) that are challenged with problems of overpopulation due to migrant influx, high demand for energy and resources, land conversion and pollution from domestic and industrial sources. In the catchment area of Manila Bay, only about 20% of the population has sewerage services<sup>53</sup>. In 2005, only 8% of sewage was fully treated (up to secondary). Generally, industrial and commercial wastewater is discharged with very little or no treatment. Residential sewage constitutes about 65-75% of the water pollution in Metro Manila while the rest comes from industries and solid waste dumped into drainage systems or into rivers and coastal areas<sup>54</sup>. In effect, most of the wastewaters that drain

<sup>48</sup> Philippine Statistics Authority. 2010. Census of Population and housing. Philippines: PSA.

<sup>49</sup> National Statistics Office. (2010). Census of Population and Housing Philippines.

<sup>50</sup> PEMSEA. 2006. Initial valuation of selected uses and habitats and damage assessment of Manila Bay: PEMSEA technical information report no. 2006/01. Quezon City, Philippines: Global Environment Facility/United Nations Development Programme/International Maritime Organization Regional Programme on Building Partnerships in Environmental Management for the Seas of East Asia (GEF/UNDP/PEMSEA), pp. 165.

<sup>51</sup> Perez, R. T., Amadore, L. A., & Feir, R. B. 1999. Climate change impacts and responses in the Philippines coastal sector. *Climate Research*, 12, 97-107.

<sup>52</sup> Food and Drugs Administration. (2013). Revised guidelines for the assessment of microbiological quality of processed Contamination of Coliform Bacteria in Water and Fishery Resources in Manila Bay Aquaculture Farms 123 foods. FDA Circular No. 2013-010. Retrieved from [www.fda.gov.ph/attachments/article/17218/FC2013-010.pdf](http://www.fda.gov.ph/attachments/article/17218/FC2013-010.pdf).

<sup>53</sup> The World Bank (2012) Implementation status and results: Manila Third Sewerage Project.

<sup>54</sup> GEF (2005) Manila Third Sewerage Project.

<sup>55</sup> PEMSEA, MBEMP-MBIN, 2007. Manila Bay Area Environmental Atlas, PEMSEA Technical Report 20. Global Environment Facility/United Nations Development Programme/International Maritime Organization Regional Programme on Building Partnerships in Environmental Management for the Seas of East Asia (PEMSEA) and the Manila Bay Environmental Management, Quezon City, Philippines.

<sup>56</sup> Manila Bay Environmental Management Project. 2001. Environmental Management Bureau, Department of Environment and Natural Resources.

out into the bay are heavily contaminated and contains untreated sewage. The bay also serves as the country's major sea port<sup>55</sup> At the bay's shipping ports and ferry terminals, an average of 30,000 ships arrive and depart annually to transport passengers, manufactured goods and raw materials<sup>56</sup>.

Rapid urbanization around Manila Bay, intensive use of its waters and weak implementation of environmental laws have resulted in the deterioration of the bay. According to a study by UPMSI, the bay's near-bottom dissolved oxygen (DO) levels fall to as low as 1 mg/L<sup>57</sup> (June 2008) and nutrient levels exceed the ASEAN water quality criteria<sup>58</sup>. The effects of eutrophication and hypoxia on coastal marine ecosystems can be dramatic, as low DO levels can result in massive die-offs of fish and invertebrates and can cause major shifts in community structure and production of the entire ecosystem<sup>59</sup>. According to a modeling study by PEMSEA (2013), the annual biochemical oxygen demand generated in the 58 sub-basins draining into Manila Bay was estimated at 270,182 MT/year for 2015, increasing to 302,531 MT/year for 2020. Domestic sources of BOD and other chemicals contributed the highest pollution loads, followed by industrial and commercial sources, agricultural sources and inputs from forest land cover<sup>60</sup>.

## Project Description

### A. Project beneficiaries

The proposed project is expected to benefit the following:

**Fish consumers and the general public:** Mitigating water pollution of the bay will help reduce the entry of heavy metals in the food chain and reduce the risk of people from exposure to pathogenic bacteria and hazardous chemicals. Fish products will continue to supply the population with a good source of nutrition. People who directly come in contact with the bay such as fishers, coastal dwellers, etc. will have reduced health risks from contaminated water.

**Fishers and aquaculture farmers:** In the long term, with improved water quality, the ecosystem of Manila Bay will recover and the productivity of the bay will improve, which will result in improved income for fishers whose livelihood depend on fish harvests from the bay.

**Industry sector:** The industry sector will benefit economically from the technical assistance on transitioning to cleaner production to help them meet environmental standards. Assistance will include an improved collaboration arrangement with government and relevant stakeholders for a multi-sectoral sustainable development partnership.

The safety and well-being of employees in the workplace will be ensured by making sure that workers will not be at risk from exposures to harmful chemicals and emissions.

**Government:** Among the benefits that the government could gain from this proposed project is a strengthened capacity to implement environmental laws through the establishment of: management systems; waste treatment infrastructures and; long-term sustainability plans.

The proposed project is well-aligned with the PDP targets and supports the priority programs of NEDA, DENR, DOH, DOTr, DOLE, DA, DILG, DPWH and other departments.

<sup>57</sup> Hypoxia occurs when DO levels fall below 2 mg/L (or ~30% saturation). At these oxygen levels, animals generally begin to feel the effects of suffocation (Diaz and Rosenberg, 2008). Nutrient enrichment causes increased primary production and hence accumulation of organic matter and so contributes to the formation of hypoxia (Diaz and Rosenberg, 2008; Nixon, 1995; Rabalais et al., 2009).

<sup>58</sup> Chang, K.-H., Amano, A., Miller, T.W., Isobe, T., Maneja, R., Siringan, F., Imai, H., Nakano, S., 2009. Pollution study in Manila Bay: eutrophication and its impact on plankton community. *Interdisciplinary Studies on Environmental Chemistry-Environmental Research in Asia*, 261–267.

<sup>59</sup> Diaz, R.J., Rosenberg, R., 2008. Spreading dead zones and consequences for marine ecosystems. *Science* (New York, N.Y.) 321, 926–929.

<sup>60</sup> PEMSEA. 2013. Total Pollutant Loading Study in the Laguna de Bay–Pasig River– Manila Bay Watershed. Partnerships in Environmental Management for the Seas of East Asia (PEMSEA), DENR and the Laguna Lake Development Authority.

## B. Overall project objective

The overall objective is to mitigate water pollution in Manila Bay and to reduce its impacts on human health and on the coastal and marine environments of the bay.

The specific objectives of the project are:

1. To improve the capacity of a number of pilot enterprises located in the three Water Quality Management Areas (WQMAs) located around Manila Bay to reduce their wastewater loads and solid waste generation through the adoption of the UNIDO TEST approach, thereby helping them to comply with the relevant laws and regulations on industrial wastewater and industrial solid waste.
2. To improve the capacity of the national and local government to effectively manage the environmental and health impacts associated with the industry sector, both formal and informal, by providing support in the development and implementation of action plans to mitigate these impacts in the short-term, and to develop policy recommendations to ensure longer-term mitigation of these impacts and to turn these into law.
3. To provide technical support to these same local governments in the work leading to the establishment of the necessary wastewater treatment facilities and solid waste management facilities to adequately serve the enterprises (as well as wet markets, slaughterhouses and the domestic sector) in the three WQMAs.
4. To study water pollution from the shipping industry and related land-based industrial and service enterprises and provide recommendations for its mitigation and preventive management.
5. To conduct a baseline assessment and set up the continuous monitoring of: (1) marine habitats (i.e. coral reefs, sea grass beds and mangroves, and associated fish) in the bay and; (2) pollution-related illnesses that can be attributed to Manila Bay. This monitoring and evaluation system will serve as a tool for long-term management of the bay's health by the government.

## C. Intervention strategy

To reach these objectives, a multi-prong strategy will be adopted to implement the project.

**Creation of an inter-agency project partners group to support project implementation.** Given that the bay is the focus of multiple, overlapping mandates of many government agencies, both national and local, it is essential for the project's success that the project staff work closely with all these agencies. To this end, an inter-agency project partners group (IAPPG) will be created to bring together all the relevant government agencies and LGUs for the implementation of the project. The IAPPG will act as the project's Steering Committee. Inception and planning meetings will therefore be conducted with the IAPPG at the beginning of the project. The IAPPG will also review and approve an annual work plan. Periodic meetings of the IAPPG will also be held to review the progress on project implementation and to update/adjust the work plan based on lessons learned and findings on the ground.

**Harmonization of policies.** The project will focus in particular on improving inter-agency cooperation by helping to harmonize the relevant policies on standards and thresholds across agencies. In this way, government departments will be observing similar standards to follow, which would allow for a more cohesive implementation of "pollution-prevention" strategies.

**Development of the necessary capabilities.** For the project to succeed, it will be necessary to develop the capabilities needed by the people/sectors involved in the project to achieve the project objectives in the short term. Thus, the project will build the knowledge, competencies and skills expected from the key players so that they can perform according to the work performance indicators expected from them. It will also be necessary to build the capabilities in these same stakeholders which are required to ensure that the project results can be sustained, expanded and replicated in national programs in the long term.

**Assistance in the work transition for the displaced workers from the informal sector.** Recognizing that a stronger enforcement of existing laws and regulations could lead to the closure of a number of informal enterprises and operations, the project will collaborate with DOLE to develop a program for workers displaced by these closures. Either they will be trained in a new skill or they will be job-matched with participating employers.

**Establishment of innovative wastewater and waste treatment infrastructures.** One particularly acute problem is that the Manila Bay area is very much lacking in wastewater and solid waste treatment facilities. The main reason for this is that they are very costly. The project will therefore provide specific support on identifying and supporting the establishment of innovative wastewater and waste infrastructure that reduce the investment and operating costs of such infrastructure.

**Use of strong data for policy advocacy and awareness-raising campaigns.** Sound and strong data are essential for ensuring the credibility of any recommendations being put forward by the project. Thus, results of the technical studies will serve as basis for management action, policy recommendations and development of an awareness and advocacy program.

#### D. Implementation partnerships

The project will be a collaboration among DENR, DOH, NEDA, DA, DOTr, DOLE, DOST, DTI, DPWH, DOE, DILG, LGUs, academe, NGOs and other relevant stakeholders. The key partners and their respective roles are as follows:

Implementing Partner	Role/Responsibility
DENR	DENR’s principal role in the project will be to oversee all of the activities linked to the contamination of the bay. Since it will play such an important role in the project, it will also have the role of Government Coordinating Agency
DTI	DTI will support in identifying pilot enterprises to adopt the TEST program. It will also help in consolidating an industry database.
DA	DA will support in identifying pilot enterprises to adopt the TEST program from land-based and water-based agriculture.
DOTr	DOTr will support the study on the shipping industry and the development of necessary management program and policy recommendations.
DOH	DOH will be responsible for the specific output regarding the studies of the health effects of water pollution and the development of programs to monitor these health effects.
LGUs	Since the LGUs have the mandate to manage and improve water quality within their territorial jurisdiction, LGUs will play the role of bringing the on-the-ground reality to the policy dialogues and developing the necessary policies to ensure proper implementation of General Effluent standards and sanitation standards.
NEDA	Ensures that the project direction is aligned and in accordance with the sector plan; provides advice on the conduct of studies, researches, policy analysis and policy recommendations.

#### E. Project results/outputs

**Strengthened governance capacity.** Strengthened capacity of relevant government agencies and LGUs to implement the environmental laws, particularly on addressing pollution from the industry sector. This will be done through the establishment of management procedures, technical studies and data analysis, improved inter-agency collaboration, development of integrated management plans and drafting of policy recommendations. The role of the local governments will be particularly crucial in monitoring the informal sector/unregulated enterprises and companies. The project will identify the necessary policy tools to institutionalize this under the local governments.



**Adoption of the UNIDO TEST Approach.** Water quality of Manila Bay is improved by assisting the industry sector in transitioning to resource efficient and cleaner production (RECP) and meeting the environmental standards as prescribed by the law. The project will adopt the Transfer of Environmentally Sound Technology approach developed by UNIDO (see Attachment 1). The main focus of the TEST approach will be to reduce the wastewater and solid waste that the enterprises generate, but the teams will also consider other issues where there are obvious improvement options (e.g., air pollution, energy conservation, etc.).

**Establishment of innovative waste treatment infrastructures:** Demonstration sites are established for a sewage treatment plant with a biogas power plant and an innovative solid waste treatment plant. These facilities will be used in awareness-raising campaigns and for trainings.

**Technical studies as basis for management.** Studies are conducted to serve as basis for management action and policy development. The first study will be a Maritime/Shipping Industry Pollution Impact Study. Maritime/Shipping economic activities are not strictly monitored by the government. This is an important study which could help support the development of a management strategy and policy to address pollution from this industry. The second study will be on the carrying capacity of Manila Bay. According to modeling studies, there is a need to look into the carrying capacity of Manila Bay. The study suggests that if no action will be taken to regulate the population around Manila Bay, the water quality of the bay will continue to deteriorate. The third study will be an Environment and Health Impact Study.

**Policy recommendations and advocacy for policy adoption.** Policy recommendations are drafted and the necessary laws and regulations to implement the policy recommendations are developed.

**Monitoring and evaluation of pollution impacts and integrated management planning.** Baseline data on impacts of pollution on the environment and on people's health in the Manila Bay area are collected. Necessary mechanisms to ensure regular monitoring are established. Changes over time are monitored as the basis for developing and implementing an integrated management plan that considers environment protection, ecological resilience, human health, carrying capacity, climate change and disaster risks.

**Information management and utilization.** An industry sector database containing basic profiles of the enterprises and the results of any known environmental and health monitoring undertaken by the relevant authorities is created. Information generated are to be used as a basis for management decisions/actions, policy advocacy and awareness-raising among stakeholders.

## F. Key project activities

Activities	Locations	Timing	Partners
<b>COMPONENT I: ADOPTION OF THE UNIDO TEST APPROACH IN PILOT ENTERPRISES IN THE FORMAL SECTOR IN 3 SELECTED PRIORITY WQMAs IN THE MANILA BAY AREA</b>			
1.1. Build the capacities of a number of pilot enterprises located in the three WQMAs surrounding Manila Bay, to help them meet environment and health standards through resource efficiency and cleaner production, using the TEST approach – See Attachment 1. (Will cover the production industry, fisheries, shipping industry, among others).	Manila Bay area	Year 1-5	DENR, DA, DOTr, DOLE, DOST, DTI, DILG, LGUs
1.2. Should any of the enterprises, after implementing the TEST approach, still be in violation of environment and health standards, and the decision is taken to close them down, provide assistance to the employees in two ways: (1) in collaboration with DOLE, facilitate their employment somewhere else where they can use their skills or (2) in collaboration with DOST and DOLE, offer them vocational training so that they can obtain new skills and be employable.			
1.3. Develop an industry sector database on environment and health. Get the baseline of all existing enterprises/companies within the Manila Bay watershed. The database will contain profiles and result of environmental monitoring and relevant health data.			
1.4. Evaluate, refine and recommend the adoption of the TEST approach as a national management strategy to improve the environmental compliance rate by the industry sector.			
<b>COMPONENT II: ASSESSMENT AND POLICY RECOMMENDATIONS FOR THE INFORMAL SECTOR</b>			
2.1. Conduct a study, including primary data collection from a representative sample of existing informal productive/industrial activities taking place in the three WQMAs within the Manila Bay watershed. Locate the activities geographically and assess to the extent possible the environmental impacts they are having on the WQMAs' waterways.	Manila Bay area	Year 1-4	DENR, DOLE, DOST, DTI, DOH, DILG, LGUs
2.2. Develop and implement an action plan that aims to mitigate the informal sector's impacts on waterways in the short term.			
2.3. Draft policy recommendations to mitigate these impacts over the long term. Develop the necessary laws and regulations to implement the policy recommendations. Ensure that the required budgetary allocations are made in the national budget.			

Activities	Locations	Timing	Partners
<b>COMPONENT III: DEVELOPING THE CAPACITY OF THE GOVERNMENT</b>			
3.1. Provide the necessary support to improve the government's capacity to monitor the industry sector and enforce relevant environmental laws. Review the existing environmental compliance monitoring and enforcement system for the industry sector and identify ways to enable the government to actively carry out this mandate. Undertake efforts to improve the collaboration of the Regional Office of DENR and the local governments.	Manila Bay area	Year 1-5	DENR, DPWH, DA, DOTr, DOLE, DOST, DTI, DOE, DOH, DILG, LGUs
3.2. Advocate and provide technical assistance to selected local governments on the establishment of necessary wastewater treatment facilities and solid waste management facilities to allow enterprises to have their sewerage and solid waste properly handled.			
3.2.1. Raise awareness on the urgency of the need for such facilities among the local governments through study tours and/or technical trainings.			
3.2.2. Encourage local governments to avail themselves of existing financial assistance programs for such facilities. Provide technical assistance in the preparation of the necessary technical studies and documents that may be required.			
3.2.3. Draft operational work plans and sustainability plans to support the implementation of the waste treatment facilities.			
3.3. Build demonstration sites of innovative wastewater and waste treatment facilities:			
3.3.1. Sewage Treatment Plant with a Biogas Power Plant for selected LGUs			
3.3.2. Solid Waste Treatment Plant for selected LGUs			
3.4. Apply practical tools/materials/solutions to catch floating litter from tributaries to prevent them from entering Manila Bay.			
<b>COMPONENT 4: MARITIME/SHIPPING INDUSTRY POLLUTION IMPACT STUDY.</b>			
4.1. Study the extent of water pollution from ships and other vessels that enter the bay, from land-based harbor activities servicing these ships, as well as from ship-breaking yards located on and around the bay.	Manila Bay area	Year 1-4	DENR, DOTr, DOLE, DOH, LGUs
4.2. Include some of the land-based enterprises involved in servicing ships docked in the bay (loading, unloading, ship maintenance, etc.) in the TEST program (Component 1).			
4.3. Establish programs for the environmentally sound management and disposal of PCB wastes, POPs, mercury and other heavy metals and other hazardous wastes in the ship-breaking yards.			
4.4. Recommend management strategies and policies to mitigate water pollution generated by ships while they are sailing into and out of the bay.			

Activities	Locations	Timing	Partners
<b>COMPONENT V: CARRYING CAPACITY STUDY AND POLICY RECOMMENDATIONS</b>			
5.1. Conduct a carrying capacity study of Manila Bay that considers future trends in industrialization, urbanization, climate change and disaster risks.	Manila Bay area	Year 2-3	DENR, DA, DOTr, DOLE, DTI, DOH, DILG, LGUs, University of the Philippines
5.2. Develop a short-term and long-term Urban Plan to decongest the Manila Bay Area.			
5.3. Develop and recommend for adoption the necessary policies to ensure that the carrying capacity of Manila Bay will be maintained within sustainable levels.			
<b>COMPONENT VI: ENVIRONMENT AND HEALTH IMPACT STUDY</b>			
6.1. Undertake a baseline monitoring of coral reefs, seagrass beds and mangrove, as well as associated fish and other indicator marine organisms.	Manila Bay area	Year 2 & 4	DENR, DA, DOTr, DOLE, DTI, DOH, DILG, LGUs, University of the Philippines
6.2. Undertake a baseline monitoring of health impacts that can be imputed to the pollution of Manila Bay.			
6.3. Put in place the necessary mechanisms to ensure regular monitoring with public reporting to the relevant authorities.			
6.4. Develop an information campaign to raise awareness and encourage active support of the various stakeholders to rehabilitate and revive Manila Bay.			

## G. Gender mainstreaming

Gender equality means creating equal opportunities for women and men by allowing them to contribute on equal terms economically, politically, socially and culturally. It means that no one will be prevented from reaching her or his full potential because of their sex and puts equal value on the varying roles played by women and men in society<sup>61</sup>. Equality does not mean that women and men will become the same, but that women's and men's rights, responsibilities and opportunities will not depend on whether they are born male or female. Gender equality implies that the interests, needs and priorities of both women and men are taken into consideration, recognizing the diversity of different groups of women and men<sup>62</sup>.

The proposed project will analyze the roles and needs of women and men and will promote equal access to project resources and services, equal participation in project activities and decision-making processes and equal benefit from trainings or other capacity building activities offered by the project.

<sup>61</sup> Ibid 42, p.56.

## H. Project financing and indicative budget (in EUR)

The proposed total cost of the project per component is as follows:

Component	Total	Year 1	Year 2	Year 3	Year 4	Year 5
Component 1: Transfer of Environmentally Sound Technology in pilot enterprises in the formal sector	<b>16,444,000<sup>1</sup></b>	2,390,000	5,315,000	6,415,000	2,072,000	252,000
Component 2: Assessment and policy recommendations for the informal sector	<b>2,360,000</b>	750,000	750,000	680,000	180,000	-
Component 3: Developing the capacity of the government	<b>55,635,000<sup>2</sup></b>	607,000	707,000	12,107,000	22,107,000	20,107,000
Component 4: Maritime/Shipping industry pollution impact study	<b>531,000</b>	-	331,000	200,000	-	-
Component 5: Carrying capacity study and policy recommendation	<b>1,000,000</b>	-	500,000	500,000	-	-
Component 6: Environment and Health Impact Study	<b>10,375,000<sup>3</sup></b>	-	5,000,000	-	5,375,000	-
<b>Total</b>	<b>86,345,000</b>	<b>3,747,000</b>	<b>12,603,000</b>	<b>19,902,000</b>	<b>29,734,000</b>	<b>20,359,000</b>

1 – Estimates to cover costs of technical assistance for around 100 pilot firms; technology investment costs are excluded, where firms will be expected to invest.

2 – Costs include investment costs to build a demonstration Wastewater Treatment Plant with a biogas digester and a Solid Waste Treatment Plant with a separation system with some primary treatment of the different waste streams.

3 – Include fish tissue analysis for heavy metals and organic contaminants.

A possible financing source for some of the components of this project is the Global Environment Facility in the focal area of International Waters.

<sup>62</sup> Ibid 43, p.56.

The proposed total cost of the project according to budget category is as follows:

Budget line	Total	Year 1	Year 2	Year 3	Year 4	Year 5
Project staff:						
- International	275,000	55,000	55,000	55,000	55,000	55,000
- National	120,000	24,000	24,000	24,000	24,000	24,000
Project consultants:						
- International	270,000	45,000	75,000	75,000	60,000	15,000
- National	2,380,000	310,000	460,000	600,000	745,000	265,000
Sub-contracts	59,500,000	1,600,000	6,500,000	10,550,000	22,850,000	18,000,000
Meetings	240,000	40,000	40,000	60,000	60,000	40,000
Equipment	15,050,000	1,400,000	4,000,000	6,650,000	3,000,000	-
Other direct costs	8,510,000	320,000	1,220,000	1,950,000	2,970,000	2,050,000
<b>Total</b>	<b>86,345,000</b>	<b>3,794,000</b>	<b>12,374,000</b>	<b>19,964,000</b>	<b>29,764,000</b>	<b>20,449,000</b>

## I. Sustainability of project results

### Leadership, partnership and collaboration

The DENR and the LGUs are mandated to implement pollution prevention laws for the industry sector. Their capacities to lead the inter-agency implementation of environmental laws among the industry sector will be strengthened through the technical assistance they receive in enhancing management processes/systems and enhancing enforcement arrangement for improved implementation in the long term.

### Policy and budget allocation

*Long-term adoption of the TEST approach:* the project will encourage the government to adopt the TEST approach as a management strategy and as a budgeted government program to assist the industry sector in the formal sector to comply with environmental laws.

*Policy recommendations and long-term management plans:* The project will help develop policy recommendations, urban development plans and management plans to address issues regarding the informal sector, the shipping industry and the carrying capacity of the bay. It will work with government to start the process of turning these recommendations and plans into laws and regulations and securing the necessary budget allocations to ensure their implementation.

### Monitoring and evaluation

*Databases and reporting:* The project will establish an industry sector database on health and environment. It will also develop a monitoring and evaluation plan and a reporting program for Manila Bay. It will work with government to ensure that these are adopted into official government programs to allow continuous reporting to policymakers and stakeholders in the future. This will allow policymakers to monitor the trends as a basis for further legislation and budgetary support.

## J. Risks to project implementation

Project assumptions	Risk of failure	Mitigation actions
The environmental authorities enforce environmental standards that are necessary to protect the water quality of Manila Bay.	Risk of failure is low. If government fails to enforce standards, it may lessen incentives for enterprises to participate in the TEST programme.	<ul style="list-style-type: none"> <li>- The programme is predicated on reducing enterprise costs by giving priority to options which cut enterprise costs through resource efficient and cleaner production, thus giving them an incentive to participate even in the absence of strong enforcement.</li> <li>- Need to effectively communicate to enterprises how they could benefit in savings as a result of resource efficient and cleaner production.</li> <li>- Conduct efforts to raise knowledge and awareness of enterprises on the impact of pollution in the environment, health and economy.</li> </ul>
Enterprise adopts environmentally sound technology options (combination of process and pollution control technologies).	Risk of failure is medium. Pilot enterprises may think that environmentally sound technology options are too costly and that if they implement them their operations would no longer be profitable.	<ul style="list-style-type: none"> <li>- There is considerable evidence that compliance with environmental regulations is not excessive for the great majority of enterprises (in the range of two to four percent of production costs). Effectively communicate to enterprises the cost of compliance vs. the cost of penalties/fines or closure.</li> <li>- Raise knowledge and awareness on the impacts of pollution on environment, health and economy.</li> </ul>
Financing is available for the enterprises to implement EST options.	Risk of failure is low. Lack of programs providing financial support for environmental projects.	<ul style="list-style-type: none"> <li>- Work with the government to create incentives to encourage financial support to initiatives that promote resource efficiency and cleaner production.</li> </ul>

## K. Project monitoring, reporting and evaluation

Formal monitoring and evaluation (M&E) of the project will follow the principles, criteria and minimum requirements set out in the GEF M&E policy in its current version and the respective guidelines and procedures issued by the GEF Evaluation Office and/or the GEF Secretariat. At the same time, M&E will comply with the rules and regulations governing the M&E of UNIDO technical cooperation projects, in particular the UNIDO Evaluation Policy and the Guidelines for Technical Cooperation, both in their respective current versions.

The overall objective of the M&E process is to ensure successful and quality implementation of the project by:

- Tracking and reviewing project activities execution and actual accomplishments;
- Leading the project processes so that the implementation team can take early corrective action if performance deviates significantly from original plans;
- Adjust and update project strategy and implementation plan to reflect possible changes on the ground, results achieved and corrective actions taken; and
- Ensure linkages and harmonization of project activities with that of other related projects at national, regional and global levels.

## **L. Communication and visibility**

Support from donor(s) will be highlighted and emphasized during all relevant project activities. The project anticipates the following communication and visibility activities: issuing press releases, distributing fact sheets/brochures and newsletters, publicizing project activities on websites, making presentations at workshops, conferences and/or other events and education/awareness campaigns.

All communication and visibility activities will be conducted in accordance with the donor(s)' communications and visibility manual (if any). For example, awareness about the project will be promoted at different levels (national, local, etc.). All workshops and training courses will be made aware of the donor financing. Their logos, along with those of major partners and associates will be noticeably visible on all printed materials and presentations. Reports will prominently feature all logos. Press releases or other media products will reference project partner names and logos, including source and amount of funding.



## **THE UNIDO TEST APPROACH**

The UNIDO Transfer of Environmentally Sound Technology (TEST) approach builds on the success which UNIDO had in implementing resource efficient and cleaner production (RECP) programs around the world. The approach brings together the RECP methodologies and the more traditional investments in end-of-pipe technologies to control and treat waste and pollutant emissions. The TEST approach can be summarized as follows.

A series of assessments are conducted in a step-wise manner at each of the pilot enterprises taking part in a TEST program by a team of enterprise staff supported by national and international consultants. Each step takes the enterprise team through a phase of the TEST methodology. Every step is comprised of two parts. The first part is a training, given initially by international experts. The training is supported by a TEST toolkit, which is provided to the enterprise teams as well as the national experts working with the enterprises. On the basis of this training, the enterprise teams, with support from national experts and the TEST toolkit, will apply the knowledge and skills they have learned in the training to complete the next phase of the TEST methodology. The purpose of the assessment is to allow the enterprises to meet three goals:

- (a) develop and adopt a menu of RECP options to optimally increase the enterprise's resource efficiency and to reduce the amount of pollution and waste it generates;
- (b) adopt end-of-pipe technologies to bring any residual pollution and waste into compliance with environmental standards – these can now be of smaller scale and therefore cheaper because of the reductions in pollutant and waste loads brought about by the RECP options;
- (c) implement the environmental management system which is best suited to its industrial reality; implementing an EMS will ensure that the enterprise's RECP efforts are sustained.

The TEST approach can be used to reduce/eliminate any pollutant or waste that an enterprise generates or any material or energy resource that it consumes. The focus of the enterprise's efforts is normally decided at the beginning of the TEST program by the senior management of the enterprise.

The TEST approach also includes a component where the capacities of national experts and national institutions are built up to support the implementation of the TEST approach. This ensures that there is a body of expertise in the country which can continue promoting the TEST approach once the initial TEST program is completed.

## Extended Concept Note 3

Project title:	<b>Reduction of Lead Exposures from ULAB Recycling Activities</b>
Location(s):	TBD
Planned start date:	End 2019
Duration:	Five years
Proposed government coordinating agency:	Department of Environment and Natural Resources, Environmental Management Bureau
Budget (in EUR):	1,680,000

### Project Summary

This project will reduce human exposure risks associated with lead-contaminated soil, air and water in selected residential areas where small scale recycling of used lead acid battery causes pollution and creates health risks. Multi-faceted, multi-stakeholder actions targeting environmental health assessments in areas contaminated by small scale lead recycling, lead-exposure risk mitigation activities and a policy enhancement program led by the Department of Environment and Natural Resources and implemented in collaboration with the Departments of Health, Trade and Industry, Labor and Employment, Interior and Local Government, Social Welfare and Development (DSWD) and the Housing and Land Use Regulatory Board (HLURB) in partnership with civil society is proposed.

### Relevant Background

Since 2008, the DENR has received reports of contaminated sites throughout the country through projects funded by the Asian Development Bank, the European Commission, Global Environment Facility, the World Bank and others. Data collected from these projects has identified approximately 150 lead-contaminated sites in the country where human health is at risk due to lead exposure. These sources of lead emissions at these sites were the recycling of Used Lead Acid Batteries (ULAB) and lead smelting for casting of recycled lead. It is estimated that these sites are only a small portion of the sites contaminated with lead in the country. Over 200 sites were initially surveyed in the 2017 national inventory of potentially lead-contaminated sites conducted by DENR-EMB, Innogy and Pure Earth.

The highest lead readings recorded in the Toxic Sites Identification Program (TSIP) implemented by Pure Earth as part the UNIDO project “Mitigating Toxic Exposures in Low- and Middle-Income Countries”, funded by the European Commission and USAID, were around 200,000 ppm. Community lead exposures have been measured in some sites. For instance, in a lead legacy site in Meycauayan, Bulacan, Blood Lead Level (BLL) tests conducted in 2010 by the DOH and the University of the Philippines – National Poison and Management Control Center (UP-NPMCC) in partnership with Pure Earth, showed that out of the 76 children ages 6-7 years old who were tested, 12 had BLL of more than 10 micrograms/deciliter ( $\mu\text{g}/\text{dL}$ ), with some having levels as high as 65  $\mu\text{g}/\text{dL}$ . To put that in perspective, the US Center for Disease Control (CDC) uses 5  $\mu\text{g}/\text{dL}$  as the level of concern for a child’s BLL. In a lead contaminated site in San Simon, Pampanga, screening examination for lead conducted in 2017 using the Blood LeadCare® Analyzer showed elevated blood levels among 44 recycling and smelter workers, adult residents and children, with 12 of 13 workers exhibiting lead levels above the maximum detection limit of the analyzer (65  $\mu\text{g}/\text{dL}$ ). Four children who showed persistently elevated BLLs for the 3 determinations underwent confirmatory laboratory tests. The results were consistent with the results of the screening tests. The levels were 37.6, 54.1, 66.4, 67.6  $\mu\text{g}/\text{dL}$ .

There are major health-related concerns with regards to lead exposure. Lead cannot be broken down, so it persists in the environment as dust once it has been emitted. Lead is readily absorbed by the body through inhalational and oral routes. When absorbed, lead is distributed primarily to three compartments: blood, soft tissue (kidney, liver, brain), and mineralizing tissue (bone and teeth). Lead stays in the body for long periods of time, having a biologic half-life of approximately 25 days in blood, 40 days in soft tissue, and 10-20 years in cortical bone. Transfer of lead across the placenta also occurs from exposed pregnant women to their developing fetus in the womb. Likewise, pregnant women and women of childbearing age can store lead in their bodies to be passed on to a future fetus. Lead is a particular health concern because excessive exposure to lead results in serious adverse health impacts, including:

- neurological impact on memory, coordination and speech
- intelligence loss in children
- higher incidence of heart disease
- disability and death

Children are most at risk from lead contamination because their smaller bodies result in proportionally higher doses for the same level of exposure, because children tend to ingest more dirt, and because their neurological development is still in progress.

In the Philippines, ULAB management is tackled in major laws, namely Republic Act (RA) 6969 “Toxic Substances and Hazardous and Nuclear Wastes Control Act” and RA 9003 “Ecological Solid Waste Management Act”. DENR has also released Department Administrative Order (DAO) 2013-22 “Revised Procedures and Standards for the Management of Hazardous Wastes” and DAO 2013-24 “Chemical Control Order (CCO) for Lead and Lead Compounds” among others. While these policies include specifics related to lead, many operators throughout the ULAB supply chain are not registered, being part of the informal sector. They are engaged in ULAB recharging, reconditioning, and recycling, operations which they carry out without any health, safety or pollution controls. There are also some operators who are in the formal sector and so are registered with the government. However, they too are often not complying with environmentally sound management standards. The current monitoring mechanisms are not sufficient to police those who are intentionally or inadvertently polluting their communities with uncontrolled emissions, fugitive dust, or improper worker safety protocols. There is also a significant gap in identifying, monitoring, and controlling land pollution from lead sources such as ULABs due to a lack of guidelines for the management of contaminated sites. Thus, there is a need to develop soil quality standards, institutional framework for soil quality monitoring, definition of levels of soil contamination, target measures for soil clean-up, standards for control and remediation and financial liabilities. There is also a need to closely monitor ULAB operations of small enterprises for OHS compliance.

Through a series of demonstration projects in communities strongly contaminated with lead, the project will not only reduce exposures to lead in those communities, but will also create the capacities in government to scale up the project approaches and protocols to the rest of the country. The project will support such a scale up by also developing policy recommendations to properly manage lead-contaminated sites in the Philippines and to prevent new sites contaminated with lead in the future.

## Project Description

### A. Project beneficiaries

The main project beneficiaries are workers in ULAB recycling operations and residents of lead-contaminated areas. They will be educated about the dangers of lead exposure and how to protect themselves and their families from toxic exposures. They also will live in a cleaner environment as a result of the risk mitigation actions.

In addition, government officials from DENR, DOLE, DTI, DILG, DSWD, DOH, and HLURB, as well as the LGUs where the critical lead-contaminated sites around ULAB recycling operations are located, will be the beneficiaries. Through the project, they will build up the necessary skills to identify and act on lead-contaminated sites threatening the health of the communities they serve. They will learn how to rapidly assess human health risk related to lead contamination in water, air, and soil using a tested assessment protocol. They also will receive hands-on trainings in conducting exposure risk mitigation actions that are low-cost but effective and proven techniques.

Finally, the same officials will benefit from multi-stakeholder policy and program development capacity building that seek to develop guidelines in addressing existing lead-contaminating operations and contaminated sites and prevent further spread of lead contamination.

## **B. Overall project objective**

The overall objective of the project is to reduce human health risks to lead exposure from ULAB recycling.

## **C. Intervention strategy**

A four-pronged strategy will be adopted to achieve the project objective.

While it is known that sites contaminated with lead exist in the Philippines, there has been no systematic assessment done of all the possible sites contaminated with lead in the country, and there is a lack of documented health risks and effects associated with lead exposure in those sites where there is known contamination with lead.

This project will start that process by undertaking such an assessment in one region. Environmental assessments will lead to the identification of lead pollution sources (particularly by small scale ULAB processing enterprises), lead levels in the environment and pathways to the human population in the target region as well as workers health and safety considerations, in collaboration with DOLE. At the same time, steps will be taken to ensure that this effort is sustained. The assessment will be used to improve the capacity of the responsible government agencies in undertaking such assessments. They can then use these capacities after the project is completed to carry out similar assessments in the other regions of the country<sup>63</sup>. The region will be chosen at the start of the project by the project's Steering Committee.

In the chosen demonstration region, sites contaminated with lead will be identified using the approaches pioneered in the Toxic Sites Investigation Program (TSIP). Once these sites have been identified, their levels of contamination will be characterized using the methodologies which have already been developed as part of TSIP. The Steering Committee will then prioritize a number of such sites at which to demonstrate effective and practical exposure risk mitigation measures in communities which are affected by the lead contamination as well as measures that need to be taken with respect to the small scale ULAB processing enterprises. The aim is to eliminate risks to health of ULAB enterprise workers and have the surrounding residences and their immediate vicinity free of lead and have the contaminating enterprises and the community residents adopt lead exposure risk mitigation measures at work and at home. As part of these demonstrations, the project will develop systems or protocols to follow for worker OHS in the enterprises, and for site and household clean-up and/or exposure risk reduction, and it will build the capacities of the responsible government agencies to use such systems or protocols. These government agencies can then use these systems or protocols to undertake further risk mitigation projects in other regions of the country.

Health assessments will be conducted in communities where risk exposure is high in collaboration with the DOH. The output of these will outline demographics, environmental and occupational

<sup>63</sup> Note that these capacities can be used to also carry out assessments for contaminants other than lead.

**“ There has been no systematic assessment done of all the possible sites contaminated with lead in the country ”**

history, common medical complaints, physical and neurologic exam findings, and blood lead levels of residents in communities of high lead exposure. The health assessment protocol will include data collection forms (environmental/occupational history, general health assessment), informed consent and assent forms and the blood lead reporting form. The protocol and forms will undergo review and approval by DOH and other relevant institutional and ethical review boards. In the demonstration communities, the project will assist LGU, in collaboration with DILG, to conduct thorough community health and environmental safety education campaigns for residents, where they can learn about the health hazards posed by lead and about the ways in which they can reduce their exposure to lead in the future. Where applicable, community organizations will be engaged with the project to recruit and train participants, local health centers and regional hospitals will be trained to conduct blood lead level testing and follow-up health services, and local industry coalitions will lead trainings and compliance reviews to improve environmental and health protections for workers. Participants will be trained in hygiene, occupational health and safety, and household cleaning practices that are required to reduce risk of toxic lead exposures after the areas undergo risk mitigation efforts. Local community members and leaders including local health workers will be trained and provided materials for the lessons to be repeated to new audiences or in schools as refresher courses. All of this work, will engage both nationally and locally responsible government units so that capacities to up-scale such interventions nationally.

Gender, income-level, housing stability and quality, age, disability status, and identification with an indigenous or minority population will all be characteristics to be identified and taken into account in the design and reach of community education and risk mitigation programs for the target communities in the project. As a result of the project, residents in target communities will live in cleaner environments and will understand how to reduce their risks of exposure to lead through hygiene and home cleaning protocols as well as occupational hygiene practices.

In parallel to these on-the-ground activities, the project will work with the relevant government agencies to address gaps in regulation and improve enforcement and implementation mechanisms so that lead pollution is better controlled in the Philippines. The policy recommendations developed by the project stakeholders will focus primarily on the management of lead-contaminating business operations and the lead-contaminated legacy sites, if the Steering Committee also chooses some of these for demonstration purposes, and prevention of further lead contamination. Initial suggestions brought forth by the stakeholder discussion for HPAP were standards for allowable levels of lead in soil, air, and water; guidelines for risk mitigation project implementation, establishment of medical surveillance system for environmental toxicant exposures, implementation of large-scale blood lead or other environmental toxicant screening of youth or other populations through school or hospital-based testing programs; and identification of barriers to enforcement of existing environmental regulations and zoning or land use requirements. With regards to strengthening enforcement, there is a need to ensure cohesive regulatory controls across the supply chain of ULABs. It is also important to capture a significant number of formal and informal establishments handling ULABs and lead in the online Hazardous Waste Database (HWDB) of DENR-EMB, and refine hazardous waste classifications of lead-containing substances in the online HWDB to have a more accurate inventory of ULABs generated nationwide (currently, ULABs are lumped together with other lead-containing substances under D406). The national ULAB recovery program needs strengthening, and the monitoring of the import and export of lead-acid batteries needs to be enhanced.

## **D. Implementation partnerships**

This project will be implemented through a partnership of relevant national and local government departments and units. Specifically, under the coordination of the DENR, DOLE, DOH, DTI, DILG, DSWD and HLURB, as well as LGUs where the demonstration sites are located, will be involved in implementation.

Project management and coordination will be the responsibility of DENR-EMB, acting as the lead agency for overall coordination and day-to-day management through a Project Management Unit (PMU), supported by the project. In addition, the project's implementation will be overseen by a Steering Committee whose membership will be made up of representatives of the DENR, DOLE, DTI, DILG, DSWD and HLURB, as well as representatives of the main CSO partners.

Multilateral institutions will be approached for funding of the project.

With coaching from project national and international experts, the implementing government agencies will be responsible for mapping the sites contaminated with lead in the chosen region, for undertaking environmental and health risk assessments at those sites, for developing systems/protocols for human health risk mitigation, and for implementing these systems/protocols at a number of demonstration sites. In general, DENR will take the lead on environmentally-related issues, DOLE for worker occupational health and safety issues, and DOH on health-related issues. In addition, the departments will be responsible for recommending the necessary upgrades to the country's laws and regulations.

Civil society, led by a CSO partner, will be selected and endorsed by the Steering Committee. CSOs will be engaged in leading community education programs in the target lead-affected communities, and in training residents to protect themselves and their families from lead exposures in their homes, play spaces and work places.

## **E. Project results/outputs**

The project intends to reach the following outputs:

10. Health risks from lead exposure in the demonstration region are evaluated.
11. Lead exposure risks in the target communities are reduced.
12. Policy recommendations made related to preventing and reducing lead pollution.

## F. Key project activities

Activities	Locations	Timing	Partners
<b>Output 1. Health risks from lead exposure in the demonstration region evaluated</b>			
1.1. Undertake preparatory project implementation activities (Inception meeting, Administrative requirements, etc.)	Manila	Year 1	DENR
1.2. Choose one region which will be the focus of the project's activities	Manila	Year 1	Steering Committee
1.3. Undertake a mapping exercise in the chosen demonstration region of all sites known or suspected to be contaminated with lead, based on information on the types of industrial and artisanal activities being carried out (or having been carried out in the past), on data of lead poisoning, and on any other relevant information.	Chosen demonstration region	Year 1-2	DENR, with Steering Committee members contributing information on contaminated sites and enterprises DOH, DTI, DOLE, DILG, DSWD, HLURB
1.4. Undertake the necessary training to ensure that the responsible government agencies can perform the site environmental and health assessments.	Manila	Year 1-2	Project experts, with participating agencies assigning staff to take part in assessments
1.5. Perform soil, air, and water testing for lead in the identified sites, especially in any communities in and around the sites.	Sites identified in the mapping exercise	Year 2-3	DENR, LGUs, DOLE inspectors on OHS
1.6. At those sites where the potential for human exposure to lead is high (because residential areas are in or close to the enterprises, or for some other reason), assess human health risks of exposure	Some of the sites identified in the mapping exercise	Year 3-4	DOH, DOLE, LGUs
1.7. Perform Blood Lead Testing in communities where the human health risks of exposure are high	Some of the sites identified in the mapping exercise	Year 3-4	DOH, LGUs
<b>Output 2. Lead exposure risks in the target communities reduced</b>			
2.1. Choose several of the sites where blood lead testing has shown high levels of exposure to lead as target risk mitigation communities.	Manila	Year 4	Steering Committee
2.2. Develop systems or protocols to be followed in deciding up on the risk mitigation measures to be adopted in each of the target communities.	Manila	Year 3-4	Multi-stakeholder working group
2.3. Undertake the necessary training to ensure that the responsible government agencies can use the systems/protocols which have been developed.	Manila	Year 3	Project experts, with participating agencies assigning staff to take part in assessments
2.4. Implement the systems/protocols in each of the target communities and enterprises.	Target communities	Year 4-5	DENR, DOLE, DOH, DTI, DILG, DSWD, HLURB

Activities	Locations	Timing	Partners
2.5. Implement the risk mitigation projects chosen through the systems/ protocols.	Target communities	Year 4-5	DENR, DOLE, DOH, LGUs
2.6. Undertake the necessary training to ensure that the CSOs know how to educate communities on how to mitigate the risk of future (re)contamination with lead.	Target communities	Year 2	Project experts
2.7. Educate stakeholders on risk mitigation in work places, household and play areas.	Target communities	Year 3-4	CSO Partner(s)
<b>Output 3. Policy recommendations made related to preventing and reducing lead pollution</b>			
3.1. Coordinate multi-stakeholder working group of seven departments of the government.	Manila	Year 1	DENR
3.2. Identify gaps in current legislation and implementation pertaining to toxics management particularly lead.	Manila	Year 1	Multi-stakeholder working group
3.3. Conduct workshops, consultations and validations to develop policy and program recommendations.		Year 2-4	Multi-stakeholder working group
3.4. Approve and implement agreed improvements.	Manila	Year 5 onwards	Relevant departments

## G. Gender mainstreaming

Gender equality means creating equal opportunities for women and men by allowing them to contribute on equal terms economically, politically, socially and culturally. It means that no one will be prevented from reaching her or his full potential because of their gender and puts equal value on the varying roles played by women and men in society<sup>64</sup>. Equality does not mean that women and men will become the same, but that women’s and men’s rights, responsibilities and opportunities will not depend on whether they are born male or female. Gender equality implies that the interests, needs and priorities of both women and men are taken into consideration, recognizing the diversity of different groups of women and men<sup>65</sup>.

The proposed project will analyze the roles and needs of women and men and will promote equal access to project resources and services, equal participation in project activities and decision-making processes, and equal benefit from trainings or other capacity building activities offered by the project. In addition, the project will adopt the “Inclusivity Principles” that highlight the importance of responding to the needs of vulnerable groups. These principles embodies the fulfillment of the needs of women and men, the youth, the elderly and persons with disabilities.

<sup>64</sup> Ibid 42, p.56

<sup>65</sup> Ibid 43, p.56



## H. Project financing and indicative budget (in EUR)

Budget lines	Total	Year 1	Year 2	Year 3	Year 4	Year 5
Project staff:						
- International	<b>175,000</b>	35,000	35,000	35,000	35,000	35,000
- National	<b>260,000</b>	52,000	52,000	52,000	52,000	52,000
Project consultants:						
- International	<b>60,000</b>	10,000	10,000	15,000	15,000	10,000
- National	<b>45,000</b>	5,000	15,000	15,000	5,000	5,000
Sub-contracts	<b>1,000,000</b>	-	100,000	400,000	400,000	100,000
Meetings & Travel	<b>90,000</b>	30,000	15,000	15,000	15,000	15,000
Other direct costs	<b>50,000</b>	10,000	10,000	10,000	10,000	10,000
<b>Total</b>	<b>1,680,000</b>	<b>142,000</b>	<b>237,000</b>	<b>542,000</b>	<b>532,000</b>	<b>227,000</b>

No co-financing has been identified.

No funding partners have yet been identified.

## I. Sustainability of project results

There are two outcomes that are sustainable as part of the project efforts – the government policy improvements and the enterprise and community behavior and environmental changes. By supporting the government’s efforts to improve its own policies and enforcement mechanisms, the project will help to ensure sustainability of the project results. The community education as part of the risk mitigation efforts will cover required behavioral changes in order to maintain the safer environment for the target communities. To maximize sustainability of the lessons learned, surveys will track knowledge gained through the training sessions to ensure participants understood the key lessons and the mitigation measures to adopt so that they can adequately reduce their risks going forward.

## J. Risks to project implementation

Project assumptions	Risk of failure	Mitigation actions
Government participants are supportive of these efforts and engage their departments in the project	Risk of failure is low. The government working group as part of the HPAP process identified the projects to be proposed including this one.	HPAP members will sign the project proposal agreeing to undertake the activities through their departments if the project is awarded.
Government participants from the various departments will participate in the project activities – including them in their annual planning and budgeting processes from year 2 onwards of project implementation	Risk of failure is medium. These activities are already required by the departments as per regulations but are not currently being carried out fully due to capacity constraints and resource limitations.	Capacity building of government departments and local units and intensive advocacy and awareness building activities will be conducted to create political and public awareness to encourage policy makers to take up the issues at hand.
Local Government Units take ownership of the project and assign focal personnel for the project	Risk of failure is medium. There are competing priorities and LGUs may have technical and resource limitations. Some LGUs may view the project as additional work but some may welcome it as part of their capacity building and ultimately, protecting the welfare of their constituents.	Emphasize project benefits when presenting to LGUs. Focus on cooperative LGUs. Engage them in discussions on how to best implement the project in their localities. Involve them in actual implementation as a form of capacity building.
Local communities and small scale lead processing enterprises will participate in project activities and adopt the risk mitigation measures.	Risk of failure is medium. Typically, local communities participate once they understand the benefits of the project. However, if small scale lead processing enterprises and community residents are engaged in livelihoods that will be impacted by the mitigation efforts, there might be resistance to change of practices.	Conduct intensive awareness-raising campaigns. Provide feedback during health assessment and BLL testing. Identify alternative livelihoods and provide training, connect to market.

## K. Monitoring, reporting and evaluation

DENR, the project’s lead agency, in collaboration with a national or an international technical assistance providing agency, will be responsible for the project’s monitoring, evaluation, and reporting activities through the Project Management Unit (PMU).

The PMU will monitor the progress of the project against the outcomes and indicators through monthly meetings, quarterly reporting of programme and financial details. The PMU will conduct regular meetings with the project implementers in person and via teleconference, supported by bi-monthly meetings, to ensure on-time delivery of results and responsive management decisions. Results will be measured according to progress against indicators and adherence to the work plan deadlines established in the Kick-off Meeting of the project and according to funder requirements. Means of verification of data include steering committee and stakeholder meeting records, knowledge assessments, and evaluation reports.

Reporting to funders will be completed as required and at least annually.

There will be a robust final evaluation process involving stakeholders’ feedback and clear sustainability planning.

## **L. Communication and visibility**

Support from donor(s) will be highlighted and emphasized during all relevant project activities. The project anticipates the following communication and visibility activities: issuing press releases, distributing factsheets/brochures and newsletters, publicizing project activities on websites, making presentations at workshops, conferences and/or other events, and education/awareness campaigns.

All communication and visibility activities will be conducted in accordance with the donor(s)' communications and visibility manual (if any). For example, awareness about the project will be promoted at different levels (national, local, etc.). All workshops and training courses will be made aware of the donor financing. Their logos, along with those of major partners and associates will be noticeably visible on all printed materials and presentations. Reports will prominently feature all logos. Press releases or other media products will reference project partner names and logos, including source and amount of funding.

## Extended Concept Note 4

Project title:	<b>Improvement of Indoor Air Quality from Household Energy Use</b>
Location(s):	Selected sites in Metro Manila and rural areas
Planned start date:	End 2019
Duration:	Five years
Proposed government coordinating agency:	Department of Health
Budget (in EUR):	2,494,250

### Project Summary

This project aims to support the baseline knowledge and actions for the improvement of indoor air quality from household energy use by an assessment of current practice through deskwork, gathering primary and secondary data from the field, stakeholder consultations, field and laboratory surveys in low-income communities in selected Philippine cities and rural areas. These efforts can be strengthened by reviewing the local and international policies related to indoor air pollution and household energy use in the Philippines, and by suggesting control solutions to indoor air quality. Prior to this, indoor air quality will be characterized on the basis of structural, functional and occupant aspects, as will the health risks from exposure to emissions from household energy use. Study communities shall be selected to demonstrate the control solutions, together with interventions on improved household energy use. The improvement of air quality shall be tracked through the five-year project period. Policy recommendations on household energy use shall be made to mitigate indoor air pollution and protect the health of families in low-income communities, and in some cases shall be implemented. A possible outcome is the adoption of a national indoor air quality policy that protects the health of people and promotes social welfare, environmental and economic development.

### Relevant Background

Air pollution has invisible and inhalable components called air particulate matter (APM), which have sizes so small ( $PM_{10}$  and  $PM_{2.5}$ ) that they can enter the gas and blood exchange regions of the human body. According to the World Health Organization, most APM-caused premature deaths are due to cardiovascular diseases; 40% of these deaths are from ischemic heart disease, 40% from stroke, 11% from chronic obstructive pulmonary disease (COPD), 6% from lung cancer, 3% from acute lower respiratory infection. About 4 millions of these premature deaths are attributable to household air pollution caused by the use of solid fuels<sup>66</sup>.

Despite the modernization and development that has taken place in the Philippines, most households remain dependent on traditional cooking practices that use firewood and crude charcoal briquettes as fuel, particularly in low-income communities whether they are in urban or rural areas. 55%<sup>67</sup> of the Philippine population (equivalent to about 60 million people) relies on traditional cooking fuels and technologies. In addition, traditional cooking practices involve a lot of grilling. These activities expose residents of households to indoor air pollution, at unknown levels and extent. Smoke from burning of solid fuels contains pollutants of known health hazards, including particulate matter ( $PM_{2.5}$ ), carbon monoxide (CO), nitrogen dioxide ( $NO_2$ ) and sulfur dioxide ( $SO_2$ , in this case mainly from the burning of coal). Exposure to household air pollution from burning of solid

<sup>66</sup> Lim, SS. et al, 2012, Global Burden of Disease Study, 2010. Lancet 2012, 380:2224-60

<sup>67</sup> WHO, 2007, Indoor Air Pollution National Burden of Disease Estimates

fuels has been implicated, with varying degrees of evidence, as a causal agent of several diseases, and has been reported to cause globally 4.3 million premature deaths yearly<sup>68</sup>.

Even though a large portion of the population is exposed to indoor air pollutants, the magnitude of these pollutants' impact on the health of the Filipino people is as yet undocumented. This means that the issue of household air pollution has yet to reach the attention of the general public and policy makers. Although initiatives that aim to provide cleaner cooking solutions and produce cleaner cookstoves have been initiated in the Philippines by private entities, the levels of indoor air pollution in households in the Philippines as well as the potential for its reduction through use of cleaner cooking technologies and fuels has not been mapped.

## Project Description

### A. Project beneficiaries

The primary target beneficiaries of this project are that portion of the population which is most exposed to indoor air pollution. These will tend to be low-income households, and it is expected to involve more women, children and the elderly. Through some components of the project, it is expected that a certain quantifiable improvement in indoor air quality will be reached in the project's targeted demonstration area, in selected Philippine cities and rural areas.

A number of groups, namely national government agencies (NGAs), civil society organizations (CSOs) and members of the Inter-Agency Committee on Environmental Health (IACEH), are also expected to benefit from the capacity building which the project will deliver.

### B. Overall project objective

The overall objective of the project is to improve indoor air quality in selected Philippine cities and rural areas used as demonstration areas, as a first step towards creating the necessary public policy framework to manage indoor air pollution nationwide based on international best practice.

### C. Intervention strategy

The project will build on, and provide inputs to, a broader indoor air quality (IAQ) management program that is aiming to prepare strategies and regulations, evaluate trends, insert IAQ issues into air quality models, review the impact of emissions due to household energy use, assure compliance with regulatory actions, and revise current air quality regulations and strategies.

The project will focus on demonstration areas, namely low-income communities in selected Philippine cities and rural areas, whose use of traditional cooking and heating methods with traditional fuels is impacting the indoor air quality of their residences. The demonstration area shall be further classified into:

- Emerging areas: Metro Manila and selected urban/rural local government units that have a need for mapping their indoor air quality;
- Mature areas: selected urban/rural local governments that have already been mapped for household indoor air quality but have not been assessed for market linkages, demonstrated change, management and health impacts.

The initial objective is to map out the stakeholders, to identify what has been done already, what are the remaining gaps, and to determine further actions for the improvement of the indoor air quality. Regional testing centers for indoor air quality measurement in the laboratory and field will need to be established to implement standard protocols for measurement and emissions testing.

<sup>68</sup> Health Effects Institute, 2012

One part of the project activities will be the conduction of diagnostic studies on levels of indoor air pollution and their impacts. The work will: (i) characterize indoor air quality based on structural, functional and occupant aspects; (ii) assess the effectiveness of indoor air quality management measures and their mitigation potentials (especially for infants, children and women); (iii) assess indoor air quality issues especially with relation to cooking and heating fuels. The results will help to further deepen the knowledge base on air quality management in the Philippines. The results will also be used to design an awareness-raising program for low-income households that can be used not only in the demonstration areas but also in other parts of the country. Finally, the results will be used to inform a roundtable and policy dialogue with government and other stakeholders. The scope of this work may vary based on the participating community's current indoor air quality management capacity and will be defined in detail after community selection.

Another part of the project activities will use the output of previous studies by the Institute of Environmental Science & Meteorology of the University of the Philippines on household cookstoves, as well as the current Technical Assistance project funded by the Asian Development Bank<sup>69</sup>, and will include: (i) an assessment of technologies for energy efficiency and emission reductions in indoor air pollution (cooking and heating) in terms of applicability, performance, efficiency, cost-effectiveness, and local context; (ii) identify needs for capacity building, policy reforms, technology transfer and other issues related to the community's capacity to adopt these technologies; (iii) provide policy recommendations at national/provincial level that are linked to household level air quality; (iv) offer technology training programs and study tours to a model developed country (Republic of Korea) to better understand experiences with indoor air quality management policies, household energy use and sustainability, technologies and financial mechanisms; and (v) hold a technology fair on innovative, high-tech and adaptive technologies to build linkages between local technology providers and the potential users in government and private sector.

Lastly, a proof of demonstrated change will be reported, based on the programs and policies that are established. To this effect, the effectiveness of the programs which will have been adopted in the demonstration areas will be assessed.

#### **D. Implementation partnerships**

A main group of project implementers will be the NGAs, particularly those that belong to the Inter-Agency Committee on Environment and Health (the Department of Health and the Department of Environment and Natural Resources, to name two). They will be responsible for providing government data, access to stakeholders' groups, and advice on policy needs, and for the institutionalization of the outputs.

Another important group of implementers will be the LGUs (Sangguniang Bayan, administrators and Baranggay officials). Communication between the project implementers and the LGU is critical to the cooperation and participation of household to be involved. The LGUs will support the UP-IESM in the procurement, installation, operation and maintenance of the indoor air quality monitoring devices. Iloilo City LGU can be used as an example of an LGU that is willing to support endeavors related to indoor air quality.

The IACEH Secretariat will play a role of facilitator, organizing the stakeholder discussions, inception meetings and round table discussions.

Much of the field work will be carried out by UP-IESM, using experience that it has built up in similar projects.

At various points during implementation, the private sector and CSOs such as the Partnership for Clean Air (PCA) will be involved.

<sup>69</sup> ADB TA, 2018. "The impact of Philippine cooking practices on household air quality: focus on highly urbanized and component cities in the Philippines", implemented by the UP-IESM.

Technology visits and best practices on sustainable household energy consumption will be conducted in the Science Cabin of the Science Walden of the Ulsan National University in South Korea.

The Department of Science and Technology, Department of Trade and Industry, Partnership for Clean Air, and the IACEH will partner in the holding of the Innovation Fair.

## E. Project results/outputs

The specific outputs which project implementation will reach are as follows:

List of Outputs	
Output 1	An inception report has been prepared
Output 2	Regional Testing Centers (RTCs) have been established
Output 3	Information has been collected on current cooking practices and indoor air quality due to household cooking combustion fuel use in the emerging demonstration areas
Output 4	Information has been collected on the health implications on the current cooking practices in the mature and emerging demonstration areas
Output 5	A market assessment of combustion fuels and cookstoves has been conducted
Output 6	Management capacity and measures have been demonstrated
Output 7	Policy recommendations have been made at national/provincial level to ameliorate household level air quality, and in some cases have been implemented
Output 8	Knowledge exchange has taken place
Output 9	Programs have been developed to improve the quality of life of communities still relying on traditional cookstoves and combustion fuels
Output 10	The effectiveness of the programs adopted in the demonstration areas has been assessed

## F. Key project activities

Activities	Locations	Timing	Partners
<b>Output 1. An inception report has been prepared</b>			
1.1. Conduct stakeholder mapping.	IACEH HQ, selected Philippine cities and rural areas	Q1/Y1	DOH, DENR, LGU partners, IACEH
1.2. Develop criteria for the selection of demonstration areas: mature and emerging areas.			
1.3. Organize community-level inception meetings.			
1.4. Collect necessary primary and secondary data and carry out analysis to support the community-level activities.			
<b>Output 2. Regional Testing Centers (RTCs) have been established</b>			
2.1. Identify criteria for candidate RTCs, and choose the RTCs.	Identified university partners in the regions	Q2/Y1	DOH, DENR, UP-IESM, regional academe partners
2.2. Develop the capacity of the chosen RTCs (1 per identified region).			
2.3. Develop protocols for measuring indoor air quality and testing emissions from household cooking activity.			
2.4. Procure and set up the portable indoor air quality monitors in participating communities.			
2.5. Pilot test the protocols.			

Activities	Locations	Timing	Partners
<b>Output 3. Information has been collected on current cooking practices and indoor air quality due to household cooking combustion fuel use in the emerging demonstration areas</b>			
3.1. Carry out a community level study to characterize indoor air quality based on structural, functional and occupant aspects.	Selected Philippine cities and rural areas	Q1/Y1-Q4/Y2	DENR, RTC, LGU partners
3.2. Determine the levels and extent of household air pollution from burning solid fuels (PM <sub>2.5</sub> , SO <sub>2</sub> , NO <sub>2</sub> , CO <sub>2</sub> and CO) in the representative communities.			
<b>Output 4. Information has been collected on the health implications on the current cooking practices in the mature and emerging demonstration areas</b>			
4.1. Carry out a household level health assessment of impacts of household cooking.	Selected Philippine cities and rural areas	Q1/Y1-Q4/Y2	DOH, RTC, LGU partners
4.2. Carry out a clinical level health assessment of impacts of household cooking.			
<b>Output 5. A market assessment has been conducted of combustion fuels and cookstoves</b>			
5.1. Undertake a community level assessment of the market chain for combustion fuels and cookstoves.	Selected Philippine cities and rural areas	Q1/Y1-Q4/Y2	IACEH, LGU partners, NGO partners, CSO partners
5.2. Identify needs for capacity building, policy reforms, technology transfer and other issues related to supporting the community's capacity to adopt these technologies.			
<b>Output 6. Management capacity and measures has been demonstrated</b>			
6.1. Undertake an assessment of technologies for emission reductions in indoor air pollution (cooking and heating) in terms of applicability, performance, efficiency, cost-effectiveness, and local context.	Mature areas	Q1/Y3-Q4/Y4	DOH, DENR, DOST IACEH, Iloilo City, NGO partners, CSO partners
6.2. Assess the effectiveness of indoor air quality management measures and their mitigation potentials.			
<b>Output 7. Policy recommendations have been made at national/provincial level to ameliorate household level air quality, and in some cases have been implemented</b>			
7.1. Conduct roundtable policy dialogues with government and other stakeholders.	Selected Philippine cities and rural areas	Q1/Y3-Q4/Y4	DOH, DENR, IACEH, LGU partners
7.2. Develop recommendations for market instruments.			
7.3. Develop draft guidelines for management of indoor air quality.			
7.4. Develop recommended emission standards for cooking equipment.			
7.5. Develop recommendations for cook stove standards and labeling.			
7.6. Recommend changes/additions to local ordinances/policies.			
7.7. In some of the more mature LGUs, implement the recommendations			



Activities	Locations	Timing	Partners
<b>Output 8. Knowledge exchange has taken place</b>			
8.1. Organize technology training programs and a study tour to a model developed country (Republic of Korea) for better understanding of experiences in indoor air quality management policies, household energy use and sustainability, technologies, and financial mechanisms.	Selected Philippine cities and rural areas	Q1/Y5	DOST, DTI, IACEH, LGU partners
8.2. Hold a technology fair on IAQ-linked innovative, high-tech and adaptive technologies to build linkages between local technology providers and the potential users in government and private sector.			
8.3. Develop a communication plan on the knowledge products that will be developed in the project			
<b>Output 9. Programs have been developed to improve the quality of life of communities still relying on traditional cookstoves and combustion fuels.</b>			
9.1. Develop programs on how to mitigate the environmental impacts of traditional cooking practices on the communities.	Selected Philippine cities and rural areas	Q1/Y3-Q1/Y5	DOH, IACEH, LGU partners, CSO partners, NGO partners
9.2. Develop programs on how to reduce risks from indoor air pollution by changing cooking practices			
9.3. Develop programs on how to institutionalize the policies and market instruments to improve indoor air quality which have been implemented in the more mature LGUs.			
<b>Output 10. The effectiveness of the programs adopted in demonstration areas has been assessed</b>			
10.1. Assess improvements on the quality of life of the mature demonstration area.	Selected Philippine cities and rural areas	Q1/Y3-Q4/Y5	DOH, IACEH, LGU partners
10.2. Assess reductions in indoor air pollution achieved based on the strategies adopted by communities in the emerging area.			

## G. Gender mainstreaming

Gender equality means creating equal opportunities for women and men by allowing them to contribute on equal terms economically, politically, socially and culturally. It means that no one will be prevented from reaching her or his full potential because of their sex and puts equal value on the varying roles played by women and men in society<sup>70</sup>. Equality does not mean that women and men will become the same, but that women's and men's rights, responsibilities and opportunities will not depend on whether they are born male or female. Gender equality implies that the interests, needs and priorities of both women and men are taken into consideration, recognizing the diversity of different groups of women and men<sup>71</sup>.

The proposed project will analyze the roles and needs of women and men and will promote equal access to project resources and services, equal participation in project activities and decision-making processes, and equal benefit from trainings or other capacity building activities offered by the project.

<sup>70</sup> Ibid 42, p.56

<sup>71</sup> Ibid 43, p.56

## H. Project financing and indicative budget (in EUR)

Budget line	Total	Year 1	Year 2	Year 3	Year 4	Year 5
Project staff:	<b>636,000</b>	<b>127,200</b>	<b>127,200</b>	<b>127,200</b>	<b>127,200</b>	<b>127,200</b>
- International	<b>330,000</b>	66,000	66,000	66,000	66,000	66,000
- National	<b>306,000</b>	61,200	61,200	61,200	61,200	61,200
Project consultants:	<b>273,750</b>	<b>54,750</b>	<b>54,750</b>	<b>54,750</b>	<b>54,750</b>	<b>54,750</b>
- International	<b>30,000</b>	6,000	6,000	6,000	6,000	6,000
- National	<b>243,750</b>	48,750	48,750	48,750	48,750	48,750
Sub-contracts	<b>725,000</b>	145,000	145,000	145,000	145,000	145,000
Meetings	<b>315,000</b>	63,000	63,000	63,000	63,000	63,000
Other direct costs	<b>264,500</b>	52,900	52,900	52,900	52,900	52,900
Administrative Costs	<b>225,000</b>	45,000	45,000	45,000	45,000	45,000
Contingency	<b>55,000</b>	11,000	11,000	11,000	11,000	11,000
<b>Total</b>	<b>2,494,250</b>	<b>498,850</b>	<b>498,850</b>	<b>498,850</b>	<b>498,850</b>	<b>498,850</b>

## I. Sustainability of project results

Communications among the project team, collaborators and agencies are critical to get the buy-in for sustainability of project results. For example, the LGUs' willingness to participate and openness to initiate efforts in undertaking direct interventions to promote cleaner cooking alternatives is an important factor that ensures that the output of the project will be used as basis for policy interventions directed at mitigating the detrimental effects of indoor air pollution. The same principle of support goes with the IACEH members.

## J. Risks to project implementation

Project Assumptions	Risk of Failure	Mitigation Action
Timeline of the project are calculated well	Risk of failure is medium. Miscalculating the operational timeline of the project may lead to burn out of the project staff. It is important to maintain healthy working conditions.	It is important to consider the practical timeline of the project and consider the practicability/feasibility of any method to be applied.
Budget allocations are calculated well	Risk of failure is medium. The university proponent may provide counterpart/cash advances for the operations.	It is important to allocate contingency funds for operations.
Project partners are committed throughout the project's duration	Risk of failure is high. Non-commitment of project partners due to constraints in resources put the project at high risk of failure.	It is important to commit enough financial provisions to project partners. Honorariums may be provided to project partner representatives that would play a substantial role.
LGU officials (Mayor, council) and administrators stay in their position all through the project duration	Risk of failure is high. As implementation is completely dependent on LGU buy-in and support. Changes/movement in LGU administrators place the project at high risk of failure.	Implementation of the project should coincide with the start of the appointment of LGU officials (usually by July of the Philippine election year).

<b>Project Assumptions</b>	<b>Risk of Failure</b>	<b>Mitigation Action</b>
Inter and Intra disciplinary approaches are in place	Risk of failure is high. Project outputs rely only on one field/ niche (environment and health).	It is important to include experts in policy, economy, gender, social aspects.
Methods applied are systematic, reliable and robust.	Risk of failure is high. If this is not implemented, the results and quality may be compromised and activities may need to be repeated, which may have implications for budget and staff time.	Integrate the project in an academic setting, as this facilitates sustainable transfer of knowledge. Including PhD students and post-doctoral researchers into the project can sustain the quality and integrity of any generated knowledge products.

## **K. Monitoring, reporting and evaluation**

The overall objective of the M&E process will be to ensure successful and high-quality implementation of the project by:

- Tracking and reviewing of project activities execution and actual accomplishments;
- Leading the project processes so that the implementation team can take early corrective action if performance deviates significantly from original plans;
- Adjust and update project strategy and implementation plan to reflect possible changes on the ground, results achieved, and corrective actions taken; and
- Ensure linkages and harmonization of project activities with that of other related projects at national, regional and global levels.

The project will be subject to a final evaluation at the end of the project and, if so agreed with the donors, to a mid-term evaluation half-way through the project.

## **L. Communication and visibility**

Support from donor(s) will be highlighted and emphasized during all relevant project activities. The project anticipates the following communication and visibility activities: issuing press releases, distributing factsheets/brochures and newsletters, publicizing project activities on websites, making presentations at workshops, conferences and/or other events, and education/awareness campaigns.

All communication and visibility activities will be conducted in accordance with the donor(s)' communications and visibility manual (if any). For example, awareness about the project will be promoted at different levels (national, local, etc.). All workshops and training courses will be made aware of the donor financing. Their logos, along with those of major partners and associates will be noticeably visible on all printed materials and presentations. Reports will prominently feature all logos. Press releases or other media products will reference project partner names and logos, including source and amount of funding.

**Annex 1**  
**DRAFT VERSION OF THE**  
**IMPLEMENTING GUIDELINES FOR EO 489**



Republic of the Philippines  
Department of Health  
**OFFICE OF THE SECRETARY**



Republic of the Philippines  
**Inter-Agency Committee on Environmental Health (IACEH)**

EXCERPT FROM THE MINUTES OF THE IACEH MEETING  
HELD ON xx MAY 2019 IN xx QUEZON CITY, PHILIPPINESxx

Resolution No. 2019-001

**APPROVING THE IMPLEMENTING GUIDELINES**  
**OF EXECUTIVE ORDER NO. 489 SERIES OF 1991**  
**(DRAFT VERSION AS OF 18 FEBRUARY 2019)**

**WHEREAS**, it is the policy-thrust of the Government to safeguard and make the environment conducive to the improvement and maintenance of the health of the people throughout the country;

**WHEREAS**, the Cabinet had taken steps towards this direction by creating the Inter-Agency Committee on Environmental Health under Cabinet Resolution No. 3, series of 1987;

**WHEREAS**, there is a need to institutionalize the Inter-Agency Committee on Environmental Health to make it more effective and efficient in the discharge of its functions and responsibilities as well as responsive to the demands of the times; and

**WHEREAS**, it is imperative to strengthen the said Inter-Agency Committee to better protect the health of the people from the growing health problems related to environmental degradation;

**NOW, THEREFORE**, Pursuant to Section 3 of Executive Order (EO) No. 489, series of 1991, the Inter-Agency Committee on Environmental Health hereby adopts and promulgates the Implementing Guidelines (IG) of Executive Order No. 489, series of 1991, otherwise known as "Institutionalizing the Inter-Agency Committee on Environmental Health."

CERTIFIED CORRECT:

ATTESTED:

**RUBY C. CONSTANTINO, MD, MPH, CESO IV**  
OIC-Director IV, DPCB  
Head, IACEH Secretariat

**FRANCISCO T. DUQUE III, MD, MSc**  
Secretary of Health  
Chair, IACEH

**IMPLEMENTING GUIDELINES (IG) OF EXECUTIVE ORDER NO. 489, SERIES OF 1991, OTHERWISE KNOWN AS “INSTITUTIONALIZING THE INTER-AGENCY COMMITTEE ON ENVIRONMENTAL HEALTH (IACEH)”**

**IG 1. TITLE.** These guidelines shall be known and referred to as the “Implementing Guidelines of Executive Order No. 489, series of 1991.”

**IG 2. DEFINITION OF TERMS.** For the purposes of this Implementing Guidelines (IG), the following terminologies shall be understood as follows:

- (a) Climate Change - refers to a change in climate that can be identified by changes in the mean and/or variability of its properties and that persists for an extended period, typically decades or longer, whether due to natural variability or as a result of human activity.
- (b) Committee - refers to the Inter-agency Committee on Environmental Health.
- (c) Civil Society Organizations or CSOs - refers to non-state actors whose purpose and actions are neither to generate profits nor to seek governing power. CSOs include non-government organizations (NGOs), civic organizations, professional associations, foundations, independent research institutes, community-based organizations (CBOs), faith-based organizations, peoples organizations, social movements, and labor unions.
- (d) Environmental Health - comprises those aspects of human health, including quality of life, that are determined by physical, chemical, biological, social, and psychosocial factors in the environment. It also refers to the theory and practice of assessing, correcting, controlling, and preventing those factors in the environment that can potentially affect adversely the health of present and future generations.
- (e) National Government or Government - refers to the national political authority that controls the nation and carries out and enforces laws, sets and maintains foreign policy, and collects taxes, among others. Actions are usually carried out by national government agencies and instrumentalities, such as the Department of Health, the Department of Environment and Natural Resources, etc.
- (f) National Environmental Health Action Plan or NEHAP - is the country’s results- and risk-based sectoral planning document and operational tool that sets the national-level direction to address priority concerns and issues related to environmental health through a variety of intended actions. It contains a listing of programs, activities, and other initiatives that could be undertaken by Government and its partners.

**IG 3. DESIGNATED ALTERNATES.** The Committee members identified herein may designate an alternate to represent their respective offices in the Committee provided that the alternate must be fully authorized to decide on behalf of the member.

**IG 4. MEETINGS OF THE COMMITTEE**

- (a) Regular Meetings. The Committee shall be convened every quarter or on some other dates as may be deemed appropriate by the Committee; Provided, That the Committee shall meet at least quarterly.
- (b) Quorum. For meetings of the Committee, the presence of majority, or seven (7), of its members with the Chairman or Vice-Chairman shall constitute a quorum. In the absence of a quorum, the Committee shall defer all items on the agenda requiring a decision for the next meeting.
- (c) Internal Rules. The Committee shall adopt its own internal rules of meetings. Only official members shall be allowed to participate in discussions, raise motions, and vote. Resource persons or observers may be allowed by the Committee to attend in order to clarify or answer questions that may be raised in the meeting.
- (d) Decisions. The Committee shall decide on any matter at hand for resolution by a majority vote. Each member of the Committee shall each have one vote. Decisions made are final and executory and all members of the Committee shall abide, even if they have voted contrary to the decision. Resolutions of the Committee during its official meetings shall be published in the official website of the Committee and/or the Department of Health website.
- (e) Special Meetings. As may be deemed necessary by the Chairperson, special meetings other than the regular meetings may be convened at a place and time determined by the Committee.
- (f) Referendum. The Chairperson may authorize the circulation ad referendum of matters that are of such urgency that the same cannot await the next regular Committee meeting. In such cases, approval of a majority of the members, or seven (7) members, of the Committee shall be sufficient for action; Provided, That matters approved ad referendum shall be submitted to the Committee at its next meeting for confirmation; Provided, further, that such decisions are consistent with subsection (e) hereof.

**IG 5. POLICIES, GUIDELINES, AND PROGRAMS.** The Committee shall formulate strategies and programs on environmental health based on issues discussed that need inter-agency collaboration which include Committee members, other relevant government agencies and instrumentalities as well as its sectoral and development cooperation partners.

- (a) Immediate and Short-Term. Pressing and critical environmental matters shall be assessed and acted upon directly by relevant agencies and partners concerned, consistent with their respective mandates and the NEHAP. Notwithstanding any action taken by Committee members and partners, these matters shall be taken up for discussion during a regular or a special meeting immediately following the emergence of such urgent concerns for a to ensure that appropriate, comprehensive and coordinative action is taken or recommended by the Committee.

- (b) **Medium-and Long-Term.** The NEHAP provides for the country's directions and shared response to existing and emerging environmental health issues and challenges. It provides for sector-specific baseline information, existing efforts and initiatives, and national medium-term targets (i.e. the Medium-term Philippine Development Plan). The ultimate desire of the NEHAP is to ensure a sound and sustainable environment towards a healthy and safe community.
- (c) **Updating and Amending the NEHAP.** The NEHAP shall be subject to periodic review, and where warranted, updating or amendment, as deemed necessary. Moreover, when relevant events and/or agreements with serious consequences on environmental health present themselves, the Committee may decide to call for an early review of the NEHAP outside its review cycle. The decision to review the NEHAP shall emanate from a formal request of an Committee member to do so and shall proceed upon the approval of the Inter-Agency Committee. Requests to review the NEHAP emanating from non-members of the Committee shall be sent to any Technical Working Group (TWG) for review and shall be tabled on the Committee agenda only upon the recommendation of the TWG.

**IG 6. COORDINATION ARRANGEMENTS.** All concerned agencies and instrumentalities, not limited to the members of this Committee, shall ensure efficient complementation of resources and interventions as reflected in their respective plans, programs, projects and activities, with the corresponding budgets to support the efforts of the Committee. Each agency concerned shall likewise come up with their respective enabling policies or set guidelines necessary to ensure holistic convergence efforts for the effective implementation of this Committee's strategies and programs.

**IG 7. MONITORING AND EVALUATION.** The Committee shall develop monitoring and evaluation systems for the activities of the Committee.

**IG 8. INFORMATION, EDUCATION AND COMMUNICATIONS (IEC).** The Committee shall coordinate and monitor the implementation of information, education and communication campaigns and programs on environmental health, including but not limited to the propagation oftimely and relevant information/advisories, recognition and replication of best practices, formation of environmental health adovcates or champions and implementation of multimedia campaigns, among others. It shall call and mobilize relevant agencies and as needed, constitute an inter-agency team on IEC for the imlementation of this provision.

**IG 9. LEARNING.** The Committee shall undertake research and development activities through the appropriate sector, on environmental health to keep abreast of and validate current trends, and improve accuracy, availability, and reliability of knowledge and practice.

**IG 10. OTHER GOVERNMENT AGENCIES.** Other departments, bureaus, offices, or instrumentalities of the government, including government- owned or controlled corporations and state universities and colleges, and local government units shall be

called and mobilized for the effective implementation of this Implementing Guidelines. These agencies include, but are not limited to, the following:

- (a) Department of Education
- (b) Department of Social Welfare and Development
- (c) Department of Energy
- (d) Department of Education
- (e) Metropolitan Manila Development Authority
- (f) Commission on Higher Education
- (g) Climate Change Commission
- (h) National Solid Waste Management Commission
- (i) Civil Service Commission
- (j) Leagues of Cities
- (k) Leagues of Municipalities
- (l) Leagues of Provinces
- (m) Anti-Terrorism Council
- (n) State Universities and Colleges

**IG 11. OTHER PARTNERS.** The Committee shall also call and mobilize non-governmental agencies, such as institutions, the academe, the business sector, and development cooperation partners for support and assistance in the effective implementation of this Implementing Guidelines.

**IG 12. REGIONAL INTERAGENCY COMMITTEE ON ENVIRONMENTAL HEALTH (RIACEH).** All Regions shall create the RIACEH to protect their constituents from the impact on health of environmental degradation seriously affecting their Regions. The composition, functions and procedures of the RIACEH shall be similar in nature with the National Committee. The Regional Committee shall call and mobilize relevant partners within their respective jurisdiction for the effective implementation of this Implementing Guidelines. The measures/actions that have undertaken by the RIACEH shall be coordinated to the IACEH.

**IG 13. TECHNICAL WORKING GROUP (TWG).** The Committee shall constitute and mobilize Technical Working Groups (TWGs) from among its members, as well as from other government partners and other partners, to assist the Committee in carrying out its functions. The TWGs may be merged, expanded, or dissolved depending on needs. TWG membership shall be approved by the Committee.

**IG 14. ROLES OF THE TECHNICAL WORKING GROUPS (TWGs)**

- (a) The TWGs are constituted and mobilized to provide specialized sectoral, scientific, social, technical, financial, and administrative expertise, assistance, and advise to the Committee. The TWGs shall exercise these roles on a comprehensive, objective, open and transparent basis. Reports and recommendations generated by TWGs should be neutral with respect to policies, and shall deal objectively with scientific, technical and socio-economic factors relevant to such policy.



- (b) Specifically, the TWGs shall assist the Committee in the dispensation of the latter's functions and responsibilities. The TWGs or its designated representatives shall attend Committee meetings and activities as deemed necessary or when needed. The TWGs shall provide regular updates of its activities and its progress in relation to the goals and plans for which it was mobilized. The TWGs shall provide recommendations to the Committee on issues concerning their sectors.

#### **IG 15. ORGANIZATIONAL ARRANGEMENTS.**

- (a) The TWGs shall be collegial bodies that shall arrive at recommendations collectively. The Chairs and Vice Chairs to each of the constituted TWG are identified in IG 15 (e), but can be amended based on needs and current status of such agencies. Members of the TWGs shall be designated and duly appointed by the Committee.
- (b) Roles of the Chair and Vice-Chair. The TWG Chair shall ensure that members are actively engaged in the achievement of its goals and plans. It shall take the lead in the conduct of meetings and is responsible for the development of agenda, and shall preside over such meetings. The TWG Chair shall facilitate, coordinate, communicate and provide directions to members in accordance to TWG goals, plans, programs and activities. The TWG Vice Chair shall assist the Chair in the performance of functions and shall assume the responsibilities of the Chair in its absence.
- (c) Roles of Members. The TWG Members shall actively participate in the meetings of the TWG and provide technical information and recommendations on issues and concerns brought about in the TWG which are relevant to their respective agencies.
- (d) Internal Procedures. Deliberations for recommendations by the TWGs shall be done through plenary meetings. TWGs shall adopt internal rules for the conduct of its meetings. In finalizing recommendations, the TWGs shall exhaust all efforts to reach consensus. Recommendations of the TWGs are not final and executory until they have been approved by the Committee.
- (e) NEHAP Sectoral Groups. The TWGs of the Committee shall take the lead in formulating and updating NEHAP sectoral plans comprising of seven (7) environmental health priorities, such as:
- 1) Water Supply, Sanitation, and Health Sector
    - Chair: Department of Interior and Local Government
    - Vice- Chair: Department of Health
  - 2) Air Quality and Health Sector
    - Chair: Department of Environment and Natural Resources
    - Vice- Chair: Department of Transportation
  - 3) Solid Waste Management and Health Sector
    - Chair: Department of Interior and Local Government
    - Vice- Chair: Department of Environment and Natural Resources

- 4) Chemical Safety and Health Sector
  - Chair: Department of Environment and Natural Resources
  - Vice- Chair: Department of Agriculture
- 5) Food Safety and Health Sector
  - Chair: Department of Health
  - Vice- Chair: Department of Agriculture
- 6) Occupational Safety and Health Sector
  - Chair: Department of Labor and Employment
  - Vice- Chair: Department of Health
- 7) Climate Change and Health Sector
  - Chair: Department of Environment and Natural Resources
  - Vice- Chair: Department of Health

**IG 16. SECRETARIAT HEAD.** The Director of the Department of Health– Disease Prevention and Control Bureau- Environmental and Occupational Health Office, co-lead by the Department of Environment and Natural Resources- Environmental Management Bureau, shall be the head of the Secretariat. In case of organizational changes officially instituted in the Department of Health, the Secretariat head shall be the closest equivalent to the post identified in Section 5 of the E.O. 489.

**IG 17. RESPONSIBILITIES OF THE SECRETARIAT.** The Secretariat shall oversee and take the lead in the implementation and monitoring of plans, programs and activities of the Committee.

**IG 18. ROLES AND FUNCTIONS.** The Secretariat shall have the following roles and functions:

- (a) Provide administrative, financial, logistics support to the Committee and TWGs in fulfilling its functions and responsibilities;
- (b) Assist the Committee in making all necessary arrangements for Committee meetings and activities. It shall also prepare minutes of meetings, resolutions, and other relevant documents for use or as a result of such meetings or activities. The Secretariat shall also take custody of documents and records of meetings and other activities of the Committee;
- (c) Assist the Committee and TWGs in formulating and updating the NEHAP and establishing and maintaining a system for its implementation, coordination, monitoring, evaluation, and review;
- (d) Assist the Committee members and other Partners in the development, coordination, and monitoring of policies, guidelines, programs, projects and activities to achieve environmental protection for health promotion at the national and local levels;

- (e) Assist the Committee in undertaking information dissemination and education campaigns on environmental health programs or information/advisories to create greater awareness on environmental health;
- (f) Assist the Committee in coordinating and supporting the conduct of researches and studies;
- (g) Assist the Committee in creating an enabling environment that shall promote and harmonize broader multi-stakeholder participation in environmental protection for health promotion;
- (h) Undertake other support services and activities that are necessary to achieve the foregoing functions or such other support services and activities that may be directed or delegated by the Committee.

**IG 19. APPROPRIATIONS.** All other Government agencies and instrumentalities serving to satisfy the effective implementation of this Implementing Guidelines, not limited to the members of the Committee, shall likewise allocate from their respective General Appropriations Act budget line, adequate funds to ensure that corresponding budgets are available to support the plans, programs, and activities of the Committee.

**IG 20. SEPARABILITY CLAUSE.** If for any reason any section or provision of this Implementing Guidelines should be subsequently declared unconstitutional or invalid, the other sections or provisions hereof shall not be affected thereby.

**IG 21. AMENDMENTS.** Amendments can be made to the Implementing Guidelines subject to the approval of the Committee.

**IG 22. REPEALING CLAUSE.** By virtue of this Implementing Guidelines, all Administrative Orders, Memorandum Circulars, rules, or regulations, and other issuances or parts thereof which are inconsistent with the Executive Order No. 489 are hereby modified accordingly.

**IG 23. EFFECTIVITY.** These Implementing Guidelines shall take effect immediately upon approval.

## Annex 2

# THE GLOBAL ALLIANCE ON HEALTH AND POLLUTION

The Global Alliance on Health and Pollution (GAHP) is a global collaborative body that assists low- and middle-income countries to take concrete action to reduce the impacts of pollution on health. GAHP members include more than 40 national ministries of health and environment, development banks, United Nations organizations, other bilateral and multilateral groups, universities, non-governmental organizations, and other actors working on pollution. The current GAHP Secretariat is the New York-based non-profit organization, Pure Earth (also known as the Blacksmith Institute).

More information about GAHP is available at [www.gahp.net](http://www.gahp.net).

## Origin and Design of the HPAP Program

The global Health and Pollution Action Plan (HPAP) program is an initiative of the GAHP. It emerged from the recommendations of the Lancet Commission on Pollution and Health and from the expertise and guidance of GAHP members. The Commission report makes six core recommendations, including:

*“In addition to increased funding, international technical support for pollution control is needed in prioritization and planning of processes to tackle pollution within rapidly industrializing cities and countries; in development of regulatory and enforcement strategies; in building technical capacity; and in direct interventions, in which such actions are urgently needed to save lives or can substantially leverage local action and resources. Financing and technical assistance programmes need to be tracked and measured to assess their cost-effectiveness and to enhance accountability.”*

GAHP has received requests from over 20 low- and middle-income country governments to facilitate research, prioritization, planning, project selection and design, and the development of funding strategies to address pollution challenges. Although GAHP is not a funding agency, the expertise and experience of its member organizations can be highly valuable for countries where national institutions face limitations related to funding and technical capacity. In response to these requests for assistance, the GAHP developed the global HPAP program, aimed at low- and middle-income countries.

The goals of the HPAP program are to:

1. Assist governments to identify, evaluate and prioritize existing pollution challenges based on health impacts
2. Establish pollution as a priority for action within national agencies and development plans
3. Define and advance concrete interventions to reduce pollution exposures and related illnesses

The HPAP is a pollution prioritization and planning process. It differs from other planning processes in that it is structured to bring together different agencies and parties that may not frequently work closely together. It is intended to promote collaboration. It is therefore driven by national agencies – Ministries of Environment, Health, Production/Industry, Transport, Energy, Mining, Agriculture and others – with facilitation and support by GAHP. The process can be tailored to the needs of an individual country, and aims to assist governments in identifying, prioritizing and accelerating national interventions to reduce pollution-related illness and death. It is designed to develop

and implement well-defined and practical outcomes, with commitments by all the participants, including international partners and donors, to undertake specific short- and medium-term actions to improve environmental health. In countries where a National Environmental Health Action Plan (NEHAP) has already been developed with the support of WHO, the HPAP is intended to support the practical implementation of the key priorities.

Depending on the national context, the scope of the HPAP can include indoor and outdoor air pollution, unsafe water and inadequate sanitation, chemical contamination of soil, and occupational exposures to pollutants.

The HPAP process is flexible and can be tailored to the needs of each country, but generally includes the following steps. In the Philippines, the steps have been:

- **PHASE 1.** Collection, compilation and analysis of available information on health impacts from pollution and existing pollution management programs by the Ministries of Health, Environment and Industry/Production, with assistance of the GAHP.
- **PHASE 2.** Inception and technical meetings to prioritize pollution issues, define next steps, including roles and responsibilities of stakeholders through a participatory process.
- **PHASE 3.** Preparation of a draft Health and Pollution Action Plan describing priority pollutants, pollution sources, health impacts, cost-effective interventions to reduce exposures, resources needed and potential sources of funding by a joint National Working Group with participants from the Ministries of Health, Environment, Transportation, Agriculture, Energy, Industry, Mining and with support from the GAHP.
- **PHASE 4.** Circulation of the draft Action Plan to national and international stakeholders, which are invited to provide comments. The National Working Group integrates stakeholder comments and a final Health and Pollution Action Plan is created. Stakeholders reconvene to officially endorse and validate the Action Plan and discuss next steps toward implementing suggested actions.
- **PHASE 5.** Turnover of documents. At a formal ceremony, the HPAP, the ECNs, and the Implementing Guidelines of EO 489 were turned over to the IACEH.
- **PHASE 6.** Dissemination, promotion, fund raising, implementation, monitoring and review of the HPAP through domestic and international initiatives, in collaboration with GAHP, under the guidance of a joint coordinating team between the Ministries of Health and Environment.

## Annex 3

### AVAILABLE NATIONAL DATA

Table A.3.1: Available data sources

Sector	Nature of data available	Organization holding the data
OUTDOOR AIR POLLUTION	National Air Quality Status Report	DENR-EMB
INDOOR AIR POLLUTION	Housing Characteristics and Occupancy	PSA
	Smoking in the household; Vapes (health effects)	DOH
	Household Energy Initiative (short- lived climate pollutants)	Climate and Clean Air Coalition (CCAC)
	Climate change report to NDC (nationally determined contribution)	CCAC
	Land Cover- Land Use Change (Affects indoor air through zoning and stationary source)	DILG-CLUP; DENR (stationary source monitoring)
WASTEWATER & SANITATION	National Water Quality Status Report	DENR-EMB
	Field Health Services Information System	DOH
	Philippines National Demographic and Health Survey	PSA
	Philippine Sustainable Sanitation Roadmap	DOH
CONTAMINATION OF SOIL/SITES	National Implementation Plan for the Stockholm Convention on Persistent Organic Pollutants	DENR
OCCUPATIONAL EXPOSURE	National Occupational Safety and Health Profile	DOLE-OSHC
	Roadmap for the Occupational Health Program for Public Health Workers and for the Informal Sector	UP-CPH in Manila
GENERAL	Compendium of Philippine Environment Statistics	PSA
	Philippine National Health Accounts	NSCB-SSO
	Philippine Statistical Profile	WHO

## Annex 4

# GLOBAL BURDEN OF DISEASE DATA

Agencies such as the World Health Organization (WHO) and the Institute for Health Metrics and Evaluation (IHME) have conducted increasingly sophisticated global burden of disease studies that use data from government agencies, universities and other research groups to reveal the rates of death and disease associated with different risk factors, including exposures to various forms of pollution. These studies show that pollution is now responsible for between nine million and thirteen million deaths annually, and is one of the leading risk factors causing premature death in the world.

The HPAP analysis relies primarily on data from the IHME Global Burden of Disease (GBD) study. The GBD quantifies health loss from hundreds of diseases, injuries, and risk factors, so that policymakers can fully understand their country’s health challenges – and how those challenges are shifting over time. Data from ministries of health and other research organizations are collected and analyzed by a consortium of more than 2,300 researchers in more than 130 countries. The data capture premature death and disability from more than 300 diseases and injuries in 195 countries, by age and sex, from 1990 to the present, allowing comparisons over time, across age groups, and among populations.

The GBD allows decision-makers to compare the effects of different diseases and risk factors, such as malaria versus cancer, or pollution versus malnutrition, and then use that information to make policy in their home country.

## Disability Adjusted Life Year (DALY)

The GBD study cites its data in the form of Disability Adjusted Life Years (DALYs). A DALY is a measure of overall disease burden, expressed as the number of years lost due to ill-health, disability or early death. The DALY is increasingly used in the field of public health. It extends the concept of years of life lost due to premature death, to include equivalent years of healthy life lost due to poor health or disability. In so doing, mortality and morbidity are combined into a single, common metric



## Annex 5

### LIST OF PARTICIPANTS

#### 1. HPAP and EO 489 Implementing Guidelines Consultation Meetings and Workshops Participants

Agency/Organization	Name	Designation
Government/IACEH Members		
Department of Health	Dr. Myrna C. Cabotaje	OIC-Undersecretary of Health Public Health Services Team
	Dr. Georgina Ramiro	Chief Health Program Officer, Bureau of International Health Cooperation
	Dr. Leda M. Hernandez	Director, Disease Prevention and Control Bureau (DPCB)
	Dr. Franklin C. Diza	Division Chief, Environmental-Related Diseases Division (ERDD), Environmental and Occupational Health Office (EOHO), DPCB
	Dr. Rosalind G. Vianzon	Division Chief, Environmental Related Diseases Division, EOHO, DPCB
	Engr. Ma. Sonabel S. Anarna	Supervising Health Program Officer, EOHO, DPCB
	Dr. Valeriano Timbang Jr.	Environmental and Occupational Health Officer, DPCB
Department of Environment and Natural Resources	Lourdes C. Wagan	OIC-Director, Foreign Assisted and Special Projects Service (FASPS)
	Eddie B. Abugan, Jr.	Division Chief, Project Preparation Division, FASPS
	Jacqueline Caancan	Regional Director for the National Capital Region
	Jean Borrromeo	Senior Technical Assistant to the Assistant Director/Supervising Environment Management Specialist, EMB
	Elizabeth Cariño	Senior Environment Management Specialist, EMS, EMB
	Liz Silva	Senior Environment Management Specialist, EMB
	Renato Cruz	Division Chief, Environmental Quality Management Division, Environmental Management Bureau (EMB)
	Albert A. Magalang	Division Chief, Climate Change Division/ designated National authority for CDM Secretariat (UNFCCC-Kyoto Protocol)
	Petra Aguilar	Supervising Environment Management Specialist, Climate Change Division, EMB



<b>Agency/Organization</b>	<b>Name</b>	<b>Designation</b>
Department of Environment and Natural Resources	Leza Acorda-Cuevas	Supervising Environment Management Specialist, Water Quality Management Section, EMB
	Jan Andrew Schnell	Engr. II, Water Quality Management Section, EMB
	Wyona Kay C. Rativo	Environmental Management Specialist II, Air Quality Management Section, EMB
	Angelica Gallego	Chemical Management Section, EMB
	Raquel A. Reyes	Solid Waste Management Commission, EMB
	Lorizel M. Montealegre	Environmental, Education and Information Division, EMB
	Tina Francisco	Environmental, Education and Information Division, EMB
	Apolinario T. Katipunan	Science Research Specialist, Mines and Geosciences Bureau
Department of Labor and Employment	Atty. Benjo Santos M. Benavidez	OIC-Undersecretary for Labor Relations, Special Concerns and Financial Services, Bureau of Labor Relations Director
	Ma. Teresita S. Cucueco	Director IV, Bureau of Working Conditions
	Engr. Nelia Granadillos	Chief, Environment Control Division, Occupational Safety and Health Center
	Sarah Kay Juan	Labor Employment Officer, Bureau of Working Conditions (BWC)
	Marco Valeros	MO-IV, BWC
Department of Trade and Industry	Nestor Arcansalin	Director, Resource-Based Industries Service
	Von M. Lososo	Investment Specialist, Board of Investments (BOI)
	Elma Santos	Investment Specialist, BOI
	Vincent Fernandez	Trade-Industry Development Specialist, Bureau of Philippine Standards
Department of Transportation	Elvira Medina	Assistant Secretary, Office of Commuter Affairs
	Maria Zita Antonio	Training Specialist IV, Office of Commuter Affairs
	Glenn Canouce	Transport Specialist
Department of Public Works and Highways	Engr. Alexander-Generoso Castro	ENGR III
Department of Agriculture	Marmie Zapata	Project Development Officer
National Economic and Development Authority	Lara Hidalgo	Economic Development Specialist II
	Dorothy Detabali	Social Development Staff
Philippine Information Agency	Josephine Babaran	Information Officer II
	Cornelia Cepeda	Information Officer
Laguna Lake Development Authority	Engr. Melgar Villavicencio	ENGR III
Metro Manila Development Authority	Ma. Loida Alzona	Director III, Health and Public Safety Office
UN Agencies		

<b>Agency/Organization</b>	<b>Name</b>	<b>Designation</b>
UNIDO <i>Organizer</i>	Tonilyn Lim	UNIDO Country Representative
	Nilguen Tas	Deputy Director of the Department of Environment
	Edward Clarence Smith	Senior Advisor on Health and Pollution
	Anna Blesilda Tolentino Meneses	National Consultant on Health and Pollution
	Jose Marie U. Lim	Facilitator for Implementing Guidelines of IACEH
	Dr. Mylene B. Gonzaga-Cayetano	Facilitator for Extended Concept Notes
UNICEF Philippines	Louise Maule	Chief, WASH
World Health Organization Philippines	Engr. Bonifacio B. Magtibay	Technical Officer, Environmental/Occupational Health
	Eduardo A. Genciagan Jr.	SSA - Technical Assistant
	Christine May D. Gaylan	SSA - Administrative Assistant
<b>Development Partners</b>		
Asian Development Bank	Ye Xu	Health Specialist
GIZ	Dr. Bjoern Surborg	Support to the Philippines in Shaping and Implementing the International Climate Regime (Support CCC II)
<b>NGOs</b>		
Pure Earth	Larah O. Ibanez	Executive Director
	Dr. Lorele Trinidad	Technical Consultant
	Marife Dapito	Program Officer
Clean Air Asia	Glynda Bathan-Baterina	Deputy Executive Director
	Everlyn Tamayo	Air Quality Specialist
	Precious Benjamin	Environment Researcher
Health Care Without Harm Asia	Raphael Lopez	Healthy Energy Initiative Campaigner
<b>Academe</b>		
College of Public Health, University of the Philippines (Manila)	Vivien Fadrihan-Camacho	Assoc Prof 4, College Secretary
Mapúa University	Flordeliza Villaseñor	Professor

## 2. HPAP Presentation and EO 489 Implementing Guidelines Validation Workshops Participants

Agency/Organization	Name	Designation
Government/IACEH Members		
Department of Health	Dr. Mar Wynn C. Bello	Director III, Disease Prevention and Control Bureau (DPCB)
	Dr. Rosalind G. Vianzon	Division Chief, Environmental-Related Diseases Division (ERDD), Environmental and Occupational Health Office (EOHO), DPCB
	Engr. Joselito Riego De Dios	Chief Health Program Officer, Environmental-Related Diseases Division (ERDD)
	Engr. Elmer Benedictos	Supervising Health Program Officer, DPCB
	Engr. Ma. Sonabel S. Anarna	Supervising Health Program Officer, EOHO, DPCB
	Engr. Rene Timbang	Supervising Health Program Officer, Occupational Diseases Division, DPCB
	Engr. Jocelyn Soria	Supervising Health Program Officer, DPCB
	Engr. Luis Cruz	Supervising Health Program Officer
	Dr. Ma. Elizabeth Caluag	Medical Officer V, Lifestyle-Related Diseases Division, DPCB
Department of Environment and Natural Resources	Jean Borromeo	Senior Technical Assistant to the Assistant Director/Supervising Environment Management Specialist, EMB
	Elizabeth Cariño	Senior Environment Management Specialist, EMS, EMB
	Petra Aguilar	Supervising Environment Management Specialist, Climate Change Division, EMB
	Leza Acorda-Cuevas	Supervising Environment Management Specialist, Water Quality Management Section, EMB
	Wyona Kay C. Rativo	Environmental Management Specialist II, Air Quality Management Section, EMB
	Lorizel M. Montealegre	Environmental, Education and Information Division, EMB
Department of Labor and Employment	Engr. Nelia Granadillos	Chief, Environment Control Division, Occupational Safety and Health Center
	Marco Valeros	MO-IV, Bureau of Working Conditions
	Sarah Kay Juan	Labor Employment Officer, Bureau of Working Conditions
Department of Trade and Industry	Vincent Fernandez	Trade-Industry Development Specialist, Bureau of Philippine Standards
	Elma Santos	Investment Specialist, Board of Investments
Department of Transportation	Maria Zita Antonio	Training Specialist IV, Office of Commuter Affairs
	Hanna Liuag	Transport Planner
Department of Public Works and Highways	Ara Charise Salcedo	Environmental Management Specialist II
Department of Science and Technology	Admer Rey Dablio	Senior Science Research Specialist, Industry Technology Development Institute

<b>Agency/Organization</b>	<b>Name</b>	<b>Designation</b>
Department of Information and Communications Technology	Juli Ana Sudario	OIC Government Digital Transformation Bureau
National Economic and Development Authority	Tom Javate	Supervising Economic Development Specialist, Social Development Staff
Philippine Information Agency	Cornelia Cepeda	Information Officer
Metro Manila Development Authority	Ma. Loida Alzona	Director III, Health and Public Safety Office
<b>UN Agency Partner</b>		
UNIDO <i>Organizer</i>	Tonilyn Lim	UNIDO Country Representative
	Anna Blesilda Tolentino Meneses	National Consultant on Health and Pollution
	Jose Marie U. Lim	Facilitator for Implementing Guidelines of IACEH
World Health Organization Philippines	Engr. Bonifacio B. Magtibay	Technical Officer, Environmental/Occupational Health
<b>NGOs</b>		
Pure Earth	Dr. Lorele Trinidad	Technical Consultant
	Elezabeth Ompad	Program Officer





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