# *NATIONAL SOLID WASTE MANAGEMENT STRATEGY 2012 – 2016*

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# Message

*Greetings!*

In 2011 a series of public consultations was held for the Elaboration of the National Solid Waste Management (NSWM) Strategy. The Strategy is foreseen as a roadmap for the implementing bodies to provide clear direction with well defined steps in achieving goals towards the fulfillment of the National Solid Waste Management Act of 2001 or RA9003. The consultations were held in Luzon, NCR, Visayas and Mindanao with participants from Local Government Units (provinces, cities, municipalities and barangays), National Government and representatives from the private sector, civil society groups and the academe.

The NSWM Strategy consultations are remarkable in that several hundred participants from all over the Philippines representing different sectors of society were brought together to formulate solid waste management practices which provide for the protection of public health and the environment. The wealth of input and knowledge from members of industry, government, education and civil society ensures that every stakeholder's interest is represented. Whatever the background of the participants, each one is one way or another related to ecological solid waste management.

The components of the strategy were thoroughly reviewed, discussed and debated. I believe that these components are applicable not only to the ecological solid waste management but to all aspects of environmental management and conservation. These components are bridging policy gaps and harmonizing policies; compliance monitoring enforcement and recognition; social marketing and advocacy; cross-cutting issues such as good governance and reducing disaster and climate change risks; creating economic opportunities; knowledge management on technology, innovation and research; sustainable SWM Financing and organizational development and enhancing inter-agency collaboration.

I would like to extend my appreciation to the National Solid Waste Management Commission and its Secretariat and our friends and partners from GIZ/GIZ-AHT for making the strategy consultations a success and for everyone for helping us realize our mission of mobilizing our citizenry in protecting, conserving and managing the environment and natural resources.

**Chairman Ramon J.P. Paje**
*DENR Secretary*

# Message

I was fortunate enough to be part of the National Solid Waste Management (NSWM) Strategy Cluster Island Consultation held in 2011. Over a period of several weeks and spanning Luzon (including NCR), Visayas and Mindanao, these consultations were held to elaborate the NSWM Strategy based on the Ecological Solid Waste Management Act or RA9003. I was able to meet and address the dedicated public servants from the national and local government and the brilliant and inspiring representatives from industries, academe and private/civil sector groups.

The spirit of the law of RA9003 is well and alive but like any law, it is not perfect. The challenges and opportunities that stakeholders face in the implementation of a comprehensive solid waste management implementation were thoroughly discussed. This book will illustrate the different components and key initiatives taken up in the strategy consultation. The participants themselves as key stakeholders were able to provide very valuable input on the challenges that their sectors face as well as their suggestions for how these can be resolved. Among the components tackled are gaps in the law including the issues of inter-agency collaboration and enforcement mechanisms. The difficulties of awareness and finances were also discussed. Anyone who is genuinely concerned with the environment and the state of solid waste management in our country will understand the key issues that we face in implementation and how we can hope to overcome these.

One would be inspired by the commitment and dedication that the participants showed in the course of the consultations. This is not to say that they did not face their share of challenges during the consultations, with the language barrier, the difficulties with travel, time management and coming to a consensus as some of the obstacles they had to face. But the spirited discussions, the camaraderie the participants shared and the knowledge that everyone gained more than made up for the difficulties they faced. It was truly inspiring.

I would like to personally thank the members of the Commission, the Secretariat, the coordinators and everyone who was involved in the consultations for making it a success. I look forward to the next series of consultations in the future as we work together to ensure the protection of public health and the environment through the ecological solid waste management.

**Atty. Juan Miguel T. Cuna**
*Director, Environmental Management Bureau (EMB)*

# Message

Greetings from the National Solid Waste Management Commission!

The NSWMC Secretariat along with our friends and partners from GIZ/GIZ-AHT recently held the National Solid Waste Management Framework Inter-island Consultation. The series of consultations included representatives from cities, municipalities and even barangays for the local government along with participants from the different agencies of the national government represented our policy makers. We also invited members of the academe as well as private and civil society groups representing sectoral interests of our different stakeholders. All in all, there was fair representation from all aspects of society.

It has been more than ten years since the law was implemented but it does not mean that it does not evolve with the ever changing needs of the times. The consultations were held to develop the National Solid Waste Management Framework. RA9003 states that the Framework shall reflect the assessment of the (country's) solid waste management situation, analysis of options including practical application of environmentally sound techniques of waste minimization, mandatory program of actions, public participation and Information, Education and Communication (IEC) Campaign, and aspects for standardization and measuring performance. The Framework was broken down into components and key initiatives, with the participants providing feedback through a series of workshops and forums which determined challenges, opportunities and priorities in the implementation of national ecological solid waste management program which in turn shapes the policies to be implemented at the local level.

I would like to personally thank everyone who was involved in the consultations especially the tireless members of the NSWMC and its Secretariat, the EMB and all the participants who shared their precious time and knowledge to make this all possible. I look forward to any and all future projects that we'll be working on together.

**Emelita C. Aguinaldo**
*Secretariat Executive Director,*
*National Solid Waste Management Commission (NSWMC)*

# *Acknowledgements*

The **National Solid Waste Management Strategy** is the product of a seemingly unending series of workshops and write-shops which involved the full participation and cooperation of various stakeholders' groups in the waste management sector.

The National Solid Waste Management Commission (NSWMC) through the Department of Environment and Natural Resources, the Environmental Management Bureau, the NSWMC Secretariat took the lead in writing the document and in convening the various stakeholders during the numerous consultation meetings and workshops.

The Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) GmbH provided the technical support, co-funded the activities as well as provided the direction in the Strategy development process.

## Special thanks are due:

- To ALL participants of the Cluster Island Workshops held in Luzon, Visayas and Mindanao,
- To those who read the earlier drafts and provided comments and feedbacks,
- To those who incorporated all the comments and feedback to the document,
- To the writers who willingly drafted parts of the document,
- To those who provided the necessary data and information.

## *List of Acronyms*

| | |
|---|---|
| 3Rs | Reduce, Reuse, Recycle |
| ADB | Asian Development Bank |
| AHT | AHT Group AG Management and Engineering |
| AIP | Annual Investment Plan |
| ATI | [DA's] Agricultural Training Institute |
| BAR | [DA's] Bureau of Agricultural Research |
| BDT | [DTI's] Bureau of Domestic Trade |
| BFP | [DILG's] Bureau of Fire Protection |
| BIR | [DOF's] Bureau of Internal Revenue |
| BITR | [DTI's] Bureau of International Trade Relations |
| BLGF | [DOF's] Bureau of Local Government Finance |
| BLGS | [DILG's] Bureau of Local Government Supervision |
| BOC | [DOF's] Bureau of Customs |
| BOI | [DTI's] Board of Investments |
| BOT | Build-Operate-Transfer |
| BSMED | [DTI's] Bureau of Small and Medium Enterprise Development |
| CCC | Climate Change Commission |
| CCO | [EMB's] Climate Change Office |
| CDA | Cooperative Development Authority |
| CDF | Controlled Disposal Facility |
| CDM | Clean Development Mechanism |
| CENRO | [DENR's] Community Environment and Natural Resources Office |
| CFC | Chlorofluorocarbons |
| CFI | [NSWMC's] Committee on Fiscal Incentives |
| CHED | Commission on Higher Education |
| CITEM | [DTI's] Center for International Trade Expositions and Missions |
| CLUP | Comprehensive Land Use Plan |
| CO2e | Carbon dioxide-equivalent |
| COA | Commission on Audit |
| CP | Cleaner Production |
| CPU | Central Philippine University |
| CR | Cost-Recovery |
| CSC | Civil Service Commission |
| CSP | Community Service Program |
| CSR | Corporate Social Responsibility |
| CT | Clean Technology |

| | |
|---|---|
| DA | Department of Agriculture |
| DAO | Department Administrative Order |
| DAR | Department of Agrarian Reform |
| DBM | Department of Budget and Management |
| DBO | Design-Build-Operate |
| DENR | Department of Environment and Natural Resources |
| DepEd | Department of Education |
| DF | [LGUs'] Development Fund |
| DILG | Department of the Interior and Local Government |
| DND | Department of National Defense |
| DOE | Department of Energy |
| DOF | Department of Finance |
| DOH | Department of Health |
| DOJ | Department of Justice |
| DOLE | Department of Labor and Employment |
| DOST | Department of Science and Technology |
| DOT | Department of Tourism |
| DPWH | Department of Public Works and Highways |
| DRRM | Disaster Risk Reduction and Management |
| DRRMO | Disaster Risk Reduction and Management Office |
| DSWD | Department of Social Welfare and Development |
| DTI | Department of Trade and Industry |
| ECC | Environmental Compliance Certificate |
| ECA | [BLGS'] Environmental Compliance Assessment [Section] |
| ECC | Environmental Compliance Certificate |
| EEID | [EMB's] Environmental Education and Information Division |
| EENP | Environmental Education Network of the Philippines |
| EIA | Environmental Impact Assessment |
| EIAD | [EMB's] Environmental Impact Assessment Division |
| EMB | [DENR's] Environmental Management Bureau |
| ENR | Environment and Natural Resources |
| ENRO | Environment and Natural Resources Office |
| EO | Executive Order |
| EPOS | Environmental Protection Orders |
| EPPD | [EMB's] Environmental Policy and Planning Division |
| EPR | Extended Producer Responsibility |
| ESWM | Ecological Solid Waste Management |
| ETV | Environmental Technology Verification |
| ETVP | Environmental Technology Verification Protocol |
| FCA | Full-Cost Accounting |

| | |
|---|---|
| FGD | Focus Group Discussion |
| FPA | [DA's] Fertilizer and Pesticide Authority |
| GAA | General Appropriations Act |
| GFIs | Government Financing Institutions |
| GHG | Greenhouse Gas |
| GIZ | GesellschaftfürInternationaleZusammenarbeit GmbH |
| GPPB | [DBM's] Government Procurement Policy Board |
| HEIs | Higher Education Institutions |
| HLURB | Housing and Land Use Regulatory Board |
| HOAs | Homeowners' Associations |
| HR | Human Resources |
| HRD | Human Resources Division |
| HUDCC | Housing and Urban Development Coordinating Council |
| IBP | Integrated Bar of the Philippines |
| IEC | Information, Education and Communication |
| IEE | Initial Environmental Examination |
| IPOPHL | [DTI's] Intellectual Property Office of the Philippines |
| IPP | Investment Priorities Plan |
| IRA | [LGUs'] Internal Revenue Allotment |
| IRR | Implementing Rules and Regulations |
| ISP | Internet Service Provider |
| IT | Information Technology |
| ITDI | [DOST's] Industrial Technology Development Institute |
| IWS | Informal Waste Sector |
| JAO | Joint Administrative Order |
| JCOC | Joint Congressional Oversight Committee |
| JICA | Japan International Cooperating Agency |
| JMC | Joint Memorandum Circular |
| KDCs | Knowledge for Development Centers |
| KI | Key Initiative |
| LCP | League of Cities of the Philippines |
| LDP | Local Development Plan |
| LDRRMC | Local Disaster Risk Reduction and Management Council |
| LGA | [DILG's] Local Government Academy |
| LGPMS | [DILG's] Local Government Performance Monitoring System |
| LGRCs | [DILG's] Local Government Resource Centers |
| LGUs | Local Government Units |
| LLDA | Laguna Lake Development Authority |
| LMP | League of Municipalities of the Philippines |
| LnB | Liga ng mga Barangay |

| | |
|---|---|
| LPP | League of Provinces of the Philippines |
| LSWMB | Local Solid Waste Management Board |
| MarPol | Marine Pollution [Law] |
| MC | Memorandum Circular |
| MDFO | [DOF's] Municipal Development Fund Office |
| MDGs | [UN's] Millennium Development Goals |
| MENRO | Municipal Environment and Natural Resources Office |
| MGB | [DENR's] Mines and Geosciences Bureau |
| MMDA | Metropolitan Manila Development Authority |
| MMT | Multipartite Monitoring Team |
| MOA | Memorandum of Agreement |
| MOOE | Maintenance and Other Operating Expenses |
| MOU | Memorandum of Understanding |
| MRF | Materials Recovery Facility |
| MRV | Monitoring, Reporting and Verification |
| MSC | Multi-Sectoral Committee [for capacity development of IWS] |
| MSMEs | Micro-,Small and Medium Enterprises |
| MSW | Municipal Solid Waste |
| NAMA | Nationally Appropriate Mitigation Actions |
| NAMRIA | [DENR's] National Mapping and Resource Information Authority |
| NAPC | National Anti-Poverty Commission |
| NCCAP | National Climate Change Action Plan |
| NCI | [DA-DAR-DENR] National Convergence Initiative |
| NCIP | National Commission on Indigenous Peoples |
| NCR | National Capital Region |
| NDRRMC | National Disaster Risk Reduction and Management Council |
| NEAP | Non-Environmentally Acceptable Products or Packaging |
| NEC | National Ecology Center |
| NEDA | National Economic Development Authority |
| NEEAP | National Environmental Education Action Plan |
| NFP | National Framework Plan [for the IWS] |
| NGAs | National Government Agencies |
| NGOs | Non-Government Organizations |
| NGP | National Greening Program |
| NIMBY | Not-in-my-backyard |
| NSTP | National Service Training Program |
| NSWMC | National Solid Waste Management Commission |
| NSWMCS | National Solid Waste Management Commission Secretariat |
| NSWMF | National Solid Waste Management Fund |
| NSWMS | [NSWMC's] National Solid Waste Management Strategy [2012-2016] |

| | |
|---|---|
| OCD | [DND's] Office of Civil Defense |
| OSHC | [DOLE's] Occupational Safety and Health Center |
| OP | Office of the President [of the Republic of the Philippines] |
| OSG | Office of the Solicitor-General |
| P/CENROs | [DENR's] Provincial and Community Environment and Natural Resources Offices |
| PAASCU | Philippine Accrediting Association of Schools, Colleges and Universities |
| PAB | [DENR's] Pollution Adjudication Board |
| PAGASA | [DOST's] Philippine Atmospheric, Geophysical and Astronomical Services Administration |
| PAGCOR | Philippine Amusement and Gaming Corporation |
| PAYT | Pay-as-you-throw |
| PCG | [DOTC's] Philippine Coast Guard |
| PCIEERD | [DOST's] Philippine Council for Industry, Energy and Emerging Technology Research and Development |
| PCOs | Pollution Control Officers |
| PCSD | Palawan Council for Sustainable Development |
| PCUP | Presidential Commission for the Urban Poor |
| PD | Presidential Decree |
| PDD | [CDM-] Project Design Document |
| PDF | Philippine Development Forum |
| PEMO | [EMB's] Provincial Environmental Management Office |
| PENRO | [DENR's] Provincial Environment and Natural Resources Office |
| PEZA | [DTI's] Philippine Economic Zone Authority |
| PG | Provincial Government |
| PG-ENRO | Provincial Government - Environment and Natural Resources Office |
| PHIVOLCS | [DOST's] Philippine Institute of Volcanology and Seismology |
| PIA | Philippine Information Agency |
| PIDS | [NEDA's] Philippine Institute for Development Studies |
| PLLENRO | Philippine League of Local Environment and Natural Resources Officers |
| PNP | Philippine National Police |
| POs | Peoples' Organizations |
| PPP | Public-Private Partnerships |
| PRC | Professional Regulation Commission |
| PS | Personnel Services |
| R&D | Research and Development |
| RA | Republic Act |
| RCA | Residuals Containment Area |
| RDCs | Regional Development Councils |
| RECs | Regional Ecology Centers |
| RO | Regional Office |

| | |
|---|---|
| RODG | [DTI's] Regional Operations and Development Group |
| RSO | Regional Special Order |
| S&T | Science and Technology |
| SBC | [DTI's] Small Business Corporation |
| SK | Sangguniang Kabataan |
| SLAPP | Strategic Lawsuits against Public Participation |
| SLF | Sanitary Landfill Facility |
| SO | Special Order |
| SWAPP | Solid Waste Management Association of the Philippines |
| SWCAP | Solid Waste Contractors' Association of the Philippines |
| SWM | Solid Waste Management |
| SWM4LGUs | Solid Waste Management for Local Government Units [Project] |
| SWMB | [LGU's] Solid Waste Management Board |
| TAPI | [DOST's] Technology Application and Promotion Institute |
| TDNA | Training and Development Needs Assessment |
| TESDA | Technical Education and Skills Development Authority |
| TNA | Training Needs Assessment |
| TSD | Treatment, Storage and Disposal [facility for hazardous wastes] |
| TVET | Technical, Vocational, Education and Training |
| TWG | Technical Working Group |
| UN | United Nations |
| UNEP | United Nations Environment Programme (UNEP) |
| USAID | United States Agency for International Development |
| VCA | Value Chain Analysis |
| WACS | Waste Analysis and Characterization Study |
| WEEE | Waste Electronics and Electrical Equipment |
| WFP | Work and Financial Plan |

## *Definition of Terms*

All templates that describe how to undertake the key initiatives have the following headers defined as follows:

*"**Component**"* shall refer to the major classifications of strategy directions in the Philippine SWM sector, comprising of seven (7) major and three (3) cross-cutting components. These components are the categories identified in response to consolidated strategic issue statements during the formulation of the National Solid Waste Management Strategy.

*"**Cooperating Partners**"* shall refer to NSWMC member agencies and other institutions that have been identified to have legal mandates, interest or capacity to support the lead agency in implementing the indicative actions under each key initiative.

*"**General Description**"* shall refer to a brief statement describing or justifying the need to undertake the key initiative.

*"**Geographical Scope / Target Groups**"* shall refer to specific groups of people or organizations at which the key initiative is aimed. Geographical scope delineates whether the key Initiative is to be undertaken nationwide/within the locality or at the national/regional/local levels. The phrase target groups identifies the main beneficiaries of the initiative, including the stakeholders who are intended to be consulted, educated, engaged or supported.

*"**Indicative Actions**"* shall refer to the series of specific activities that have to be undertaken towards materializing the key initiative".

*"**Key Initiative(s)**"* shall refer to the main activity(ies) that contribute towards achieving the specific objective(s) identified per strategic component.

*"**Lead Agency**"* shall refer to one or two NSWMC-member agencies or entities responsible for ensuring the full implementation of the indicative actions under each key Initiative with support from cooperating partners.

*"**Objective**"* shall refer to the over-arching purpose for which the SWM strategies and key initiatives are designed to achieve, attain or accomplish. Each component may have one or more objectives.

"***Possible Sources***" shall refer to the potential sources of support for resource requirements, usually from the lead Agency, cooperating partners and other interested groups.

*"**Special Requirements**"* shall include all the usual resources (human, financial, institutional, expertise) necessary to implement the indicative actions. Possible sources for these are also identified in the matrices. [Note: Only exceptional resource requirements specific for the key Initiative are mentioned in the matrices. All key initiatives automatically require the typical funds needed for the conduct of meetings and workshops, travel and accommodation, manpower, hiring of consultants, reproduction of materials, etc.]

*"**Strategy**"* shall refer to the main targets designed to achieve or respond to the strategic objectives. Each strategy may have one or more key initiatives.

*"**Target Period / Date of Accomplishment**"* shall define the time when the first indicative action is started until the time when the last activity is expected to be completed under each key initiative. In the document, time is expressed on a quarterly basis, e.g., Q1/2012 – Q4/2016 means that the indicative actions shall commence from the first quarter of 2012 and shall end by the fourth quarter of 2016.

Meanwhile, most technical terms used are already defined under RA 9003 and its implementing rules and regulations, and are duly re-arranged or consolidated in this document as needed. Henceforth, all other terminologies mentioned in this document are defined as follows:

*"**Academe**",* in this document, refers to any place of learning or where instructions are given to students and pupils. It encompasses all educational institutions, from pre-school to universities. Meanwhile, the term *"**Higher Education Institutions (HEIs)**"* used in this document shall specifically refer to either private or state-run academic institutions beyond secondary level, which include universities, colleges, institutes of technology and certain collegiate-level institutions, such as vocational schools, trade schools, and career colleges, that award academic degrees or professional certifications.

"***Agricultural Waste***" shall refer to waste generated from planting or harvesting of crops, trimming or pruning of plants and wastes or run-off materials from farms or fields. [*Reference*: RA 9003]

*"**Alternative Fuels and Raw Materials (AFR)**"* are wastes or secondary products from other industries that are used to substitute conventional fossil fuel and conventional raw materials, for example, "***Co-processing***" in cement kilns. "***Alternative fuels***" refer to non-traditional fuels, such as waste materials, that provide thermal energy in the production of cement while "***Alternative raw materials***" refer to non-traditional raw materials, such as waste materials, providing minerals in the production of cement. [*References*: DOST-ITDI; DENR Administrative Order 2010-06]

*"**Biodegradable Wastes**"* refer to organic matter used in compost/organic fertilizer production for organic cultivation and farming of food crops, and shall include the discards segregated from non-biodegradable wastes coming from the kitchen/household (leftovers, vegetables and fruit peelings and trims, fish/fowl cleanings, seeds, bones, soft paper used as food wrap and the like); yard or garden (leaves, grasses, weeds and twigs); market (wilted, decayed or rotten vegetables and fruits, fish/fowl cleanings, bones); and farm wastes (grass clippings, dead or decayed plants, leaves, fruits, vegetables, branches, twigs and the like). Meanwhile, DTI's Bureau of Product Standards defined "***Organic Matter***" as any material that originated from living organisms. [*References*: RA 10068, Definition of Terms; PNS/BAFPS 40:2008 on Organic Fertilizer]

*"**Biomass Resources***" refer to non-fossilized, biodegradable organic material originating from naturally occurring or cultured plants, animals and micro-organisms, including agricultural products, by-products and residues such as, but not limited to, biofuels except corn, soya beans and rice but including sugarcane and coconut, rice hulls, rice straws, coconut husks and shells, corn cobs, corn stovers, bagasse, biodegradable organic fractions of industrial and municipal wastes that can be used in bioconversion process and other processes, as well as gases and liquids recovered. [*Reference*: RA 9513]

"***Compost***" is any product of organic matter that has undergone substantial decomposition through natural processes or accelerated with the use of microbial inoculants and/or proper C:N ratio of substrates where traces of the original materials are still recognizable, maybe partly soil-like in texture, and can supply nutrients to plants. "***Organic fertilizer***" refers to any product of organic matter that has undergone substantial decomposition where the original materials are no longer recognizable, free from any pathogens, soil-like in texture, contains not less than 20 % organic matter, and can supply nutrients to plants. "***Pure Organic Fertilizer***" is an organic fertilizer material or any substantially decomposed product of organic matter, which was not enriched with chemical ingredients to increase its nutrient content with minimum total NPK (nitrogen-phosphorus-potassium) of 1.5%. [*Reference*: PNS/BAFPS 40:2008 on Organic Fertilizer]

*"**Composting**"* shall refer to the controlled decomposition of organic matter by micro-organisms, mainly bacteria and fungi, into a humus-like product."***Humus***" is that stable fraction of organic matter after a major portion of plant and animal residues have decomposed, usually amorphous and dark in color.[*References*: RA 9003, Definition of Terms; PNS/BAFPS 40:2008 on Organic Fertilizer]

*"**Cost Recovery***" refers to the imposition of fees on the SWM services provided by the LGU or any authorized private sector or civil society group in order to partially or fully recover the costs directly related to the adoption and implementation of the local SWM Plan, provided that the system for calculation and collection of fees are subject to review and approval of the local or cluster SWM Boards. [*References:* RA 9003, Section 47; IRR of RA 9003, Rule XVII]

*"**Development Partners**",*as used in this document, connotes agencies or organizations, local or international, bilateral or multilateral, which have an existing or potential thrust, interest and/or capability to support the lead and cooperating agencies in implementing the key initiatives itemized under the National Solid Waste Management Strategy 2012-2016.

*"**Dumpsites***", as referred to in RA 9003, are areas or sites unlawfully used for the disposal and final deposition of solid wastes. An *"**Open Dump**"* shall refer to a disposal area wherein the solid wastes are indiscriminately thrown or disposed of without due planning and consideration for environmental and health standards while a *"**Controlled Dump**"* shall refer to a disposal site at which solid waste is deposited in accordance with the minimum prescribed standards of site operation. Neither open nor controlled dumpsite is allowed to be operated by 2006. Dumpsites should be properly closed and rehabilitated in accordance with prescribed guidelines and standards. [*References*: RA 9003, Sections 36-39; IRR of RA 9003; DENR Administrative Order 2006-09]

*"**Eco-efficient Soil Cover***" or "***Methane-oxidizing Soil Cover***" is an emerging technique in dumpsite closure and rehabilitation that makes use of the 'reactive barrier concept' to intercept methane emissions from the waste body. Methane is transformed into carbon dioxide by natural microbial processes while passing through the eco-efficient cover strata. German studies found methane elimination within the magnitude 80-90% is possible when using 4% compost-in-soil-mixture as cover; The methane-oxidizing potential of locally available agricultural and industrial residues are also being pilot-tested in the Visayas. [*Reference*: GIZ-AHT SWM4LGUs website (www.swm4lgus.net)]

*"**Eco-Wardens**", "**Eco-Police**", "**Eco-Enforcers**" or "**SWM Enforcers**",*are terms used by various LGUs to denote their designated and/or deputized educators and enforcers in support to implementing RA 9003 and local policies on SWM, e.g., waste segregation, segregated collection, anti-littering and other prohibited acts.

"***Environmental Courts***" or "***Green Courts***" are the 117 trial courts in the Philippines designated by the Supreme Court in 2007 to hear cases involving violations of laws protecting the country's natural resources and to speed up their resolution. On April 29, 2009, the Supreme Court of the Philippines has put into effect the "Rules of Procedure for Environmental Cases". The rules include provisions for: (1) citizen suits, (2) consent decrees, (3) environmental protection orders (EPOs), (4) Writ of Kalikasan (Nature), (5) Writ of Continuing Mandamus, (6) Strategic Lawsuits against Public Participation (SLAPP), and (7) Precautionary Principle.

"***Environmental Education***" is a learning process that increases people's knowledge and awareness about the environment and associated challenges, and fosters attitudes, motivations and commitments to make informed decisions and take responsible action. According to RA 9512, environmental education shall encompass environmental concepts

and principles, environmental laws, the state of international and local environment, local environmental best practices, the threats of environmental degradation and its impact on human well-being, the responsibility of the citizenry to the environment, and the value of conservation, protection and rehabilitation of natural resources and the environment in the context of sustainable development.[*References*: UNESCO, Tbilisi Declaration; RA 9512, Section 3; RA 9003, Sections 54-56)]

*"**Environmental Technology Verification (ETV)**" or its **Protocol** "**ETVP**"* refers to the establishment or validation of environmental technology performance by qualified third parties based on test data generated through testing using established protocols or specific requirements. The objective of the ETV Technical Protocol is to establish a process for developing, conducting, and reporting scientifically sound evaluations of environmental products and technologies that will be sufficiently determinative of their functional performance under stated conditions as to provide a reasonable basis for future decisions by potential users. However, as one of its fundamental tenets, ETV does not endorse, approve or authorize for use any product that it evaluates; Rather, it renders the service of applying a national, consensus-based evaluation process, incorporating a cross-section of participants, which provides end users, regulators, and decision-makers with a sound and rational basis for future purchasing decisions. [*References*: International Working Group on ETV; DOST-ITDI's Operating Policies; DENR-DOST Joint Administrative Order 2006-01]

*"**Industry Groups**",*as used in this document, connotes both "***Industry Associations***" and "***Chambers of Commerce and Industry"***, but excludes "***Trade Associations***", unless otherwise specified.

*"**Informal Waste Sector (IWS)**"* generally refers to individuals, families, and private sector (micro-) enterprises working in waste management services and valorization, whose activities are neither organized, sponsored, financed, contracted, recognized, managed, taxed, nor reported upon by the formal solid waste authorities. In the Philippines, the IWS is defined as individuals, families, groups or small enterprises engaged in the recovery of waste materials either on a full-time or part-time basis with revenue generation as the motivation. It consists mainly of itinerant waste buyers, *paleros* (garbage trucks crew), 'jumpers' (those who jump into collection trucks to recover recyclables), waste pickers in dumpsites and communal waste collection points, informal waste collectors, waste reclaimers and small junkshop dealers. [*References*: National Framework Plan for the IWS in SWM (NSWMC, 2009); The Economics of the IWS in SWM (GIZ, 2011)]

"***Joint Congressional Oversight Committee (JCOC)***" is created to monitor RA 9003 implementation and to oversee the function of the NSWMC. The JCOC is composed of five (5) Senators and five (5) Representatives appointed by the Senate President and the Speaker of the House of Representatives, respectively. [*Reference:* RA 9003, Section 60]

*"**Leachate**"* shall refer to the liquid produced when waste undergo decomposition, and when water percolate through solid waste undergoing decomposition. It is a contaminated liquid that contains dissolved and suspended materials.[*Reference*: RA 9003]

*"**LGU Leagues**",* in this document, shall refer to the four major associations of LGUs identified as members of the NSWMC, namely, the League of Provinces of the Philippines (LPP), League of Cities of the Philippines (LCP), League of Municipalities of the Philippines and the Ligangmga Barangay (LnB).

*"**Local Government Units (LGUs)**",* in this document, shall always refer to all provincial, city, municipal and barangay political entities, including its officials and personnel.

*"**Materials Recovery Facility (MRF)**"* shall be established in every barangay or cluster of barangays to receive biodegradable wastes for composting and mixed non-biodegradable wastes for final segregation, re-use and recycling; Provided, that each type of mixed waste is collected from the source and transported in separate containers. It shall include a solid waste sorting station, drop-off center, a composting facility, and a recycling facility. In comparison, a "***Buy-back Center***" refers to a recycling center that purchases or otherwise accepts recyclable materials from the public for the purpose of recycling such materials. [*References*: RA 9003; IRR of RA 9003, Rule XI]

*"**Minors***", or "***Children***", as referred to under RA 7610: 'An act providing for stronger deterrence and special protection against child abuse, exploitation and discrimination, are those below 18 years of age (the age of emancipation in the Philippines) or older, but are unable to fully take care of themselves or protect themselves from abuse, neglect, cruelty, exploitation or discrimination because of a physical or mental disability or condition. Article VIII, Section 12 of RA 7610 states that "Children below 15 years old may be employed except: when a child works directly under the sole responsibility of his parents or legal guardian and where only members of the employer's family are employed: provided, however, that his employment neither endangers his life, safety and health and morals, nor impairs his normal development". It requires, further, the said minor child is provided by its parent or guardian with primary and/or secondary education. [*Reference*: RA 7610]

*"**Multi-Sectoral Committee (MSC) for Capacity Development of the IWS**"*is created as an interim body tasked to capacitate the IWS. MSC has membership coming from the following: NSWMC, DOLE, PCUP, NAPC, CDA, SWCAP and other organizations/agencies necessary. [*Reference*: NSWMC Commission Resolution No. 48, series of 2010]

*"**Municipal Wastes**"* shall refer to wastes produced from activities within local government units which include a combination of domestic, commercial, institutional and industrial wastes and street litters.*"**Solid Waste**"* shall refer to all discarded household, commercial waste, non-hazardous institutional, ports/harbor and industrial wastes, street sweepings,

construction debris, agriculture waste, and other non-hazardous/non-toxic solid waste. [*Reference*: RA 9003, Definition of Terms]

*"**National Solid Waste Management Commission (NSWMC)**",* is established under the Office of the President mandated to oversee the implementation of SWM plans and prescribe policies to achieve the objectives of RA 9003. The NSWMC is tasked to undertake the following activities, among others: (a) prepare the National SWM Framework; (b) approve, review and monitor implementation of local SWM plans; (c) provide technical and other capability building assistance and support to LGUs; (d) develop a mechanism for the imposition of sanctions; (e) review the incentives scheme for effective SWM, etc. RA 9003 also states that "the [DENR], through the [EMB], shall provide secretariat support to the [NSWMC]. The ***National Solid Waste Management Commission Secretariat (NSWMCS)*** shall be headed by an executive director who shall be nominated by the members of the Commission and appointed by the chairman." [*Reference:* RA 9003, Sections 4-6]

*"**National Solid Waste Management Commission (NSWMC)'s Small Core Croup (SCG) and Extended Core Group (ECG)**"* are working groups formed to consolidate the NSWM status reports into NSWM Situationer and to formulate responses to identified gaps, through public consultations and with assistance from GIZ-AHT SWM4LGUs Project, into the medium-term NSWM Strategy. The SCG was officially formed through DENR-EMB Special Order 2010-333 comprising of four (4) members of the NSWMC Secretariat (NSWMCS), including its Executive Director. The ECG is the SCG plus selected members of the NSWMC and other NSWMCS staff who served as researchers, writers, analysts and facilitators during the development of the Strategy document.

*"**National Solid Waste Management Framework**",* as provided for under RA 9003, refers to the outline of the preferred course of action or approach to support the national policy of adopting 'a systematic, comprehensive and ecological solid waste management program' as defined by ten policy principles. The NSWM Framework was formulated in 2004 based on the NSWM Status Report consolidated during the early years of RA 9003. The document is crucial in guiding LGUs to prepare and plan an ecologically sound SWM strategy. [*References:* RA 9003, Sections 2, 14 and 15; IRR of RA 9003, Rule VII; National Solid Waste Management Framework (NSWMC, 2004)].

*"**National Solid Waste Management Strategy**"* sets the development path for the Philippine SWM sector in the upcoming five years and contains detailed proposals and criteria for NSWMC, its member agencies and other concerned organizations to more effectively ensure the full implementation of RA 9003. A key element of the strategy allows for a participatory review of the gains and challenges in SWM more than a decade after the passage of the law, formulation of strategic issue statements and strategic components, consultations with national and local stakeholders and prioritization of key initiatives. In essence, the National Solid Waste Management Strategy intends to provide a mechanism to materialize the National SWM Framework, implement the provisions of RA 9003 and its

implementing rules and regulations, and mainstream cross-cutting policies and emerging concepts into the Philippine SWM sector in a strategic and well-coordinated manner.

"***Nationally Appropriate Mitigation Action (NAMA)***" refers to a measurable, reportable and verifiable set of policies and actions that countries undertake as part of a commitment to reduce greenhouse gas emissions. NAMA modalities are country-specific and designed on the basis of equity and in accordance with common but differentiated responsibilities and respective capabilities [*References*: UNFCCC website; Project Sketch, Philippine NAMA Framework Development and NAMA Piloting for the Waste Sector (GIZ, 2012)].

*"**Non-Environmentally Acceptable Products or Packaging (NEAP)**"* shall refer to products or packaging that are unsafe in production, use, post-consumer use, or that produce or release harmful products. In contrast, *"**Environmentally Preferable**"* shall refer to products or services that have a lesser or reduced effect on human health and the environment when compared with competing products or services that serve the same purpose. This comparison may consider raw materials acquisition, production, manufacturing, packaging, distribution, reuse, operation, maintenance or disposal of the product or service. The Technical Working Committee formed per NSWMC Resolution No. 9 recommends the use of LCA as a tool in determining NEA products and packaging materials. *"**Life Cycle Assessment (LCA)**"* in RA 9003, shall refer to the compilation and evaluation of inputs, outputs and the potential environmental impacts of a product system throughout its life cycle. [*References*: RA 9003, Definition of Terms; NSWMC Resolution No. 9]

*"**Open Burning**"* shall refer to the thermal destruction of wastes by means of direct exposure to fire. It shall also apply to traditional small-scale methods of community sanitation '*siga*'. [*Reference*: RA 9003, Definition of Terms]

*"**Philippine Congress**",* in this document, shall refer to the bicameral body of legislature of the Republic of the Philippines consisting of both the Senate (upper chamber) and the House of Representatives (lower chamber).

*"**Recyclable Material**"* shall refer to any waste material retrieved from the waste stream and free from contamination that can still be converted into suitable beneficial use or for other purposes, including, but not limited to, newspaper, ferrous scrap metal, non-ferrous scrap metal, used oil, corrugated cardboard, aluminum, glass, office paper, tin cans, plastics and other materials as may be determined by NSWMC, while *"**Post-Consumer Material**"* refers only to those materials or products generated by a business or consumer which have served their intended end use, and which have been separated or diverted from solid waste for the purpose of being collected, processed and used as a raw material in the manufacturing of recycled product, excluding materials and by-products generated from, and commonly used within an original manufacturing process, such as mill scrap.
[*References*: RA 9003, Definition of Terms and Section 20-21, 26-33]

*"**Recycled Material**"* shall refer to post-consumer material that has been recycled and returned to the economy while *"**Recovered Material**"* shall refer to material and by-products that have been recovered or diverted from solid waste for the purpose of being collected, processed and used as a raw material in the manufacture of a recycled product. [*References*: RA 9003, Definition of Terms and Section 20-21, 26-33]

*"**Research Institutions**",* as used in this document, includes all academe-based, private, government, non-government, foreign or donor-supported agencies and organizations involved in the research and development of SWM technologies, systems and policies.

*"**Sanitary Landfill (SLF)**"* shall refer to a waste disposal site designed, constructed, operated and maintained in a manner that exerts engineering control over significant potential environmental impacts arising from the development and operation of the facility. The term was further detailed into Categorized SLFs whose minimum design and operating features depend on net residual waste generation. [*References:* RA 9003, Sections 40-42; DENR Administrative Order 2006-10].

*"**Segregation<at source>**",* refers to the solid waste management practice of separating or sorting, <*at the point of origin*>, different materials found in solid waste in order to promote recycling and re-use of resources and to reduce the volume of waste for collection and disposal. This term is similar to *"**Source Separation**"*, which is defined as the sorting of solid waste into some or all of its component parts at the point of generation, using color-coded "***Receptacles***" or the individual containers used for the source separation and the collection of recyclable materials. Furthermore, *"**Collection**"* refers to the act of removing solid waste from the source or from a communal storage point. [*References*: RA 9003, Definition of Terms and Section 20-25]

"***Social Marketing***" is the application of marketing and selling concepts and approaches in the promotion of socially desirable ideas and behaviors.

*"**Solid Waste Management**"* shall refer to the discipline associated with the control of generation, storage, collection, transfer and transport, processing, and disposal of solid wastes in a manner that is in accord with the best principles of public health, economics, engineering, conservation, aesthetics, and other environmental considerations, and that is also responsive to public attitudes.*"**Ecological Solid Waste Management**"* shall refer to the systematic administration of activities which provide for segregation at source, segregated transportation, storage, transfer, processing, treatment, and disposal of solid waste and all other waste management activities which do not harm the environment. [*Reference*: RA 9003, Definition of Terms]

*"**Solid Waste Management Facility**"* shall refer to any resource recovery system or component thereof; any system, program, or facility for resource conservation; any facility

for the collection, source separation, storage, transportation, transfer, processing, treatment, or disposal of solid waste. [*Reference*: RA 9003, Definition of Terms]

*"**Waste Analysis and Characterization Study (WACS)**",* or *"**Waste Characterization**"* as referred to in the IRR of RA 9003, is a methodology used to identify the constituent materials which comprise the municipal solid waste stream within the LGU's jurisdiction. WACS information also includes waste generation rates (weight per capita, or per establishment, per day), sources of waste (residential, commercial, industrial, institutional, etc.), 10-year waste projection data (waste generation, diversion and net residual wastes), and other information crucial in formulating realistic local SWM plans and programs. [*References*: RA 9003, Definition of Terms and Section 19; GIZ-AHT SWM4LGUs WACS Procedural Fact Sheet]

"***Waste Avoidance and Reduction***" is the foundation of waste management hierarchy and is the preferred choice for waste management measures. Its aim is to achieve waste minimization, ergo, reduce the amount of waste entering the waste stream. This is especially pertinent for some waste streams where the recycling, recovery, treatment or disposal of the waste is problematic. "***Waste Minimization***" occurs largely as a result of competitive pressures and economic incentives, and through producer responsibility initiatives implemented by industry on a voluntary basis. While waste minimization is difficult to quantify, some countries associate indicative figures, such as trends in waste generation per capita or per GDP, as a proxy for gauging waste minimization. In the Philippines, RA 9003 defines terms related to this, including *"**Source Reduction**"*, which refers to the reduction of solid waste before it enters the solid waste stream by methods such as product design, materials substitution, materials re-use and packaging restrictions; and *"**Resource Conservation**"*, which is defined as the reduction of the amount of solid waste that are generated or the reduction of overall resource consumption, and utilization of recovered resources.[*References*: National Waste Management Strategy of South Africa; RA 9003, Definition of Terms]

*"**Waste Diversion**"* shall refer to activities which reduce or eliminate the amount of solid wastes from waste disposal facilities. Diversion activities include the processing, composting, recovery and recycling of collected materials from the municipal waste stream. Specifically, RA 9003 defines *"**Re-Use**"* as the process of recovering materials intended for the same or different purpose without the alteration of physical and chemical characteristics; *"**Recycling**"* as the treating of used or waste materials through a process of making them suitable for beneficial use and for other purposes, and includes any process by which solid waste materials are transformed into new products in such a manner that the original products may lose their identity, and which may be used as raw materials for the production of other goods or services; and *"**Resource Recovery**"*, which refers to the collection, extraction or recovery of recyclable materials from the waste stream for the purpose of recycling, generating energy or producing a product suitable for beneficial use.[*References*: RA 9003, Definition of Terms and Section 20, 26-35]

*"**Waste Electronics and Electrical Equipment (WEEE)**"*, "***Electronic Waste***", "***E-Waste***", "***E-Scrap***", or *certain "**Bulky Wastes**" and "**Special Wastes**" (e.g., "**Consumer Electronics**", "**White Goods**"*)referred to in RA 9003, describes loosely discarded, surplus, obsolete, or broken electrical or electronic devices. The categories of WEEE include large household appliances, small household appliances, IT and telecommunications equipment, consumer equipment, lighting equipment, electrical and electronic tools, toys and sports equipment, medical devices, monitoring and control instruments, and automatic dispensers. [*References*: RA 9003 and its IRR, Definition of Terms; WEEE and RoHS European Directives]

*"**Work and Financial Plan (WFP)**",* in Philippine governmental systems, refers to documents prepared by government agencies prior to start of each fiscal year to propose targets as well as its corresponding budget allocations in line with the key result areas identified under the Philippine Medium Term Development Plan. Reviewed and approved by Philippine Congress through the DBM, WFPs basically provide information on the funding program for the incoming year and resources needed based on monthly targets and cash flows, with opportunities for possible mid-year re-programming reviews.

# *Executive Summary*

The Philippine National Solid Waste Management Strategy characterize a medium-term plan (up to 2016) to deal with key issues, needs and problems experienced on the management of solid waste. It shall serve as a road map to achieve an *improved environmental quality for a cleaner and healthier environment.* The strategy provides an avenue for more concrete initiatives to achieve the objectives of the Ecological Solid Waste Management Act.

By 2012, it is hoped that a 50% diversion of solid wastes from waste disposal facilities through reuse, recycling and composting activities and other resource recovery activities have been achieved.

The National Solid Waste Management Strategy is anchored on the National Solid Waste Management Framework adopted in 2004 that was built along the principle dimensions of: (a) scope of waste management activitis, (b) critical actors and partners in implementing the activites, and the (c) means for implementing the swm objectives.

Prior to the identification of the strategic components, a situational analysis was conducted with key stakeholders of SWM. Compliance of local government units and other stakeholders to the Ecological Solid Waste Management is of varying levels. Some were able to comply with certain provisions of the law and others find it difficult given the various reasons which include, among others, the limited resources and technical capability. Hence, a set of possible suitable options (solutions) were then developed that formed part of the National Solid Waste Management Strategy.

The NSWMS consists of eight (8) strategic components that is defined by key initiatives, which are further elaborated through matrices of objectives, indicative actions, justifications, responsible entities, time frame, target groups and resource requirements.

The strategic components are the following:

1. **Bridging Policy Gaps and Harmonizing Policies.** Based on consultative discussion carried out with different stakeholders, there is a need to clarify and address policy gaps in the implementation of RA 9003. Further, there is also a need to harmonize the RA 9003 with other national laws currently being implemented.

2. **Capacity Development, Social Marketing and Advocacy.** The NSWMC and its members as well as the other partners, and the LGUs play important roles in the information and education campaign to effectively raise the awareness of the general public and consequently motivate them to observe waste avoidance and the 3Rs, which are key to achieving the goals of ESWM. As such, these channels of communication, to be able to undertake social marketing, IEC and advocacy campaigns, needs to be capacitated in the different aspects of values formation and SWM functional elements.

3. **Sustainable SWM Financing Mechanisms**. Financing has always been a critical aspect in SWM work, both at national and local levels. It is also an important sustainability indicator. This urgent need to address SWM Financing issues and concerns arose from the unavailability of resources that hinder the effective implementation of the law even as RA 9003 provides the mechanisms for solid waste management financing, incentives, and cost recovery. To support the LGUs financing needs, the NSWMC shall strive to achieve enhanced financing options for LGUs and sustainably financed SWM at the local level.

4. **Creating Economic Opportunities.** The full potential of Recycling (including composting) has always been hindered by the scarcity of market. Appreciation of the available products, the market place, supply and demand, and the players—producers, sellers, buyers—and potential investors of recyclables and recycled (including compost) products are often times inadequate. The full potential of creating economic opportunities from recyclable and recycled products shall be realized if sustainable markets are established for all recyclables and recycled products (including compost) and incentives are available and accessible to investor.

5. **Support for Knowledge Management on Technology, Innovation and Research.** Most LGUs do not have the means to access appropriate technologies on solid waste management and to conduct necessary research studies for a variety of reasons. More than 50% of municipalities in the country are classified as low income communities and are only dependent on Internal Revenue Allotment (IRA) shares and thus do not have the funds. Some of them may have the resources but lack the capacity. Others may have the capacity but have no resources. Still a few others have limitations on both. Moreover, some stakeholders need technical assistance and guidance in accessing suitable SWM technologies.

6. **Organizational Development and Enhancing Inter-agency Collaboration.** There is a need to strengthen the commitment of internal and external stakeholders and increase their capacities to effectively respond to the clients' needs. Today, there is still low level of commitment of internal and external stakeholders resulting in a relatively low compliance despite efforts that have been in place since the law took effect in 2001.

7. **Compliance Monitoring, Enforcement and Recognition**. RA 9003 mandates NSWMC to develop a mechanism to impose sanctions for violations of environmental rules and regulations. Without a mechanism for monitoring and enforcement, sectors that do not comply are not penalized; while those that comply are not recognized. The lack of an institutionalized system could continue to encourage non-compliance, where implementers and concerned sectors could just ignore their mandate. Enforcement provides the 'stick' in the carrot-and-stick policy to motivate implementers to do their work in timely and technically-sound ways. Regular monitoring and evaluation also

improves the management cycle in implementing RA 9003, i.e., through proactive responses.

8. **Cross-Cutting Issues: Good SWM Governance, Caring for Vulnerable Groups, Reducing Disaster and Climate Change Risks.** Also identified are issues that cut across the whole dimension of the implementation of the RA 9003. (a) Acknowledging that Good SWM Governance is a key factor that shall enable stakeholders to sustainably implement SWM plans, it is hoped that the objective of responsible, transparent and accountable government and citizens working together for achieving effective and efficient waste management be accomplish; (b) To protect, uphold and fulfill the rights of vulnerable groups, strategies towards the integration of the informal waste sector in the plans and programs of national and local governments shall be fully implemented; (c) having acknowledged the potential contribution of ecological solid waste management to reducing disaster and climate change risks, strategies that shall climate-proofed SWM systems, programs and infrastructures shall be implemented.

# *Introduction*

> ***"The Philippines is widely acknowledged as having an outstanding endowment of natural resources, which could provide essential ecosystem services to the population. Demands arising from development and utilization activities, population expansion, poor environmental protection, and external factors such as climate change, however, have placed the country's environment and natural resources under grave threat. For the medium-term, an environment that is healthy, ecologically balanced, sustainably productive, climate change resilient, and one that provides for present and future generations of Filipinos is envisioned. This vision will be pursued through an integrated and community-based ecosystems approach to environment and natural resources management, precautionary approach to environment and natural resources, sound environmental impact assessment (EIA) and cost-benefit analysis (CBA). These, then, are all anchored on the principles of shared responsibility, good governance, participation, social and environmental justice, intergenerational space and gender equity, with people at the core of conservation, protection and rehabilitation, and developmental initiatives."***[1]

Consistent with Philippine Agenda 21, the Environment and Natural Resource Sector under the Philippine Development Plan (PDP) for 2011-2016 shall pursue, among others, an *Improved Environmental Quality for a Cleaner and Healthier Environment (Goal 2).* Vital to the improvement of environmental quality is the full implementation of laws and other regulatory measures that includes the Ecological Solid Waste Management Act of 2000 that espouses on the implementation of the 3R concept with focus on reduction of pollution and waste generation.

The Philippine National Solid Waste Management Strategy characterize a medium-term plan (up to 2016) to deal with key issues, needs and problems encountered on the management of solid waste. The strategy provides an avenue for more concrete initiatives to achieve the objectives of the Ecological Solid Waste Management Act. It focuses on an integrated scheme whereby the legal, institutional, financial and enforcement issues are dealt with. It shall serve as a road map to achieve an *improved waste management* wherein a 50% diversion of solid wastes from waste disposal facilities through reuse, recycling and composting activities and other resource recovery activities have been achieved by 2016.

Eight components were identified and envisioned to address the strategic issues and gaps that hinder the smooth implementation of RA 9003 and the National Solid Waste Management Framework that gave emphasis to waste avoidance, source reduction, reuse, recycling and composting and residuals management. These are: (a) Bridging policy gaps and harmonizing

[1] Philippine Development Plan 2011-2016

policies, (b) Capacity development, Social marketing and advocacy, (c) Sustainable financing, (d) Creating economic opportunities, (e) Knowledge management on technologies and innovation, (f) Organizational development and enhancing inter-agency cooperation, (g) Compliance monitoring, enforcement and recognition, (h) Good governance, Caring for vulnerable groups, and Reducing disaster and climate change risks. Each strategic component is defined by key initiatives, which are further elaborated through matrices of objectives, indicative actions, justifications, responsible entities, time frame, target groups and resource requirements.

## *Approach and Methodology*

The National Solid Waste Management Strategy was developed with assistance from the GIZ through the Solid Waste Management for LGUs Project (SWM4LGUs). The member agencies of the National Solid Waste Management Commission in collaboration with a team of consultants, undertook a substantial situational analysis to identify specific problems and related needs as regards to the implementation of the RA 9003. Through a series of workshops and focus group discussions with the key stakeholders of SWM, a set of possible options (solutions) were then developed. Component strategies were then identified based on the solutions selected by the various stakeholders as the most suitable options for the effective implementation of the RA 9003. A nationwide consultation was also conducted to ascertain the perception of the stakeholders on the drafted strategies prior to its finalization.

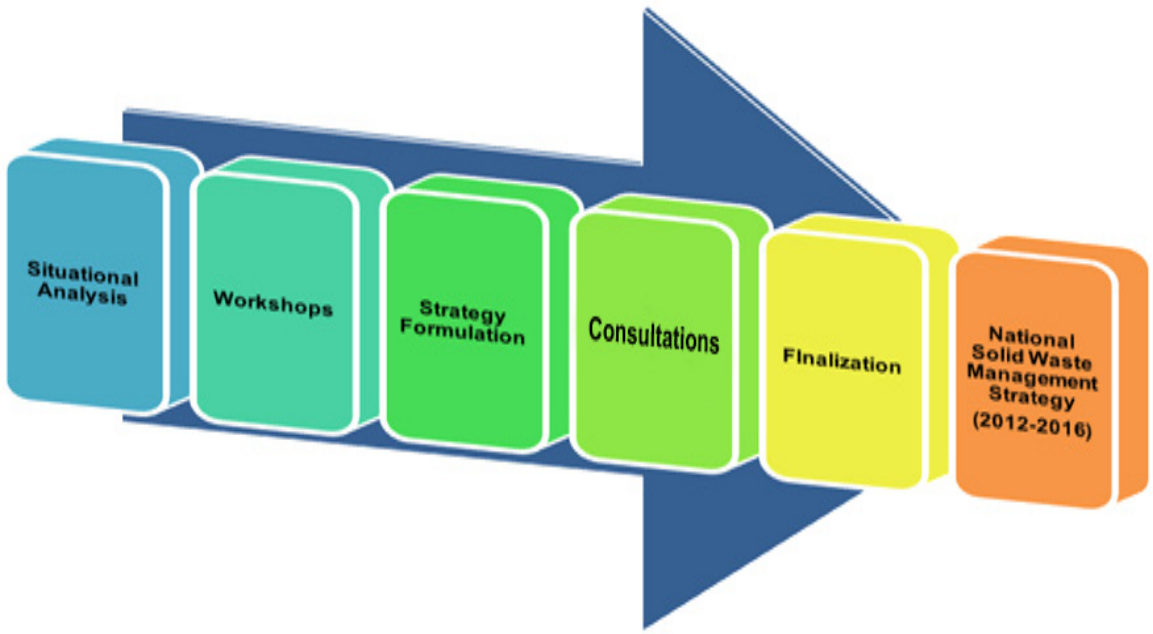


Figure 1. Process Flow on the elaboration of the National Solid Waste Management Strategy.

# *Part I:*

# *Status of National Solid Waste Management in the Philippines*

# *CHAPTER I*
# *Legal Mandate and Institutional Arrangements*

## A. LEGAL MANDATE

Waste management is a global issue intensified by the volume and complexity of domestic and industrial waste discarded by society. Unmanaged solid waste became a perennial problem in some countries. Over the last 12 years (1999 to 2010), the Philippines has endeavored to improve its management and operation of solid waste through several national laws, rules, regulations, orders, and memoranda on environment, including resolutions and ordinances issued by local government units.

### 1. The Ecological Solid Waste Management Act (RA 9003)

On January 26, 2001, then President Gloria Macapagal-Arroyo approved Republic Act 9003 (RA 9003), otherwise known as the Ecological Solid Waste Management Act of 2000, declaring the policy of the government to "adopt a systematic, comprehensive, and ecological solid waste management program" in the country.

The ecological solid waste management (ESWM) policy is based on the management of waste in the following hierarchy:

a) *Source reduction (avoidance) and minimization of waste generated at source*
b) *Reuse, recycling and resource recovery of wastes at the barangay level*
c) *Efficient collection, proper transfer, and transport of wastes by city/municipality*
d) *Efficient management of residuals and of final disposal sites and/or any other related technologies for the destruction/reuse of residuals* [1]

Provided in RA 9003 and its IRR are mandates and schedules of implementation to be undertaken by provincial, city/municipal, and barangay governments within their jurisdiction. The most important of these include:

a) *Creation of a Solid Waste Management (SWM) Board (city/municipal and provincial levels)*

[1] Congress of the Philippines, *Republic Act 9003 and its Implementing Rules and Regulations (* Republic of the Philippines, Metro Manila, 11th Congress, 3rd Regular Session), Rule VIII, Section 1.d.p89

b) *Creation of a SWM Committee (barangay level)*
c) *Submission of a 10-year SWM Plan (city/municipal levels),*
d) *Establishment of Materials Recovery Facilities (MRF) per barangay or cluster of barangays and city/municipal centralized MRF*
e) *Closure of open dumpsites and conversion into controlled dumpsites by 2004 (city/municipal levels)*
f) *Banning of controlled dumpsites by 2006 (city/municipal levels)*

The ESWM policy is supported by relevant laws enacted at the national level that affect the implementation of RA 9003. These are summarized as follows:

(1) **Republic Act No. 6969 (Toxic Substances and Hazardous and Nuclear Waste Act of 1990).** The act calls for the regulation of and restriction on the importation, manufacture, processing, sale, distribution, use and disposal of chemical substances and mixtures that pose risk and/or injury to health and to the natural environment. It prohibits the entry, transport and disposal of hazardous and nuclear wastes into the Philippine territory. It also mandates to provide advanced studies and research on toxic chemicals.

(2) **Republic Act No. 7160 (Local Government Code (LGC) of 1991).** The act devolved certain powers to the local governments units, including enforcement of laws and cleanliness and sanitation, solid waste management, and other environmental matters.

(3) **Republic Act No. 8749 (Clean Air Act of 1999).** The act directs all government agencies to adopt the integrated air quality framework as a blueprint for compliance. Among its salient provisions are the "polluters must pay" principle, and the prohibition of the use of the incineration method, which is defined as the burning of municipal, biomedical and hazardous waste or the process, which emits poisonous and toxic fumes. The act further mandates LGUs to promote, encourage, and implement segregation, recycling and composting within their jurisdiction. It also required the phasing out of incinerators by July 2003.

(4) **Republic Act No. 9275 (Philippine Clean Water Act of 2004).** The act provides for the protection, preservation, revival of quality of fresh, brackish and marine waters of the country to pursue economic growth.

(5) **Republic Act No. 9512 (Environmental Awareness and Education Act of 2008)**. The act promotes environmental awareness through environmental education. It integrates environmental education in the school curricula at all levels, public or private, barangay day care and pre-school, and non-formal, vocational, and indigenous learning.

(6) **Republic Act 9513 ( Renewable Energy Act of 2008).** The act promotes the development, utilization and commercialization of renewable energy and for other purposes. RA 9513 was passed by the 14$^{th}$ Congress of the Philippines and approved

by the President on December 16, 2008.

a. The act declared the policy of the government to:
    i. accelerate the exploration and development of renewable resources i.e. solar, geothermal, ocean, wind, and biomass, including hybrid systems for energy self-reliance, reduction of dependence on fossil fuel and bring down cost of fuel;
    ii. increase utilization of renewable energy by institutionalizing national as well as local capabilities and provide both fiscal and non-fiscal incentives on the promotion of efficient and cost effective energy systems;
    iii. encourage the use of renewable energy technologies to reduce air pollution, to protect the environment and health; and
    iv. establish the necessary infrastructure to implement the provisions of the law.

b. Section 30 of RA 9513 provides for the use of "waste to energy" technology subject to requirements of RAs 9003 and 8749 (Clean Air Act). Specifically, waste to energy technology refers to "systems which convert biodegradable material such as but not limited to animal manure or agricultural waste, into useful energy processes such as: anaerobic digestion, fermentation, and gasification, among others, subject to the provisions of the Clean Air Act of 1999 and the Ecological Solid Waste Management Act of 2000".

(7) **Republic Act No. 9710 (Magna Carta of Women or MCW).** Signed on August 14, 2009, the MCW is a comprehensive women's human rights law that seeks to eliminate discrimination against women by recognizing, protecting, fulfilling and promoting the rights of Filipino women, especially those in the marginalized sectors. The provisions of the act specify the equal opportunity of women in relations to work compensation and the working conditions/environment. This act may apply to women involved in the recycling and composting activities. MCW Implementing Rules and Regulations (IRR), which became effective on July 10, 2010, was published in two newspapers, in Malaya on June 23, 2010 and in Manila Bulletin on June 25, 2010.

(8) **Republic Act (RA) 9729 (Climate Change Act of 2009).** Approved on October 23, 2009, the act declares as a Philippine policy the adoption of the ultimate objective of the UNFCC convention, which is the stabilization of greenhouse gas concentration in the atmosphere at a level that would prevent dangerous anthropogenic interference with the climate system.
The act establishes the Climate Change Commission as an independent and autonomous body, which is given the same status as a national government agency. The Climate Change Commission is attached to the Office of the President. The Commission will be composed of three commissioners, 23 advisory board members and chaired by the President of the Philippines.

a. Among the Commission's powers and functions are:
    i. Mainstreaming of climate change, in synergy with disaster risk reduction, into the national and local development plans and programs
    ii. Coordination and synchronization of climate change with national government agencies
    iii. Formulation of framework strategy on climate change
    iv. Policy coordination to ensure attainment of goals set in the framework strategy
    v. Recommend legislation, policies, strategies, programs on appropriations for climate change adaptation and mitigation and other related activities
    vi. Promote and provide technical and financial support to local research and development programs and projects in vulnerable communities
    vii. Oversee the dissemination of information on climate change, local vulnerabilities and risks, relevant laws and protocols and adaptations and mitigation measures.
b. The act further establishes the Climate Change Office, which shall assist the Commission. The Climate Change Office will be headed by a Vice-Chairperson of the Climate Change Commission, who shall act as the Executive Director.

(9) **Republic Act No. 10068 (Organic Agriculture Act of 2010).** The act establishes a comprehensive organic farming program that includes incentives for farmers engaged in the production of agricultural crops free from harmful chemical pesticides and fertilizer. The new law, signed on April 6, 2010 also created a National Organic Agricultural Board (NOAB) to provide policy direction towards the promotion of organic farming in a bid to promote a healthier citizenry and an environment-friendly atmosphere.

(10) **Presidential Decree No. 856 (Code of Sanitation of the Philippines).** The decree prescribes sanitation requirements for hospitals, markets, ports, airports, vessels, aircraft, food establishments, buildings, and other establishments. Refuse collection and disposal system in cities and municipalities are described in Chapter XVIII of the law.

(11) **Presidential Decree No. 1151 (Philippine Environment Policy).** The decree directs all national government agencies and their instrumentalities, government and private corporations, entities, and firms to accomplish and submit Environmental Impact Statements (EIS) for every action, project or undertaking that significantly affects the quality of the environment.

(12) **Presidential Decree No. 1586 (Environmental Impact Assessment Law).** Approved on June 11, 1978, the law establishes and institutionalizes an environmental impact system where projects to be undertaken would be reconciled with the requirements of environmental quality. This requires proponents of critical projects and projects located in critical areas to secure an environmental compliance

certificate (ECC) from the President or his duly authorized representative. The inclusion of the construction of Sanitary Landfills (SLF) as a critical project was done later.

(13) **Presidential Decree No. 1160.** The law vests authority in Barangay Captains (Barangay Chairmen) to enforce pollution and environmental control laws. It also deputizes the Barangay Councilman and Barangay Zone Chairman as peace officers.

(14) **Executive Order (EO) No. 774.** Issued on December 26, 2008 the order calls for the reorganization of the Presidential Task Force on Climate Change (PTFCC), headed by then President Gloria Macapagal-Arroyo herself, with all cabinet members as members of the Task Force. EO 774 created 13 Task Groups for

a. watershed protection (DENR),
b. rainwater conservation (DPWH),
c. water recycling (NWRO),
d. atmospheric activities (DOST),
e. fossil fuel (DOTC),
f. information (PIA),
g. fisheries (DA),
h. agriculture (DA),
i. education (DepEd),
j. renewable energy (DOE),
k. CPR economics (NEDA),
l. outdoors/rooftop structures (DPWH),
m. and solid waste management (DENR)

The EO also established the Secretariat headed by the Presidential Adviser on Climate Change (PACC), which shall oversee the execution and implementation of EO 774 and report directly to the President.

(15) **Executive Order (EO) No. 785.** Issued on February 26, 2009, the EO mandates the Presidential Task Force on Climate Change to develop the National Climate Change Framework, directing the Task Group on Information to develop and coordinate a national information, education and communications program, and directing the Presidential Adviser on Climate Change to review government climate change programs and official development assistance projects.

### 2. The Philippine Disaster Risk Reduction and Management Act of 2010

The enactment of the Philippine Disaster Risk Reduction Management (DRRM) Law assists the climate change program. The law protects the people's constitutional right to life and property. Property is noted as the determinant of vulnerability, and the protection of which requires strengthening the capacity of local partners and the nation's infrastructure while building local resilience to impacts of climate change, Capacity is the "combination of all strengths and resources available within a

community, society or organization that can reduce the level of risk, or effects of a disaster (DRRM Law, Sec. 3b)."

The DRRM Law moves towards structuring universal standards of humanitarian assistance, such as standard operating procedures on deployment of rapid assessment teams, information sharing and communication systems, along with involvement and participation by all stakeholders. In order for this to be effective, the DRRM Law is coupled with a program within the government's development plan which stipulates good governance, transparency and accountability. [2]

To establish trust and communication between parties both horizontally and vertically, it allows for the decentralization of power, resources and responsibilities as well as enlarges the scope for developing "policies and plans and the implementation of actions and measures (DRRM Law, Section 4)."

One policy in place thus far is the establishment of training institutes for preparedness, which is already undertaken by certain civil society groups such as the Citizens Disaster Response Center (CDRC). This includes education on disaster risk reduction in schools, Sangguniang Kabataan Programs, and for public sector employees. Another step which will be taken for risk reduction and management is the "accreditation, mobilization, and protection of disaster volunteers and National Service Reserve Corps, Civil Service Organizations and the Private Sector (DRRM Law, Sec. 13)."

Also, according to the DRRM Law, in a state of calamity, the government will implement a price ceiling on basic commodities/necessities in order to ensure affordability. Thirty percent of the National Disaster Risks Reduction Management (NDRRM) Fund is set aside for immediate relief and assistance in the state of calamity.

Thus, in relation to Climate Change program, the DRRM Law supports the 3 R's of SWM in promoting to consumers avoidance of using the disposable and unnecessary products in order to avoid or reduce the solid wastes generated by households, commercials, institutional, industries and all levels of stakeholders.

The enactment and promulgation of some national laws stated above were based on international protocols and conventions, such as the Kyoto Protocol, the Basel Convention, and the Stockholm Convention.

### 3. Kyoto Protocol

The Kyoto Protocol was a treaty adopted on December 11, 1997 and entered into force on February 16, 2005. The Philippines was one of the countries that signed said treaty.

[2] http//www.disasterriskreductionmanagement.yahoo.com.ph

Under the treaty, countries must meet their targets primarily through national measures. However, the Kyoto Protocol offers them an additional means of meeting their targets by way of three market-based mechanisms. The Climate Change Commission is the primary agency responsible in implementing these mechanisms.
The Kyoto mechanisms are:

- Emissions trading – known as “the carbon market"
- Clean development mechanism (CDM)
- Joint implementation (JI)

**4. Basel Convention**

The Basel Convention during its first decade (1989-1999) was principally devoted to setting up a framework for controlling the “transboundary” movements of hazardous wastes, that is, the movement of hazardous wastes across international frontiers. [3]
A central goal of the Basel Convention is Environmentally Sound Management (ESM). The aim of ESM is to protect human health and the environment by minimizing hazardous waste production whenever possible. ESM means addressing the issue through an “integrated life-cycle approach,” which involves strong controls from the generation of a hazardous waste to its storage, transport, treatment, reuse, recycling, recovery and final disposal.

Each country that is a party to the convention is required to report information on the generation and movement of hazardous wastes.

Developing countries that are party to the Basel Convention are prohibited from accepting hazardous waste, including computer monitors and television sets, without proper documentation and tracking. However, it is common that customs officials in importing countries simply ignore the rules in place and accept the material.

**5. Stockholm Convention on Persistent Organic Pollutants**

The Stockholm Convention on Persistent Organic Pollutants is an international environmental treaty signed in 2001 and took effect in May 2004. It aims to eliminate or restrict the production and use of persistent organic pollutants (POPs).

In 1995, the Governing Council of the United Nations Environment Programme (UNEP) called for global action to be taken on POPs, which it defined as "chemical substances that persist in the environment, bio-accumulate through the food web, and pose a risk of causing adverse effects to human health and the environment." [4]

[3] http//www.baselconvention.yahoo.com.

[4] http//www.stockholmconvention.yahoo.com

As of January 2011, there were 172 parties to the Convention.

**6. Penal Provisions**

In addition, there are penal provisions which impose administrative sanctions on local officials for violations of RA 9003. Subsequent implementing department orders, memoranda, and circulars were issued for the effective implementation of RA 9003, including the following:

(1) ***DENR Administrative Order (DAO) No. 34, Series of 2001*** adopts and promulgates the implementing rules and regulations (IRR) of RA 9003. It prescribes details of, for example:

a) the creation of the provincial, municipal and city SWM Boards, and of the Barangay SWM Committees;
b) the elaboration of the 10-year SWM Plan, with Waste Characterization Study (WACS) and projected waste generation, among others;
c) the guidelines on the design, construction, and operational requirements of a sanitary landfill; and
d) the establishment of MRF in every barangay or cluster of barangays.

(2) ***DENR Administrative Order (DAO) No. 9, Series of 2006*** refers to guidelines to be used for the proper closure and rehabilitation of open dumpsites (ODs) and controlled dumpsites facilities (CDFs), in compliance with Section 37 of RA 9003.

(3) ***DENR Administrative Order (DAO) No. 10, Series of 2006*** refers to guidelines classifying final disposal sites into four categories based on net residual waste generation, after taking into account the waste diverted through composting, recycling and recovery efforts and taking into consideration the environmental, financial, and socio-economic conditions of the LGUs, including its hydro-geological dimensions. These guidelines comply with Sections 37, 40, 41 and 42 of RA 9003 and DAO No. 2001- 34.

(4) ***DENR Administrative Order (DAO) No. 29 Series of 1992*** refers to Implementing Rules and Regulations of Republic Act 6969. It was signed on June of 1992 and provides a general regulatory framework that industry must meet to reach compliance.

(5) ***DENR Administrative Order No. 28, Series of 1994*** refers to a set of Interim Guidelines for the Importation of Recyclable Materials containing Hazardous Substances. It refers to Electronic Assemblies and Scrap which states that all residuals of recycled material which contain hazardous substances without any acceptable disposal methods in the Philippines must be shipped back. This includes assemblies containing printed circuit boards and electronic components containing hazardous substances such as T.V., VCR, stereo and other devices.

(6) ***DENR Administrative Order No. 81, Series of 2000*** refers to Implementing Rules and Regulations of RA 8749 for medical and bio-medical wastes.

(7) ***DENR Administrative Order No. 30 Series of 2003*** is the IRR of Philippine Environmental Impact Statement (EIS) System, which aims at rationalizing and streamlining the EIS System to increase its effectiveness as a project planning and management tool. DAO 2003-30 indicates, for example, the characteristics of projects that require an ECC within the scope of the EIA system such as:

(a) Size of the project
(b) Cumulative nature of impacts vis-à-vis other projects
(c) Use of natural resources
(d) Generation of waste and environment-related nuisance
(e) Environment-related hazards and risk of accidents

(8) ***DENR Administrative Order No. 6 Series of 2010*** refers to the Guidelines on the Use of Alternative Fuels and Raw Materials for Cement Kilns.

(9) ***DENR Memorandum Circular No. 05, Series of 2002*** refers to the Clarification on the Incinerator Ban in the Philippine Clean Air Act of 1999 (Republic Act No. 8749)

(10) ***Department Memorandum Circular No. 6, Series of 2006*** pertains to the adoption of Initial Environmental Examination (IEE) checklist and report on the processing of Environmental Compliance Certificate (ECC) of categorized final disposal facilities or sanitary landfills.

(11) ***DENR-DOH Joint Administrative Order No. 2, Series of 2005*** refers to the policies and guidelines on effective and proper handling, collection, transport, treatment, storage, and disposal of health care wastes.

(12) ***DENR-DOST Joint Administrative Order No. 1 Series of 2006*** adopts the Environmental Technology Verification Protocol, a coordinated effort of DENR and DOST where claimed technologies of project proponents are reviewed, evaluated and verified by DOST from scientific and technological points of view of new and modified technology before they are utilized by the LGUs and private entities.

(13) ***DENR–DILG Joint Memorandum Circular No. 01, Series of 2006*** refers to the Nationwide Search for Model Barangay for Ecowaste Management System 2006-2007, an annual program implemented among the barangays all over the country depicting SWM initiatives and various activities related to waste reduction, reuse and recycling, and clean and green programs.

(14) ***DENR-DILG Joint Memorandum Circular No. 02 Series of 2006*** refers to the amendment of Joint Memorandum Circular 06-01, Nationwide Search for Model Barangay, a joint effort to help the country's 45,000 barangays comply with RA 9003. The program was launched in October 2003.

(15) ***Joint Memorandum Circular No. 1, Series of 2007*** of the Department of Interior and Local Government (DILG), National Economic and Development Authority (NEDA), Department of Budget and Management (DBM), and Department of Finance (DOF) provides guidelines on the harmonization and synchronization of local planning including Comprehensive Development Plans (CDP), Local Development Investment Programs (LDIPs), Annual Investment Programs (AIPs), and Annual and Supplemental Budgets. Its purpose is to strengthen the interface between local government units and national government agencies (NGAs), and to clarify and spell out responsibilities among the departments involved in this joint memorandum circular.

### 7. Resolutions of the National Solid Waste Management Commission

Table 1 shows the approved NSWMC Resolutions which strongly provide support in the implementation of the ESWM policy:

**Table I. List of Approved NSWMC Resolutions**

| Resolution No. | NSWMC Resolution Title | Remarks |
|---|---|---|
| **8** | Guidelines on the Review and approval of the 10 year SWM Plans for LGUs | Approved by the Commission members, series of 2006 |
| **9** | Creation of a Technical Working Committee (TWC) for Phasing Out of Non acceptable products and packaging materials | Approved by the Commission members, series of 2006 |
| **10** | Adoption of "LALA" as the Filipino term for Sanitary Landfill. | Approved by the Commission members on January 26, 2007 |
| **13** | Adoption and endorsement of the Cost Sharing Framework for SWM Services to NEDA-INFRACOM and other appropriate government agency as deemed necessary | Approved January 30, 2008 by the Commission members |
| **15** | Resolution Creating a National Solid Waste Management Commission Technical Working Group (NSWMC-TWG) | Approved by Sec Lito L. Atienza effective 29th January 2009. |
| **16** | Resolution to Include Department of Education (DEP-ED) as Member of the Technical Working Group (TWG) of the National Solid Waste Management Commission | Approved by Sec Lito L. Atienza effective 23rd January 2009. |
| **17** | Resolution Adopting the 3-Strike Policy | Approved by Sec Lito L. Atienza |
| **18** | Resolution Adopting the Japan International Cooperation Agency (JICA) Recycling Industry Development Study | Approved by Sec Lito L. Atienza effective 29th June, 2009 |

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|---|---|---|
| **19** | Resolution Adopting the Guidelines on the Phasing Out of Non Environmentally Acceptable (NEA) Products and Packaging Materials | Approved by Sec Lito L. Atienza effective 29th June, 2009 |
| **24** | Resolution for Department of Interior and Local Government (DILG) to issue a Memorandum to all Barangays Requesting for Status/Data regarding the Establishment of Materials Recovery Facilities (MRFs) | Approved by Sec Lito L. Atienza on June 25, 2009 |
| **26** | Resolution Adopting Eco-park as an Option to Sanitary Landfill | Approved by Sec Lito L. Atienza on June 25, 2009 |
| **27** | Resolution Allowing the Conduct of Provincial Ecological Solid Waste Management Summit | Approved by Sec Lito L. Atienza on June 25, 2009 |
| **34** | Resolution Affirming the NSWMC Secretariat to Perforn the Functions of the National Ecology Center (NEC) | Approved by Sec Lito L. Atienza on September 30, 2009 |
| **35** | Resolution Adopting the Guidelines on Deputation of Solid Waste Management Officers | Approved by Sec Lito L. Atienza on October 09, 2009 |
| **36** | Resolution Adopting the Criteria for Accreditation of an Individual and Individual Member of an Organization as Solid Waste Management Experts | Approved by Sec Lito L. Atienza on October 09, 2009 |
| **37** | Resolution Authorizing the Philippine Information Agency (PIA) to Prepare Communication Plans for NSWMC | Approved by Sec Lito L. Atienza on October 09, 2009 |
| **39** | Resolution Amending NSWMC Resolution8 re: Guidelines on the Review and Approval of the 10-yr SWM Plans | Approved by Sec Lito L. Atienza effective October 09, 2009 |
| **40** | Resolution to Adopt the Guidelines for the Campaign of Basura Free Elections 2010 | Approved by Sec Eleazar P. Quinto effective February 10, 2010 |
| **41** | Resolution Approving the 10 year Solid Waste Management Plans of Various LocalGovernment Units (LGUs) | Approved by Sec Horacio C. Ramos effective March 04, 2010 |
| **47** | Resolution Adopting the National Framework Plan of the Informal Sector in Solid Waste Management | Approved by Sec Horacio C. Ramos effective May 20, 2010 |
| **48** | Resolution Creating the Multi Sectoral Committee for Capacity Development of the Informal Sector | Approved by Sec Horacio C. Ramos effective May 20, 2010 |
| **49** | Resolution for the NSWMC Members to approve the 10 yr SWM Plans of LGUs | Approved by Sec Ramon J.P. Paje effective October 22, 2010 |

| | | |
|---|---|---|
| **50** | Adoption of the Guidebooks on Formulation of SWMP, Safe Closure of Disposal Sites, Solid Wastes Disposal Design Operation and Management | Approved by Sec Ramon J.P. Paje effective October 22, 2010 |
| **51** | Resolution Adopting the National Ecology Center (NEC) and Regional Ecology Centers (RECS) Operational Guidelines | Approved by Sec Ramon J.P. Paje effective October 22 |
| **52** | Resolution Adopting Prototype City/Municipal Ordinance Regulating the Establishment and Operation of Junk Shops & Provide Corresponding Penalties | Approved by Sec Ramon J.P. Paje effective October 22 |
| **53** | Granting Authority to the EMB Director to Issue Notice to Sue to Non- Complying LGUs to Section 37 of RA 9003 | Approved by Sec Ramon J.P. Paje effective October 22 |

Other approved NSWMC resolutions are not included in the list in Table 1 since said resolutions were undertaken for a particular locality and to recognize the contributions made by members of the NSWMC during their terms of services.

The complete list of NSWMC Resolutions (CY 2000-2010) can be downloaded at http.www.emb.gov.ph/nswmc and at the Office of National Solid Waste Management Commission Secretariat located at 2nd Flr, HRDS Bldg., DENR Compound, Visayas Ave., Quezon City.

**Table II. List of Resolutions for Signature by the NSWMC Chairman**

| NSWMC Proposed Resolution Titles | Remarks |
|---|---|
| 1.Resolution to Adopt the Guidelines on Segregation at Source, Segregated Collection and to Provide Penalties for Violations thereof. | Approved by NSWMC members; for signature of NSWMC Chairman |
| 2. Resolution to Adopt Full Implementation and Operationalization of National Ecology Center (NEC) | Approved by NSWMC members; for signature of NSWMC Chairman |
| 3.Resolution for the Banning of Thin Film Single Use Plastic Bags | For amendment of NSWMC- NEAP TWC,TWG members |
| 4.Resolution Adopting the Extended Producers /Products Responsibility (EPR) Program | For amendment of NSWMC-TWG members |
| 5.Resolution Allowing the Use of Patented Steam Reduction Technology as an Alternative Method for Ecological Solid Waste Management | For amendment of NSWMC-TWG members |

**NSWM Framework**

Consistent with the provision of Section 7 of RA 9003, the National Solid Waste Management (NSWM) Framework was prepared in 2004. The framework provides a comprehensive but practical guide for LGUs and other sectors concerned involved in the implementation, in part or in whole, of RA 9003 and its IRR.

In terms of the policy/legal and political aspects, the NSWM Framework emphasizes waste reuse, recycling, and recovery as the preferred management option. Recent development includes waste avoidance as additional option. Avoidance is considered the highest level of reduction of wastes. The framework also defines the national agencies, LGUs, and private sector as key actors in the activities.

However, one sector not mentioned in the framework, but is a great contributor to the implementation of the 3Rs, is the so-called Informal Sector. After the closure of open dumps and controlled disposal facilities, issues regarding the absence of livelihood of some wastepickers and itinerant buyers added to the problems being faced by cities and municipalities. To address the issues, the NSWMC developed and adopted the NSWM Framework for Informal Waste Sector.

Except for the inclusion of a representative from the junkshop in the barangay SWM committee, the informal waste sector did not get specific mention in the provisions of the law

**Creation of a Technical Working Group.** Members of the NSWMC through its Secretariat acted on issues related to the implementation of RA 9003 by creating a Technical Working Group (TWG). The members of the NSWMC-TWG are composed of representatives from the 14 national government agencies (NGA), one representative from a non-government organization (NGO), one representative from the recycling sector, one representative from the manufacturing sector, and one representative from the Department of Education.

The NSWMC-TWG conducts regular meeting once a month as well as emergency meetings when issue/s need to be resolved through resolutions, guidelines, memoranda and administrative orders that require a nationwide implementation.

The NSWMC-TWG also acts, reviews, amends, and revises resolutions and guidelines to meet current trends in SWM practices.

## B. INSTITUTIONAL ARRANGEMENTS

### 1. National Level

a) **The National Solid Waste Management Commission (NSWMC)**

The principal actor in the implementation of RA 9003 is the NSWMC. Under Section 4 of RA 9003, the NSWMC was established with 14 members from the government sector and three members from the private sector, who have different mandates, roles, and responsibilities.

The members of the NSWMC are the following:

(1). Department of Environment and Natural Resources (DENR),
(2). Department of Health (DOH),
(3). Department of Agriculture(DA),
(4). Metro Manila Development Authority (MMDA),
(5). Department of Science and Technology (DOST),
(6). Department of Interior and Local Government (DILG),
(7). Department of Public Works and Highways (DPWH),
(8). Department of Trade and Industry (DTI),
(9). Technical Education and Skills Development Authority (TESDA),
(10). Philippine Information Authority (PIA),
(11). League of Cities in the Philippines (LCP),
(12). League of Municipalities in the Philippines (LMP),
(13). League of Provinces in the Philippines (LPP),
(14). Liga ng Barangay (LnB),
(15). Non Government Organization (NGO),
(16). Recycling Industry,
(17). Manufacturing and Packaging Industry.

The following are the major functions and responsibilities of the NSWMC:

(a) Prepare the National Solid Waste Management Framework
(b) Approve local SWM plans in accordance with RA 9003 rules and regulations
(c) Review and monitor the implementation of local SWM plans
(d) Coordinate the operation of local SWM boards in the LGUs
(e) Develop and implement a program to assist LGUs in the identification of markets that are diverted from disposal facilities through the 3Rs

(f) Manage the SWM Fund
(g) Develop and prescribe procedures for the issuance of Permits and clearance
(h) Formulate the necessary education promotion of IEC campaign.
(i) Formulate and update a list NEAP.
(j) Encourage private sector initiatives, community participation and investments in resource recovery-based livelihood programs for local communities.

The specific and distinct roles of each member of the NSWMC are presented below:

(1). ***Department of Environment and Natural Resources (DENR)*** - The DENR is the lead government agency responsible for the implementation and enforcement of RA 9003 through the DENR Secretary who chairs the NSWMC. Among the DENR's roles and responsibilities are the provision of a Secretariat, establishment of methods and parameters to measure waste collection and disposal, issuance of rules and regulations to implement the Act, and issuance of environmental compliance certificates (ECC).

(2). ***Department of Interior Local Government (DILG)*** – The DILG, being the agency that administratively supervises of all government units (LGUs) in the country, is a regular member of the NSWMC. LGUs play vital roles in the implementation of the Act. Together with some national agencies, the DILG has coordinating functions on matters that include inventory of existing waste disposal facilities within six months after approval of the Act (with DENR and DOH); publishing a study of existing markets for processing and purchasing recyclable materials within six months after the approval of the Act (with DTI and DENR); establishment of solid waste management boards (DENR); preparation of SWM plans for the LGUs (NSWMC, DENR and NEDA); enforcement of the compliance on prohibited acts and penalties (PNP and DND); and formulation of staged compliance against the use of open dumpsites (DENR and NSWMC).

(3). ***Department of Science of Technology (DOST)*** – The DOST is the country's science and technology body in-charge. It provides central direction and leadership, coordinates all scientific and technological activities, and formulates policies to support national development. It provides verification of claimed processes and technologies to be adopted or utilized in SWM.

(4). ***Department of Public Works and Highways (DPWH)*** – The DPWH is an infrastructure agency which deals with planning, design, construction, and maintenance of roads, bridges, flood control systems, water resource structures, and other public works. The DPWH's participation in the NSWMC is delegated to the Undersecretary for Operation supported by technical

personnel. While the DPWH does not have a specific role in the NSWMC, it gives professional advice on engineering matters referred to it. It is also expected to play a vital role in the maintenance of drainage, canals, and flood control systems, which are often clogged and silted due to illegal disposal of solid waste.

(5). ***Department of Health (DOH)*** – The role of the DOH is to regulate and formulate policies and to provide technical expertise to LGUs for the devolved functions of the DOH. The Environmental and Occupational Health Office of the DOH is responsible for preparing the Health Care Waste Management Manual (HCWMM), which is currently used by hospitals, clinics, laboratories, and other health institutions. The manual provides for an effective and proper handling, collection, transport, treatment, storage, and disposal of health care wastes, which is also a concern under the Act. The HCWMM was revised in 2001, mainly to reconcile it with the two new laws namely, the Philippine Clean Air Act of 1999 and RA 9003.

(6). ***Department of Trade and Industry (DTI)*** – The DTI is the lead government agency that addresses matters of businesses and consumers. Its functions as per RA 9003 are:

(i) to elaborate an inventory of the existing markets for processing and purchasing of recyclable materials and the potential steps necessary to expand these markets
(ii) to formulate and implement a coding system for packaging materials and products to facilitate recycling and reuse
(iii) to prepare a list of non-environmentally acceptable products (NEAP)
(iv) to establish procedures, standards and strategies to market recyclable materials and develop the local market for recycled goods
(v) to develop fiscal incentives consistent with the provisions of E.O. 226 or the Omnibus Investments Code of 1987

Under Rule XII, Section 3 of the RA 9003 IRR, the DTI is responsible for conducting a study for product standards for recyclable and recycled materials in accordance with both local and international existing standards; and shall consult affected industries and other concerned agencies.

The Board of Investment (BOI) is one of the 14 attached agencies of DTI whose primary function is to promote investment in the Philippines, including investments in solid waste management by providing incentives for those who would like to engage in projects relating to SWM. Under Section 45 of RA 9003, BOI shall approve the importation of SWM equipment, machinerY, vehicles, and spare parts.

(7). ***Department of Agriculture (DA)*** – The roles and responsibilities of the DA as per RA 9003 are to publish an inventory of existing markets and demands for compost within six months after the effectivity of the Act; and assist compost producers to ensure that compost products conform with the standards of organic fertilizers.

(8). ***League of Provinces of the Philippines (LPP)*** – the LPP was established on May 25, 1988 and institutionalized when the Local Government Code was enacted in 1991. It acts as a forum to articulate issues that concern its members. To date, LPP has 80 members, which actively participate in implementing the Act, with the creation of their respective Provincial SWM Board.

(9). ***League of Cities of the Philippines (LCP)*** – In 1988, the League of City Mayors was established as an association of city mayors, and in 1991, it was institutionalized as the League of Cities of the Philippines under the Local Government Code of 1991 and evolved as administrative service to policy making bodies and technical service support to its members, now numbering to **122** cities (as of March 28, 2011). The implementation and enforcement of the relevant provisions of RA 9003 rests with the LGUs.

(10). ***League of Municipalities of the Philippines (LMP)*** – The LMP was created by virtue of the Local Government Code to provide services and implement local government initiatives with the assistance of its stakeholders in support of governance and socio-economic development to its constituencies. The LMP has a membership base of 1,494 municipal mayors from all over country. The LMP has a national directorate composed of chapter presidents elected by the mayors from each province.

(a) Under Rule XXI, Section 3 of the IRR, the DILG and its leagues, in coordination with NEC, shall ensure active education and public information on waste management down to the barangay level.

(b) As part of the mandate to implement RA 9003, the LMP, with financial support from EMB and NSWMC, initiated SWM orientation programs to LGUs and other stakeholders such as the ZERO BASURA CARAVAN and Orientation to Newly Elected Mayor (ONE-M). Also, the Mayors Development Center conducts capability building programs for all interested LGUs.

(11). ***Liga ng mga Barangay sa Pilipinas (LnB)-*** The Liga ng mga Barangay is an organization composed of barangay chairmen from all over the country. The barangay, numbering 42,008 to date, is the lowest political unit. Its chairman and councilors are elected by the residents of the community. Its role in implementing the Act is very important as provided for in Section 10 of RA 9003, which states that “segregation and collection of solid waste shall be

conducted at the barangay level specifically for biodegradable, compostable and reusable waste." Furthermore, Section 32 mandates the establishment of MRF in every barangay or cluster of barangays. In accordance with Rule VI, Section 4 of the IRR, the LnB is tasked with assessing and determining barangays that require assistance from their respective LGUs and subsequently informing their respective Local SWM Boards of the findings.

(12). ***Technical Education and Skills Development Authority (TESDA)*** – The principal function of the TESDA is to formulate manpower and skills development plans, set appropriate standards and test, coordinate and monitor manpower policies and programs, provide policy directions and guidelines for resource allocations for the technical-vocational institutions in both public and private sectors. With the passage of RA 9003, its tasks are to conduct continuing education on SWM and, in cooperation with the Department of Education (DepEd) and the Commission on Higher Education (CHED), incorporate SWM systems at all levels, and involve school administrators, and teaching and non-teaching staff in SWM activities.

(13). ***Philippine Information Agency (PIA)*** – The PIA is under the Office of the Press Secretary who reports directly to the President on matters of information dissemination. The PIA's involvement in the NSWMC is not clearly defined in RA 9003, but its national mandate is geared towards communication research and IEC design.

Under Part VI Rule XXI, Section 3 of the IRR of RA 9003, the PIA, together with Kapisanan ng mga Brodkaster ng Pilipinas (KBP), the National Press Club, the Philippines Press Institute, and the private sector (particularly the entertainment and advertising industries) shall allocate regular air time and print spaces on waste management matters, in television, radio, broadsheets, outdoor signages, other telecommunications, information technologies, and non-traditional media channels. The PIA assists the NSWMC, EMB-DENR, and NEC on the design and implementation of SWM related activities.

(14). ***Metropolitan Manila Development Authority (MMDA)*** – The Chairman of MMDA heads the Metro Manila SWM Board, which is composed of 16 mayors of the component cities and one municipality, an NGO, a representative from the recycling industry, and a representative of the manufacturing industry. Its mandate includes the formulation and implementation of policies, standards, programs and projects for proper sanitation waste disposal. It also involves the establishment ans operation of sanitary landfill and related facilities and the implementation of other alternative programs intended to reduce, reuse and recycle solid waste.

(15). ***Representative from Non-government Organization (NGO)*** – The primary purpose of the participation of the NGO in the NSWMC is to promote

recycling and protect the quality of air and water. As of January 2006, the NSWMC has listed 90 NGOs (Source: NSWMC-ESWM Kit). The NGOs are involved in various activities related to SWM, such as recycling, information dissemination, environmental advocacy, training, and study tours. While there are no direct deliverables being asked by the NSWMC or RA 9003, NGOs programs and projects actually supplement the government's drive in implementing the SWM program.

(16). ***Representative from the Recycling Industry*** –The role of the representative of the recycling industry is to promote recycling as part of the waste diversion strategy as stipulated in RA 9003.

(17). ***Representative from the Manufacturing or Packaging Industry*** – The role of the representative of the packaging industry to the NSWMC is not directly stated.

The **Vice Chair of the NSWMC** is chosen from among the three private sector representatives of NGOs, the recycling industry and the manufacturing or packaging industry. Furthermore, Rule XXI section 1 encourages the private sector (NGOs, recycling and manufacturing or packaging industry) to pursue research in SWM.

**b) Other government agencies which are not members of the NSWMC**

Other concerned government agencies which are not members of NSWMC also play specific roles vital to the implementation of RA 9003. It includes the Department of Education (DepED), the Commission on Higher Education (CHED), the National Economic and Development Authority (NEDA), the Department of Finance (DOF), the Department of Energy (DOE), the Armed Forces of the Philippines (AFP), the Philippine National Police (PNP), and the Philippine Coast Guard (PCG).

(1) The roles of the DepEd and the CHED are indicated in the various provisions of the Act and its IRR, as shown in the following summary:

**Table III: Roles of the DepEd and the CHED**

| Section/ Rule | Description | Agency involved |
|---|---|---|
| **Section 17, Article 1 Chapter III** | To ensure that waste management shall be incorporated in the curriculum of the primary, secondary and college students | DepEd and CHED |
| **Section 56, Chapter VII** | To strengthen the integration of the environmental concerns in school curricula at all levels, with particular emphasis on the theory and practices of solid waste management principles | DepEd |

| | | |
|---|---|---|
| | like waste minimization, specifically resource conservation and recovery, segregation at source, reduction, recycling , reuse, and composting. | |
| **Section 55** | To develop public awareness of the ill-effects of and the community-based solutions to the solid waste problem;<br>To concentrate on activities which are feasible and which will have the greatest impact on the solid waste problem of the country like, resource conservation and recovery, recycling, segregation at source, reuse, reduction, and composting of solid waste; and<br>To encourage the general public, accredited NGOs and people's organizations to publicly endorse and patronize environmentally acceptable products and packaging materials. | DepEd, TESDA, CHED, DILG, PIA |
| **Section 1, Rule V** | To develop an education program that will promote an effective solid waste management system. | DepEd, NEC, and EMB |
| **Section 2, Rule XXI** | To incorporate ecological solid waste management in the school systems at all levels, emphasizing the involvement of the school administrators, teaching and non-teaching staff, and students in school-wide and nearby community waste management actions, and in the strengthening of the waste management content in the curricula. | DepEd, CHED, TESDA, and DENR |
| **Section 3, Rule VII** | To ensure that waste management shall be incorporated in the curriculum of primary, secondary and college students. | DepEd and CHED |

(2) ***National Economic and Development Authority (NEDA)*** – The NEDA is not a member of the NSWMC. Its role is spelled out in Rule VII of the IRR, which tasks the NEDA to develop a coordinative mechanism that will guide the LGUs in preparing the Local Government SWM Plan, together with the DENR, the DILG, and the various leagues of LGUs under the overall supervision of the NSWMC.

(3) ***Department of Finance (DOF)*** – The role and/or functions of the DOF are discussed in the IRR, specifically Rule XII:

(i) Section 1 - Together with the DTI and the NEC, the DOF is mandated to conduct investigation of recycled goods when developing a market, which would identify potential purchasers through market research techniques and contact buyers to determine their specifications, transportation agreements, and

quantity requirements; and

(ii) Section 2 - The NSWMC, the NPS, the NEC and the DOF shall encourage national and local agencies and organizations to purchase environmentally preferable products and services, considering environmental performance and human health.

(4) ***Department of Energy (DOE)*** – Rule XXI of the IRR describes the functions of the DOE, which are to lead efforts in landfill extraction and utilization of biogas, and to lead in producing usable forms of recovered resources, e.g., energy from waste.

(5) ***Law Enforcement Agencies (PNP, AFP and PCG)*** - Through the DILG, these agencies are in charge of the enforcement of Sections 48 and 49, prohibited acts and penalties, respectively.

Included in law enforcement by the PCG is the prohibition of garbage discharge or emission of harmful substances that come from ships, in operation or not, in order to prevent pollution.

Said section of the Act provides that penalties shall be imposed on any person/s caught discharging or emitting from any Philippine or from any other ships while within Philippine waters of the following substances:

(a) Oil, whether carried as cargo or as bunker;
(b) Oily mixture, whether generated from cargo operations or from machinery spaces;
(c) Noxious liquid substances carried in bulk;
(d) Harmful substances in packaged form;
(e) Sewage;
(f) Garbage; and
(g) Other harmful substances, whether generated during the operation of the ship or not.

However, these provisions do not apply in the following cases:

(a) The discharge or emission is necessary for the purpose of securing the safety of a ship and those on board or saving life at sea; or
(b) The discharge results from unintentional damage to the ship or its equipment, and all reasonable precautions have been taken after the occurrence of the damage or the discovery of the discharge for the purpose of preventing or minimizing the discharge, unless the master, owner, or agent of the ship acted either with intent to cause damage, or recklessly and with knowledge that damage would probably result; or
(c) The discharge is for the purpose of combating specific pollution incidents in order to minimize the damage from pollution.

**2. Local Government Level**

The Local Government Code or Republic Act 7160 stipulates that the provision of basic services and facilities shall be provided by the LGUs. The services include the provision of solid waste disposal system or environmental management system and services or facilities related to general hygiene and sanitation. However, Section 484 of the same law provides that the appointment of the environment and natural resources officer is optional for provincial, city, and municipal governments.

The provision therefore allows LGUs to lodge the waste management function in any of its different offices. Hence, services for SWM in some LGUs become fragmented and therefore not integrated.

To reiterate, RA 9003 mandates the creation of a Provincial SWM Board, a City/Municipality SWM and a Barangay SWM Committee.

The Provincial SWM Boards shall be composed of the following:

1. All the mayors of its component cities and municipalities;
2. A representative from the Sangguniang Panlalawigan to be represented by the chairperson of either the Committees on Environment or Health or their equivalent committees, to be nominated by the presiding officer;
3. The provincial health and/or general services officers, whichever may be recommended by the governor;
4. The provincial environment and natural resources officer;
5. The provincial engineer; Congressional representative/s from each congressional district within the province;
6. A representative from the NGO sector whose principal purpose is to promote recycling and the protection of air and water
7. quality;
8. A representative from the recycling industry
9. A representative from the manufacturing or packaging industry; and
10. A representative of each concerned government agency possessing relevant technical and marketing expertise as may be determined by the Board.

The Provincial SWM Board shall have the following functions and responsibilities:

a) Develop a provincial SWM plan based on the SWM plans created and submitted by the respective City and Municipal SWM Boards. It shall review and integrate the submitted plans of all its component cities and municipalities and ensure that the various plans complement one

other, and have the requisite components. The Provincial SWM Plan shall be submitted to the NSWMC for approval.

The Provincial SWM Plan shall reflect the general program of action and initiatives of the provincial government in implementing a SWM program that would support the various initiatives of its component cities and municipalities.

b) Provide the necessary logistical and operational support to its component cities and municipalities in consonance with subsection (f) of Section 17 of the Local Government Code;

c) Recommend measures and safeguards against pollution and for the preservation of the natural ecosystem;

d) Recommend measures to generate resources, funding, and implementation of projects and activities as specified in the duly approved SWM plans;

e) Identify areas within its jurisdiction which have common SWM problems and are appropriate units for planning local SWM services in accordance with Section hereof;

f) Coordinate the efforts of the component cities and municipalities in the implementation of the Provincial SWM Plan;

g) Develop an appropriate incentive scheme as an integral component of the Provincial SWM Plan;

h) Convene joint meetings of the Provincial, City and Municipal SWM Boards at least every quarter for purposes of integrating, synchronizing, monitoring, and evaluating the development and implementation of its provincial SWM plan;

i) Represent any of its component city or municipality in coordinating its resource and operational requirements with agencies of the national government;

j) Oversee the implementation of the Provincial SWM Plan;

k) Review every two years or as the need arises the Provincial SWM Plan for purposes of ensuring its sustainability, viability, effectiveness, and relevance in relation to local and international developments in the field of SWM; and

l) Allow for the clustering of LGUs for the solution of common SWM problems.

The City and Municipal SWM Boards, on the other hand, shall be composed of the following:

1. City or municipal mayor as head with the following as members:
2. A representative of the Sangguniang Panlungsod or the Sangguniang Bayan, preferably chairpersons of either the Committees on Environment or Health, who will be designated by the presiding officer;
3. President of the Association of Barangay Councils in the municipality or city;
4. Chairperson of the Sangguniang Kabataan Federation;
5. A representative from NGOs whose principal purpose is to promote recycling and the protection of air and water quality;
6. A representative from the recycling industry;
7. A representative from the manufacturing or packaging industry; and
8. A representative of each concerned government agency possessing relevant technical and marketing expertise as may be determined by the Board.

The City and Municipal SWM Boards shall have the following duties and responsibilities:

a) Develop the City or Municipal SWM Plan that shall ensure the long-term management of solid waste, as well as integrate the various SWM plans and strategies of the barangays in its area of jurisdiction. In the development of the SWM Plan, it shall conduct consultations with the various sectors of the community;
b) Adopt measures to promote and ensure the viability and effective implementation of SWM programs in its component barangays;
c) Monitor the implementation of the City or Municipal SWM Plan through its various political subdivisions and in cooperation with the private sector and the NGOs;
d) Adopt specific revenue-generating measures to promote the viability of its SWM Plan;
e) Convene regular meetings for purposes of planning and coordinating the implementation of the SWM plans of the respective component barangays;
f) Oversee the implementation of the City or Municipal SWM Plan;
g) Review every two years or as the need arises the City or Municipal SWM Plan for purposes of ensuring its sustainability, viability, effectiveness, and relevance in relation to local and international developments in the field of SWM;
h) Develop the specific mechanics and guidelines for the implementation of the City or Municipal SWM Plan;

i) Recommend to appropriate local government authorities specific measures or proposals for franchise or build-operate-transfer agreements with duly recognized institutions, pursuant to R.A. 6957, to provide either exclusive or non-exclusive authority for the collection, transfer, storage, processing, recycling or disposal of municipal solid waste. The proposals shall take into consideration appropriate government rules and regulations on contracts, franchises and build-operate-transfer agreements;
j) Provide the necessary logistical and operational support to its component cities and municipalities in consonance with subsection (f) of Section 17 of the Local Government Code;
k) Recommend measures and safeguards against pollution and for the preservation of the natural ecosystem; and
l) Coordinate the efforts of its component *barangays* in the implementation of the City or Municipal SWM Plan.

The *Barangay* SWM Committee shall also be created with the following members:

1. A *kagawad*
2. The SK chair
3. Presidents of Home Owners Association
4. Public/private school principals or representative
5. Parents and Teachers Association president or representative
6. A representative of a religious organization
7. A representative of the business sector
8. A representative from an environmental NGO
9. President of the Market Vendors Association
10. A representative from a junkshop owners' association

The committee shall have the following functions:

a) Formulate SWM program consistent with the City/Municipal Solid Waste Management Plan
b) Segregate and collect biodegradable, compostable, reusable wastes
c) Establish MRF
d) Allocate barangay funds; look for sources of funds
e) Organize core coordinators
f) Submit SWM monthly reports

As of end 2010, the following are the status of the boards and committees created by the local government unit.

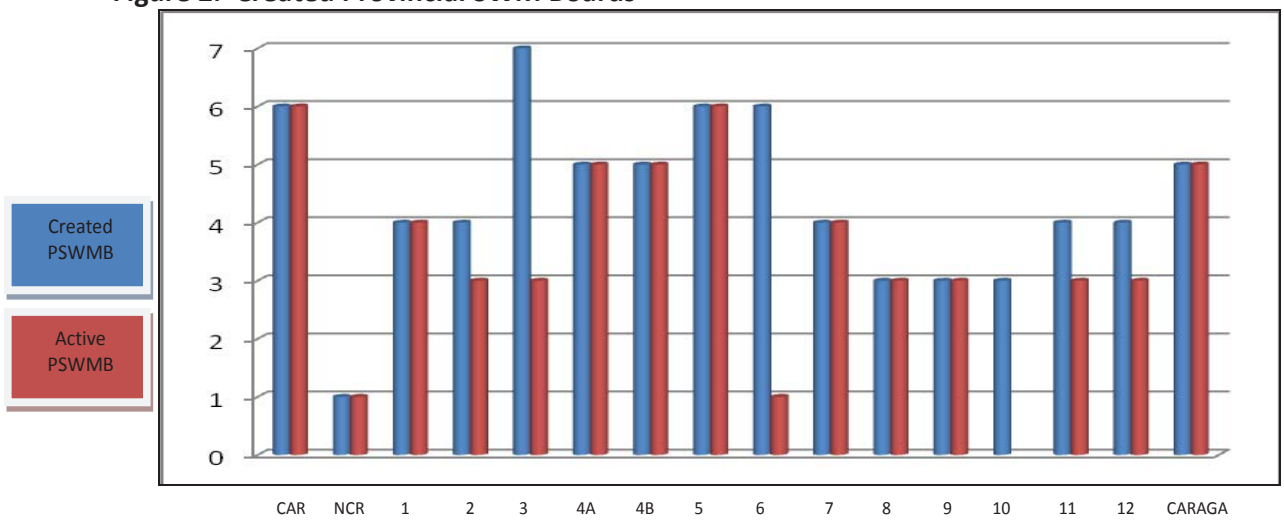
**Table IV. Boards and Committees Created by LGUs.**

| REGION | No. of Provincial SWM Boards Created | No. of Active Provincial SWM Boards | No. of City/ Municipal SWM Boards Created | No. of active City/ Municipal SWM Boards | No. of Brgy. SWM Committees Created & Active | No. of Active Brgy. SWM Committees |
|---|---|---|---|---|---|---|
| **CAR** | 6 | 6 | 77 | 77 | 1174 | 1174 |
| **NCR** | 1 | 1 | 17 | 17 | 1509 | No data |
| **I** | 4 | 4 | 9 | 9 | No data | No data |
| **II** | 4 | 3 | 64 | 49 | 917 | 473 |
| **III** | 7 | 3 | 130 | 34 | No data | No data |
| **CALABARZON** | 5 | 5 | 123 | 86 | 3,247 | 678 |
| **MIMAROPA** | 5 | 5 | 73 | 35 | 1,457 | 575 |
| **V** | 6 | 6 | 57 | 57 | 177 | 161 |
| **VI** | 6 | 1 | 123 | 97 | 4,039 | 30 |
| **VII** | 4 | 4 | No data | 5 | No data | 15 |
| **VIII** | 3 | 3 | 95 | 52 | 928 | 262 |
| **IX** | 3 | 3 | 60 | 50 | 1,300 | 850 |
| **X** | 3 | | 5 | | 48 | |
| **XI** | 4 | 3 | 46 | 28 | 1152 | 806 |
| **XII** | 4 | 3 | 44 | No data | 886 | No data |
| **CARAGA** | **5** | **5** | **73** | **18** | **1310** | 420 |

SOURCE: EMB Regional Offices. October 2010

Almost all of the provinces in the country have created their Provincial SWM Boards, except for some provinces in Regions 2, 8 and 5. About 68% of the Boards created are active and conduct regular meetings and perform their roles as mandated by RA 9003.

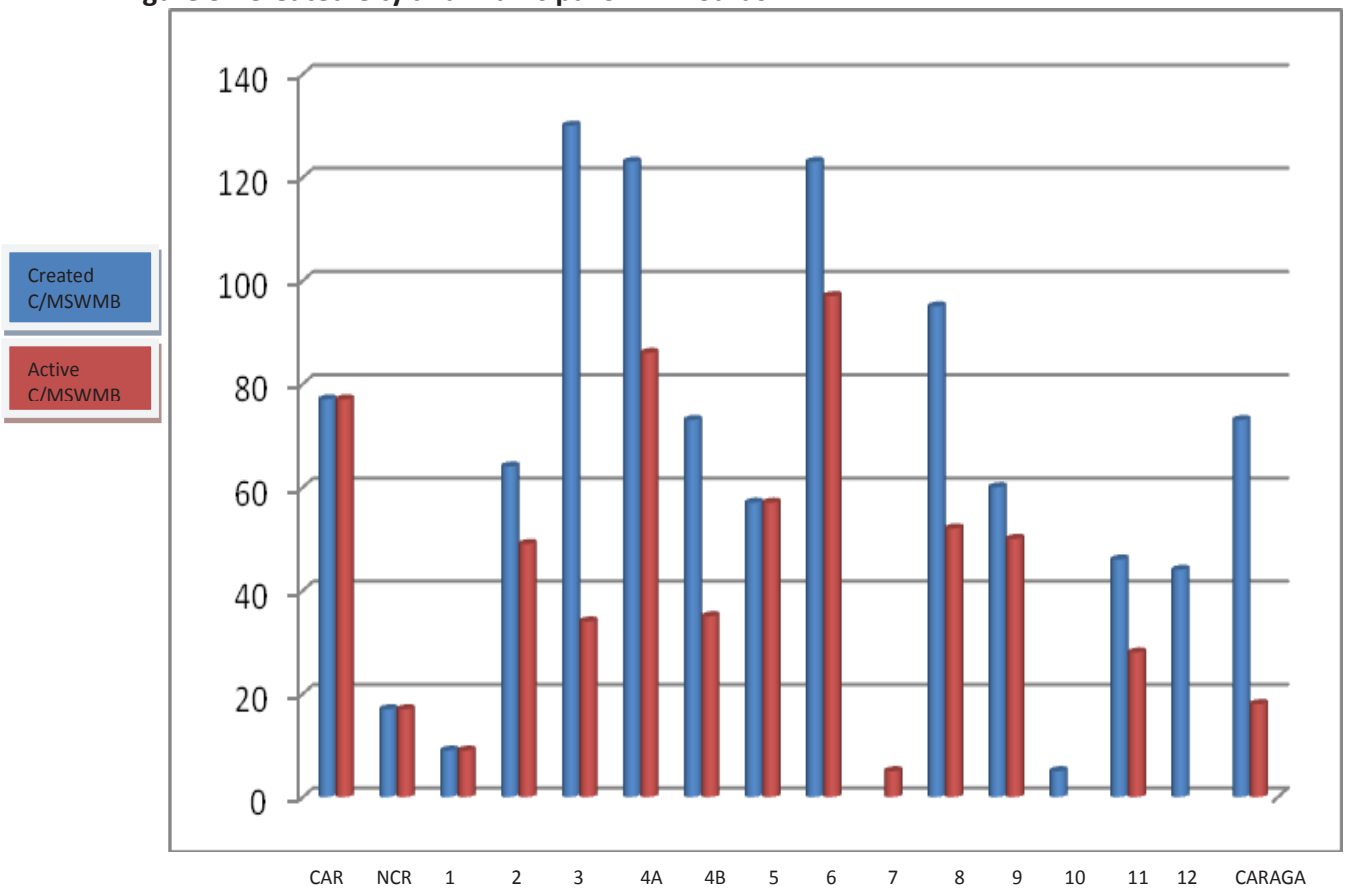
**Figure 2. Created Provincial SWM Boards**




Source: NSWMC October 2010.

On the other hand, about 60% or only about 996 of the total 1,634 cities and municipalities have created or established their SWM boards. Of the 996 SWM boards established, only 614 or 61% are active.

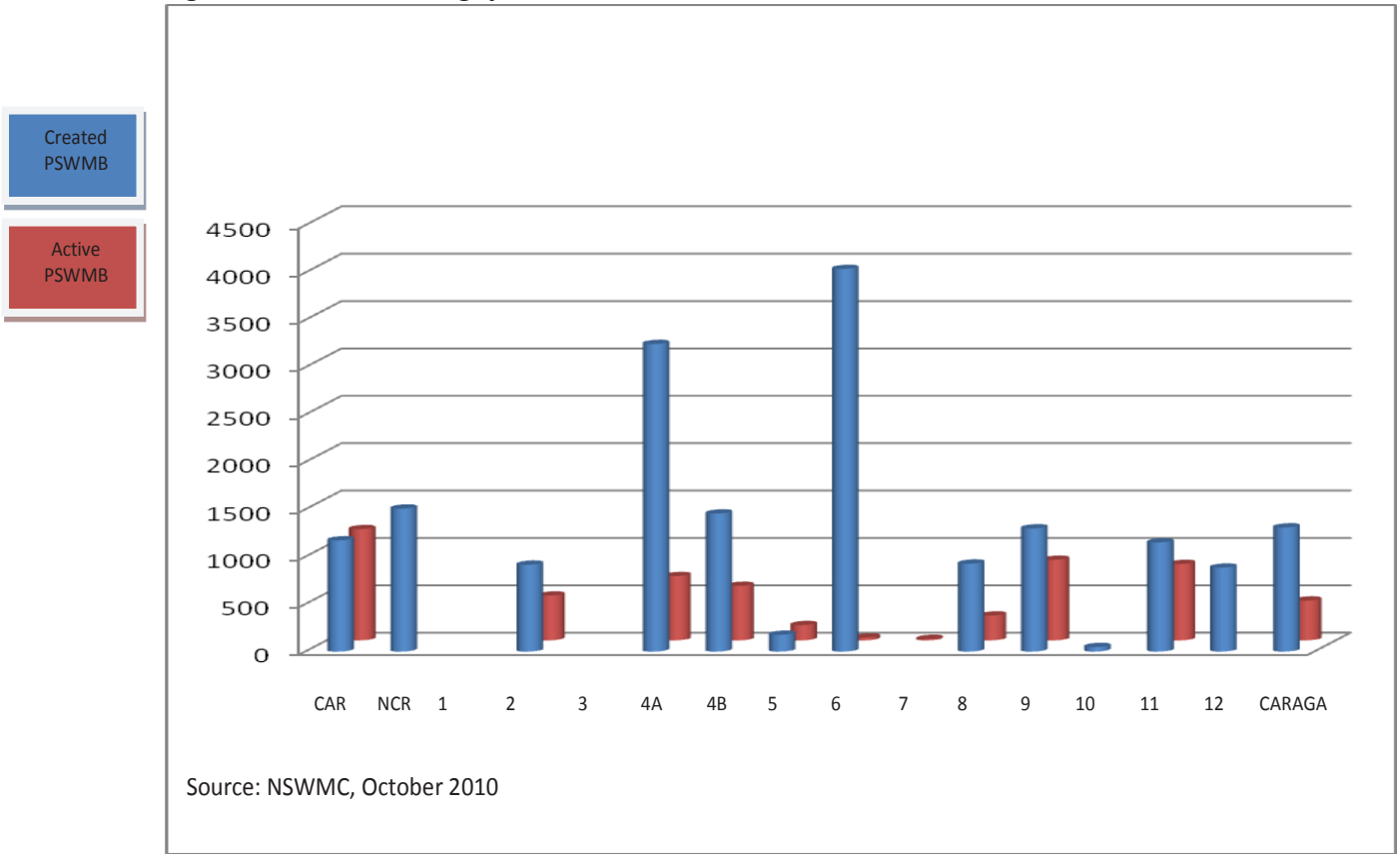
**Figure 3. Created City and Municipal SWM Boards**




Source: NSWMC, October 2010

Only about 43% or 18,144 of the total 42,026 *barangays i*n the country have organized Barangay SWM Committees. Only 30% of the 18, 144 have active *Barangay* SWM Committees, the reports of which are incomplete. Some regions have not completed monitoring and validation of the committees.

**Figure 4. Created Barangay SWM Committees.**




Source: NSWMC, October 2010

**ISSUES RAISED ON**
**LEGAL MANDATE AND INSTITUTIONAL ARRANGEMENT**

In the process of developing the NSWM Strategy and based from the various consultation workshops conducted, the following issues as regards to the legal mandate and institutional arrangement were often mentioned and raised by the stakeholders.

1. Some of the relevant government agencies are not included as members of the National Solid Waste Management Commission (NSWMC) like the Department of Education, Department of Finance, National Economic and Development Authority and others.
2. The present institutional arrangement does not allow for the establishment of the NSWM Fund
3. At the LGU level, there is a very low efficiency level of services due to lack of long-term SWM plan
4. There is no room for private institutions to be recognized, supported or even to be coordinated with the barangay.
5. As mandated by law, the EMB Director heads the NEC, but to date there is no existing organizational structure, no personnel, no budget for NEC within EMB
6. There is no existing database that could help synchronize as well as coordinate the SWM implementation at all levels.
7. The Members of the NSWMC do not regularly submit accomplishment report as mandated by law.
8. NSWMCS who plays an important role in terms of information dissemination are not equipped with the right information about other processes of SWM, which results to unclear and not so detailed presentations to stakeholders.

# *CHAPTER 2*
# *Institutional Support Mechanisms*

Included as one of the provisions of RA 9003 is the establishment of an institutional support mechanism necessary to effectively implement the Act. Such bodies shall support the implementation of the act by making available information, consulting, training and networking services. These bodies are already known as the National and Regional Ecology Centers.

## A. National Ecology Center (NEC) and the Regional Ecology Centers (REC)

Section 7 of the Ecological Solid Waste Management Act of 2000 mandates that a National Ecology Center shall be established under the Commission, which shall be headed by the Director of the EMB. The NEC shall provide consulting, information, training, and networking services necessary in implementing the Act.

The Regional Ecology Centers shall also be established, and shall be headed by the EMB Regional Directors in their *ex officio* capacities. The RECs shall maintain a multi-sectoral, multi-disciplinary pool of experts, including those from the academe, business and industry; inventors, practicing professionals, youth, women, and other concerned sectors, who shall be screened according to qualifications set by the Commission. The RECs shall perform the following functions:

1. Facilitate training and education on integrated ecological solid waste management by:
    a. formulating training programs on proper SWM and technical operations of SWM facilities;
    b. developing of an accreditation and certification system for the conduct and holding of training programs on SWM; and
    c. developing an educational program, in collaboration with DepEd, to promote effective SWM systems .
2. Establish and manage a comprehensive SWM information database and dissemination system, in collaboration with DTI, on resource recovery techniques, materials and price list of recyclables, and information on clean technologies.
3. Promote the development of a recycling market by establishing a national recycling network that will enhance the opportunity for recycling;
4. Act as the hub for networking of LGUs, NGOs, and industries for voluntary compliance of the pertinent provisions of the Act;
5. Provide or facilitate expert assistance in pilot modeling of SWM facilities, including technologies and techniques for effective SWM;
6. Develop, test, and disseminate model waste-minimization and reduction-auditing

procedures for evaluation options; and

7. Act as the clearinghouse for cleaner production/cleaner technologies on solid waste management.

The IRR stipulates that the NEC and the RECs shall make accessible to the general public all related information generated, collected, recorded, and stored, as well as data for solid waste management plans, the National Framework, the National Status Report, and all other relevant information necessary for ecological SWM.

A portion of a 4.56-hectare property formerly owned by the National Housing Authority Construction was earmarked as the site of the NEC office, in an area located on East Avenue, Diliman, Quezon City, beside the minting plant of the *Bangko Sentral ng Pilipinas*. To date, existing within the NEC premises are a training room, a display area for model/best practices, and the office of the Zero Waste Movement.

The Commission Secretariat currently performs several functions of the NEC, including those related to consulting, information, training, and networking services, with the EMB providing the necessary resources.

RA 9003 specifies the organizational structure of the RECs, while it mandates the EMB regional offices to lead the RECs. Similar to the NEC, the RECs have a structure that is easily accessible to SWM stakeholders. An REC, as a multi-stakeholder assembly, aims to enhance SWM capacities by tapping and synergizing available expertise and potential resources of NGAs, NGOs, academe, media, and other concerned stakeholders. It serves as platform for public participation/networking and ensures that all information generated, collected, and stored is accessible to the general public.

The actualization of the role of the RECs in supporting SWM sector development was initially tested in the Western Visayas (Region 6) with support from GIZ-AHT SWM4LGUs Project in 2009 to 2010. Membership, roles and responsibilities and operational mechanisms were proposed and defined during the activity. Regions 7 (Central Visayas), 8 (Eastern Visayas), 13 (Caraga, Mindanao), and other regions later adapted the resulting model in institutionalizing RECs.

**The Region 6 and 8 Experience**

In Regions 6 and 8, members acknowledged that for the REC to be more functional and to perform the individual mandates, an organizational structure within thematic work committees is needed. Hence, the REC was grouped into the following three committees: (a) environmental education and awareness (b) technology transfer and public-private partnership and (c) LGU support and networking. Committee work is a crucial pre-condition for REC assembly to come up with agreements and resolutions. One of the early challenges observed during pilot REC operations was that the involved agencies appeared inefficient in sustaining self-organized committee work. Possible factors identified were top management

commitment, policy gaps, multiple staff assignments and deviating targets of individual member agencies. Hence, various organizational analyses were conducted in order to analyze strengths and weaknesses of the organization and to better define roles, functions and responsibilities of REC members as well as standard procedures and monitoring/evaluation systems.

Based on the made experiences, a corresponding REC guideline and manual of operations was developed and submitted to the NSWMC for later national policy issuance. This guideline proposes how to organize, operationalize and sustain the REC, including the use of various instruments, procedures, and financial and staffing requirements needed to make it functional.

The NSWMC/NEC is currently working on harmonizing available formats of SWM database to comply with the legally mandated regional SWM database for monitoring LGU compliance to RA 9003. Further, regional EMB offices have been consolidating information gathered from LGU monitoring and from contributions of REC members, which are featured in the annual State-of-the-Brown-Environment status reports compiled nationwide.

Through the REC's mandate in establishing an accreditation program for SWM trainings, GIZ-AHT supported the development of a 17-module toolkit that encompasses the essential elements LGUs need to know in enhancing their local SWM systems. The NSWMC's adoption of the toolkit as a standardized accreditation system is currently being reviewed while parallel efforts are in the pipeline to convert this SWM toolkit into a university curriculum as well.

As of March 2011, EMB regional offices have established and operationalized their respective RECs. However, the degree of operations varies per region.

**Other Approaches to REC Establishment**

Most (EMB) Regional Offices have established their RECs by inviting representatives from the regional offices of the NSWMC member-agencies. However, the invitation is not limited to the member-agencies only but to non-members as well. e.g., DepEd, PNP, Coast Guard, etc., depending on the projected needs of the region,

Some RECs have difficulty fully utilizing and making operational a number of their member-agencies because some require a directive from their main office in order to perform functions of the REC, which is not part of their Key Result Areas.

## ISSUES RAISED ON INSTITUTIONAL SUPPORT MECHANISM

Despite the existing mandate that a National Ecology Center (NEC) be established, no organizational structure, no personnel assigned and no budget has been allotted for the NEC. Currently, it's the National Solid Waste Management Secretariat which is partly functioning as the NEC.

The NEC and REC as stated in the law shall "Act as the clearinghouse for cleaner production/cleaner technologies on solid waste management" which might be in conflict with the function of DOST who is currently doing the Environmental Technology Verification (ETV)

# CHAPTER 3
# SWM SYSTEM

## WASTE GENERATION TO WASTE DISPOSAL

Waste management practices differ between developed and developing countries, even between urban and rural areas, upland and lowland areas, as well as residential and non-residential/industrial producers. The difference also lies as to who takes responsibility for the types of waste produced, e.g., domestic and non-hazardous waste versus the hazardous and commercial/industrial waste. The former is usually the responsibility of local government authorities, while the latter is the sole responsibility of the generator or producer.

In the Philippines, solid waste is an indication of urbanization. Cities usually generate more waste compared to the rural areas. Metro Manila, for example, generates almost a quarter of the country's total waste generation (WB, 2001).

SWM remains to be one of the biggest challenges the country faces today.

### A. Waste Generation and Composition of Solid Waste

The National Census of 2007 placed the estimated population of the Philippines at 94 million, with an annual growth rate of 1.95% (2000-2007). In 2009, it was reported that the region generated between 0.30 and 0.684 kilograms of solid waste depending on the socio-economic status/level of the region. The National Capital Region (NCR) posted the highest waste generation rate of 0.71 kg per capita per day, while ARMM had the lowest with 0.30 kg per capita per day. Based on these figures, the total waste generation was estimated at 35 tons per day or 13.1 million tons per year.

**Table V. Waste Generation by Region**

| Region | Volume of Waste Generated (Projected 2010) Tons per day | Million Tons per Year 2010 |
|---|---|---|
| **1** | 1640.73 | 0.5989 |
| **2** | 1056.57 | 0.3856 |
| **3** | 3486.55 | 1.2726 |
| **4a** | 3979.52 | 1.4525 |
| **4b** | 873.01 | 0.3186 |
| **5** | 1803.51 | 0.6583 |
| **6** | 2592.02 | 0.9461 |
| **7** | 2501.34 | 0.9130 |
| **8** | 1420.22 | 0.5184 |
| **9** | 1336.21 | 0.4877 |
| **10** | 1626.10 | 0.5935 |

| | | |
|---|---|---|
| **11** | 1745.25 | 0.6370 |
| **12** | 1294.21 | 0.4724 |
| **13** | 849.26 | 0.3100 |
| **CAR** | 595.79 | 0.2175 |
| **NCR** | 8257.17 | 3.0139 |
| **ARMM** | 871.29 | 0.3180 |
| **TOTAL** | **35928.75** | **13.1140** |

Source: NSWMC 2009

Note: Table 3 was derived from data provided by NSWMCS, which shows the waste generation of the 1,610 LGUs (cities and municipalities) per ton per day. The average waste generation per capita per region was multiplied by the population of each region to estimate the waste generation per day in every region.

**1. Waste Characterization**

Section 16 of RA 9003 provides that a province, city or municipality, through its local solid waste management boards, shall prepare a 10-year SWM plans consistent with the National Solid Waste Management Framework, provided that the waste management plan shall be for re-use, recycling, and composting of wastes generated in its jurisdiction.

One of the most important components of the waste management plan is waste characterization. As described in Section 17 of RA 9003:

> "*For the initial source reduction and recycling element of a local waste management plan, the LGU waste characterization component shall identify the constituent materials which comprise the solid waste generated within the jurisdiction of the LGU. The information shall be representative of the solid waste generated and disposed of within that area. The constituent materials shall be identified by volume, percentage in weight or its volumetric equivalent, material type, and source of generation which includes residential, commercial, industrial, governmental, or other sources. Future revisions of waste characterization studies shall identify the constituent materials which comprise the solid waste disposed of at permitted disposal facilities."*

***Waste analysis and characterization study in Selected Metro Manila LGUs***

Through the assistance of the Asian Development Bank, five local government units in Metro Manila conducted a waste analysis and characterization study (WACS) in 2003 that included the cities of Makati, Muntinlupa, Quezon City, Pasig, and Valenzuela. Shown in the table below is a summary of the findings of the study. Waste generation rates ranged from 0.32 kg/capita/day in Valenzuela City to 0.63 kg/capita/day in Quezon City.

**Table VI. Waste Analysis and Characterization Study**

| Component | Makati | Muntinlupa | Pasig | Quezon City | Valenzuela |
|---|---|---|---|---|---|
| **a. Quantity** | | | | | |
| **Tons/year*** | 87,200 | 80,400 | 102,067 | 532,100 | 60,200 |
| **Population**** | 421,308 | 366,674 | 528,179 | 2,301,261 | 519,227 |
| **Average kg/cap-day** | 0.57 | 0.60 | 0.53 | 0.63 | 0.32 |
| **b. Bulk Density (Avg. kg/ cu m** | 92 | 172 | 139 | 218 | 159 |
| **c. Composition (% wet wt)** | | | | | |
| **Paper** | 14.7 | 10.2 | 12.4 | 14.1 | 11.3 |
| **Glass** | 2.4 | 3.1 | 5.0 | 3.4 | 1.4 |
| **Metals** | 2.7 | 3.9 | 11.6 | 3.6 | 3.1 |
| **Plastics** | 25.0 | 28.1 | 20.9 | 21.4 | 28.3 |
| **Kitchen/Food Waste** | 32.6 | 29.1 | 23.1 | 39.9 | 38.0 |
| **Other Organic** | 18.9 | 20.4 | 18.9 | 14.8 | 14.2 |
| **Other inorganic** | 3.5 | 5.0 | 6.7 | 2.4 | 2.2 |
| **Hazardous/Special** | 0.2 | 0.2 | 1.4 | 0.4 | 0.6 |
| **Total** | 100 | 100 | 100 | 100 | 100 |
| **d. Moisture Content (Avg.% air dry)** | 41 | 29 | 33 | 67 | 38 |

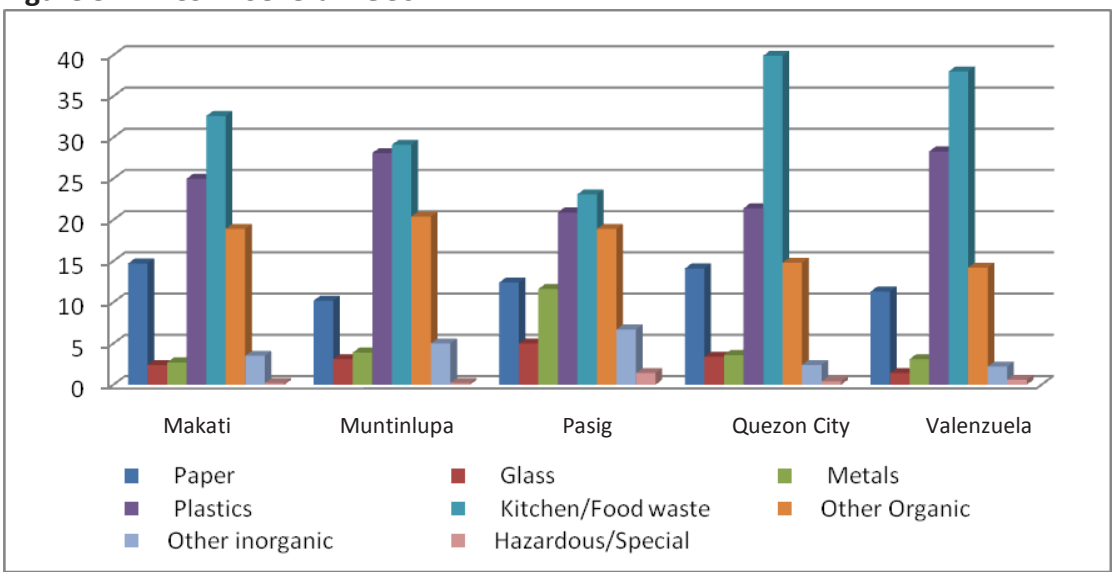
Source: ADB Study 2003

**Quantity of waste disposed estimated for Pasig based on results of other cities*

***Population based on 2003 National Statistics Office Data*

The chart below illustrates the characteristics of waste generated per city. In the 5 cities where WACS was conducted, it is evident that the kitchen/food and other organic wastes comprises about 50% in each city (51.5% in Makati; 49.5% in Muntinlupa; 42% in Pasig; 54.7% in Quezon City and 52.2 in Valenzuela). The recyclables, including the plastic with 21% to 28%, comprises around 42% to 49% of the waste. Other inorganics and special wastes is about 2%-6% and 0.2% - 1.4%,respectively.

**Figure 5. WACS in Several LGUs**




The Philippine Environmental Governance Project (EcoGov), which was supported by the United States Agency for International Development (USAID), also conducted WACS on several LGUs.

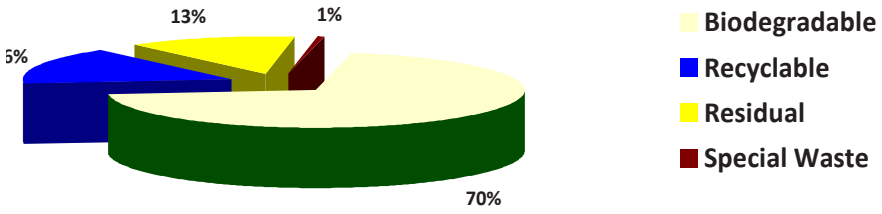
The table below shows the results of the WACS conducted in Alabel, one of the municipalities in the SOCCKSARGEN Region or Region 12. The WACS took into account all possible sources of solid wastes: households, public market, food establishments, general stores, industries, institutions, recreation centers, service centers, slaughter house, and health related sources. Of these sources, the public market generated the greatest amount of solid waste. However, except for the industries, all other waste sources generated biodegradable wastes the most.

**Table VII. Waste Analysis and Characterization Study, Municipality of Alabel, 2008**

| Waste Sources | TOTAL | % | Waste Composition | | | |
|---|---|---|---|---|---|---|
| | | | Biodegradable | Recyclable | Residual | Special Waste |
| Households | 400.68 | 22.90% | 268.77 | 59.75 | 66.68 | 5.48 |
| Public Market | 646.14 | 37.00% | 559.09 | 26.61 | 60.45 | - |
| Food Establishments | 188.17 | 10.80% | 137.89 | 18.95 | 30.96 | 0.37 |
| General Stores | 88.87 | 5.10% | 42.31 | 22.09 | 24.36 | 0.11 |
| Industries | 173.89 | 9.90% | 39.02 | 122.17 | 11.35 | 1.35 |
| Institutions | 111.5 | 6.40% | 86.97 | 8.75 | 14.99 | 0.78 |
| Recreation Centers | 105.85 | 6.10% | 92.97 | 7.62 | 5.18 | 0.08 |
| Service Centers | 28.06 | 1.60% | 12.14 | 4.88 | 8.19 | 2.86 |
| Slaughterhouse | - | - | - | - | - | - |
| Health-Related Sources | 4.97 | 0.30% | 0.02 | 1.45 | 3.49 | 0.01 |
| **TOTAL** | **1,748.13** | | **1,239.17** | **272.28** | **225.64** | **11.04** |
| **% to TOTAL** | | | **71%** | **16%** | **13%** | **0.60%** |

The study also revealed that biodegradable wastes constituted most of the solid wastes generated by households as shown in the figure below. The volume of residual wastes, however, exceeded that of the recyclable wastes. One factor that can be considered is the fact that there is insufficient markets for the recyclable wastes that are in the waste stream in Region 12.

**Figure 6. Waste Characterization, Municipality of Alabel - 2008**




**What is WACS?**

Waste Analysis and Characterization Study is used as a tool for informed decision-making. It is a planning tool in identifying necessary SWM intervention based on sound and reliable data. It covers the whole municipal waste stream – from waste sources (or where wastes are generated such as households, public market, commercial establishments, schools) to disposal site or end-of-pipe. It attempts to determine the amount of wastes generated at source and actual amount of wastes brought to the disposal site.

WACS has three stages. The first stage involves preparation and training. This stage includes training the ESWMB, SWM-TWG, and other participants who will join in the actual waste characterization—on WACS definition, features, uses and methodologies. Also included in this stage is selection of WACS options, i.e., LGU decision-makers will select the WACS method to be adopted. The first stage also involves waste source identification, sampling plan development, resource/material acquisition, and solid waste collection plan preparation.

The second stage involves the conduct of actual waste characterization, i.e., the actual identification of waste types and volume from selected household and non-household samples.

The third stage comes after the actual waste characterization, where data gathered are processed to serve as bases for developing strategic programs on ISWM.

***Options in generating WACS data:***

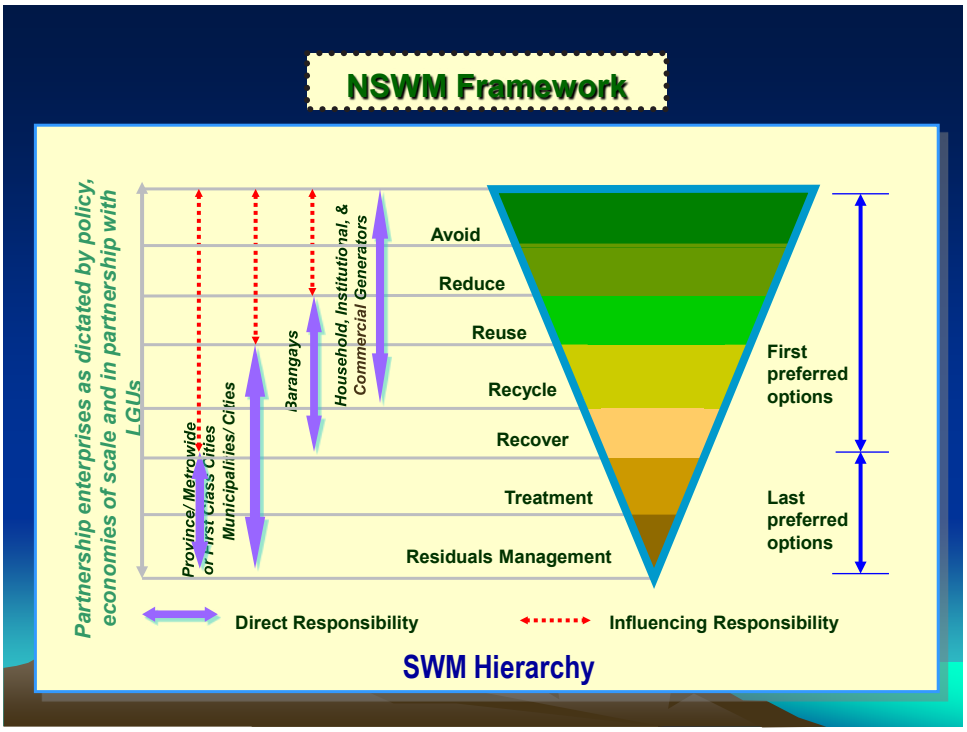
1) Seven-day WACS, which involves taking waste generation samples (all types– biodegradable, recyclable, residual, and special wastes) from selected waste generators for seven days as the data for estimating waste generation within the collection area and the whole LGU.
2) Three-day WACS, which requires measuring waste generation samples from selected waste generators for three days. In a statistical study which compares results of the seven-day WACS with the three-day WACS, the resulting findings show that there is no significant difference between the two options. With sample days reduced to only three, fewer resources, both financial and manpower are necessary. This method also needs simpler sampling plan and collection route.
3) Adoption of typologies, which can be developed from actual WACS data of LGUs that have generated their WACS figures. WACS typology is the adoption by an LGU of WACS data, specifically per unit waste generation data, of another LGU with similar socio-economic factors. WACS typology offers two options:

    a. Full/Complete WACS Typology is the adoption of available WACS data of another LGU/LGUs within a region/province with similar conditions for all waste generators. This is recommended for smaller, homogenous LGUs. Since data are readily available, this option is a very low cost method of generating WACS data to estimate waste generation within collection area and whole LGU.
    **b.** Partial WACS Typology is the adoption of WACS data of another LGU for waste generation of some sources, e.g., households but do actual WACS for other sources. This option is recommended for medium-sized LGUs. Actual conduct of WACS is recommended for public markets, municipal hall, schools, and hospitals

## B. Waste Avoidance

Waste avoidance is given little importance in the waste management programs of LGUs, even as it is the first preferred option in the waste management hierarchy. Collection and disposal remain the primary focus of SWM programs.

**Figure 7. Solid Waste Management Hierarchy**




Avoidance refers to an action to reduce the amount of waste generated by households, industry, and all levels of government. It is the most important but challenging component in the waste management hierarchy. The key to a successful waste avoidance program is a change in the people's attitude.

### Reduce

When you reduce the amount of waste you throw away, you save landfill space, save raw materials and natural resources such as energy and water, and save money. We can easily reduce the amount of waste we produce using some simple steps.

- Always take your own shopping bags and say 'no' to plastic bags at the supermarket
- Choose products with minimal packaging, and avoid individually wrapped products
- Buy products in reusable, refillable or recyclable packaging
- Avoid packaging fruit and vegetables in plastic bags
- Avoid disposable items such as paper serviettes, towels and tissues
- Buy long-lasting kitchen utensils, household products and clothing
- Mend broken appliances and furniture where possible
- Reduce packaging by buying in bulk
- Before you buy something, think "Do I really need it?"

**Reuse**

Reusing is another way of decreasing the amount of waste you throw away, which in turn decreases the volume of waste destined for landfi ll. In reusing a product, try and identify a long term use for the product. There are many ways to reuse things we consider unwanted or no longer useful

You can:- Take old books, magazines and toys to hospitals, doctor's rooms, gyms, dental surgeries, schools or preschools

- Hold a Garage Sale – your 'trash' may be another person's treasure!
- Instead of buying brand new power tools, borrow or hire the ones you might only use now and then
- Take good used clothing and household items to opportunity shops, school or church fairs
- Reuse containers such as glass jars for storage
- Take your own basket or calico bags when shopping
- Use the internet to locate someone that may be able to make use of your unwanted goods

Other different initiatives are now being practiced by various sectors. These include, Green Procurement, implementation of the 3Rs and identification of the Non-Environmentally Acceptable Products (NEAP).

**1. Green Procurement**

On March 29, 2004, the Office of the President issued ***Executive Order No. 301*** establishing a **"A Green Procurement Program for All Departments, Bureaus, Offices, and Agencies of the Executive Branch of Government."**

The executive order also provides for a systematic and comprehensive National Ecolabelling Program that is necessary to support a "green procurement" policy not only in all government offices but by the general public as well. (Source: Supreme court E-library)

Green Procurement is an approach to procurement in which environmental impacts play an important role in purchasing decisions, with procurement officers concerned about them more than price and quality. Companies which pride themselves on environmental stewardship and thoughtful care of the environment may use green procurement, among many other tactics, to ensure that they do business in an environmentally responsible way. A number of aspects of the procurement process may be adjusted to meet a mission of environmental sustainability.

Within a procurement office, green procurement can involve changes in office procedure which are designed to benefit the environment. For example, rather than having people submit purchase orders and requests on paper, the procurement office might switch to electronic methods of communication so that paper is not wasted. The office might also engage in environmentally friendly activities, such as reducing energy usage, keeping plants around the office to improve air quality, or buying carbon offsets to compensate for office energy usage. *(Source: JUNE M. ALVAREZ, Executive Director, Philippine Center for Environmental Protection)*

**2. Current initiatives by the private sector**

Uniliver Philippines has a project named Project Eliminate, which was created to target ZERO LANDFILL in their plant and offices. They reached their target in 2004 and the company has maintained it since then, concentrating on the following goals:

> •*Reduce / Avoid – Through Total Productive Maintenance (TPM), they improved their process and reduced their waste by 80%. Furthermore, as plastic is made from oil, they developed a process to use the residual packaging waste as a co-fuel for cement manufacture.*
>
> •*Reuse – Sort all recyclable which cannot be avoided and develop processes to treat the waste that cannot be recycled.*
>
> •*Recycle – A lot of our landfill can be recycled directly. Teams were put in place to improve sorting in the production lines. Now, they sell carton and plastic to recyclers and as a result, their garbage was reduced by 50%*. (Source: e-copy file of Uniliver Philippines)

**3. Non-Environmentally Acceptable Packaging (NEAP) materials**

Section 5 of Rule XII of the RA9003 IRR stipulates that:

*The Commission should decide on the basis of a set of criteria, which products or packaging are non-environmentally acceptable. Provided, that this criteria is regularly reviewed to ensure its appropriateness and accuracy, in light of scientific and technical progress, and of the experience gained in this area. Prohibiting non-environmentally acceptable products, any decision to prohibit certain packaging types and products must be supported by available scientific, environmental, technical and economic information and technical studies through, but not limited to life cycle assessment and economic analysis. Provided that the Commission consults representatives from affected industries and subject to public notice and hearing.*

A Technical Working Committee within the National Solid Waste Management Commission was created to identify NEAP materials. The committee identified the following products that are due for assessment:

a. Plastic Packaging (Sando Bags, Polystyrene, Laminates, Sachets) including Food Containers and Baby Products with Pthalates
Core Members: DOH-FDA, PPIA, PIP, PPCP, DTI-BPS, NGO, Academe (Ateneo, UP, Mapua, La Salle)

b. Electronic Goods (Includes Cellphone, Cellphone Batteries and Accessories)
Core Members: PAIA/EAPI, DTI-BPS, DENR-EMB, PPIA, NGO, Academe (UP, Mapua, La Salle)

c. Products with Heavy Metals

DOH-FDA, DTI-BPS, DENR-EMB, NGO, Academe (UP, Mapua), NGO, Academe (Ateneo, UP, Mapua, La Salle), Private Sector

d. Construction Materials

DPWH, DTI-BPS, FPI, PCEPSDI, PPCP, Academe (UP Engineering, Mapua, La Salle)

Plastic carry bags and foam polystyrene were selected to undergo the first round of evaluation by the NEAP Technical Committee. Due to perceived contribution of plastic bags to flooding, land and marine pollution and its low recycling rate many LGUs have already passed ordinances banning and or regulating the sale and use of the two packaging materials.

Reacting to the LGU trend, the plastic industry have undertaken voluntary measures such as –in store recovery programs in cooperation with selected supermarkets and the submission of oxo-biodegradable plastic bags to the Bureau of Product Standards as industry's alternative to non-degradable plastic carry bags.

At present, a number of LGUS have enacted an ordinance regulating the use of plastics in their localities, including Los Banos in Laguna; Muntinlupa, Metro Manila; Burgos, Ilocos Sur; and San Marcos, Isabela. Further, Quezon City and some Caloocan City barangays have initiated the plastic bag recycling.

## C. Storage

Storage refers to the interim containment of solid waste after generation and prior to collection for ultimate recovery or disposal.[5]

In urban areas, plastic drums and garbage containers usually supplied by the LGUs are the most commonly used for temporary storage of solid waste prior to collection. In commercial areas, particularly in malls, restaurants, and large shops, garbage bags and bins are supplied by the commercial establishment. In rural areas steel drums, wooden boxes, sacks, rattan baskets, and large tin cans are generally used. Private residents use plastic containers and plastic bags (sando bags), and large tin cans to temporarily store their waste prior to waste collection. However, most of the wastes are still not segregated due to lack of awareness and discipline on the part of the citizen to practice segregation at source.

[5] Congress of the Philippines, *Republic Act 9003 and ite Implementing Rules and Regulations (* Republic of the Philippines, Metro Manila, 11th Congress, 3rd Regular Session), p7

To address this problem, some LGUs provided containers for segregated waste as temporary storage prior to collection and final disposal. Color codes have not yet been assigned to aid waste segregation especially in the residential areas, like condominiums, buildings, and other dwellings.

Sections 21 and 22 of the RA 9003 mandate that wastes segregation shall primarily be conducted at the source, to include household, institutional, industrial, commercial and agricultural sources. Solid wastes shall be segregated and labelled with the following categories: "compostable," "non-recyclable," "recyclable," or "special waste."

Segregation, as defined in RA 9003, refers to a solid waste management practice of separating different materials found in solid waste in order to promote recycling and reuse of resources and to reduce the volume of waste for collection and disposal.

Some LGUs have strictly enforced segregation at source coupled with segregated collection, through a ”no segregation, no collection” ordinance. Compliance of LGUs on the mandatory segregation at source ranges from 53%-100% based on a validation conducted on selected LGUs identified as having a promising initiative in solid waste management.

## D. Collection

RA 9003, in its IRR, stipulates that collection refers to the act of removing solid waste from the source or from a communal storage point. The law also provides for a segregated collection of solid wastes.

Section 24 of the law mandates the use of separate collection vehicles, schedules and/or separate trucks or haulers for specific types of wastes. The vehicles used for the collection and transport of solid wastes shall have the appropriate compartments to facilitate efficient storing of sorted wastes while in transit. However, at present, a number of LGUs still practice mixed waste collection.

LGUs are primarily responsible for the collection of solid wastes. On the barangay level, waste segregation and collection should be conducted specifically for biodegradable/compostable and reusable/recyclable wastes (IRR Rule VIII). The cities and municipalities are responsible for the collection and disposal of non-recyclables (residuals) and special wastes.

The following are different techniques used in waste collection:

1. *Door-to-Door Collection*
   Collectors move materials from house to house in the target area to collect recyclables and sell them to dealers/junkshops.
2. *Stationary Collection*

This collection system utilizes MRFs in barangays that are set up within or near the targeted collection area for the temporary storage of segregated recyclables, which are brought to or picked up by collectors or junkshop dealers.

3. *Waste Collection by Trucks*
   Garbage truck workers segregate recyclable materials while collecting garbage from house to house, and sell them to the junkshops.

Solid waste collection in the country is commonly done by an organic unit in the LGU, the Public/General Services Office, an organic unit in the LGU. In other LGUs, however, the solid waste collection unit is placed under the city/municipal administrator or engineering office. In the absence of a permanent solid waste management unit, collection service is either implemented by the administration or through private contractors.

A number of highly urbanized cities and municipalities currently practice the "no segregation, no collection" policy, including pilot districts in Quezon City and in San Carlos City, Negros Occidental.

***Role of the Informal Sector in waste collection***

The informal waste sector include individuals, families, groups, or small enterprises engaged in the recovery of waste materials with revenue generation as the motivation, either on a full-time or part-time basis. Members of this sector are classified as itinerant waste buyers, jumpers at collection trucks, garbage crew, waste reclaimers, and small and illegal junkshops.

In the Philippines, an organized waste sector that includes junkshops and waste reclaimers currently exist. Most of them were organized by NGOs, LGUs, or the private sector.

The NSWMC is the only national office directly involved in the development of the informal waste sector. On the other hand, other national agencies work directly or indirectly with the informal waste sector as part of their mandate. In addition to the national agencies, various church-based, private organizations, and NGOs also work for the welfare of the informal waste sector.

Recycling activities of the informal waste sector allow conservation of resources and productive use of the materials. Their activities also are more energy efficient and cost effective compared to their counterparts in the formal sector. Unfortunately, they are known to work in unsafe and hazardous environments.

The NSWMC Secretariat and member of the Commission, in collaboration with the UNEP Regional Resource Center for Asia and the Pacific, developed a National

Framework on the Management of the Informal Waste Sector under the Advanced Waste Management Project, which was funded by the Japanese Government and the Institute for Global Environmental Strategies. The project supported selected Southeast Asian Countries (Cambodia, Malaysia, Thailand and the Philippines) in formulating their National Strategy and Action Plan to promote 3Rs, and disseminating their experiences as best practices to the other countries.

The mission is to integrate the informal sector in the SWM system by providing them with a favorable policy environment, skills development, and access to a secured livelihood, employment, and social services. By getting organized, waste pickers will have a stronger bargaining position with industry and government, and thus, can gain higher incomes. If organized into cooperatives, they can enter into contracts with industry or grant agreements with donor agencies.

The framework plan proposed five interventions that would help improve the conditions of the informal waste sector:

- Supporting waste collectors to enter new service roles and niches in separate collection and recycling;
- Assuring waste collectors access to sorting space at transfer stations, controlled and sanitary landfills;
- Supporting better market leverage and/or diversification of activities through cooperatives and associations;
- Opening channels of communications with formal stakeholders and decision-makers into the planning process; and
- Improving the work conditions through the implementation of environmental and occupational safety practices and systems.

(Source: NSWMC 2009)

## E. Transfer and Transport

Transfer stations, as defined in RA 9003, are those facilities utilized to receive solid wastes, temporarily store, separate, convert, or otherwise process the materials, or to transfer the solid wastes directly from smaller to larger vehicles for transport.

*Section 24 of the RA 9003 stipulates:* Requirements for the Transport of Solid Waste - The use of separate collection schedules and/or separate trucks or haulers shall be required for specific types of wastes. Otherwise, vehicles used for the collection and transport of solid wastes shall have the appropriate compartments to facilitate efficient storing of sorted wastes while in transit.

Vehicles shall be designed to consider road size, condition, and capacity to ensure the safe and efficient collection and transport of solid wastes.

The waste compartment shall have a cover to ensure the containment of solid wastes while in transit.

For the purpose of identification, vehicles shall bear the body number, the name, and the telephone number of the contractor/agency collecting solid waste.

*Section 25 of the RA 9003 provides:* Transfer stations shall be designed and operated for efficient waste handling capacity and in compliance with the environmental standards and no waste shall be stored in such station beyond 24 hours.

Under the law, siting of the transfer station shall consider the land use proximity to collection area and accessibility of haul routes and to deposal facility.

In most cases, LGUs (or the contractors) use motorized collection vehicles, which include compactors and non-compaction trucks especially in urban areas. The most common type of equipment used in waste collection is a dump truck or compactor truck. Most LGUs have acquired at least one dump truck for collection of solid waste. Reports indicate that waste collection service varies widely from LGU to LGU, depending mostly on the equipment availability.

A transfer station is a facility that has a designated receiving area where waste collection vehicles discharge their loads. The waste is usually compacted, then loaded into larger vehicles for transport to a final disposal site, such as a sanitary landfill, a waste-to-energy plant, or a composting facility. The waste is temporarily stored in the transfer station until loaded into a larger vehicle and moved off site usually in a matter of hours. (Source: US EPA 2002). In Metro Manila, there are two transfer stations, one at pier 18 and another at Marikina.

**Marikina Transfer Station**

## F. Processing and Recovery

Processing and recovery are two important elements of SWM, in addition to the preferred options, namely, waste avoidance/minimization, waste reduction, waste reuse, and waste recycling.

Processing and recovery of waste may be done in a number of ways and may involve several stages, depending on the type of waste and the purpose of the initiative. It should be noted, however, that the success of processing and recovery highly depends on the effectiveness of other prior activities, such as waste avoidance, segregation at source, and segregated collection.

### 1. Material Recovery Facilities (MRFs)

Section 32 of RA 9003 mandates that Material Recovery Facilities (MRFs) be established in every barangay or cluster of barangays, The MRF includes a solid waste transfer station or sorting station, drop-off center, a composting facility, and a recycling facility.

MRFs serve to reduce the amount of wastes to be disposed of mainly through recycling, composting, and residual treatment. The combination of MRF, composting, and other processing activities in some cases are done in so-called Eco-parks.


As of 2012, a total of 7,683 MRFs have been established, serving a total of 8,704 barangays from 1,265 MRFs, serving a total of 1,672 barangays in 2006, or an increase of 80% in the number of barangays covered for a period of 6 years. Moreover, in recent years, MRFs have also been established in schools, malls, and other commercial establishments.

Below is a list of the number of MRFs found in the regions in 2012. Note that the National Capital Region and Region 11, particularly, Davao, posted a relatively high percentage of compliance in terms of barangays covered by the MRFs established.

MRFs are being operated by either the public or the private sector.

**Table VIII. Material Recovery Facilities Established**

| Region | No. of MRFs | Barangays Served | Percent (%) coverage from the total number of Barangays |
|---|---|---|---|
| **1** | 672 | 694 | 13.97 |
| **2** | 170 | 175 | 6.97 |
| **3** | 326 | 375 | 10.96 |
| **4A** | 657 | 783 | 19.27 |
| **4B** | 117 | 122 | 8.23 |
| **5** | 302 | 390 | 10.83 |
| **6** | 644 | 804 | 19.75 |
| **7** | 401 | 435 | 14.12 |
| **8** | 881 | 1080 | 24.08 |
| **9** | 248 | 283 | 14.86 |
| **10** | 484 | 679 | 30.46 |
| **11** | 950 | 950 | 52.24 |
| **12** | 175 | 184 | 15.41 |
| **13** | 548 | 590 | 45.04 |
| **CAR** | 155 | 186 | 15.48 |
| **NCR** | 935 | 956 | 55.95 |
| **ARMM** | 18 | 18 | 0.60 |
| **Total** | **7683** | **8704** | |

Source: NSWMCS, March 2012

Currently, a number of LGUs engage local junk dealers/shops to serve as their MRFs. Through a Memorandum of Agreement, the junkshops become part of the SWM system of the local government. Furthermore, MRFs established by public and private schools and commercial establishments also serve as storage areas of recyclables before being sold to junk dealers.

**Guidelines for the Establishment of Junkshop cum MRF in every Barangay**

1. Each Barangay shall have the following:
    a. A Barangay Solid Waste Management Committee created through a resolution
    b. A Barangay Solid Waste Management Plan with the following:
        i. Profile
        ii. Estimated volume of waste generated
        iii. Schedule of collection for biodegradable and recyclable wastes
        iv. Programs for IEC/separation, segregation and recycling
        v. Funding requirements for SWM programs
2. Each barangay shall identify a junkshop within its jurisdiction and come up with an agreement naming such as its MRF.
3. The identified junkshop must fulfill the following requirements:
    a. Licensed and accredited
    b. Should establish network with junkshop operators
    c. Submit period evaluation of its operation including challenges met
    d. May accommodate eco-aides as recommended by the barangay for segregation and recycling
    e. Maintain a record of incoming/collected wastes to be used in determining the waste diversion
    f. Must adhere with the following criteria for a model junkshop:
        i. Clean, orderly and odor-free area
        ii. Accredited and licensed
        iii. Facility big enough to accommodate recyclable and sorting operation
        iv. With honest trustworthy, reliable, cooperative and disciplined workers
        v. Enough parking space for customers and delivery purposes
        vi. Junkshop owners must be conscientious taxpayers
        vii. Must have well-equipped and identified eco-aides
        viii. Must display complete name and address
    g. Must have a solid waste action plan that will be submitted to the barangay for consolidation
    h. Must have a memorandum of agreement with the barangay
    i. Must initiate the preparation of a schedule and route plan as well as information dissemination

Source: NSWMC 2010

***Clustering***

Section 13, Article X of the 1987 Constitution allows LGUs to group themselves, consolidate, or coordinate for purposes beneficial to them and in accordance with the law. Similarly, the Section 17 of the Local Government Code authorizes LGUs to exercise such power as "necessary, appropriate, or incidental" to the efficient and effective provision of basic services and facilities including solid waste disposal system or environmental management system and services or facilities related to general hygiene and sanitation.

Furthermore, RA 9003 mandates LGU coordination for *jointly* addressing: i) **common** solid waste management problems; and/or ii) establishing **common** waste treatment and disposal facilities.

LGUs opt to cluster for the following advantages and benefits:

**Table IX. Benefits of Clustering to LGUs**

| Advantages of Clustering | Benefits to LGUs |
|---|---|
| • Preservation of common heritage and identity | • Scarce resources to implement projects will be supplemented by other members' shares |
| • Development needs easier to identify and address | • High possibility of funding assistance and approval of proposals from donor agencies/financial institutions |
| • Serves as a tool in establishing growth centers in the Province/Region | • Equipment needed for infrastructure development and waste management will be supplemented by other members |
| • Ensures greater benefits thru equitable sharing | • Wider market for services will be established |
| • Allows wider area jurisdiction to achieve desired economies of scale | • Increase in employment opportunities for constituents |

Source: ATTY. ERNESTO P. MACEDA, Jr. August 2006

**Brgy. Lingsat Cluster, San Fernando, La Union -**

The Brgy. Lingsat Cluster is composed of four barangays, namely, Lingsat, Carlatan, Dalumpines Oeste, and Padaraoan, located in San Fernando City, La Union. The cluster was spearheaded by the people of Brgy. Lingsat after successfully managing anEcological Solid Waste Management Program they started in 2002.

Called the Lingsat Ecowaste Management System or LEMS, they believed that their system was applicable, adoptable, and sustainable, which led to a successful application in the three neighboring barangays. With a Memorandum of Agreement, the barangay cluster shared in the expenses to set up a segregated collection system and a common MRF.

The LEMS reduced by 66% the city trucks' waste collection in the barangay cluster. Offshoot programs and projects also flourished, such as the Lingsat Fish Pond, Lingsat Marine Protected Area, and the Lingsat Environmental Complex, which has a vermi-composting facility,an herbary, and a butterfly garden.

As the barangay residents greatly benefit from the ecowaste program, the LEM also extend direct help to two scholars who now work as eco-aides and IEC volunteers; Likewise, 90 marginalized Lingsat fisherfolk directly benefit from the sales of recyclables and compost, subsidizing their boats' registration fees and painting.

## 2. Managing Biodegradable Wastes

Biodegradable or compostable wastes (also biowaste) include garden wastes (weeds, leaves, twigs, seeds, etc), and animal wastes (manure, carcass, etc). In households, it consist of leftover foods, vegetable trimmings, and fruit peelings, are most often used as feeds for animals/pets.

a) Composting

Composting is the most common option to manage biodegradable waste. LGUs employ different composting technologies. Most barangays, cities, and municipalities use windrow types or in vessel type (bio-reactor) of composting systems. Vermi-composting, utilizing African worms or night crawlers, are also being practiced. The most common techniques are briefly described below:

(1) *Windrow composting* is the process of converting organic materials into compost using an elongated pile with a width measuring twice the height of the pile. Usually, the windrow measures 1m wide, 1.5 meters in height and the length depends on the volume of organic materials to be composted. The height of the pile allows the generation of sufficient heat, maintains

temperature and allows enough oxygen to diffuse to the center of the pile. Individual windrows are constructed to compose a batch that lasts for several weeks. Windrows are placed on a firm and impermeable surface for easy turning. The turning of the pile is required to re-introduce air into the pile and increase porosity so that efficient passive aeration from atmospheric air takes place at all times. Turning is done manually or through the use of mechanical equipment. The whole process takes 30 to 60 days.

(2) *Vermi composting* - utilizes earthworms to convert organic waste into vermi compost. *It utilizes Eudrilus euginae* or the African night crawler earthworm. The earthworms feed on the decaying organic waste and with the aid of the microorganisms in the digestive tract of the African crawlers, the organic materials are expelled as worm manure which is called vermi cast. This method involves four phases: preparation of the organic material, anaerobic decomposition, aerobic decomposition, and harvesting. The whole process takes 25-35 days.

**Vermicomposting of Biodegradable Market Wastes in Ormoc City**

Ormoc City, which is home to more than 180,000 residents, generate more than 30,000 tons of municipal solid waste per year (2010 data). Due to the city's resource and geographical limitations, the city waste collection serves only half of the households.

The latest waste analysis and characterization study, found that 48% of the total waste generated in Ormoc is biodegradable. Between 1.5 to 2.0 tons of segregated biodegradable wastes generated at the public market and the city center are delivered to the composting facility daily. Big particles in the waste are first shredded before being delivered to the windrow composting facility. It takes usually between two to four months before the compost can be harvested. To improve quality and to add value to the compost, the facility has constructed vermicomposting boxes to feed the mixture to the 'African nighcrawler.' These worms thrive in pre-composted materials and then excrete nutrient-rich vermicast.

Along with the original compost, vermicast produces vermicompost products proven to effectively re-fertilize the soil and yield healthy crops. The LGU has assigned more than 20 dedicated personnel to operate the facility and do the crucial task of maintaining each of its seventy 1-m3 vermicomposting boxes made of bamboo slats/plastic screens. Worm composting needs constant monitoring of moisture content, maintenance of sheds to limit direct sunlight, and elimination of potential worm predators. After about six weeks, vermicompost is harvested and then sieved using a locally fabricated, manually operated drum screen to remove impurities as well as recover the worms. The harvested compost is then kept in 10-m3 boxes for final processing by worms until it is distributed to farmers. ---SWM4LGUs

(3) *Backyard composting* are also being done in some of the local governments, mostly, in the countryside. The following are some of the approaches:

- Twin pits
- Tower tires
- Bottomless composters
- Clay flower pots compost
- Plastic Bag Composter
- Compost bins

**BENEFITS AND USES OF COMPOST**

1. Compost improves the physical, chemical, and biological properties of the soil, as a soil conditioner.
2. Compost can be used as a soil supplement in flower beds, vegetable gardens, lawns, and in planting new trees or shrubs.
3. Compost helps conserve moisture, prevent erosion, and reduce weed growth.

b) Support Programs for Composting

To support composting, the Department of Agriculture (DA) has distributed mechanical shredders in all regions through the dioceses and/or church organizations and People's Organizations (POs). Furthermore, they also support other LGU initiatives such as partnership with the Quezon City LGU and "Agri Kalikasan," where the DA intends to assist composting projects that would be sourced from "palengke" waste (market waste).

A recent assessment of composting approaches in rural areas (Paul et al., 2008) undertaken in six municipalities compared applied technologies, input material, output produced, investment and operation costs, and evaluated benefits for the local waste management systems.

The composting technologies compared were windrow, boxes, and vermi-composting versus mechanized drum-composter. It was found that composting has an overall positive effect on local SWM. However, municipal composting investment and operation costs surpass the costs for the commonly practiced waste dumping. Static windrow or box-composting were identified as "less costly composting technologies," if compared with drum composting. However, increase of fuel expenditures for waste transportation, the reduction of waste to be disposed of, and the positive effect of compost applied to garden/agricultural soils may motivate municipal authorities to continue implementing composting projects.

Good showcases in composting have been demonstrated to other LGUs especially to empower the barangays. Information on composting systems has been transferred most effectively through inter-LGU sharing forums and through the assistance of environmental groups. The availability of technical knowledge and success stories are apparently the best driving force for LGUs to adopt the technologies.

**Brgy. Old Centro Proper, San Mateo, Isabela**

Located in San Mateo, Isabela, Brgy, Old Centro Proper stands out as one of the models for networking and mobilization of citizenry. Aside from the Barangay SWM Committee, various organizations such as the Isabela Green Ladies Organization or IGLO, Homeowners Association per purok (six puroks with 11 zones) Rural Improvement Club, Barangay Pastoral Council, Couples for Christ, Knights of Columbus, San Mateo West Central School, and San Mateo Vocational & Industrial High School are active in the barangay. After being shortlisted in the Search in 2003, recognitions came their way—from newspapers, radio, and TV. Thus, the barangay became a regular Lakbay Aral site for many local governments wanting to learn community-based ESWM.

Brgy. Old Centro Proper is also made more outstanding by what they call a Special Waste Vault, a containment of hazardous waste, such as florescent bulbs, spent batteries,

c. Lack of Market for Compost

The lack of market for compost, or even compost utilization, currently faces barangays or LGUs even as they have MRFs with composting facilities. The investment in composting equipment, such as mechanical composting drums, shredders, and other equipment, as well as on a regular supply of microbial inoculant, is not easily recovered because of the lack of market or buyer for the compost produced.

As barangays and LGUs are challenged by the situation, the market for compost needs to be developed. While the organic fertilizer standard (which covers compost) was formulated in 2009, the IRR of the Organic Agriculture Act of 2010 was approved two years later in March 2011. The law binds the connection between composting and organic agriculture, which many stakeholders, both environmentalists and farmers, have long waited for; however the challenge remains for the agriculture sector to make the shift from chemical fertilizers to organic fertilizers as input to agricultural production.

**3. Managing Recyclable Waste**

Recycling as defined in the Ecological Solid Waste Management Act is “the process of treating the waste to make it suitable for a beneficial use, and may even transform the waste material into a new product, and which could also be used as raw materials for the production of other goods and services.”

Recyclable wastes, as defined in RA 9003, refers to any waste material retrieved from the waste stream and free from contamination that can still be converted into suitable beneficial use or for other purposes, including, but not limited to,

newspaper, ferrous scrap metal, non-ferrous scrap metal, used oil, corrugated cardboard, aluminum, glass, office paper, tin cans, and other materials as may be determined by the Commission.

Generally, there are four types of recyclable materials. These are paper, plastics, glass and metals, further classified into the following (As cited in ADB Report 5c, 2003):

**Table X. Types of Recyclable Materials**

| Type | Kinds |
|---|---|
| Paper | Newsprint (old/used newspaper)<br>Printing & Writing (bond paper, book paper, computer paper)<br>Kraft (old boxes and brown paper bags)<br>Paperboard (carton and tag board)<br>Tissue/Napkins<br>Office/Bank/School waste paper<br>Mixed paper<br>Printing press trimmings |
| Plastic | Polyethelene terephthalate or PET (soft drink/mineral water bottle)<br>High-Density Polyethelene or HDPE (shampoo bottles/food crates)<br>Low-Density Polyethelene or LDPE (e.g. clear plastic bags)<br>Polyvinyl chloride or PVC (e.g. floor tiles, water pipes, molded chair/table)<br>Polypropylene or PP (e.g. bottle cap, egg tray, waste basket)<br>Polystyrene or PS (e.g. styropor and styrofoam)<br>Other unclassified types of plastic (some also used as food containers) |
| Metal | Tin/steel (tin/steel can, scrap iron/bronze/copper)<br>Other ferrous (or magnetic) metal<br>Aluminum (aluminum can, aluminum scrap/cuttings)<br>Other non-ferrous (or non-magnetic) metal<br>Mixed/composite metal |
| Glass | Clear (crystal, no color)<br>Colored (amber, green)<br>Mixed glass<br>Mixed/composite |
| Others | Used car battery, used cartridge, scrap marble, empty/used doypacks (lately used as handicraft materials), junk computer, sawdust |

Recovery of recyclables is generally done at source. Many households segregate and sell some of their used and disposable items like old newspaper, empty bottles, and scrap metal. These are usually bought by pushcart-driving buyers, who are either the informal *waste pickers* or the organized *eco-aides* who, in turn, sell the items to junk shops or dealers. However, a significant amount of recyclable wastes still enter the solid waste collection and disposal stream. These are retrieved from waste collection vehicles while in transit to the dumpsite and at the dumpsite itself. While collecting

the waste, the *paleros* (crew members accompanying the garbage collection truck) immediately segregate the saleable materials from the rest of the waste.

Other sources of recyclable solid wastes, like the large commercial and industrial establishments, segregate and sell the materials directly to dealers and are delivered to or picked up by the latter in bulk.

There is a network of junk dealers in Metro Manila called "*Linis Ganda*" that buys the recyclable materials from individual households. About 500 waste dealers are involved in "Linis Ganda," with about 1,000 Eco-Aides[6].

The remaining recyclable wastes are recovered away from the source. While a few are gathered by waste pickers from roadside litter, the largest quantities are retrieved from waste collection vehicles while in transit to the dumpsite and at the dumpsite itself. While collecting the waste, the *paleros* (crew members accompanying the garbage collection truck) immediately segregate the saleable recyclable materials from the rest of the waste.

a) Market for Recyclables

RA 9003 mandates the Department of Trade and Industry to develop markets for the recycling industry, thus giving rise to a study called, "Study on Recycling Industry Development in the Philippines" (study period 2006 until 2008).

The study aimed at formulating a Master Plan and Action Plan to clarify the policies, measures, and action to be taken by the national government to promote and develop the recycling industry in the country in order to achieve the primary objective of RA 9003 as well as increase awareness on reduce, reuse, and recycling of wastes.

A project of the Board of Investments and Department of Trade and Industry, and funded by the Japan International Cooperation Agency (JICA), it was fully supported by the NSWMC and the private sector, particularly the recyclers of glass bottles, metals, papers, plastics and electronic wastes. The findings were presented at the Recycling Seminar Symposium and Exhibition held in SM Mega Trade Hall on January 24-25, 2008.

According to the study (2008), there are some limiting factors to the recovery of recyclable materials:

(1) Concentration of recycling industries in selected areas and the high

[6] (http://www.bestpractices.org/database/bp_display_best_practice.php?best_practice_id=724)

cost of transporting recyclable materials;

(2) Weakness of local recycling industries due to high operating costs; and,
(3) Fragmented information and network for optimizing the flow of recyclable/recoverable materials from generators to the final users.

Also among the findings of the study is the instability of domestic supply, both in quantity and quality. Lack of a steady supply of recyclable waste will tend to depend on imported materials and affect business operations, while poor quality of materials will mean low prices and a decrease in productivity. The JICA study recommended that the following issues be considered in the formulation of national policies, measures, and actions to be taken:,

(1) Proper distribution of information on domestic recyclable materials among the important players and stakeholders
(2) Establishment of a strong local-based recycling system from segregation at source to the final receiver of the materials
(3) Introduction of financial and non-financial incentives to promote the recycling industry and its related activities

As regards the recycling industries or the end-users of recyclable materials, their status of development varies with types of materials as well as localities. Also, the dominant role and intervention of the informal sector in the distribution of recyclable materials greatly affects the material flow of major recyclables in terms of their quantity and quality.

The JICA study on mentioned above also reveals that the dominance of small and medium recyclers in the Philippines is also problematic in terms of material consumption efficiency, proper management of working safety and environment and pollution control. It should be noted however that the there are many potential areas of improvement in the current recycling practices for resource use efficiency and environmental management.

**Commercial-based SWM Programs**

The law requires larger commercial and industrial companies to implement their own solid waste management system., an example of which is described here.

As *Shoe Mart (SM) Group and Ayala Foundation* continue to promote the recycling, reuse, and reduction of wastes through their monthly waste markets and recyclers fair in their respective branches, another super mall, Robinson's Supermarket joined the waste diversion's effort of the private sector to support the implementation of RA 9003.

On June 4, 2009, Solid Waste Management Association of the Philippines (SWAPP), a non-profit membership organization, and Robinson's Supermarket Corporation (RSC) signed a project undertaking to promote the "use of less plastic" as an effort to efficiently manage solid waste through the Eco Savers Bag Project. It is expected that this project will contribute to increase the recycling rate which is reported to have been 26% in 2006. Under this agreement, RSC will donate a portion of the income from the ecobag to SWAPP to support its advocacy for a clean environment. As an organization, RSC subscribes to the promotion of wellness through a healthy lifestyle and environment. This collaborative undertaking of RSC and SWAPP will be in effect for a period of one year, from June 2009 to June 2010.

b) Waste Exchange and Resource Recovery Events

Waste exchange is also one option for managing recyclable wastes. The Philippine Business for the Environment (PBE) and the EcoIndex in the CALABARZON area manages the Industry Waste Exchange Program (IWEP) and the Resource Recovery Events (RRE), respectively. PBE operates as an information clearinghouse that matches waste generators and waste buyers, while the EcoIndex regularly conducts RRE that allows the waste generators to bring in their recyclables/waste products to invited recyclers and waste users.

The recyclables are dominantly collected by the waste pickers, as shown in the table below, indicating that still a large amount of recyclable materials are brought into disposal sites. The next tables show the collection of recyclable materials by middleman and traders and the collection rate of individual primary recyclers.

**Table XI Collection of Recyclable Materials by Primary Collectors (unit: kg/psn/day)**

| Recyclable Material | Primary Collector | Metro Manila | Metro Cebu | Southern Mindanao |
|---|---|---|---|---|
| Paper | Street Collectors | 3.18 | 3.59 | 2.45 |
| | Collection Workers | 21.83 | 1.81 | 0.62 |
| | Disposal Site Scavengers | 22.01 | 8.21 | 12.86 |
| Aluminum | Street Collectors | 0.76 | 0.35 | 0.40 |
| | Collection Workers | 0.78 | 0.13 | 0.02 |
| | Disposal Site Scavengers | 2.50 | 0.05 | 1.79 |

| | | | | |
|---|---|---|---|---|
| Other Metals | Street Collectors | 1.39 | 5.04 | 14.76 |
| | Collection Workers | 12.35 | 0.94 | 0.64 |
| | Disposal Site Scavengers | 16.75 | 6.34 | 13.75 |
| Plastic | Street Collectors | 1.63 | 3.94 | 3.50 |
| | Collection Workers | 9.79 | 0.50 | 0.63 |
| | Disposal Site Scavengers | 20.32 | 4.48 | 25.00 |
| Glass | Street Collectors | 0.85 | 0.58 | 6.65 |
| | Collection Workers | 6.58 | 0.26 | 0.94 |
| | Disposal Site Scavengers | 9.96 | 0.32 | 49.64 |

*Source: JICA Study, 2008*

**Table XII. Collection of Recyclable Materials by Middleman and Trader (unit: kg/day/dealer)**

| Recyclable Material | Trader | Metro Manila | Metro Cebu | Southern Mindanao |
|---|---|---|---|---|
| Paper | Eco-aides (Garbage Crew) | 12.76 | 12.76 | 12.76 |
| | Junkshops | 167.94 | 95.31 | 103.26 |
| | Consolidators | 385.71 | 709.82 | 661.43 |
| Aluminum | Eco-aides (Garbage Crew) | 0.88 | 0.88 | 0.88 |
| | Junkshops | 17.03 | 7.37 | 8.38 |
| | Consolidators | 127.14 | 2.34 | 20.00 |
| Other Metals | Eco-aides (Garbage Crew) | 11.79 | 11.79 | 11.79 |
| | Junkshops | 137.76 | 250.94 | 87.52 |
| | Consolidators | 1242.86 | 959.82 | 500.00 |
| Plastic | Eco-aides (Garbage Crew) | 5.20 | 5.20 | 5.20 |
| | Junkshops | 266.39 | 160.53 | 330.31 |
| | Consolidators | 114.29 | 550.25 | 442.86 |
| Glass | Eco-aides (Garbage Crew) | 3.56 | 3.56 | 3.56 |
| | Junkshops | 49.12 | 183.76 | 48.86 |
| | Consolidators | 74.29 | 0.00 | 532.36 |

*Source: JICA Study, 2008*

Eco-aides are the organized door-to-door collectors of recyclable materials under the management of NGOs, LGUs, or Barangay offices. Therefore, the collection amount by Eco-aides is much higher than informal street collectors. Junkshops are the receivers of recyclables from primary collectors including eco-aides and also the traders to the bigger traders such as consolidators or final users of the products. Consolidators are the biggest traders of recyclable materials receiving them from large-scale generators of recyclable materials such as factories, commercial facilities,

and office buildings as well as from smaller junkshops and even from individual primary collectors. Most of the consolidators are the suppliers of recyclable materials to their final users as well as importers/exporters of such materials.[7]

**Table XIII Hierarchy of Informal Waste Sector Recycling**

| | |
|---|---|
| | **Importers of Recyclable Materials** |
| **Highest Value** | **Recycling Industries** |
| | **Brokers, wholesalers/consolidators** |
| | **Big Junkshops** |
| | **Medium and Small Junkshops** |
| | **Itinerant Waste Buyers** |
| | **Garbage Crew or Paleros** |
| | **Jumpers** |
| | **Waste Pickers** |
| **Lowest Value** | |

Source: D.C. Wilson, Costas Velis and Chris Cheeseman. "Role of informal sector recycling in waste management in developing countries." Habitat International, *2005. as cited in the National Framework Plan for the Informal Sector in Solid Waste Management, 2008*

c) Recycling Technologies

**Table XIV: Overview of Recyclable Technologies**

| Recyclable Material | Process Flow | Products |
|---|---|---|
| PACKAGING LAMINATES | | |
| -a layered packaging material consisting of thin films of thermoplastic and aluminum foil which come in the form of pouches and sachets<br>-exhibits superior barrier properties against moisture and preserves oxygen<br>-most commonly used as packaging material in budget packs for powdered products like instant coffee, milk, juice, etc | 1. Grinding/Crushing<br>2. Batching<br>3. Molding/Forming | |
| POLYSTYRENE FOAM | | |
| -Unique characteristics: inert, lightweight, versatile, cheap but non-biodegradable | Melting in Melting Unit | Bricks<br>Catwalk Tiles |

[7] Ex Corporation, 2008. The Study on Recycling Industry Development in the Republic of the Philippines

| | | |
|---|---|---|
| -Most common plastic material used for disposable food packaging (fastfood chains)<br>-remains visible in waste streams, clogged drainage | Molding in Table Top Mold | Blocks, synthetic planks |
| GLASS PACKAGING | | |
| -100% recyclable<br>-color segregation needed (Flint or clear(*Coke)*, Green Amber (*Cali, Sprite)* or brown *(SMB Pale Pilsen)*, Flint with blue prints<br><br>Glass Cullet - Broken glass from soft drinks, beer, liquor, pharmaceutical bottles and packers jars | -Waste glass bottles > Melting > Molting glass > Form > Annealing > Products<br>-Melting Temp. about 1450 C Low fuel consumption | Hand Blown Glass glass decors<br><br>Novelty products |
| PAPER | | |
| Segregate paper by type<br><br>Unsorted paper = classified as mixed waste | | Every ton of paper recycled saves almost 17 trees |
| Non-usable Paper:<br>Carbon paper<br>Plastic coated or laminated paper, usually book covers<br>Wet-strength or unrepulpable paper | | 17% of our waste is paper<br><br>60% Energy Savings / 90% less air pollution |
| CARTON BASED PACKAGES OR CONTAINERS | | |
| | Packages or containers turned into Composite Boards | Composite Boards for<br><br>cement pallets<br>furniture backing<br>flash doors<br>roofs. Water & fire resistant |
| ALUMINIUM CANS | | |
| | | kitchen utensils, wheelchairs & other finished manufactured products. |

*NSWMC 2006*

**Other waste recovery processes are:**

(1) REPAIR / REFURBISHING: A method of recovery which is neither reuse nor recycling. It needs fewer materials and less energy to manufacture either new or recycled products.
(2) Electronics recycling through DEMANUFACTURING: A non-destructive process to recover reusable parts or recyclable materials. Electronics are dismantled to be resold, or further processed for recycling.
(3) REMANUFACTURED cartridges use replacement ink to avoid discarding used

cartridges.

(4) Recycled CANDLES through melting and mixing with paraffin to produce new candles/products.

(5) TIN CANS are cleaned and through other process e.g. formed into new cans.(NSWMC 2006 – to be updated)

## G. Other SWM Processes and Technologies

### 1. Biomass Technologies

Biomass refers to the mass of non-fossilized and organic materials that originate from plants, animals, and micro-organisms. The materials are products, by-products, and residues and waste from agriculture, forestry, and related industries, as well as non-fossilized and biodegradable organic fractions of industrial and municipal wastes. Biomass also includes gases and liquids recovered from the decomposition of non-fossilized and biodegradable organic material. (Source: CDM in CHARTS ver 9.0, November, 2009. Institute for Global Environmental Strategies through the Ministry of Environment, Japan.)

**Fuels from Waste**

Opportunity fuels are usually by-products of waste streams from other processes. Although these fuels do not have the same heating value characteristics as conventional fossil fuels, they still are beneficial as a potential source of alternative energy, especially when used with distributed generation (DG) energy systems. Common opportunity fuels are anaerobic digester gas, landfill gas, and wood and wood waste. The fuels are derived mostly from solid biomass waste, such as crop residues, farm waste from animal feeding operations, municipal solid waste, sludge waste, and wood waste. (Source: EPA)

According to the Department of Energy (DOE), the contribution of biomass, along with wind and solar sources for non-power applications, will comprise a large portion of the total demand for renewable energy (RE) in the next 10 years. Biomass resources will continue to dominate *total non-power demand* for RE, increasing from 40.43 million barrels of fuel oil equivalent (MMBFOE) in 2003 to 47.46 MMBFOE in 2012. Latest estimates reveal that the country's agriculture sector is expected to reach a *biomass supply potential* of 323.1 MMBFOE by 2012.

*Biomass* is "*renewable*" if one of the following five conditions applies:

1. The biomass is originating from land areas that are **forests**1 where:

(a) The land area remains a forest; and b) Sustainable management practices are undertaken on these land areas to ensure, in particular, that the level of carbon stocks on these land areas does not systematically decrease over time (carbon stocks may temporarily decrease due to harvesting); and
(c) Any national or regional forestry and nature conservation regulations are complied with.

2. The biomass is **woody biomass** and originates from **croplands and/or grasslands** where:

(a) The land area remains cropland and/or grasslands or is reverted to forest; and (b) Sustainable management practices are undertaken on these land areas to ensure in particular that the level of carbon stocks on these land areas does not systematically decrease over time (carbon stocks may temporarily decrease due to harvesting); and (c) Any national or regional forestry, agriculture and nature conservation regulations are complied with.

3. The biomass is **non-woody** biomass and originates from **croplands and/or grasslands** where:

(a) The land area remains cropland and/or grasslands or is reverted to forest; and
(b) Sustainable management practices are undertaken on these land areas to ensure in particular that the level of carbon stocks on these land areas does not systematically decrease over time (carbon stocks may temporarily decrease due to harvesting); and (c) Any national or regional forestry, agriculture and nature conservation regulations are complied with.

4. The biomass is a **biomass residue**2 and the use of that biomass residue in the project activity does not involve a decrease of carbon pools, in particular dead wood, litter or soil organic carbon, on the land areas where the biomass residues are originating from.

5. The biomass is the non-fossil fraction of an **industrial** or **municipal waste**.

Otherwise, where none of these conditions applies, the biomass is considered as *"nonrenewable"*.

In terms of geographical biomass supply situation, DOE reports that there is abundant supply of bagasse in Regions III, IV, VI and VII; coconut residues in Regions IV, VIII, IX and XI; and ricehull in Regions II, III, IV and VI.

The biomass technologies currently being utilized in the country include the use of:

1. bagasse as boiler fuel for cogeneration;
2. rice/coconut husks dryers for crop drying;

Small scale pyrolizer for farm irrigation featured by the Forest Products Research and Development Institute (FPRDI) of the Department of Science and Technology (DOST) produces combustible gas and carbon from agro-forest wastes such as rice hull, shells of pili, peanut and coconut, corn cobs, coffee bean hull and wood chips. The gas can be used to fuel an internal combustion engine to drive irrigation pumps. The system is capable of pumping about 30,000 gallons of water per hour compared to the traditional diesel engine pump's 12,000 gallons per hour output. It can meet the water requirement of a 9.3-hectare farm in eight hours. (Source: FPRDI-DOST)

3. biomass gasifiers for mechanical and electrical applications; and
4. fuelwood and agri-wastes for oven, kiln, furnace, and cookstoves for cooking and heating purposes. (Source: DOE)

Noteworthy initiatives in relation to processes and technologies are those undertaken by the Central Philippine University (CPU), Iloilo City; the EMB-DENR Region 6; and the AHT GROUP AG, GTZ-AHT Project, conducting very valuable researches on biomass and urban waste utilization. Among these are:

**Biomass Waste Utilization: An Approach for Solid Waste Reduction**[8]

Abstract:
"*Three approaches have been devised by Central Philippine University (CPU) in utilizing the enormous biomass waste generation in Western Visayas region of the Philippines. These approaches are direct combustion, gasification and briquetting. Gasification technologies developed by the University include steam-injected stoves and gasifiers are all fuelled by either rice husks or sawdusts and are good alternatives in reducing the generation of such wastes. To explore options for value adding Alternative Fuels and Raw materials (AFR), a manually-driven pelleting/briquetting machine was developed and tested at the Calajunan waste disposal facility in Iloilo City. This test included recovered light packaging materials, carbonized rice husks, sawdusts and low grade quality paper residuals to produce pellets which may be utilized as AFR by the*

[8] By: Aries Roda D. Romallosa, Alexis T. Belonio, Randy V. Pabulayan of Central Philippine University, Bienvenido L. Lipayon of DENR Region 6, Iloilo City and Johannes G. Paul of the AHT GROUP AG, GTZ-AHT Project Office.

*cement industry. A second test for peletting/briquetting was also done in order to produce alternative fuels for household consumption as substitute for wood fuel and charcoal. Results indicate that based on the actual number of stoves and gasifiers sold in the region, 18 to as high as 139 tons of biomass wastes/year may be removed from the wastes stream by utilizing them as fuel for household and industrial applications. Conversion of other wastes in AFR pellets and household briquettes is feasible provided that AFR be sieved into smaller particles.*"

**a) Briquette Production from Biomass**

(1) Production of Briquettes from Biomass and Urban Wastes Using a Household Briquette Molder (Central Philippine University, Aries Roda et.al.)

"Converting biomass and urban wastes using a simple briquette molder has great prospects when utilized as fuel for household use and eventually as substitute fuel to charcoal. Five different types of briquettes with their respective mixing proportions were produced, namely:

- Briquette 1) paper (100%);
- Briquette 2) Carbonized Rice Hull (CRH) 71% and binding material (29%);
- Briquette 3) paper (50%) and CRH (50%);
- Briquette 4) paper (50%) and sawdust (50%); and
- Briquette 5) paper (50%), CRH (25%) and sawdust (25%);

Results of the study revealed that the most viable mixtures for the production of briquettes based on practically and high rate of production and performance when used and compared to charcoal as fuel in boiling water and cooking rice are Briquettes 1, 4 and 5. The briquettes produced were pillow-shaped with approximate dimensions of 5cm length x 5cm width x 4 cm height. Paper was found to be an ideal substitute binding material for briquetting. Briquette production can be a viable business enterprise and source of income; for Uswag Calajunan Livelihood Association, Inc. (UCLA), the informal waste pickers can be an expert in recycling waste products like paper and other biomass wastes for profit, thereby providing the populace with a new and cheap alternative source of cooking energy."

One of the conclusions derived from the study is that "a gross income ranging from Php 180 (US$4) to Php 270 (US$7) may be earned in one day one member of UCLA if they would convert the waste paper recovered from the Calahunan dumpsite of Iloilo City, Philippines."

(2) Testing of Briquette Production for Household Use by Informal Waste Workers at the Calajunan Dumpsite in Iloilo City, Philippines (Romallosa, et.al. 2010)

"Three recommended mixtures for briquette production were tested by eight

identified informal waste workers within a 10-day briquette production test at the Calajunan dumpsite in Iloilo City, Philippines. The test revealed that Briquette 1 utilized a total of 127.50 kg dry waste paper; Briquette 2 was produced out of 183.80 kg of paper and sawdust while Briquette 3 was formed using 152.00 kg of paper, carbonized rice husk and sawdust. Briquette 2 produced the highest dry briquettes at 175.50 kg per 4.27 hr/day briquetting time followed by Briquette 3 at 142.74 kg for 4.18 hr/day and Briquette 1 at 122.25 kg for 4.19 hr/day. When all briquettes produced per day would be sold by the local waste worker's association at a rate of Php15 (US$0.34) per kg, Briquette 2 would give the highest approximate daily earnings of Php263 (US$6). Heating value of the pillow-shaped briquettes produced ranged from 6,500 to 7,000 Btu/lb."

(3) Briquettes are also produced by a number of LGUs, like Sta. Rosa, Laguna and Teresa, Rizal in the CALABARZON Region. The city government of Sta. Rosa, Laguna sells its charcoal briquettes at Php 20.00 per kilo. In Teresa, Rizal, paper briquettes are sold at Php10.00 per kilo. In Region IVB, Brookspoint and Puerto Princesa, Palawan, and Sablayan, Mindoro are among the LGUs producing charcoal briquettes, as well the municipalities of Suralah and Polomolok in Region 12.

The Philippine Rice Research Institute (PhilRice), in the Science City of Muñoz in Nueva Ecija, has developed a resource recovery system on biomass utilization: *Physical conversion using thresher, chopper, and shredder; thermal conversion through carbonization/carbonized rice hull (CRH) production and gasification system (power generation); and biological conversion to gas for heating***.** According to the PhilRice study, CRH export nets an income of Php30,000 per container shipment. At the local market, CRH is sold at Php 30/10 kg bag. A higher value is obtained when used in the production of microbial inoculants and organic fertilizer. Hence, this system can produce jobs and livelihood projects for the informal waste sector as well as promote socio-economic sustainability.

**b) Bioreactor Technology**

Another form of biomass utilization is bioreactor technology, also known as biogas digester or anaerobic reactor. The technology converts biomass including waste from agriculture, livestock, industries, domestic, and other human activities into energy and bio-fertilizer by anaerobic process (without oxygen).

The Industrial Technology Development Institute of the Department of Science and Technology (ITDI-DOST) developed bioreactors of different capacities for rapid composting:

- 500kg/day capacity, costing approximately Php350,000.00;
- 1ton/day capacity costing approximately Php557,000.00;
- 3 tons/day costing approximately Php1.3 M; and
- 5 tons/day capacity costing approximately Php2.3 M.

ITDI-DOST also developed portable bio-digesters that cost between Php 9,000.00 and 25,000.00, made of different types of material and capacity. Among those that use portable biodigesters are the LGUs of Buguias and La Trinidad, Benguet; Alabang, Muntinlupa City; Sta. Cruz, Laguna; Bacoor, Cavite; and Camalaniugan and Tuguegarao City in Cagayan Valley; Ozamiz City, Pagadian City; and other institutions, such as the National Kidney and Transplant Institute, and DOLE Philippines in Tagum City, Davao.

**c) Rice Husk Ash as Cement Substitute**

The use of rice husk ash (RHA) as additive to improve resistance to acidic attack and as cement substitute (up to 35%) and the use of fiber and agricultural wastes for roofing tiles are also some of the technologies to utilize biomass.

**d) Methane Recovery**

landfill gas from closed dumpsites can also be captured and utilized to generate electricity. Projects that involves Methane Recovery and Utilization are the: Payatas Gas to Power Generation Project in Quezon City; San Pedro Landfill Methane Recovery & Energy Generation (CDM) Project of Bacavalley Ecowaste, Inc. and Montalban Methane Capture to Electricity Project of Montalban Methane Power Corporation, among others. More information on some of these projects is provided in Section E of this chapter (Other Processes that Require Environmental Compliance Certificate).

**2. Co-Processing**

As defined in the Guidelines on the Use of Alternative Fuels and Raw Materials in the Cement Kilns or DENR Administrative Order (DAO) 2010-06, co-processing is the reuse or recovery of mineral or energy content of waste materials while simultaneously manufacturing cement in a single, combined operation.

Furthermore, the Guidance Manual on the Use of Alternative Fuels and Raw Materials in Cement Kiln Co-processing indicates that in the process of cement manufacture, portions of traditional fuels are replaced with the combustible components of the waste materials while the non-combustible components replace a portion of the raw materials. (DOST-ITDI, 2008)

The Philippine cement industry consists of six enterprises that operate a total of 14 cement plants. In 2007, cement sales increased for the first time in the preceding five years and reached 13.04M tons (CEMAP, 2009). Due to increasing oil and raw material prices, the cement industry initiated activities that aimed to co-process alternative fuels and raw materials (AFRs). Since 1998, the cement industry, in cooperation with DENR, and DOST, had explored the feasibility of using industrial hazardous wastes as AFR. Later in 2003, the Cement Manufacturers Association of the Philippines (CEMAP), GTZ, DENR, and DOST embarked on a partnership to further ensure the environmental and economic viability of AFRs. The collaboration involved

trial burns, registration as Treatment-Storage-Disposal-facilities (TSD-facilities), and culminated in developing the Guidance Manual on the Use of AFRs in Cement Kiln Co-processing for the Philippines. Developed in cooperation with all relevant stakeholders, the manual aims to inform authorities, industries, and civil society about co-processing. The manual contains regulations, standards, and procedure to put co-processing into practice; for example, registration and permit requirements, control systems, waste acceptance criteria, emission limits, and monitoring and reporting procedures (DOST-ITDI, 2008).

Registered cement plants are also allowed to use non-hazardous wastes, such as used tires, rice husks, paper, packaging material and biomass. A waste material can be co-processed provided it meets the criteria specified in Section 4 of DAO 2010-06.

The waste hierarchy is taken into account inasmuch as only those wastes are used as AFRs in co-processing which otherwise would be required to be disposed of in landfills. Additionally, co-processing, in comparison with other available treatment technologies, offers an environmentally compatible treatment of waste with the advantage of energy utilization (substitution of fossil fuels) and possible saving of other raw materials (DOST-ITDI, 2008).

DENR Administrative Order No. 2010-06, or the Guidelines on the Use of Alternative Fuels and Raw Materials in Cement Kilns, which governs the use of AFRs in cement kiln co-processing, adheres to the basic policy of the government to regulate, use, and dispose of hazardous substances and wastes as stipulated in RA 6969; promote compliance to air emissions standards as contained in RA 874; and advocate resource recovery as specified in RA 9003.

Section 5 of the administrative order indicates that un-segregated municipal solid wastes are not acceptable for cement kiln co-processing. Likewise, Section 7 sets out the minimum qualifications of co-processing facilities, including compliance with the relevant provisions of the following regulations:

- Philippine Clean Air Act (RA 8749)
- Philippine Environmental Impact Statement System (PD 1586)
- Philippine Toxic Substances and Hazardous and Nuclear Wastes Act of 1990 (RA 6969)
- Philippine Mining Act of 1995 (RA 7942) and their corresponding rules and regulations
- DOLE Department Order No. 16, Series of 2001 (Amendments to Rule 1030 of the
- Occupational Health and Safety Standards)

As of January 31, 2011 the following are among the cement companies registered as TSD Facilities, and as such, co-process segregated solid waste materials including biomass (Source: EMB website):

- **Holcim Philippines, Inc. – Bulacan (Formerly Union Cement Corporation).** The facility is located in Brgy. Matictic, Norzagaray, Bulacan. It uses the following solid waste materials as AFR: biomass, bad order products/trade returns, rubber wastes, plant domestic wastes, plastic wastes, plastic residuals, and production wastes.

- **Holcim Philippines Manufacturing Corporation (Formerly Alsons Cement Corporation).** The facility is located in Luga-it, Misamis Oriental. It uses the following solid waste materials as AFR: biomass, bad order products/trade returns, rubber wastes, plant domestic wastes, residual wastes, packaging materials, and production wastes.

- **Holcim Philippines, Inc.** The facility is located in Bo. Ilang, Davao City. It uses the following solid waste materials as AFR: biomass, bad order products/trade returns, rubber wastes, and plant domestic wastes.

In relation to AFRs, a paper entitled "**Recovery of Alternative Fuels and Raw Materials and its Socio-Economic Benefits for Waste Reclaimers at the Calahunan Dumpsite in Iloilo City, Philippines**" (Paul. et.al. 2010)

The paper presents a test conducted to determine the potential for waste diversion, its implications on the proposed new landfill and to identify options to integrate the informal sector in the municipal waste management project.

"During the test run more than 225 tons of AFR were recovered with 30 workers, which were hired from the local waste pickers. The waste recovery rate of AFR and SRM as accomplished during the test corresponds with a potential waste diversion rate of 20% or >30 tons/day, if computed for the daily delivered 160 tons of solid waste at Calahunan.

The segregated AFR were utilized in co-processing for cement production by Holcim at their cement plant in Lugait, Mindanao. In addition 23 tons of SRM were recovered during the test such as metal cans, paper and cardboards and various types of bottles and hard plastics. The expertise of waste pickers in handling and sorting the mixed solid waste turned out to be essential for the success of the entire operation and for achieving an adequate output. During the conducted test, the informal sector benefited not only by receiving a regular income that was above the statistical poverty line of two dollars per day (UN Millennium Development Goals), but also availed of adequate, save and controlled working conditions for the involved waste reclaimers. The presented paper summarizes the set up, results and experiences encountered during the 100 days AFR recovery test form a technical and socio-economical point of view. It furthermore highlights potentials for a wider utilization of residual wastes in the Philippines and formulates important lessons learned regarding the technical criteria and process of mechanized material recovery and its implications for the involved wastes reclaimers."

### 3. Mechanical –Biological Treatment (MBT)

Mechanical-biological treatment of waste is a means of preparing waste material for disposal. MBT is a generic term for the **integration of several processes commonly found in other waste management technologies,** such as Materials Recovery Facilities (MRFs), sorting and composting, or anaerobic digestion.

The process offers the following advantages at the landfill site:

- Less waste volume
- Better compactability
- Less biogas production
- Improved quality and smaller quantities of leachate (GTZ MBT 1998)

An MBT plant can incorporate a number of different processes in more than 50 different combinations. In principle, it is a residual waste treatment process that involves both mechanical and biological treatment processes. MBT plants reduce the environmental impact of landfilling residual waste. MBT, therefore, complements, but does not replace, other waste management technologies, such as recycling and composting as part of an integrated waste management system (Last 2009).

MBT plants typically aim to:

- Pre-treat waste going to a landfill
- Divert non-biodegradable and biodegradable MSW going to landfill by mechanical sorting into materials for recycling and/or energy recovery as refuse derived fuel (RDF)
- Divert biodegradable MSW (BMW) going to landfill by:
    - Reducing the dry mass of BMW prior to landfill
    - Reducing the biodegradability of BMW prior to landfill
    - Stabilizing into a compost-like output
    - Converting into a combustible biogas for energy recovery, and/or
    - Drying materials to produce a high calorific organic rich fraction for use as RDF (Defra 2007)

An example of MBT is the Environmental Recycling System at the Irisan Dumpsite of Baguio City, which is a combination of recovery and pre-processing of plastic waste to be pelletized and exported. The ERS System, with ETV No. 06-005, is a technology of Protech Machinery Corporation. Based on the ETV (Environmental Technology Verification) Summary of the DOST, the verification of ERS was limited to testing the regulated parameters for organic fertilizers under the Fertilizers and Pesticides Authority (FPA) of the Department of Agriculture (DA).

### 4. Oil Recovery from Plastic Wastes and Used Tires

Poly-Green Technology & Resources Inc., a company with office address at 159 Jose Bautista Ave., Malabon City, requested the DOST to verify its claims on the Poly-Green Technology through the Environmental Technology Verification Protocol.

"The Poly-Green technology is an industrial process that converts non-biodegradable and mostly non-recyclable plastic waste into liquid hydrocarbon, similar to diesel and gasoline. The process involves the shredding of assorted plastics into evenly sized pieces before it is fed into the extrusion machine where it is melted and mixed with a catalyst. The melted plastic then goes to a specially-designed pyrolysis chamber where de-polymerization occurs and hydrocarbon gases are produced.

The product from the pyrolysis chamber passes through a distillation column to separate the different hydrocarbon chains. The liquid product from the distillation column are then filtered and centrifuged to remove contaminants and impurities. The light gases, on the other hand, are purified, compressed and stored. The process is done entirely inside a vacuum to avoid the release of resultant chemicals into the environment.

Based on the result of the analysis, the poly-green diesel meets the standards for Industrial Diesel Oil (IDO) on the cetane index, distillation, temperature, carbon residue, sulfur, and water and sediments. Poly-green gasoline passes the standards for sulfur, lead content, Cu corrosion, and octane number, while the calorific value is close to the heating value of low-sulfur gasoline (19,533 Btu/lb)…" (Source: The Philippine ETV Compilation of Verified Environmental Technologies).

To date, the NSWMC has not received any official report from any source that pertains to recovery of oil from used tires in the country. Though according to the US Environmental Protection Agency (EPA), oil with varying quality from saleable fuel oil that may need processing to lower-value oil blend stock are among the outputs of typical pyrolysis of waste tires. Pyrolysis as defined by EPA is a method to break down tires into potentially usable end products. Called by a variety of names, such as thermal distillation and destructive distillation, pyrolysis is the heating of organic compounds in a low oxygen environment.

EPA further says that "although many attempts have been made over the past several decades, EPA is not aware of any commercial pyrolysis systems operating continuously in the U.S. According to the U.S. Rubber Manufacturer's Association's 2007 Edition, Scrap Tire Markets in the United States , tire pyrolysis did not play a role in the management of scrap tires in the United States as of late 2007. One reason for this is that the value of the pyrolysis-derived oil, char, and gas thus far has been lower than the overall cost of the pyrolysis process that produced them. The technology continues to be explored for commercial feasibility, and there are a limited number of pilot operations that have been built".

When investigating the pyrolysis process, here are some practical considerations:

- Challenges of operating in an oxygen-limited, high temperature environment with complex equipment and an abrasive feedstock (scrap tires);
- Environmental considerations such as the need for air emission control systems and disposal of products or byproducts that may be unmarketable. In addition, zinc and sulfur, both found in tires, are not destroyed or decomposed thermally and may remain in one or more of the pyrolysis products;
- It is difficult to optimize quality and yields of the pyrolysis-derived gas, oil, and char since conditions that favor one often have a negative impact on another. Refining end products may add costs if it is necessary to meet customer needs and may require additional pollution controls;
- Markets of sufficient size and price that support the pyrolysis operation must be developed for pyrolysis-derived oil, char and gas. The quality and thus value of these end products may be different from the commercially available materials against which they are competing;
- Products may have regulatory requirements that need to be met in order to be sold (i.e., Toxic Substance Control Act (TSCA); and
- The need to ensure availability of a steady and adequate supply of tires within an affordable haul distance." (Source: US EPA website)

**5. Technologies with Environmental Technology Verification**

The International Working Group on Environmental Technology Verification (ETV) works *to establish or prove the truth of the environmental performance of a technology per established protocols or specific requirements. It is often shortened to "verification" in documents addressing ETV* (ETV-IWG, 2010).

On January 16, 2006, the DENR and the DOST signed a Joint Administrative Order (JAO) DENR-DOST JAO No. 01 Series of 2006 Adopting the Environmental Technology Verification Protocol (ETVP). ETVP refers to the implementation of a real world test and demonstration to verify or prove claims on the functional performance of a particular technology with regard to all relevant parameters.

Under the JAO, the DOST is the primary agency mandated to undertake the technology assessment. In relation hereto, the DENR recognizes the ETVP of the DOST and shall make the latter's findings as the basis for the granting and approval of applicable permits and clearances, among others.

DENR DOST JAO 2006-01 covers the technology review and verification of new and modified technology for the following:

- use of technology in the treatment, storage and disposal of wastes;
- use of technology in pollution control and abatement;
- best environmental technology; and
- cleaner production technologies.

To date, the DOST have issued ETV on the following six technology categories:

CATEGORY 1 Solid/Hazardous/Healthcare Waste Treatment Technology
CATEGORY 2 Energy Saving Technology
CATEGORY 3 Solid Waste Recycling Technology
CATEGORY 4 Oil Spill Remediation Technology
CATEGORY 5 Bioremediation Technology
CATEGORY 6 Degradable Plastic Technology
(Source: The Philippine ETV Compilation of Verified Environmental Technologies, DOST)

Provided below is a list of other SWM technologies/processes verified by the DOST under Waste Treatment Technology (Category 1), Solid Waste Recycling Technology (Category 3), and Degradable Plastic Technology (Category 6). Each technology verified is provided with a Reference Code No., i.e., ETV-00-000 where ETV stands for Environmental Technology Verification; 00 stands for the last two digits of the year the technology was applied for verification; and 000 stands for the order/sequence of review.

**The presentation of these technologies in this document "Status Report of SWM - NSWM Strategy" does not however constitute an endorsement of such.**

**Table XV. Category 1. Solid/Hazardous/Healthcare Waste Treatment Technology**

| Reference No. | Company | Name of Technology and Brief Technical Description (based on information provided by the company) |
|---|---|---|
| **ETV-06-002** | Pyrotech Solution and Integrated Services Corporation | Model JR-130 Thermal Processor<br><br>Pyrotech Solution and Integrated Services Corp. intends to install and utilize the Model JR-130 Thermal Processor for the treatment of municipal solid waste, pharmaceutical waste, toxic and hazardous industrial waste and hospital/medical wastes. The treatment process involves pyrolysis, where organic materials are gasified by introducing heat from an outside source in a closed chamber in the absence of adequate oxygen. |
| **ETV-06-012** | Cleansave Waste Corporation | Controlled Steam Generation Technology<br><br>The CSG Technology is an autoclave technology or steam treatment process, which features a controlled steam process.<br><br>The process utilizes constant steam |

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| | | temperature at 160$^{o}$C under pressure of 75 pound per square inch gauge (psig) for a period of 45 minutes for treatment and disinfection of waste.<br><br>It is intended for municipal solid waste and hospital waste. |
| **ETV-06-014** | Biodiesel and Energy Resources Corporation (BERC)<br><br>Pyrotech Solution and Integrated Services Corporation | SK-05 Carbonization Furnace<br><br>The ETV on SK-05 Carbonization Furnace was conducted to verify the claims of Biodiesel and Energy Resources Corporation that the technology is a non-burn technology for the treatment of solid and semi-solid wastes as prescribed by Rule XXVII of the Philippine Clean Air Act. The data or results used for the evaluation were from the developer Inora AG in Germany for the desk review.<br><br>The facility is composed of various components – the carbonizer, thermal afterburning, waste heat boiler and turbo generator. |
| **ETV-09-003** | 88 International Phils. Co. Inc. | Carbonator<br><br>The fundamental of this technology is use of thermal energy (dry hot air) through indirect heating concept within a low-medium process temperature, under the absence of oxygen (<1%) and well controlled as well as isolated process treatment condition to achieve the thermal cracking of various organic waste materials. The technology employs the carbonization process to convert organic component of solid waste into non-hazardous and stable carbon. |
| **ETV-09-014** | EnECO TOPS Philippines, Inc. | A desk evaluation of the EnECO Thermal Oxidation Process System was conducted to verify the claims of En ECO TOPS Philippines, Inc. that the |

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|---|---|---|
| | | treatment process using the system will not generate toxic air emissions. The EnECO TOPS Model M2DL installed at Johnston Atoll, USA is a batch-operated, two-stage thermal gasification/oxidation system…..After ignition, the waste is oxidized with no agitation and very little excess air. The gasification cycle is completed for about 16 to 22 hours. The waste is thermally decomposed overnight with clean-out of the primary gasification chamber the following morning. |
| **ETV-09-017** | Clean Echo Techwin, Inc. | G-50 Waste Processor<br><br>G-50 employs thermal process or the gasification of wastes using high heat treatment (250-1000$^{o}$C). The process is divided into three stages: feed preparation, processing stage; and cleaning stage. |

**Table XVI. Category 3. Solid Waste Recycling Technology**

| Reference No. | Company | Name of Technology and Brief Technical Description (based on information provided by the company) |
|---|---|---|
| **ETV-06-005** | Protech Machinery Corporation | Environmental Recycling Systems<br><br>The agronomic value of the resulting compost from ERS has been evaluated and the claim that the resulting compost from ERS can be used safely as compost or soil conditioner has been verified. The verification of ERS was limited to testing the regulated parameters for organic fertilizers under the Fertilizer and Pesticides Authority (FPA) of the Department of Agriculture (DA). |
| **ETV-08-002** | GMB Marketing & Recycling Center | Enviroblocks<br><br>Process includes mixture of ground glass, fine aggregate and cement.<br><br>Process of manufacturing involves grinding of the glass disks into its |

| | | |
|---|---|---|
| | | desired size using a hammermill; mixing of the ground glass with fine aggregates, cement, and water, molding using a hollow block making machine; ad then curing.<br><br>Intended for use as building/construction materials. |
| **ETV-09-009** | POLY-GREEN Technology & Resources, Inc. | Poly-Green Technology<br><br>An ETV was conducted for a proto-type of Poly-Green technology to verify claims that: Poly-Green Technology can produce liquid (i.e. diesel and gasoline) from waste plastics that can be used for different applications at a conversion ration of 70% to 80%.<br><br>Pollution generated by the technology during its operation is within applicable DENR Standards. |

**Table XVII. Category 6. Degradable Plastic Technology**

| Reference No. | Company | Name of Technology and Brief Technical Description (based on information provided by the company) |
|---|---|---|
| **ETV-08-011** | Prima Plastic Manufacturing Corporation (PPMC) and ESTA Trading Corporation (ETC) | Plastic Bag with BDA Degradable Additive<br><br>As Provided by Prima Plastic Manufacturing Corporation and the ESTA Trading Corporation, the Degradable Additive BDA is a multi stage degradable plastic additive that can help in the breakdown of plastic bags first by photo degradation and oxidation and later by biodegradation. Degradable additive BDA when added to the polymer resin during the manufacture of plastic bags can trigger the breakdown of plastic bags approximately 90 days onward. |

| | | |
|---|---|---|
| | | Degradation, which reduces the molecular weight of the plastic product, is composed of two (2) processes: photo degradation and oxidation. Photo degradation is the breakdown of the plastic product by UV light from the sun while oxidation takes advantage of the thermal energy and time to degrade the plastic. |
| **ETV-08-013;**<br><br>**ETV-08-014** | First in Colors, Inc. and Licton Industrial Corporation | MB Biomate BM-205<br><br>The MB Biomate BM-205 is a unique concentrate designed to make polyolefins degradable. It contains a propriety mixture of pro-oxidant catalyst such as metal salts and rare earth compounds.<br><br>Polyolefins formulated with MB Biomate BM-205 undergo two-step degradation. Initially, degradation occurs by an oxidative process and subsequently by biodegradation. Oxidative process or photo degradation is the breakdown of the plastic product by UV light and thermal energy from the sun. After undergoing degradation, further breakdown of the plastic occurs through the second stage, biodegradation. |

### 6. Other Processes Requiring Environmental Compliance Certificate

The Procedural Manual for DENR Administrative Order No. 30 Series of 2003 (Implementing Rules and Regulations of Presidential Decree No. 1586) says that certain Waste Management Projects that fall under Other Processes are covered by the Philippine EIS System. Hereunder are examples of these projects with ECC issued by the EMB Regional Offices (Source: EMB website and NSWMCS Records).

**Table XVIII. Other Processes covered by the Philippine EIS System**

| PROJECT TYPE | PROJECT NAME AND LOCATION | ECC REFERENCE CODE AND PROPONENT | CAPACITY |
|---|---|---|---|
| **Landfill gas Utilization Project/ Other Power Plant & Power Facility** | San Pedro Landfill Methane Recovery and Energy Generation (CDM) Project<br><br>Location: Bo. San Antonio, San Pedro, Laguna | ECC-LDBW-0903-353-9001<br><br>Proponent: Bacavalley Ecowaste, Inc. | 4 Megawatt Total Power Production Capacity |
| ***Landfill gas Utilization Project / Other Power Plant & Power Facility*** | Montalban Methane Capture to Electricity Project<br><br>Location: Bo. San Isidro Montalban, Rizal Province | ECC-LDBW-0812-211-4020<br><br>Proponent: Montalban Methane Power Corporation | 15 Megawatts power generation capacity |
| ***Other Power Plant & Power Facility*** | Thermal Converter Waste-to-Energy Facility Project | ECC-LDBW-0911-0206<br><br>Proponent: San Pedro Thermal Conversion Inc. | 25.5 Megawatts power generation capacity |
| ***Other Power Plant & Power Facility*** | Biosphere Gasification Facility Project<br><br>Location: Brgy. Lara, City of San Fernando, Pampanga | ECC-RO3-0912-0226<br><br>Spectrum Blue Steel Corporation | Will utilize or dispose an estimated 172 tons of fresh waste per day to generate 10MW of electricity. |

## H. Disposal

Disposal as one of the major functional elements of ESWM refers to the discharge, dumping, deposit, leaking, placing, or spilling of any solid waste into or in any land. Disposal site refers to a site where solid waste is finally deposited or discharged (RA 9003, 2000).

### 1. Open and Controlled Dump Facilities

Open Dumpsite (OD) refer to disposal areas wherein the solid wastes are indiscriminately thrown or disposed without due planning and consideration for environmental and health standards.

Currently, majority of cities and municipalities maintain a 'collect and dump system,' where mixed wastes are brought to the dumpsites. Record keeping is done by counting the number of trucks and unorganized waste picking still takes place at the dump sites, since they are not fenced and waste is not covered. They are located close to ravines, gullies, seashore, bodies of water, and other open spaces. The roads to the sites are mostly not accessible after heavy rains.

Controlled Dump Facilities (CDF) is the first step in the progression from open dumping but was only allowed for a period of five years inclusive of the three-year conversion. No significant investment required in the capital cost or equipment purchases, but its enhancement would have concentrated primarily on improvements to operational and management issues.

The chart below indicates that the number of open dumpsites in the country almost remained constant over the years. The number of controlled dumpsites was also in the same situation except in year 2000, which had a drastic increase due to the issuance of RA 9003 requiring LGUs to close their open dumpsites.

RA 9003 Section 37, Article 6 states that *"No open dumps shall be established and operated, nor any practice or disposal of solid waste by any person, including LGUs, which constitutes the use of open dumps for solid waste, be allowed after the effectivity of said Act: Provided, That within three (3) years (2004) after the effectivity of said Act, every LGU shall convert its open dumps into controlled dumps, in accordance with the guidelines set in Section 41 of this Act: Provided, further, that no controlled dumps shall be allowed five years (2006) following the effectivity of said Act."*

As of 2004, there was no existing rehabilitation or post-closure plan for the 1,034 open and controlled disposal facilities in the country. Rehabilitation and closure of these dumpsites took place only in 2006 after guidelines on proper closure were issued.

*DENR Administrative Order (DAO) No. 9, Series of 2006 refers to guidelines to be used for the proper closure and rehabilitation of open dumpsites (ODs) and controlled dumpsites facilities (CDFs), in compliance with Section 37 of RA 9003.*

In 2010, record shows that the number of OD and CDF increased to 1,172 which can be attributed to close monitoring and updating of the EMB Regional Offices.

Shown in Table XIX below are those sites issued corresponding Authority-To-Close (ATC),from year 2008 to 2012. Reports submitted to the Commission indicate that there are LGUs, including those with Final Notices, merely abandoned their old dumpsites and started operating new ones. The decreasing trend in the number of operating open and controlled dumpsites indicate that more and more LGUs are slowly trying to comply with the law.

It could not be denied however that there are LGUs who disregard the deadline set by RA 9003, notwithstanding the series of notices of violation issued by the Commission and capability building assistance provided by DENR-EMB. The non-attention is being attributed to a lack of political will, technical know-how, and financial capability to implement the mandates of the law. Moreover, the situation is compounded by the fact that no LGU has been penalized for not complying with the specific provision on appropriate disposal facility.

**Table XIX. Status of SWM Facilities**

| FACILITIES | 2000 | 2004 | 2005 | 2006 | 2007 | 2008 | 2009 | 2010 | 2012 |
|---|---|---|---|---|---|---|---|---|---|
| **Open Dumpsites** | 688 | 739 | 794 | 692 | 826 | 806 | 838 | 790 | 445 |
| **OD with ATC** | | | | | | 133 | 210 | 203 | 200 |
| **Controlled Disposal Facilities** | 65 | 295 | 309 | 388 | 359 | 379 | 396 | 382 | 203 |
| **CDF with ATC** | | | | | | 116 | 153 | 154 | 165 |
| **Sanitary Landfill** | **0** | **3** | **4** | **10** | **35** | **45** | **72** | **84** | **110** |
| **MRFs** | 144 | 940 | 1103 | 1265 | 2200 | 2428 | 6141 | 6957 | 7683 |
| ***Brgy Served by MRF*** | 144 | 940 | 1103 | 1384 | 2473 | 2701 | 6744 | 7938 | 8704 |

Source: NSWMC Secretariat. March,2012.

## 2. Sanitary Landfill

Until 2004**,** the single and most dominant issue for solid waste management in the Philippines is where to bring the wastes collected. All collected wastes are disposed in controlled disposal facilities and open dumpsites. During that time, the country has only two sanitary landfills, located in Capas, Tarlac and Inayawan, Cebu City as of 2004 (SWM Framework 2004).

In the Philippines, a sanitary landfill is defined as a waste disposal site that has been designed and engineered to accept municipal residual waste, while ensuring minimal negative impact on the environment; or a specially engineered site for disposing of solid waste on land, constructed in such a way as to reduce hazard to public health and safety. Some qualities of a sanitary landfill include natural impermeable lower layer to block the movement of leachate into ground water; a leachate collection system; gravel layers permitting the control of methane; and daily covering of garbage with soil.

In sanitary landfilling, wastes are compacted and covered at the end of each day. The design and operation of a sanitary landfill requires the use of several disciplines. Its establishment also requires some planning, as well as the construction of roadways and other infrastructure. The U.S. Environmental Protection Agency (USEPA 2003) defines it as an engineered method of disposing solid waste on land.

The rehabilitation of existing dumpsites have also integrated measures for material sorting, composting and waste treatment and to establish a new landfill. To reduce waste disposal and to integrate the local waste pickers into the project, the establishment of a mechanized material recovery system was started in 2005 (Paul, et al 2010).

The last four years marked a significant number of LGUs that opted to establish sanitary landfills. Tables XIX and XIX, shows that 35 LGUs built their sanitary landfills in 2007 from only ten in 2006 when the deadline for operation of controlled dumpsites took effect. Related to this, the National Solid Waste Management Commission started implementing the Three Strike Policy in 2008 in order to discipline LGUs who continuously violates the law. It was noticed that it had an impact to LGUs since a sustained growth was observed up to the end of 2010, a total of 81 SLFs were either undergoing construction or were already operational.

**Table XX. Number of LGUs with and without Sanitary Landfills**

| Region | Open Dumpsite | Controlled Disposal Facilities | Landfill | SLF w/ ECC Undergoing Construction |
|---|---|---|---|---|
| **1** | 23 | 25 | 2 | 17 |
| **2** | 10 | 5 | 3 | 10 |
| **3** | 29 | 4 | 4 | 4 |
| **4a** | 40 | 36 | 9 | 3 |
| **4b** | 34 | 10 | 5 | 2 |
| **5** | 34 | 1 | 1 | |
| **6** | 25 | 11 | 3 | 6 |
| **7** | 104 | 46 | 6 | 2 |
| **8** | 55 | 10 | 1 | 7 |
| **9** | 26 | 15 | | |

| | | | | |
|---|---|---|---|---|
| **10** | 24 | 14 | 1 | 1 |
| **11** | | 14 | 1 | |
| **12** | 4 | 2 | 3 | 10 |
| **13** | 24 | 4 | 1 | 1 |
| **CAR** | 13 | 6 | 1 | 3 |
| **NCR** | | | 2 | |
| **ARMM** | | | 1 | |
| **Total** | **445** | **203** | **44** | **66** |

*Source: NSWMC Secretariat, March, 2012*

**a) Siting Criteria for Sanitary Landfills**

Section 40 of RA 9003 cites the following minimum criteria for the siting of sanitary landfills:

(1) the site selected must be consistent with the overall landuse plan of the LGU;
(2) the site must be accessible from major roadways or thorough fares;
(3) the site should have an adequate quantity of earth cover material that is easily handled and compacted;
(4) the site must be chosen with regard for the sensitiveness of the communities residents;
(5) the site must be located in an area where the landfill's operation will not detrimentally affect environmentally sensitive resources such as aquifers, groundwater reservoirs or watershed areas;
(6) the site should be large enough to accommodate the community's wastesfor a period of five (5) years during which people must internalize the value of environmentally sound and sustainable solid waste disposal;
(7) the site chosen should facilitate developing a landfill that will satisfybudgetary constraints, including site development, operation for many years, closure, post closure care and remediation costs;
8) operation plans must include provisions for coordinating with recycling a recovery projects; and
(9) designation of a separate containment area for household hazardous wastes

**b) Categorized Final Disposal Facilities**

DENR Administrative Order (DAO) No. 10, Series of 2006 refers to Guidelines on the *Categorized Final Disposal Facilities into* four categories based on net residual waste generation, after taking into account the waste diverted through composting, recycling and recovery efforts and taking into consideration the environmental, financial, and socio-economic conditions of the LGUs, including its hydro-geological dimensions. These guidelines comply with Sections 37, 40, 41 and 42 of RA 9003 and DAO No. 2001- 34.

1) Categories of CFDF

**Table XXI: DAO 2006-10 Guidelines in Categorizing Disposal Facilities**

| | Category 1 | Category 2 | Category 3 | Category 4 |
|---|---|---|---|---|
| **Volume of Waste** | < 15 tons/day | 15 – 75 tons/day | 75 – 200 tons/day | **> 200 tons/day** |
| **Technical standards:** | | | | |
| **Drainage** | √ | √ | √ | **√** |
| **Gas Venting** | | | | |
| **Leachate Collection** | | | | |
| **Leachate Treatment** | Ponds | Ponds | Ponds | **Treatment** |
| **Clay Liner** | 60 cm k < 10-5 cm/s | 75 cm k < 10-6 cm/s | 75 cm k < 10-7 cm/s | **60 cm k < 10-7 cm/s** |
| **HDPE Liner** | | | | **1.5 mm** |

Source: World Bank/NEDA et al. 2007

The guidelines are promulgated to support LGUs in planning and implementing strategies on ESWM through a set of categories on disposal facilities, specifying realistic categories and reasonable conditions for meeting legal requirements.

The guidelines cover the different categories and requirements of Municipal Solid Waste (MSW) disposal facilities and the necessary permits accorded for each category. These shall guide the LGUs, a cluster of LGUs and/or developers in the design, construction and operation of sanitary landfills. Department Memorandum Circular No. 6, Series of 2006 pertains to the adoption of Initial Environmental Examination (IEE) checklist and report on the processing of Environmental Compliance Certificate (ECC) of categorized final disposal facilities or sanitary landfills.

2) Design of Categorized Final Disposal Facility

Design and construction of Categorized Final Disposal Facility (sanitary landfilling) require that landfills must be lined with an impermeable layer (either geo-membrane or soil liner, or a combination of both) to impede the leachate from percolating through the soil strata, and eventually to the groundwater. In addition, provisions have been included for leachate collection and subsequent treatment before discharging to the environment.

The categories of SLF is based on the determination of net residual waste, given the potential waste generation by the LGU, less waste diverted through composting, recycling, and other recovery methods. It likewise considers the projected waste

increase over a 10-year period. The design and development takes into account the environmental setting/condition of the site. The table below shows the minimum features for disposal categories.

**Table XXII. Minimum Features For Disposal Categories**

| Features | Category 1<br>Shall apply to LGUs or cluster of LGUs generating residual waste of ≤ 15 tpd | Category 2<br>Shall apply to LGUs or cluster of LGUs generating residual waste of ≥75 tpd | Category 3<br>Shall apply to LGUs or cluster of LGUs generating residual waste of ≥ 200 tpd | Category 4<br>Shall apply to LGUs or cluster of LGUs generating residual waste of > 200 tpd |
|---|---|---|---|---|
| **Site Clearing** | ✓ | ✓ | ✓ | ✓ |
| **Final Cover** | ✓ | ✓ | ✓ | ✓ |
| **Drainage Facility** | ✓ | ✓ | ✓ | ✓ |
| **Embankment** | - | ✓ | ✓ | ✓ |
| **Gas Vent** | - | ✓ | ✓ | ✓ |
| **Leachate Collection System** | - | - | ✓ | ✓ |
| **Leachate Pond** | ✓recommended | ✓recommended | ✓ | ✓ |
| **Leachate Treatment** | - | - | - | ✓ |
| **Signages** | ✓ | ✓ | ✓ | ✓ |
| **Perimeter Fences/Security** | ✓ | ✓ | ✓ | ✓ |

LGUs, which implement sustained and full scale diversion through recycling/or various methods of composting, may maintain lower disposal categories. Each LGU or cluster of LGUs may develop and operate their respective final disposal facilities and progressively move from a lower to a higher category as the amount of disposable residual waste increase over time.

The benefits of Clustering of a Common Solid Waste Disposal Facility may include the following:

- Harmonize ESWM initiatives and commonality of solutions among adjoining and often similarly situated LGUs
- Strengthens Segregation-at-Source, Segregated Collection and Recovery Systems
- Maximize economies of scale
- Reduce number of landfills
- Development fund and logistical resources through the respective congressional district

Since 2006, data on solid waste generation without waste diversion showed that 1,447 or 90% of 1,610 municipalities and cities could be categorized under Category 1; and 9% under Category 2 (Table XXIII). Highly urbanized cities, like Metro Manila (14 cities), Cebu, and Davao fall under Category 4; while most other highly urbanized cities fall under Category 3. If LGUs were to follow the minimum 25% waste diversion rate under RA 9003, only eight highly urbanized cities would fall under Category 4. Moreover, with a 25% waste diversion rate, 99% of all cities and municipalities would require only Categories 1 and 2.

**Table XXIII: Distribution of Municipalities and Cities Based on DAO 2006-10**

| Category | Without Waste Diversion | | With 25% Waste Diversion | |
|---|---|---|---|---|
| | Number of LGUs | Percent | Number of LGUs | Percent |
| **Category 1 (< 15 tons/day)** | 1,442 | 89.6 | 1,495 | **92.9** |
| **Category 2 (15 – 75 tons/day)** | 142 | 8.8 | 93 | **5.8** |
| **Category 3 (75 – 200 tons/day)** | 10 | 0.6 | 14 | **0.9** |
| **Category 4 (> 200 tons/day)** | 16 | 1.0 | 8 | **0.5** |
| **TOTAL** | **1,610** | **100.0** | **1,610** | **100.0** |

Source: World Bank/NEDA et al. 2007

3) Other Essential Components of SLF

Only residual wastes or the non-recyclable portion of the waste are disposed of in SLF. Other types of wastes such as household toxic and hazardous wastes (THWs) and biodegradable wastes may be accepted provided there are facilities (e.g., THW vault, composting, MRF) within the compound.

The development of a SLF as a waste management facility must conform to the guidelines provided in RA 9003 and the corresponding IRR. In addition to the minimum features, the following are essential components and consideration:

(a) Access road, contingent utilities and other auxiliary structures.
(b) Technical evaluation on the natural liner system with clay as in the cases of Bais and Ormoc City of Negros Oriental and Leyte, respectively (GTZ, SWM4LGU 2009)
(c) To prevent flooding of landfill, a storm water collection or drainage system will be installed. Proper design of storm drainage system will reduce the volume of leachate requiring expensive treatment process.

(d) Recirculation of leachate is optional depending on the volume and quality of leachate. The treatment system consists of stabilization tanks and natural lagoon or wetland treatment system.
(e) Collection and utilization of gas is optional for smaller SLFs with a capacity less than 500,000 tons of waste (FS for Passi City 2008).
(f) Added to the operation of a SLF is a Material Recovery/Composting Facility.
(g) Other SLF support infrastructures shall include administration building / office, service area, water and power supply, fence, gate, and signage (Guidebook on Disposal Facility 2010).

The capacity of the landfill site should be able to sustain operations lasting from 10 to 15 years. More than 90% of the 1,600+ LGUs (Table XXIII) in the country generate residual waste from 1 to 75 tons per day; therefore, clustering of disposal facilities and adoption of alternative technologies for residual wastes are better options.

The landfill's target lifespan shall be set depending on the duration of the operation, and should be set at a minimum of five years operation. However, the effective disposal capacity of the deposition area within the landfill should also be considered in the lifespan target.

The SLF system should be designed with respect to environment preservation by preventing undue incidents such as overflowing of the waste and leachate seepage; propagation of vectors and attracting animals; scattering of wastes; and emission of unpleasant odor. Storage and Treatment is one of the main functions of SLF system. It must be designed to have a capability to store safely the waste within its boundary and to retain the leachate from seeping out and polluting the environment. SLF also provides Environmental Protection and is used for Land Development. Ideally, post-closure land use should be limited to non-residential and low-construction development, such as parks or recreational amenities.

Landfill disposal had been practiced for several years in the past without rousing any issue in the public regarding safety. It was generally believed that leaching from waste was completely attenuated or purified by the soil, and therefore, contamination of groundwater was not an issue. Thus, disposal of waste on practically all types of landforms (e.g., gravel pits, ravines, etc.) was an acceptable practice. Some of the SLFs have also adopted recycling, material recovery, and composting before disposing residual waste to the SLF.

However, landfill disposal came under scrutiny due to increasing concern for public health and the environment. Several studies showed that unregulated landfills do contaminate groundwater from generation and percolation of leachate or wastewater that passes through the underlying soil, polluting sources of drinking water. Likewise, biological and chemical decompositions of waste build up methane gas that may cause spontaneous combustion and contribute to depletion of the ozone layer.

### 3. Ecological Park (Eco Park)

A. Cognizant of the challenges that face LGUs that operate open dumpsites and controlled disposal facilities in complying with the requirements of the Act, notwithstanding the adaptation mechanisms provided, the Commission passed Resolution No. 26, series of 2009 adopting Eco Park as an Option to Sanitary Landfill.

B. The resolution provides that an Ecological Park, known as Eco Park, shall refer not only to a post-closure site (closed and rehabilitated open dumpsite, controlled dump facility, and SLF) converted into an integrated facility designed for processing, treating, sorting, retrieving, extracting or recovery of recyclable materials, biodegradable wastes, non-hazardous/non toxic solid wastes and processing of residual wastes but also applicable to a new identified area that passes the DENR standard/criteria in establishing said facility.

The facility should be composed of: MRF for composting (e.g. vermi-culture, windrow type, backyard pit, rubber tire, compost rotary drums); storage area for recyclable non-hazardous/non-toxic solid waste materials; and processing (e.g.bioreactor, biodigester, charcoal briquetting, plastic/Styrofoam oven melter).

EMB regional offices were able to list down 35 existing ecological parks;

**Table XXIV. List of Ecological Parks**

| LGU | PROVINCE | REGION |
|---|---|---|
| Bayambang | Pangasinan | 1 |
| Lal-lo | Cagayan | 2 |
| Aritao | Nueva Vizcaya | 2 |
| Bayombong (Capital) | Nueva Vizcaya | 2 |
| Malolos City (Capital) | Bulacan | 3 |
| Marilao | Bulacan | 3 |
| Plaridel | Bulacan | 3 |
| Los Banos | Laguna | 4a |
| Sta Cruz | Laguna | 4a |
| Teresa | Rizal | 4a |
| Sablayan | Occidental Mindoro | 4b |
| Ligao City | Albay | 5 |
| Bulan | Sorsogon | 5 |
| Irosin | Sorsogon | 5 |
| San carlos City | Negros Occidental | 6 |
| Dumaguete | Negros Oriental | 7 |
| Tabon-Tabon | Leyte | 8 |
| Catarman (Capital) | Northern Samar | 8 |
| San Isidro | Northern Samar | 8 |

| | | |
|---|---|---|
| Margosa Tubig | Zamboanga del Sur | 9 |
| Buug | Zamboanga Sibugay | 9 |
| Linamon | Lanao del Norte | 10 |
| Compostela | Compostela Valley | 11 |
| Laak (San Vicente) | Compostela Valley | 11 |
| Montevista | Compostela Valley | 11 |
| Pantukan | Compostela Valley | 11 |
| Island Garden City of Samal | Davao del Norte | 11 |
| New Corella | Davao del Norte | 12 |
| Santo Tomas | Davao del Norte | 12 |
| Polomolok | South Cotabato | 12 |
| Surallah | South Cotabato | 12 |
| Sibagat | Agusan del Sur | 13 |
| Hinatuan | Surigao del Sur | 13 |
| Lanuza | Surigao del Sur | 13 |
| | | |

The number of LGUs adopting Eco Parks as an ESWM strategy is expected to increase due to the continuous increase of alternative local technologies and prevailing working conditions in their respective areas. Eco Parks become very accessible to neighboring LGUs for their Lakbay_Aral, especially those wanting to be more RA 9003-compliant.

**a) Eco Park as a Practical Alternative**

The minimum requirements for sanitary landfill design, construction, management and operations as prescribed under Rule XIV of RA 9003 are in some ways complied by eco parks with minimum investment on the part of the LGU regardless of the volume of waste generated. A case in point are the eco parks of Sto. Tomas, Davao del Norte that generates 36 tpd and of Hinatuan, Surigao del Sur that generates less than 40 tpd.

**4. Clustering of Disposal Facilities**

Other SWM programs that encourage waste reduction and household-based management of biodegradable wastes and recyclable wastes might already substantially reduce the need for an expensive disposal facility. It is equally important, therefore, that SWM programs focus on waste reduction and alternative technologies to process residuals, in tandem with alternative safe disposal of wastes.

The other implication is the need for common disposal facilities. Since the volume of waste is too small for the majority of LGUs, alliance building as regards clustering of municipalities for SLF construction and operation can result in economies of scale. (World Bank/NEDA et al. 2007)

Currently, there are sanitary landfills established by private entities that accommodate solid wastes from Metro Manila. These include the following:

**Table XXV. List of Existing Sanitary Landfill intended for Cluster**

| Region | Province | Host City/Municipality | Service Area | Status |
|---|---|---|---|---|
| **3** | Bulacan | Norzagaray | LGUs in Bulacan and Metro Manila | Operational with ECC |
| **3** | Bulacan | Sn Jose Del Monte | LGUs in Bulacan and Metro Manila | Operational with ECC |
| **3** | Tarlac | Capas | LGUs in Tarlac, Baguio City and Metro Manila | Operational with ECC |
| **4A** | Laguna | San Pedro, Operated by Pilotage | LGUs in Laguna, Cavite and Metro Manila | Operational with ECC |
| **4A** | Rizal | Morong | LGUs in Rizal and Metro Manila | Operational with ECC |
| **4A** | Rizal | San Mateo | LGUs in Rizal | Operational with ECC |
| **4A** | Rizal | Montalban | LGUs in Rizal and Metro Manila | Operational with ECC |
| **NCR** | Metro Manila | Navotas, operated by Phileco | LGUs in Metro Manila | Operational with ECC |

The following are Proposed Clustering Projects:

a) Metro Bohol Cluster
b) Northern Metro Cebu Cluster
c) Surallah, South Cotabato Cluster
d) Tacurong-Isulan, Sultan Kudarat Cluster*
e) Malay Buruanga Cluster
f) 3rd District Albay Cluster
g) Misamis Oriental Cluster
    a. Magsaysay/Talisayan/Balingoan
h) Misamis Oriental Oriental Cluster
i) Manticao/Logain
j) Ternate, Cavite to host the entire province of Cavite

**Factors to be considered in clustering:**

a) Willingness to host
b) Change of leadership
c) Social Acceptability
d) Economic viability
e) Income and Cost-Sharing scheme
f) Proximity of the SWM (disposal) facility
g) Available and suitable area
h) Willingness to cluster
i) Willingness to pay tipping fee

**ISSUES RAISED ON SOLID WASTE MANAGEMENT SYSTEM**

Despite the different efforts and initiatives to manage the waste, issues were still raised during the various national consultation workshops conducted. Following were the common concerns that were pointed out by the different stakeholders.

1. There is no existing guidelines for the siting and operationalization of SWM facilities e.g. MRF, composting etc., as a result, toxic and hazardous waste are often found in the MRFs.
2. The functionality, quality and effectivity of SWM Facilities are highly dependent on the present leadership/elected official.
3. Private SWM initiatives are often not recognized, not supported or coordinated at the barangay level.
4. Recyclables are still of low value.
5. No inventory of agricultural waste.
6. The NSWMC does not have close coordination with non member National Government Agencies like DOE as regards to their role as mandated by RA 9003.
7. The NSWMCS lacks the orientation about Other SWM Processes, hence their information dissemination or capacity development activities are often not enough to inform or capacitate other stakeholders
8. Members of the NSWMC do not have regular submissions of accomplishment reports based on mandate. There is lack of harmonization of policies and uniformity of the definition of terms.

# *Chapter 4 – Cross Cutting Issues*

## A. Climate Change Adaptation and Disaster Risk Reduction

The Philippine archipelago and its local communities are vulnerable to the dangers of climate change. Climate change is expected to intensify the severity and/or increase the occurrence of storm surges, typhoons, and high tides, resulting in significant soil and coastal erosion. An increase in the incidence of diseases, such as malaria and dengue fever, are also projected as an effect of climate change.

Waste contributes to climate change.

Greenhouse gases (GHG), such as carbon dioxide, methane, nitrous oxide, sulfur hexafluoride, perfluorocarbons, and hydrofluorocarbons contribute to global warming. In the Philippines, waste contributes 10.4% to GHG. (Source: World Resources Institute, Climate Analysis Indicators Tool (CAIT) Version 6.0, 2009.),

## B. Dumping, Open Burning, and Landfilling of Mixed Wastes

Developing and newly industrializing countries, like the Philippines, commonly dispose of mixed MSW in dumpsites and/or through open burning. Biodegradable wastes comprise a significant proportion of these disposed solid wastes. The decomposition and open burning of this type of waste lead to methane and $CO_2$ emissions. Methane is about 23 times stronger at warming the atmosphere than carbon dioxide ($CO_2$). (GTZ 11/2008). Biomass burning also results in nitrogen oxide emission.

In 1997, the US Environmental Protection Agency estimated that landfills accounted for 36% of methane emissions in the US (EPA Website). On the other hand, ADB reported a 12% (2005) contribution of global methane gas from landfills (ADB 2008b). In the Philippines, most sanitary landfills still practice landfilling of biodegradable wastes.

As a GHG control measure, active gas venting of the landfill with subsequent gas flaring reduces emissions, but capture rates are only around 50% even with top quality venting systems. A large portion of the landfill gas still escapes through the surface. When the methane concentration declines, flaring becomes unreliable. The gas venting system method is not sustainable since it does not eliminate organic decomposition, the cause of methane generation.

In addition to gas venting systems are two other but more expensive methods:

(1) methane gas capture for electricity generation, and
(2) treatment for solid waste in mechanical-biological pre-treatment (MBT).plants.

For landfill gas projects to produce electricity and become viable, a guaranteed amount of organic waste is critical in order to recover the investor's capital investment. Moreover, organic waste will still be disposed of into landfills.

In the use of MBT plants, biodegradables are stabilized or **inertized** through composting and fermentation before being landfilled. The decomposition processes, which would otherwise take place in the landfill, are brought about in a substantially shorter period of time under controlled technical conditions. The process simultaneously produces compost or a fermentation product, which can be used as organic fertilizer. A contract to build an MBT facility in Molave, Zamboanga del Sur was recently signed between the local government and Herhof, Helector S,A., Zehira USA, LLC, a company based in Henderson, Nevada USA,. (PIA, March 4, 2011)

Open and controlled dumpsites continue to be sources of methane gas emissions, and hence failure to close these facilities exacerbates GHG emissions. Their proper closure and rehabilitation will greatly contribute to GHG reduction.

**C. Waste-To-Energy Projects and Climate Change Mitigation**

Under the Kyoto Protocol, an international climate change agreement which came into force in 2005, 38 industrialized countries agreed to cut their GHG emissions by 5% below 1990 levels between 2008-2012.

Countries that fail or find it more expensive to reduce their emissions domestically can emit more than their assigned limits; however, they should buy "allowances" from other industrialized countries that emit less than their allowed limits. Or, through the Clean Development Mechanism (CDM) scheme, they can opt to buy "credits" from projects in developing countries that emit less than their allowed limits. The carbon credit trade is a potential source of income for those engaged in the waste management industry.

The number of CDM projects around the world has increased from only 60 in 2004 to several thousand initiatives in 2008, according to data from the UN Evironment Program. In the Philippines, most waste-to-energy Projects are either already registered or in the process of registration with the CDM. As of March 2011, 49 CDM projects have been successfully registered in the country. Some of these projects involve waste –landfills, hog manure, sewage, and agricultural residue. Additional funds from carbon trading may be generated for income generation but the CDM process is complex with time-absorbing administrative processes and risks along the process of project development and registration until the issuance of carbon credits.

Waste-to-energy and biomass projects are discussed in *Other Processes* section in this chapter. Under the Renewable Energy Act of 7008, these types of projects are considered alternatives to fossil-based energy sources such as coal and oil, subject to the requirements of the Clean Air Act and the Ecological Solid Waste Management Act. As such, they are taken as climate mitigating measures and are applicable for registration under the CDM. For Ecowaste Coalition, waste prevention is the most practical carbon emissions reduction scheme complemented by reusing, recycling and composting.

For example, landfill gas technology removes only between 16% and 65% of methane. (Themelis, Nicklolas J. and Priscill A. Ulloa,"Methane Gas Generations in Landfills, Renewable Energy 32 (2007). For Ecowaste Coalition, waste prevention is the most practical carbon emissions reduction scheme complemented by reusing, recycling and composting; and landfilling and incinerating waste are the worse options. (Ecowaste CoalitionResolution for a National Campaign on "Waste-to-Energy" Schemes Proceedings, General Assembly, March 19, 2011)

**D. Disaster Risk Reduction and Solid Waste Management**

Waste processes and waste facilities, if not properly managed, could contribute to disasters and carry potential risks. Moreover, some contradict laws that seek to protect people and the environment from harm.

Locating waste facilities in environmentally critical areas, such as watersheds and protected areas, is not only contradictory to RA 9003, but also to other laws such as the Agricultural Modernization Act and the National Integrated Area Protection System (NIPAS Act). The Obando landfill, which was issued an ECC, is an example.

In December 2008, the Supreme Court ordered executive agencies, including the DENR and the MMDA, to coordinate in the clean-up, restoration, and preservation of the water quality of Manila Bay. The high court then subsequently ordered the concerned agencies to comply with the June 30, 2011 deadline in cleaning up the polluted bay. But in December 2010, DENR issued an ECC to Eco Shield Development Corp. to establish a 44-hectare landfill in barangay Salambao, Obando, a fishing village situated in Manila Bay. Villagers protest that the project will endanger their livelihood.[9] A Writ of Kalikasan was issued by the Supreme Court in February 21, 2012 through a Temporary Environmental Protection Order (TEPO) directing respondents to cease and desist from constructing and operating the landfill project.[10]

[9] (http://www.businessmirror.com.ph/home/top-news/9090-scuttle-obando-landfill-denr-told-

[10] http://ecowastecoalition.blogspot.com/2012/02/groups-welcome-writ-of-kalikasan-vs.html

The Payatas dumpsite tragedy in July 2000 is a dramatic illustration of a solid waste-related disaster. More than 200 informal waste workers were killed in the trash slide, a result of many years of open and uncontrolled dumping of waste. A trash slide at the Irisan dumpsite in Baguio City during the 2011 Typhoon Mina, killed six people, damaged homes and affected water systems in Benguet.[11]

The old Smokey Mountain may be considered a disaster-in-the-making, endangering the lives of informal waste workers who "mine" recyclable materials out of the dumpsite. Ordered closed in 1990, albeit improperly, the dumpsite has a very steep and unstable slope.

Typhoon Ondoy in 2009 also helped to show how improper solid waste management could contribute to a natural disaster. Tons of solid waste, blocked the *esteros* and drainage canals of Metro Manila, resulting in massive flooding at the height of the typhoon. The Linis Estero Project, is a disaster mitigation measure being undertaken by the DENR, but needs to be backed up by more sustainable mechanisms, such as communities taking charge of their own solid waste management systems.

The Philippine Climate Change Act of 2009 (RA 9729) mandates LGUs to be the frontline agencies in formulating, planning, and implementing climate change action plans in their respective areas. Moreover, waste management processes as mandated by RA 9003 , such as waste avoidance, waste segregation, reuse, repair, recycling and composting, when adopted by the LGUs, automatically become a compliance strategy to RA 9729.

As part of solid waste management efforts, the immediate and safe closure of open and controlled dumpsites contributes to disaster risk reduction. As mandated in the Disaster Risk Reduction and Management Act, strict monitoring of closed dumpsites and sanitary landfills and waste-to-energy projects to ensure that they comply with environmental and health standards will also help prevent disasters or reduce risks.

Disaster risk prevention calls for implementing the best preferred options in waste management as embodied in the 3Rs. Emphasis should be on the 3Rs rather than mitigating emissions at the disposal end.

## E. Composting and Climate Change

Composting is a better alternative to landfilling organics, in that the former eliminates methane production, provides a series of economic and environmental co-benefits, and has a substantial impact on GHG reduction. Additionally, there is greater carbon storage in crop biomass as a result of composting. Experimental studies have shown that increased carbon sequestration in soil from composting

[11] Sun Star Baguio, http://www.sunstar.com.ph/baguio/local-news/2011/10/22/measures-crafted-vs-irisan-trash-slide-186449

application ranges from 6 to 40 tons of carbon per hectare[12]. Compost application results in reduced need for GHG-producing petroleum-based chemical fertilizer, pesticides, herbicides, and additives. These chemicals emit large quantities of GHG during application and as they decompose in the soil.

**Laguna de Bay Community Waste Management Project: Avoidance of methane production from biomass decay through composting**

*Activities started as the Laguna de Bay Institutional Strengthening and Community Participation Project, supported by the World Bank (project appraisal 2003). The project was explicitly designed to help reverse the degradation of the Laguna de Bay Watershed while reducing greenhouse gas emissions through its interventions.*

*The objective of the Laguna de Bay Community Waste Management Project is to implement a set of small scale waste management projects in the Laguna de Bay watershed. The watershed is heavily degraded and has ever-increasing environmental pressures from more than 10 million people and thousands of industries that produce largely untreated solid and liquid wastes. The continued degradation has resulted in increasing greenhouse gas emissions from waste, and through the waste management interventions under the project, both environmental degradation and greenhouse gas emissions are reduced.*

*The Laguna de Bay Community Waste Management Project is made up of two different CDM projects: methane recovery through wastewater treatment and methane avoidance through composting. This description focuses on the solid waste composting component.*

*The purpose of this component is to reduce the waste disposed in landfills and the associated methane emissions in the region through composting of organic matter. These activities are based on the small-scale methodology. The composting activity will prevent methane from being produced through anaerobic decay in disposal sites by diverting the waste from the disposal sites and treating it aerobically. Two different types of composting technologies will be used: windrow composting and the bioreactor technology. These technologies are similar to those composting systems, which have found successful applications in Asia. North America and Western Europe for the aerobic composting of municipal solid wastes.*

*The annual average of the estimated reductions over the crediting period of 7 years is 8901 tons of CO2e/yr, the total estimated emission reductions are 62307 ton of CO2. The project is a type III small-scale activity under category AMS III F. Avoidance of methane production from biomass decay through composting.*

*The solid waste-composting project includes seven municipalities and one city with populations ranging from 17,999 to 267,406. All are in the Laguna de Bay region. The sub-projects are located in Santa Rosa City, Pakil, Pangil, Mabitac, Pila, Nagcarlan and Siniloan in the province of Laguna, and Silang in the province of Cavite.*

*(PDD 11/2007)*

[12] http://www.cawrecycles.org/issues/ghg/compost, accessed March 21, 2011)

## F. Recycling and Climate Change

An EPA research indicates that in terms of climate benefits, recycling is the next best approach to waste prevention. (Climate Change and Waste, EPA, 2003).

In 2000, the Los Angeles Department of Water and Power recycled 76% of its waste, including paper, yard trimmings, plastics, and wood. The recycling effort reduced GHG emissions by about 4,000 metric tons of carbon equivalent. Seydel Companies prevented the disposal of 813 tons of high density polyethylene (HDPE) through packaging waste reductions and changes to their manufacturing processes. The modifications resulted in the reduction of approximately 400 MICE, the basic unit of measure for GHG) (US EPA March 2003).

In 2006, in life cycle assessments conducted by the EPA on incineration and recycling, the latter was shown to provide greater net energy and GHG reductions than the former across a wide range of materials, including aluminum cans, steel cans, glass, corrugated cardboard, magazines/third class mail, newspaper, office paper, phonebooks, textbooks, dimensional lumber, and medium-density fiberboard. A 2006 report by Eunomia Research and Consulting (UK) found that GHG emissions from incinerators were actually higher than those from conventional gas-fired power plants.

Greenhouse gases are emitted during the harvesting of trees and extraction and transport of materials. Waste prevention and recycling delay the need to extract some raw materials, lowering GHG emissions emitted during extraction. Waste prevention in manufacturing through more efficient resource use and making products from recycled materials requires less energy. Both lower GHG emission.

“Reviewing various waste disposal options, a comprehensive study for the European Commission found that segregation, recycling, and composting can cut GHG emissions the most compared to all other waste options.” (Smith, Alison, et al. “Waste Management Options and Climate Change, Final Report to the European Commission, DG Environment, July 2001, http//ec.europa.eu/environment/waste studies/pdf/climate _change pdf accessed February 2,2009)

## G. Special Waste—Toxic, Hazardous, and Infectious

Special wastes in RA 9003 include toxic and hazardous wastes generated by households and commercial establishments such as paints, thinners, household batteries, lead-acid batteries, consumer electronics such as cell phones, television etc. Bulky wastes such as electronic and electrical appliances are also included under the special wastes category.

The categories of healthcare wastes include:

- general waste
- infectious wastes
- pathological waste
- sharps
- pharmaceutical wastes
- genotoxic wastes
- chemical waste
- waste with high content of heavy metals
- pressurized containers
- radioactive waste

Pathological wastes include:

- tissues
- organs
- fetuse
- bloods and body fluids
- infectious wastes
- sharps

Pharmaceutical wastes includes expired pharmaceuticals and drugs stocked at producers and retailers' facilities.

In 2008, 1,952 health care facilities nationwide were registered as Hazardous Waste Generator, majority of which are located in the National Capital Region (NCR) (Department of Health (DOH) [www.doh.gov.ph]). The DOH regulates these facilities through its Bureau of Health Facilities and Services (BHFS), in coordination with Centers for Health Developments (CHDs). On the other hand, the DENR is in charge of issuing guidelines and permits implementing the rules on the transport, storage, and disposal of health care wastes.

As of February 2008, there were 61 registered hazardous waste transporters, capable of transporting healthcare waste as contained in the Hazardous Wastes Tracking System (HWTS). Most of these operate or service the NCR and Region 4A.[13] If not monitored closely, this can also give rise to illegal collection and dumping of healthcare wastes in solid waste disposal facilities. As often seen, open dumpsites in

[13] CALABARZON). (HEALTHCARE WASTES MANAGEMENT IN THE PHILIPPINES: GERI GERONIMO R. SAÑEZ at www.3rkh.net/3rkh/.../13_3RKH_TWGSHW1_SR_**Philippines**.pdf

various parts of the Philippines contain medical waste, such as syringes, dumped together with general waste.

## H. Other Issues and Concerns

**1. CFLS** – It is expected that 13 million Compact Flourescent Lamp waste will be generated from the 2010 Philippine Energy Efficiency Project. There is no collection system in place; and disposal and treatment facility of CFLS from the municipal solid waste stream is not yet available as of 2011. Each CFL contains up to five milligrams of mercury, a potent neurotoxin.

There are ongoing negotiations to craft an international agreement to reduce mercury use. The target year for signing the treaty is in 2013. The goal is to reduce mercury use not only in CFLs but also in mercury containing medical devices, in paper making, and in plastics production. There are also on-going discussions to issue a global ban on non-essential uses of mercury in products and processes as quickly as possible.

**2. Electronic and electric wastes**

- From 1995 to 2005, approximately 25 million units became obsolete; and in 2006-2010, additional 14 million units are projected to reach obsolescence.
- In 2005, 2.7 million units of TVs, refrigerators, air conditioning units, washing machines, radios became obsolete, and 1.8 million units going to landfills. (*G.L. Peralta and P.M. Fontanos, "E-waste issues and measures in the Philippines," Journal of Material Cycles and Waste Management 8 (2006): 34-39.).*

As of late, there is no national law governing e-wastes. Increased amount of electronic waste due to domestic consumption will have an impact on health and the environment unless soundly managed.

**3. Non-separation of special wastes at source and no system for special waste collection** results in entry of toxic and hazardous waste in solid waste disposal facilities. Some waste contractors and transporters also dump toxic and hazardous waste materials from industries to avoid the high cost of transport and treatment.

**4. Treatment and Disposal of Special Wastes** – Some LGUs construct septic vaults within sanitary landfills for the storage of special wastes; however, such a system does not destroy but rather merely store waste. The implementing rules and regulations of RA 9003 states that a separate area for household hazardous wastes can be designated (Rule 14, Operations of Sanitary Landfill); however, the EMB ruling states that only treated wastes can be di*sposed in the designated area.*

**5. Dumping and Importation of Toxic and Hazardous Wastes -** DENR Administrative Order No. 28 provides the guidelines on importation of recyclable materials containing hazardous substances scrap metals (including lead acid batteries and metal bearing sludge), solid plastic materials, electronic assemblies and scraps. While the administrative order states that importation must comply with the requirements and procedures of the Basel Convention, there is concern that this might serve as a sort of "open-door policy" for foreign e-waste. On the other hand, some argue that allowing e-waste imports will help boost the economy by creating jobs in the recycling industry.

**6. E-waste** dumping is an issue of concern because it results in the illegal trans-boundary movement of hazardous constituents such as heavy metals and brominated flame retardants. The government and other signatories to the Basel Convention have yet to ratify the Decision II/12, which bans the export of toxic waste (not just electronic waste) and wastes intended for recovery and recycling from rich countries to poor countries.

Aside from legally imported near-end-of-life electronic and electrical goods, such items enter the country through smuggling. Major sources of e-wastes are Japan, Korea, Taiwan,China, Hongkong, United States, and Australia.

E-waste is a problem because it contains hazardous materials such as lead, cadmium and mercury and persistent organic pollutants such as brominated flame retardants, polychlorinated biphenyls and polyvinyl chloride. They are frequently disposed of together with residential and commercial waste and are often recycled in uncontrolled conditions in dumpsites, junkshops, and in the homes of informal waste workers. The general public is not aware of the danger posed by e-waste, which leads them to dispose of it together with the general household or commercial waste. E-waste treatment and processing facilities are not readily available.

As people continue to purchase new computers, mobile phones, and other electronic gadgets proper management of e-waste becomes an urgent concern.

**7. Increase in Non-Environmentally Acceptable Products and Packaging** - RA 9003 Article 4 Section 30 prohibits the use of non-environmentally acceptable packaging and products. It defines "non-environmentally acceptable products or packaging as products (NEAP) or packaging that are unsafe in production, use, post-consumer use, or that produce or release harmful by-products when discarded. The Commission has yet to come up with the NEAP list.

According to articles published by Philippine media, the country is being flooded with products containing toxic and hazardous materials, including toxic toys, insecticide chalk, skin whitening creams, baby bottles with Bisphenol- A, leaded paints, silver jewelry cleaners, and many more. People as well as wildlife are exposed to these materials. The Toxic Substances and Hazardous Waste Act, or RA 6969, regulates toxic and hazardous substances in products and materials on a one-

on-one basis . While this is embodied in the law, new science shows that even when exposure to individual chemicals falls below the level where they cause an effect, chemicals can 'add-up' and cause potentially dangerous "cocktail effect." (State of the Art Report on Mixture Toxicity written by the researchers of the University of Gothenburg in Sweden and the University of London UK and published by the EU's Directorate-General for the Environment.). Hence, chemical safety advocates clamor for the fast tracking of the NEAP process.

## 8. Transparency, Accountability, and Public Participation in Solid Waste Management Governance

Lack of political will is most often cited a reason for local governments' non-compliance with RA 9003. Some indicators include discontinuance of SWM programs initiated by previous administrations; insufficient budget and human resources allocation for SWM; failure to implement segregation at-source, segregated collection, and closure and rehabilitation of open and controlled dumpsites, and many other provisions of the law.

The LGUs and the people are seen to lack the motivation to properly manage their Ecological waste due to a lack of awareness on the value and benefits of ecological solid waste management. Henceforth, environmental education is necessary.

Moreover, ESWM is seen as a cost rather than as income-generating activity for LGUs. Local chief executives fail to prioritize ESWM in the budget and resource allocation, while environmental cost accounting is not factored in when planning for ESWM systems.

Public-private investments in waste facilities and services face a lack of regulatory policy and/or poor enforcement thereof, thereby such activities lack transparency and become prone to corrupt practices.

As waste collection services are given free, people believe such are the sole responsibility of the government. An imposition of pay-as-you-throw-garbage fees, for example, is far from becoming a norm; as such a scheme may be seen as a reason to lose votes in the elections.

Public participation is enshrined in RA 9003 through the multi-sectoral solid waste management boards, from the regional to the local levels. While LGUs have organized these boards, many of these boards are not functional, thus depriving both the local government and the public a venue for exercising public participation and eco-citizenship.

# *CHAPTER 5 – SWM Initiatives in Asia and other Countries*[14]

The Philippines can learn from solid waste management best practices in Asia, even replicate and enhance these practices, given almost the same cultural backgrounds. Below are some of these best practices:

**A. Composting Technologies**

**1. Organic Waste Management in Bangladesh: Decentralized Composting**

Even with an average waste collection efficiency of 55%, the domination of organic content in the waste stream (>70%), seriously crippled the local authorities in Bangladesh in managing the country's solid waste.

Waste Concern, a research-based organization, initiated a pilot project on community-based resource recovery in Dhaka City in 1995. With additional support from the government and international organizations, they undertook a decentralized community-based composting projects in Dhaka.

Activities included door-to-door waste collection, composting of collected waste in a decentralized manner (employing barrel type composting, aerator type composting, and box type composting), and marketing of compost and recyclable materials.

In 2008, the decentralized composting concept was replicated in 20 cities and towns in Bangladesh. Waste Concern has since initiated a large scale, 700 tons/day composting plant in Dhaka City producing 50,000 tons of organic fertilizer every year. The organization looks forward to reducing about one million tons of GHG over an eight year period under the Clean Development Mechanism of the Kyoto Protocol.

Parallel to this, the Philippines' RA 9003 requires barangays or clusters of barangays to establish a Materials Recovery Facility where one of the components is to establish a composting facility, either in the backyard as provided for in a municipal, city, or barangay ordinance or in a common area within the barangay, city, or municipality or even offsite. Several types of composting were introduced, such as windrow composting, vermi-composting, and in-vessel composting. (AIT 2008)

[14] IP Report 2010

## 2. Commercial Large-Scale Composting in India

M/s Excel Industries Ltd produces compost and sold as a "bio-organics soil enricher." Centralized composting plants with capacities of 35-500 Mg/day were set-up at Kolkata, Bangalore, and a few other places in India. Most of these plants run on a "build-own-operate" basis or as joint ventures with local or state agencies and have been successful in marketing their compost and able to sustain their production. M/s Excel Industries has a nationwide distribution and sales network for its agro-chemicals, which confers a distinct advantage in marketing *Celrich* compost.

According to M/s Excel Industries, farmers buy about 95% of *Celrich* for growing sugarcane, grapes and bananas, cutting down their chemical fertilizer consumption by more than 25%. According to the company's own estimates, a 500 Mg/day plant will require a capital investment of about US $1.7 million, exclusive of the land cost. The overall production cost is estimated to be between US $25 and US $30 per Mg of compost. The direct operating costs are estimated as US $10.4 to US $12.5 per Mg of compost. Depending on the transportation distance and other local overheads, the selling price varies between US $33.5–US $42 per Mg of compost. (Korner & Visvanathan 2007)

## 3. Vermi-composting in Vietnam

Twenty-one communities of Barommatrilokanat make compost using tiger worms to reduce the volume of household waste. Making the compost begins with the separation of household waste into three categories: organic matter, recyclables, and general rubbish.

Organic waste is collected in plastic bins and brought to the community composting centers where it is dumped in circular cement and brick enclosures that house the worms. It takes three to four months to turn a batch of waste into compost, which is rich in humus that helps improve the structure and quality of the soil. The compost makes clay soil more porous and fertile and helps it retain water better. This compost has become a source of extra income for the communities in Barommatrilokanat. (Korner & Visvanathan 2007) Many of the LGUs and institutions adopt vermi-composting as a way of treating the biodegradable portion of their wastes. The vermicasts are known to have high nutrient content conducive to plant growth. The vermicasts are either applied in their gardens or sold to gardens and farms.

### 4. Waste to Energy and Fertilizer Project, Rayong, Thailand

In 2002, the Rayong Municipality in Thailand established the pilot SWM treatment plant using anaerobic digestion. The project aimed to produce electricity while the by-product (digestate) was to be used as soil conditioner or fertilizer. The plant had a capacity to treat 25,500 tons of bio-waste annually and could produce 5,800 tons of digestate and 3,826 MWh surplus of electricity from 21,900 tons of bio-waste. The increasing solid waste problem in Rayong ended and resulted in a successful project. An important contributing factor for the success was the community's willingness to solve the problem, along with the support and cooperation from NGOs and government agencies. (Korner & Visvanathan 2007)

### 5. Takakura Home Method of Composting

The Takakura Home Method (THM) is a composting method that can be used at the individual household level in urban areas. It was developed by Mr. Koji Takakura from the Japanese JPEC Company. JPEC developed the method extensively, in partnership with The Kitakyushu Initiative Network (KIN) of the United Nations Economic and Social Commission for the Asia and the Pacific (UNESCAP) and Surabaya, Indonesia City Councils and the Kitakyushu International Techno-Cooperative Association (KITA) in Kitakyushu City, Japan.

The Takakura Home Method uses native micro-organisms (NM) for composting, which is cultured and fermented from locally available materials such as fresh fruits, vegetable peels, coconut wine, brown sugar, rice bran, and rice husks. It is used in the household level by using baskets with holes, mixing the waste and NM starter and covered with husk pillow and cloth. The method can also be applied for composting market wastes in a larger area. (Cebu City Summit 2009)

THM is also being applied in some of the LGUs in Bago City, Negros Occidental and is being introduced in Cebu City.

### 6. Food Waste Biogas, Kerala, South India

A successful waste management endeavor was initiated by BIOTECH in Kerala, South India in 1998. The innovative program manages organic wastes from homes, institutions, and municipalities to produce alternative sources of energy such as biogas and electricity.

BIOTECH developed biogas digesters suitable for households, schools, hostels, and other municipal sites to process unwanted food wastes and other organic wastes and convert them to cooking gas, replacing 1,400 tons of LPG per year.

To date, BIOTECH has built and installed 12,000 domestic biogas plants, 220 institutional plants, and 17 municipal plants that use waste from the municipal fish markets to produce biogas, which is then used in a 3kW-engine to generate electricity for lighting the market. Effluents from the biogas digesters also make good fertilizers for household and agricultural use. Besides the household digesters, BIOTECH also runs institutional plants at schools (canteen waste) and at markets for the treatment of vegetable waste and fish waste.

In the Philippines, the DOST has come up with a model portable biogas digester, which households could use using the biodegradable wastes generated at home. The gas generated can be used for cooking. With the high cost of liquid petroleum gas, which is commonly used in homes for cooking, big savings can be generated through this method, not to mention that biodegradable wastes are reduced in the process. This technology is now being commercialized by an accredited fabricator of DOST. (Biotechin 2009)

## B. Recycling Technologies

### 1. Plastic-tar Roads in India

Domestic wastes, such as polyethylene, polypropylene, and polystyrene or plastic carry-bags, disposable cups, and PET bottles that are collected from garbage dumps are important ingredients of construction materials. When mixed with hot bitumen, the plastic melts to form a coat over the aggregate and the mixture is laid on the surface like a normal tar road. Use of shredded plastic waste acts as a strong binding agent for tar making and the asphalt lasts long. By mixing plastic with bitumen, the ability of the bitumen to withstand high temperature increases. Plastics can be mixed with heated tar and later mixed with gravel. Up to 5% polyethylene and 20% polystyrene can be used.

Plastic waste is melted and mixed with bitumen in a particular ratio. Normally, blending takes place when temperature reaches 45.5% but when plastic is mixed, it remains stable even at 55%. Roads laid with shredded plastic waste is more durable compared to those asphalted with an ordinary mix. The binding property of plastic makes roads last longer besides giving added strength to withstand more loads.

While a normal highway-quality road is said to last up to five years, plastic-bitumen roads are believed to last up to 10 years. The bitumen mix-plastic flakes can protect against water seepage due to the presence of plastic resulting lesser road repairs. A kilometer of road with an average width requires over two tons of poly-blend.

The cost of plastic road construction may be slightly higher compared to the conventional method. However, this should not deter the adoption of the technology as the benefits are much higher than the cost.

Salem, an industrial town in Tamil Nadu, was the first to lay plastic-tar in India. The technology has become one of the solutions for plastic waste management in India. There are more than 12 roads laid using plastic waste in Tamil Nadu alone. Other than Tamil Nadu, Karnataka and Maharashtra have also utilized the technology using waste plastic in shredded form in road construction. (AIT 2008)

In the Philippines, a project using asphalt mixed with plastic wastes is now being studied and piloted at the Department of Science and Technology (DOST) compound. The Philippine Plastic Industry Association is looking into a partnership with the DOST and the Department of Public Works and Highways to promote this technology.

Many LGUs have adopted the technology of mixing a percentage of shredded residual wastes in making concrete products, such as hollow blocks, pavers, and tiles for non-load bearing facilities. An example is the initiative of Teresa, Rizal which has been a subject of study tours by other LGUs for its best practice on solid waste management.

**2. Green Label Scheme in Thailand**

The Thailand Business Council for Sustainable Development initiated the Thai Green Label Scheme in 1993, which was formally launched in August 1994 by the Thailand Environment Institute in association with the Ministry of Industry.

The Green Label is an environmental certification awarded to specific products that are shown to have minimum detrimental impact on the environment in comparison with others that serve the same function. The scheme was developed to promote the concept of resource conservation, pollution reduction, and waste management. It applies to products and services, excluding foods, drinks, and pharmaceuticals. Products or services that meet the Thai Green Label criteria can carry the Thai Green Label. There are 39 categories (11 categories are under the study) for the Thai Green Label criteria. Thirty companies have been awarded the Green Label certification. Participation in the scheme is voluntary. (Good Practices 2009)

The Philippines has the Eco labelling Program for products and services, which is headed by the DTI Bureau of Product Standards and co-chaired by the Environmental Management Bureau of the DENR. Members of the program's steering committee come from different government agencies and consumer groups. The program provides a coding system for products that pass the criteria set for environmentally acceptable products and services. Products that pass are awarded a Green Choice Seal of Approval,

which is effective within three years and may be renewed after verification of compliance. As of this writing, 20 products and services have been issued a Green Choice Seal of Approval. Currently, the Ecolabelling Program works on the labeling of Quick Food Services.

**3. Promotion of Material Recovery, Energy Recovery and Replacement in Cement Kiln, Thailand**

The Thai Government has promoted the co-incineration of wastes in cement kilns since 2001 as an option for waste disposal other than landfilling. The benefits of this program are in energy and materials recovery. The program also includes energy replacement for coal/coke and material replacement for the raw material used in the cement kiln process. Currently, there are seven cement manufacturers that have expanded their capability in co-incineration of hazardous wastes.

The DENR has come up with a guideline on co-processing of segregated municipal wastes for cement kilns under DAO 2010-6. Plastic wastes and tires, and biomass as alternative fuel raw materials are allowed to be co-processed in cement factories. (Good Practices 2009)

***a) Thailand Green Purchasing Network***

Thailand Research Fund, Thailand Environment Institute, Thai Industrial Standards Institute, Thailand Business Council for Sustainable Development, and Thailand Network of Eco-efficiency and Cleaner Production have established the Thailand Green Purchasing Network, which intends to enhance the green supply chain not only in the demand side but also the supply in the Thai market through an information exchange on green products, green manufacturers, and green criteria. (Good Practices 2009)

The Philippines also adopted Green Purchasing under Executive Order 301 where all government offices and instrumentalities are required to establish a Green Purchasing Program in the procurement of goods and services. The DENR and some government agencies have already established Green Purchasing.

***b) Take-Back Program on End-of-Life Products, Thailand***

The Thai Ministry of Natural Resources and Environment initiated a take-back program on end-of-life mobile phones, including batteries and packaging, in order to recycle or dispose of them in an environmentally sound manner. The program aims to encourage customers to take back the used or end-of-life mobile phones, including accessories such as batteries and packaging wastes, in the collection points provided by manufacturers or relevant stakeholders, such as network providers, on a voluntary basis. (Good Practices 2009)

## C. Landfill Technologies

### 1. Principles of Fukuoka Method – Semi-Aerobic Landfill

Instead of conventional anaerobic landfills, some countries have begun using semi-aerobic landfilling. A particular type of semi-aerobic landfills, known as the Fukuoka Method, has been developed in Japan (F.C.E.B., 1999). Other countries, such as Malaysia, Indonesia, Philippines, and Brazil also use the Fukuoka Method today.

In the semi-aerobic landfill, the leachate collection system (LCS) consists of a central perforated pipe (main collection pipe) with perforated branch pipes on either side of it, laid at suitable intervals. The pipes are embedded in graded boulders (5-15 cm) and laid at an adequate slope. The main collection pipe ends in an open leachate collection pond outside the landfill cell. The pipes are designed and laid so that only one-third of the section is filled with leachate, leaving the remaining area free for air to flow.

At each intersection of the main collection pipe and branch pipes, and at the end of each branch pipe, vertical gas ventilation pipes enclosed in graded boulders packed inside a perforated used drum are erected. The heat generated by microbial activity in the semi-aerobic landfill causes the temperature inside the landfill to rise. Convection currents generated by the temperature difference between the landfill and the outside air make it possible for air (oxygen) to enter the waste layers through the main collection pipe. As fresh air is drawn in the waste layers through the process of convection, aerobic conditions are introduced causing micro-organisms to flourish inside the waste layers, thus speeding up the decomposition process and reducing the emission of methane.

Benefits of semi-aerobic landfill:

- The quality of leachate improves significantly and more rapidly than in anaerobic landfills.
- The generation of methane gas, which contributes to global warming, is reduced.
- Enhanced stabilization makes it possible to return the completed landfill sites to other uses in a shorter period.
- The technology is cost effective and simple to construct and operate, and allows a high degree of freedom in the selection of materials of construction. (Reinhart & Chopra 2000)

**Fukuoka Method in Samoa**

*Tafaigata landfill completed in 2005 in Upolu transformed a messy and smelly open dump to a clean landfill using the Fukuoka Method,. The transformation process was funded by Japanese International Cooperation Agency (JICA), at a cost of US$400,000. The following year, Vaiaata landfill in Savaii also implemented the Fukuoka Method funded by Government of Samoa at a cost of $200,000. Tafaigata landfill was the first landfill to implement the Fukuoka method in the Pacific region and it has become a successful model. MNRE NEWSLETTER, March 2008*

## D. Community-based Projects

### 1. India for the Waste-pickers

Shristi is a non-profit research, technical assistance, and advocacy organization based in Delhi, India. It works on environmental issues related to waste management, ragpickers, recycling, and medical wastes. It focuses on helping communities and institutions solve their problems using local resources. Shristi has implemented several community-based recycling and composting projects that incorporate the informal sector. It has trained ragpickers to collect garbage from residents and to compost biodegradable waste. Some of Shristi's projects include:

- Using vermicomposting to convert kitchen scraps into worm castings in a Delhi Development Authority residential neighborhood in Munirka
- Designing a waste management system that employs ragpickers and manages wastes from offices and households; the kitchen scraps are pit-composted.
- Installing a vermicomposting project at the All India Institute of Medical Science to manage more than 140 kg of waste per day.
- Putting in place a waste management system at Malcha Marg, which employs ragpickers.
- Starting a waste management system in Anand Niketan using local sweepers and a ragpicker to vermicompost the waste.

Another Indian organization, Chintan, works primarily in Delhi on issues related to sustainable and equitable consumption. It works both with policy makers and at the grassroots level with the city's poorest wastepickers, communities, and institutions generating wastes.

Chintan builds the capacity of wastepickers by training them in waste handling and composting in order to make their work both safer and economically viable. It also works with wastepickers on other issues including police harassment, access to medical facilities, right to work, and recognition and inclusion in planning processes. Some of their ongoing projects include:

- Waste handling in Dilli Haat, a popular food and crafts bazaar in the heart of Delhi run by Delhi tourism. The project includes training cooks and assistants to segregate

waste, training wastepickers to pick up waste, composting food and other waste, proper waste management of plastics, public awareness, and sweeping. The site is also used to train wastepickers for other projects.

- Waste handling for a chain of luxury hotels in Delhi, where recyclers have created an informal enterprise that buys recyclables while also increasing segregation through a system of information sharing with the managers. This helps waste recyclers to build diverse skills.
- Recycling in a slum area where the local non-government organization is trained to carry out waste segregation, collection, and composting with encouragement on households from the local children. (Source: *Resources Up in Flames – The Economic Pitfalls of Incineration versus a Zero Waste Approach in the Global South,* Brenda Platt, Institute for Local Self-Reliance for Global Alliance for incinerator Alternatives/Global Anti-Incineration Alliance, p.63.)

2. Thailand and Waste-Collectors

The waste collectors work for about 6-10 hours per day. They work on the day when the truck collecting the waste pours the waste at the dumping sites. They work different shifts, for example from 6.00-7.00 am, 12.00-1.00 pm, before 5.00 pm, and before 8.00 pm.

Apart from having old and new waste in the dumpsite, there is also mix of hazardous waste, like chemical fuel, medicine bottles, and pesticide. Contaminated waste is also present, such as used condom, diaper, and sanitation clothes. Others are metal waste, spoiled food, animal remains, wood, stick for meatball, and dangerous item such as gun bullets. In their work, half of the waste collectors wear gloves. Some wear rubber gloves.

3. India

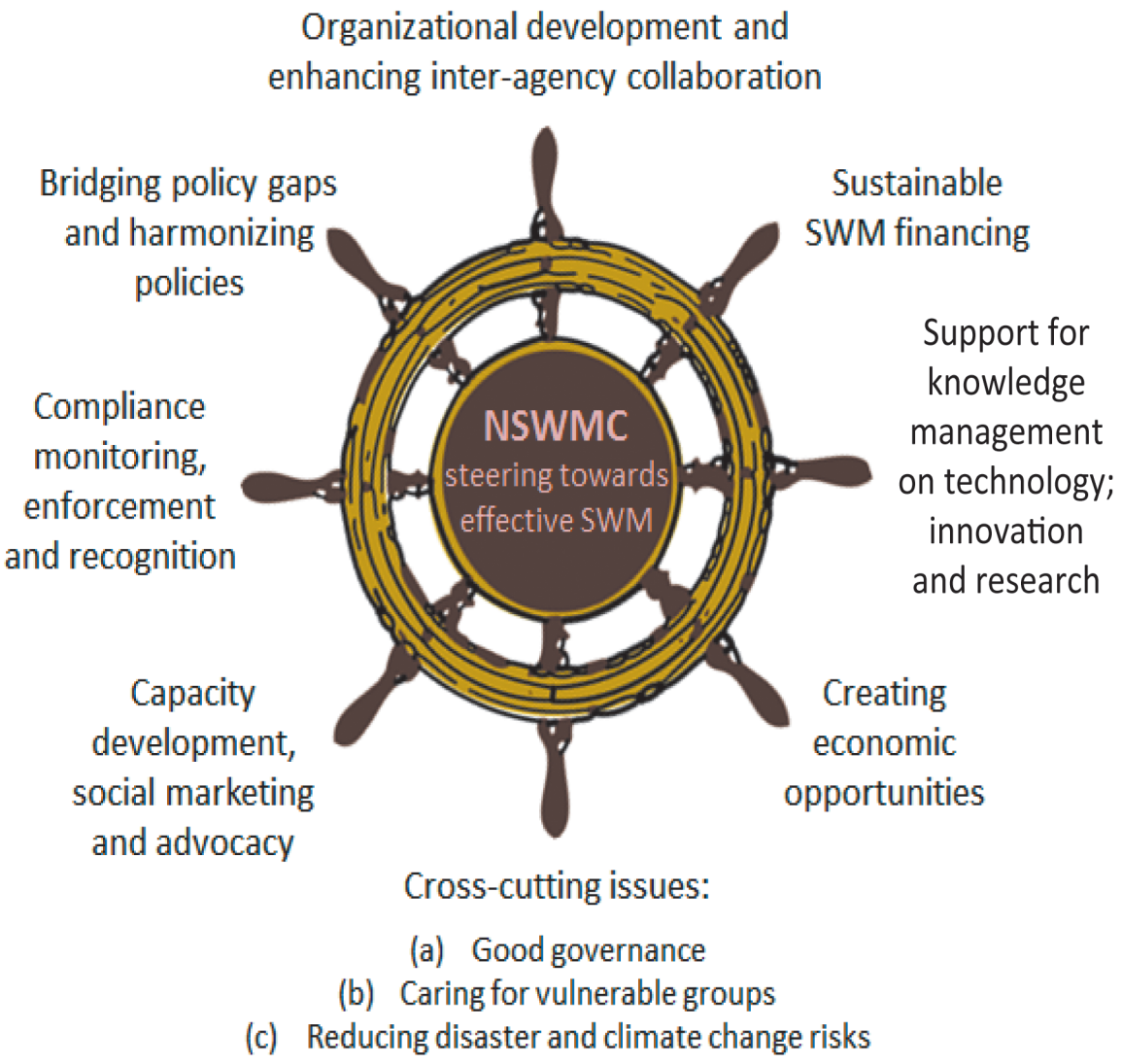
In Pune, one in every four of the scrap collectors works seven days a week. Wastepickers maintain the worst and the longest working hours with almost 10 per cent leaving their homes before six in the morning and a third before 8:00 am. Many younger women manage to leave for work only between 8:00 and 10:00 in the morning because they shoulder the additional responsibility of cooking and cleaning for their families.

Despite this, it is usually the women who leave earlier in the morning. Likewise, more women return home only after 7”00 pm. Notwithstanding the fact that some enter the occupation because of time ‘flexibility,’ half actually put in between nine and 12 hours of work for six days a week. Hardly anyone works part-time and 50 percent work eight hours a day.

The actual time spent by most scrap collectors in commuting to and from the place of residence to the place of work is over an hour. They cover ten kilometers daily, over and above the travelling for scrap collection.

# *Part II:*

# *National Solid Waste Management Strategy 2012-2016*


Organizational development and enhancing inter-agency collaboration
Bridging policy gaps and harmonizing policies
Sustainable SWM financing
Support for knowledge management on technology; innovation and research
Compliance monitoring, enforcement and recognition
NSWMC
steering towards effective SWM
Capacity development, social marketing and advocacy
Creating economic opportunities
Cross-cutting issues:
(a) Good governance
(b) Caring for vulnerable groups
(c) Reducing disaster and climate change risks

## Component 1 **Bridging Policy Gaps and Harmonizing Policies**

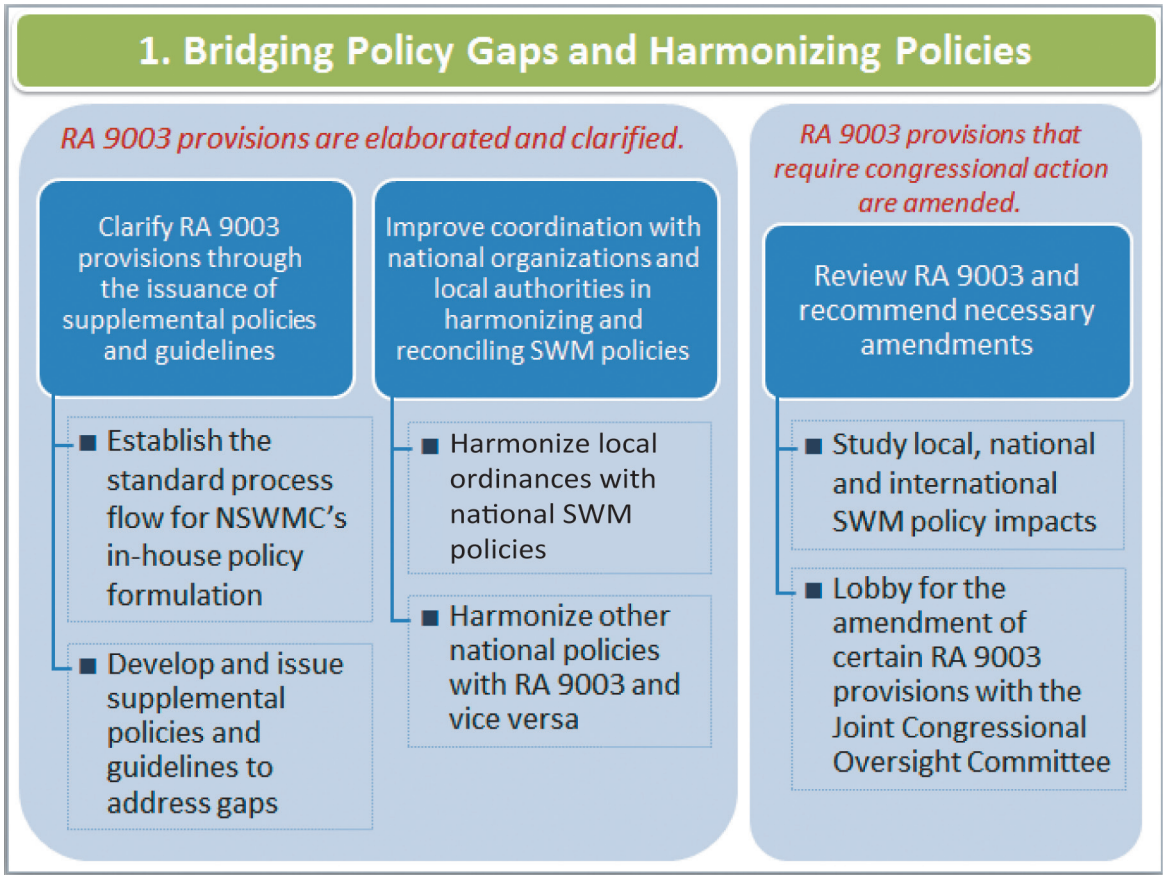
The need to bridge policy gaps was confirmed from consultative discussions carried out with different stakeholders as well as from feedbacks from the field, the results of which reveal that a number of gray areas and gaps in RA 9003 need to be clarified and addressed as these could be a ground for poor planning and compliance.

Therefore, guidelines are needed in implementing specific approaches in SWM. As mandated by RA 9003, the NSWMC should prescribe policies to achieve the objectives of the law because the absence of it could affect countrywide implementation. Moreover, national standards and guidelines provide for easy and consistent implementation of the law. The absence of common and commonly-understood guidelines could lead to divergent interpretations that may cause delay in implementing the same.

The gaps identified during the consultations are:

a. Policies for organizational support structures (e.g., DepED/DOE membership, mandatory creation of local ENR offices, delineation of P/CENRO roles and capacitation of LGUs);
b. Segregation, collection, transfer and transport systems (e.g., general, equipment, contracts, hauler accreditation guidelines, informal sector);
c. Waste diversion (e.g., WACS; drop-off facilities; compost standards; MRF siting, its function as TSD facility and its competition with junkshops;
d. Residual waste management (e.g., clarification of RCA, eco-park, residual waste; SLF siting; integrated facility; SLF clay liner construction; eco-efficient soil cover study, septic vaults).
e. Cleaner systems and technologies [e.g., NEAP list, extended producer's responsibility (EPR), eco-labeling, green vs e-procurement policies, Berde rating, cleaner production law, harmonization of burn/non-burn, safeguards to alternative technologies];
f. Special handling of other types of wastes (e.g., demolition/construction, food waste donation, confiscated food (imported/local), agricultural waste handling, ship waste dumping vis-à-vis outdated MarPol law); and
g. Hazardous components of MSW (e.g., furniture refurbishing, guidelines on collection, handling and disposal).

Furthermore, there is also a need to harmonize the laws as overlapping and contradicting provisions in the different laws of the land lead to confusion in the interpretation. Consistent policies will guide not only the regulated community, but the regulators themselves. Some SWM undertakings have also become irrelevant and inconsistent with emerging systems and models for resource utilization and management. Complementation of policies and initiatives among different sectors (government, private sector, NGOs, etc.) could promote more efficient SWM, making it more responsive to the felt needs of the stakeholders. To address these urgent concerns, the NSWMC shall strive to achieve the following objectives through the strategies and key initiatives proposed below.




Objective 1.1 RA 9003 provisions are elaborated and clarified.

Strategy 1.1.1 Clarify RA 9003 provisions through the issuance of supplemental policies and guidelines

Key Initiative 1.1.1.1 Establish the standard process flow for NSWMC's in-house policy formulation

Key Initiative 1.1.1.2 Develop and issue supplemental policies and guidelines to address gaps

Strategy 1.1.2 Improve coordination with national organizations and local authorities in harmonizing and reconciling SWM policies

Key Initiative 1.1.2.1 Harmonize local ordinances with national SWM policies

Key Initiative 1.1.2.2 Harmonize other national policies with RA 9003 and vice versa

Objective 1.2 RA 9003 provisions that require congressional action are amended.

Strategy 1.2.1 Review RA 9003 and recommend necessary amendments

Key Initiative 1.2.1.1 Study local, national and international SWM policy impacts

Key Initiative 1.2.1.2 Lobby for the amendment of certain RA 9003 provisions with the Joint Congressional Oversight Committee

| | |
|---|---|
| ***Key Initiative 1.1.1.1:*** **Establish the standard process flow for NSWMC's in-house policy formulation** | |
| **Component 1**<br>Bridging Policy Gaps and Harmonizing Policies | |
| **Objective 1.1**<br>RA 9003 provisions are elaborated and clarified | **Strategy 1.1.1**<br>Clarify RA 9003 provisions through the issuance of supplemental policies and guidelines |
| **Lead Agency** | National Solid Waste Management Commission (NSWMC) – DENR |
| **Cooperating Partners** | DENR and EMB Planning and Legal Divisions, NSWMCS, NSWMC-TWG |
| **General Description** | The current procedure in the formulation of SWM policies and guideline documents are as follows:<br><br>Step 1: NSWMC's Technical Working Group (NSWMC-TWG) drafts the policy or guideline based on working documents prepared by NSWMC Secretariat (NSWMCS) [Note: There are cases where NSWMCS is assigned to draft the policy or guideline];<br>Step 2: NSWMCS sends copies to EMB Regional offices through SWM Coordinators for comments;<br>Step 3: Draft document passes through EMB's TWG on the review of major environmental laws [Note: TWG was created per EMB SO No. 2011-258];<br>Step 4: NSWMCS calendars it for deliberation of NSWMC-TWG;<br>Step 5: NSWMCS incorporates all comments and calendars it for endorsement to and deliberation by the members of NSWMC;<br>Step 6: A Resolution of the Commission is prepared for signature of the NSWMC Chairperson, i.e., the DENR Secretary, when there are no major comments to the policy or guideline. [Note: In comparison, it was previous practice for the draft resolution to be initialed by majority of NSWMC members duly authorized by their principals prior to signature of the Chairperson.];<br>Step 7: After the Resolution is signed, a Department (or Joint) Administrative Order is prepared by NSWMCS for deliberation with the EPPD of EMB then forwarded to the DENR Planning and Policy for further review and signature of the DENR Secretary. Parallel review by other concerned agencies is undertaken in cases of joint issuances. The approved DAO, JAO or any appropriate legal instrument is disseminated and posted at the DENR and EMB website.<br><br>This is the practice but the policy process flow has not been formally approved by the Commission. It is therefore imperative that NSWMC's procedural flow be standardized and recognized to streamline policy making processes in all cases. This ensures timely and relevant issuance of supplemental guidelines. |
| **Indicative Actions** | 1. Document, review, assess and enhance existing process flows for NSWMC policy formulation, e.g., routing system, time line, NSWMC internal operating guidelines, NSWMCS staff work, complementing |

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| | DAO/JAO for streamlined implementation, etc.;<br>2. Prepare a draft resolution adopting the process flow;<br>3. Review draft resolution by TWG and endorse to NSWMC for approval;<br>4. Establish a tracking system to ensure that the adopted procedure in policy formulation is followed. |
| **Target Period/Date of Accomplishment:** | Q1/2012 to Q2/2012 |
| **Geographical Scope/Target Groups:** | National Level – NSWMCS, DENR and DENR-EMB's legal, policy and planning offices, Other concerned stakeholders |
| **Special Requirements** | |
| **Possible Sources** | DENR-EMB, NSWMC members, Development partners, Private sector |

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| ***Key Initiative 1.1.1.2:*** **Develop and issue supplemental policies and guidelines to address gaps** | |
| **Component 1**<br>Bridging Policy Gaps and Harmonizing Policies | |
| **Objective 1.1**<br>RA 9003 provisions are elaborated and clarified | **Strategy 1.1.1**<br>Clarify RA 9003 provisions through the issuance of supplemental policies and guidelines |
| **Lead Agency** | NSWMC – DENR and NSWMCS |
| **Cooperating Partners** | NSWMC-TWG, Other concerned agencies |
| **General Description** | There are still many policies and guidelines that have not been prepared and prioritized by NSWMC, which lead to confusion in implementation. Examples of these are the guidelines for deputation of SWM officers, handling of special wastes in the MRF, harmonized formula for computing waste diversion, how to conduct WACS, color-coding of waste storage facilities, composting and compost quality guidelines, standards for establishing MRFs and transfer stations, landfill leachate and gas monitoring guidelines, accreditation of trainers and professionals, availment of financing programs, setting of minimum % allocation from DF for SWM, DBM guidelines on SWM accounting, etc. |
| **Indicative Actions** | 1. Identify policy gaps and prioritize supplemental policies to be formulated in consultation with stakeholders;<br>2. Formulate NSWMC resolutions in accordance with the approved procedure in policy formulation;<br>3. Recommend to concerned agencies the issuance of DAO, JAO, MC or any appropriate legal instrument;<br>4. Ensure that newly approved policies are properly disseminated, e.g., NSWMC website, official communication to all concerned, etc. |
| **Target Period/Date of Accomplishment:** | Q1/2012 to Q4/2016 |
| **Geographical Scope/Target Groups:** | Nationwide – DENR, DENR-EMB and Other concerned stakeholders, e.g., LGUs, private sector, regional SWM coordinators |
| **Special Requirements** | Support for hiring of consultants |
| **Possible Fund Sources** | Regular budget of DENR-EMB budget, Development partners, NSWMC members, Private sector |

| ***Key Initiative 1.1.2.1:*** **Harmonize local ordinances with national SWM policies** | |
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| **Component 1**<br>Bridging Policy Gaps and Harmonizing Policies | |
| **Objective 1.1**<br>RA 9003 provisions are elaborated and clarified | **Strategy 1.1.2**<br>Improve coordination with national organizations and local authorities in harmonizing and reconciling SWM policies |
| **Lead Agency** | NSWMC – DILG |
| **Cooperating Partners** | DENR-EMB Regional Offices, DILG Field Offices, LGU Leagues, LLDA, MMDA, NSWMCS, Palawan Council for Sustainable Development (PCSD) |
| **General Description** | Local ordinances need to be reviewed with regard to RA 9003 and other national policies. The fines and penalties imposed in RA 9003 are not being followed in the ordinance of LGUs. Local policy makers should also align existing but outdated SWM ordinances with the provisions of RA 9003. |
| **Indicative Actions** | 1. Conduct policy review on existing ordinances vis-à-vis RA 9003;<br>2. NSWMC to communicate with DILG the need to issue a circular or any legal instrument requiring and guiding LGUs to harmonize their SWM ordinances with RA 9003 and its supplemental policies and guidelines;<br>3. Work with LGU leagues to advocate ordinance harmonization;<br>4. DILG, in coordination EMB through its Regional Offices, to monitor and furnish NSWMC with monitoring results; and<br>5. DILG to ensure LGU compliance. |
| **Target Period/Date of Accomplishment:** | Q1/2012 to Q4/2016 |
| **Geographical Scope/Target Groups:** | Nationwide – All LGUs, Local SWM boards |
| **Special Requirements** | Support for hiring of consultants |
| **Possible Sources** | EMB-Secretariat budget, Development Partners, NSWMC members, private sector |

| ***Key Initiative 1.1.2.2:*** **Harmonize other national policies with RA 9003 and vice versa** | |
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| **Component 1**<br>Bridging Policy Gaps and Harmonizing Policies | |
| **Objective 1.1**<br>RA 9003 provisions are elaborated and clarified | **Strategy 1.1.2**<br>Improve coordination with national organizations and local authorities in harmonizing and reconciling SWM policies |
| **Lead Agency** | NSWMCS |
| **Cooperating Partners** | DENR-EMB-EPPD, NSWMC-TWG, Office of the Solicitor-General (OSG), Other concerned agencies |
| **General Description** | RA 9003 needs to be reviewed with regard to other national policies. If within its capacity, NSWMC may issue harmonized or joint policies with concerned agencies to clarify such gaps. For example, the provision on temporary storage of special waste at the MRF runs counter to the requirement of RA 6969 where accredited transport, storage and disposal facilities for special wastes are required.<br><br>There are also other provisions of other national laws that are unclear or contradicting RA 9003, e.g., EO 226 (on incentives), RA 7160 (on fines and penalties, local taxation, etc.), PD 1586 (on environmental impact assessment), RA 8749 (on air emissions), RA 9512 (on environmental education), RA 10068 (on compost quality requirements), RA 9729 (on climate-proofing of SWM facilities), etc., and there is a need to identify and harmonize the same. This key initiative only applies to those policies, which shall not necessitate congressional amendments. Otherwise, proposals are addressed through key initiative 1.2.1.1 and/or 1.2.1.2. |
| **Indicative Actions** | 1. Study the different national laws and find the conflicting provisions;<br>2. Conduct inventory, research, meetings, and consultations with concerned national agencies, professional associations, NCIP and other stakeholders;<br>3. Craft joint proposal(s) resulting in the issuance of JAO, JMC or any appropriate legal instrument;<br>4. Ensure that the clarified policies are properly disseminated, e.g., NSWMC website, official communication to all concerned, etc. |
| **Target Period/Date of Accomplishment:** | Q2/2012 to Q4/2016 |
| **Geographical Scope/Target Groups:** | All Levels – EMB Regional Offices, LGUs, NGOs other concerned stakeholders |
| **Special Requirements** | Support for the hiring of consultants/researchers, e.g., legal experts |
| **Possible Sources** | Regular budget of DENR-EMB, NSWMC members, Development partners, Private sector |

| ***Key Initiative 1.2.1.1:*** **Study local, national and international SWM policy impacts** | |
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| **Component 1**<br>Bridging Policy Gaps and Harmonizing Policies | |
| **Objective 1.2**<br>RA 9003 provisions that require congressional action are amended | **Strategy 1.2.1**<br>Review RA 9003 and recommend necessary amendments |
| **Lead Agency** | NSWMC – DENR and NSWMCS |
| **Cooperating Partners** | DTI (BOI and BITR), DILG, Joint congressional oversight committee (JCOC), LGU Leagues, NEDA-PIDS, NSWMC-TWG, Research institutions, Concerned agencies |
| **General Description** | What is lacking in the present system of policy development is the knowledge on the impact of the policies that have been implemented. Knowledge of the impacts will lead to the improvement of policy and the improvement in compliance. The results of such studies could support lobbying activities for congressional action to amend such policies. |
| **Indicative Actions** | 1. Prioritize policies that need impact studies in consultation with stakeholders, particularly those impacts that are potentially urgent and significant;<br>2. Develop tools, criteria and mechanism to assess policy impacts;<br>3. Partner with research institutions, e.g., academe, NGOs etc., in conducting policy impact studies;<br>4. Use the results of policy impact studies to prepare policy improvements;<br>5. Lobby for the amendment of relevant SWM policies;<br>6. Institutionalize continuous policy impact monitoring system. |
| **Target Period/Date of Accomplishment:** | Q2/2012 onwards |
| **Geographical Scope/Target Groups:** | National Level – NSWMCS, EMB, DENR, Philippine Congress, NCIP, LGUs, NGOs other concerned stakeholders<br>Regional Level – DENR P/CENROs, Regional Ecology Centers (RECs), EMB Regional SWM Coordinators<br>Local Level – LGUs, including barangays; All sectors, including affected communities |
| **Special Requirements** | |
| **Possible Sources** | Regular budget of DENR-EMB, NSWMC members, Development partners, Private sector |

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| ***Key Initiative 1.2.1.2:*** **Lobby for the amendment of certain RA 9003 provisions with the Joint Congressional Oversight Committee** | |
| **Component 1**<br>Bridging Policy Gaps and Harmonizing Policies | |
| **Objective 1.2**<br>RA 9003 provisions that require congressional action are amended | **Strategy 1.2.1**<br>Review RA 9003 and recommend necessary amendments |
| **Lead Agency** | NSWMC – DENR and DILG |
| **Cooperating Partners** | DENR and DENR-EMB legal offices, LGU Leagues, NSWMCS, Philippine Congress, Concerned agencies and institutions |
| **General Description** | Pursuant to Sections 60 and 63 of RA 9003, NSWMC has to report to Philippine Congress the accomplishments and progress of SWM implementation, including the necessary recommendations in areas where there is need for legislative action. RA 9003 also needs to be revisited with regard to other national and local policies. Although the NSWMC can formulate guidelines or supplemental policies to clarify RA 9003 provisions, there are provisions in the SWM law that can only be addressed or amended through congressional and senate actions. To name a few, these may include: mandatory creation of local ENR offices, mandatory SWM allocation from congressional countrywide development fund, etc. |
| **Indicative Actions** | 1. With supporting studies, policy impacts and public reviews, identify and prioritize policies that can only be effected through amendments to RA 9003 and related laws;<br>2. Institutionalize mechanisms to enhance consultative processes with SWM stakeholders, e.g., websites, workshops, etc.;<br>3. Draft policy papers and proposals, including clear financial, institutional, monitoring and enforcement mechanisms;<br>4. Formulate NSWMC resolution(s) recommending for amendments to RA 9003;<br>5. Make representations with Congress for amendments of the law; and<br>6. Institutionalize continuous policy implementation and impact monitoring system. |
| **Target Period/Date of Accomplishment:** | Q2/2012 to Q4/2016 |
| **Geographical Scope/Target Groups:** | National Level – All concerned NGAs, NGOs other concerned stakeholders<br>Local Level – All LGUs; Local SWM boards and committees, All sectors including affected communities |
| **Special Requirements** | |
| **Possible Sources** | Regular budget of DENR-EMB, NSWMC members, Development partners, Private sector |

## Component 2 **Capacity Development, Social Marketing and Advocacy**

The NSWMC and its members, DepEd, NGOs, media partners, and the LGUs play important roles in the information and education campaign to effectively raise the awareness of the general public and consequently motivate them to observe waste avoidance and the 3Rs, which are key to achieving the goals of ESWM. Their roles are stipulated not only in RA 9003 but in the Environmental Awareness and Education Act of 2008 (RA 9512) as well.

Some of the reasons for the low awareness and poor motivation of the general public are herein identified.

- Insufficient integration of solid waste management systems in educational institutions results in the lack of awareness and motivation of millions of students and teachers alike.
- There is insufficient funding for information, education and communication (IEC) programs in LGU budgets because most of the funds are allocated to waste collection and disposal.
- The lack of political will to enforce prohibitions on littering, open burning, and waste segregation, and to provide incentives for good practices also contribute to the people's low motivation.
- Inadequate management of the ESWM system leaves room for people not to segregate waste and instead throw away mixed waste, as well as allows them to burn litter.
- The throw-away culture of people perpetuates the linear cycle of waste management that "it is alright to throw because it will soon be out of sight." More wastes generated and thrown will result in increased costs of collection and disposal that adds to greenhouse gas emissions in the end.
- There is weak promotion of waste avoidance, eco-labelling and eco-labelled products, sustainable production and consumption, etc.

For the implementers to undertake social marketing, IEC and advocacy campaigns, these channels of communication need to be capacitated in the different aspects of values formation and SWM functional elements. Such are the roles of the National and Regional Ecology Centers (NEC/RECs) in accordance with RA 9003.

To move stakeholders to take action for ESWM, the NSWMC seeks to implement the following strategies in order to achieve the objectives below.


Objective 2.1 Mainstreamed ESWM in school curricula and programs at all levels

Strategy 2.1.1 Integrate ESWM in school curricula at all levels

Key Initiative 2.1.1.1 Support curriculum development or integration as required in the National Environmental Education Action Plan (NEEAP)

Key Initiative 2.1.1.2 Select and disseminate best practices of integrating ESWM in the school curricula

Strategy 2.1.2 Require schools and universities to implement in-house SWM programs

Key Initiative 2.1.2.1 Collaborate with concerned agencies in encouraging schools and universities to implement SWM programs

Objective 2.2 Engaging the support of all SWM stakeholders through increased awareness and participation

Strategy 2.2.1 Capacitate information channels, advocates, practitioners, policy-makers and SWM focal persons

Key Initiative 2.2.1.1 Conduct needs assessment based on identified core competencies in SWM at the national, regional and local levels

Key Initiative 2.2.1.2 Develop standardized modules for SWM capacity development and training of trainers

Key Initiative 2.2.1.3 Conduct regular SWM trainings on values formation, communication, technical skills and financial management for trainers, organizations, SWM focal persons and advocates

Key Initiative 2.2.1.4 Assess and certify SWM professionals (practitioners), particularly LGU SWM focal persons through competitive assessment or examination system

Strategy 2.2.2 Establish partnerships and engage the support of local policy- and decision-makers in prioritizing SWM in their agenda

Key Initiative 2.2.2.1 Develop and implement a social marketing plan for NSWMC and its members

Key Initiative 2.2.2.2 Establish formal partnerships with the civil society, private sector, media and other interested partners in social marketing and advocacy

| ***Key Initiative 2.1.1.1:*** **Support curriculum development or integration as required in the National Environmental Education Action Plan (NEEAP)** | |
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| **Component 2**<br>Social Marketing and Advocacy | |
| **Objective 2.1**<br>Mainstreamed ESWM in school curricula and programs at all levels | **Strategy 2.1.1**<br>Integrate ESWM in school curricula at all levels |
| **Lead Agency** | NSWMC – NEC and DENR-EMB-EEID |
| **Cooperating Partners** | Agencies involved in NEEAP, CHED, DepEd, DSWD, Educational and alternative learning institutions, Environmental Education Network of the Philippines (EENP), NEC/RECs, PAASCU and accrediting institutions, TESDA |
| **General Description** | RA 9003 (Ecological Solid Waste Management Act of 2001) and RA 9512 (Environmental Awareness and Education Act of 2008) complement each other in integrating SWM and other environmental concerns in the school curricula. The NSWMC can coordinate with the lead agencies involved in developing the NEEAP to infuse SWM in its action plans for schools. |
| **Indicative Actions** | 1. Review the existing policies and programs in integrating SWM in school curricula and university course offerings;<br>2. Collaborate with the agencies involved in preparing the NEEAP to strengthen SWM in its action plans and to enhance school-LGU collaboration;<br>3. Collaborate with the NEEAP body in developing standardized SWM modules or course offerings, teachers' instructional guide and competency-based learning materials, in coordination with inter-agency bodies, and formalized through memorandum circulars, administrative orders or any appropriate legal instruments;<br>4. Assist DSWD, DepEd, CHED, TESDA and educational institutions in integrating SWM into pre-, elementary, secondary, tertiary, and technical, vocational, education and training (TVET) school curricula, the Community Service Program (CSP) for high schools and National Service Training Program (NSTP) for colleges and universities;<br>5. Collaborate with accrediting bodies, e.g., PAASCU, the possibility of integrating environmental education parameters into their accreditation and monitoring systems; and<br>6. Continuously monitor, evaluate, improve and replicate NEEAP implementation, especially at educational institutions |
| **Target Period/Date of Accomplishment:** | Q4/2011 to Q4/2015 |
| **Geographical Scope/Target Groups:** | All Levels – RA 9512 agencies, CHED, DepEd, TESDA, Academe/HEIs, School boards, Out-of-school youth and other support organizations, Daycare centers (through DSWD), Alternative learning institutions |
| **Special Requirements** | Expert's advice in curriculum building |
| **Possible Sources** | Regular budget of DENR-EMB (NSWMCS and EEID) and NEEAP agencies |

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| ***Key Initiative 2.1.1.2:*** **Select and disseminate best practices of integrating ESWM in the school curricula** | |
| **Component 2**<br>Social Marketing and Advocacy | |
| **Objective 2.1**<br>Mainstreamed ESWM in school curricula and programs at all levels | **Strategy 2.1.1**<br>Integrate ESWM in school curricula at all levels |
| **Lead Agency** | NSWMC – NEC and DENR-EMB-EEID |
| **Cooperating Partners** | CHED, DepEd, EENP, Media, NEC/RECs, NGOs, PIA, Private sector |
| **General Description** | Successful practices of schools and universities in implementing ESWM in its educational curricula and course offerings should be properly documented and disseminated to serve as inspiration and benchmarks for others in the country. |
| **Indicative Actions** | 1. Review and enhance criteria for evaluating best practices in SWM curriculum integration;<br>2. Scout for and list candidate successful practices and case studies, e.g., winners and finalists of the annual search for eco-friendly schools;<br>3. Document best practices as well as lessons learned using a common documentation format; and<br>4. Identify channels of communication, disseminate and update documented case studies through quad-media, e.g., websites. |
| **Target Period/Date of Accomplishment:** | Q4/2011 to Q4/2016 |
| **Geographical Scope/Target Groups:** | Regional and Local Levels – REC IEC committees, School boards, LGUs, Academe/HEIs, Private sector |
| **Special Requirements** | Reproduction of documented best practices of schools and universities |
| **Possible Sources** | Regular budget of concerned national agencies, Resources from private sector and donor agencies |

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| ***Key Initiative 2.1.2.1:*** **Collaborate with concerned agencies in encouraging schools and universities to implement SWM programs** | |
| **Component 2**<br>Social Marketing and Advocacy | |
| **Objective 2.1**<br>Mainstreamed ESWM in school curricula and programs at all levels | **Strategy 2.1.2**<br>Require schools and universities to implement in-house SWM programs |
| **Lead Agency** | NSWMC – TESDA, DepEd and CHED |
| **Cooperating Partners** | DOH, EENP, NEC/RECs, NSWMCS, Media, NGOs, PIA, Private sector |
| **General Description** | Educational institutions have responsibilities under RA 9003 to implement in-house SWM programs not only as waste generators but as part of their values formation role among the youth. |
| **Indicative Actions** | 1. Review and consolidate existing policies and programs of DepEd, CHED, TESDA, and host LGUs in implementing in-house SWM programs at educational institutions, e.g., school MRF, composting facility, segregation system, demo-gardens, etc.;<br>2. Identify, review and promote model SWM plans and projects in schools and universities;<br>3. Review, adopt and recommend existing guidebooks and guidelines in establishing, financing, evaluating and monitoring school-based SWM programs, e.g., EcoWaste Coalition's Zero Waste Guide for Schools, SWAPP's Step-by-step Guide in Establishing Ecosavers Program in Schools, etc., including its alignment with their host LGUs' SWM programs;<br>4. Identify institutional and financial support mechanisms for schools, e.g., DepEd funds, LGU/School board resources, etc.;<br>5. Undertake capacity building or mentoring programs for educational institutions; and<br>6. Recognize best educational institutions practicing SWM through national, regional and local awards (e.g., Annual Search for Sustainable and Eco-Friendly Schools, Zero Basura Olympics for the Academe) or private sector initiatives. |
| **Target Period/Date of Accomplishment:** | Q1/2011 to Q4/2016 |
| **Geographical Scope/Target Groups:** | Regional and Local Levels – REC IEC committees, DILG-LGRCs, Academe/HEIs, School boards, LGUs, Private sector |
| **Special Requirements** | |
| **Possible Sources** | Regular budget of concerned national agencies, Regular funding from LGU/School Boards, Resources from private sector and donor agencies |

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| ***Key Initiative 2.2.1.1:*** **Conduct needs assessment based on identified core competencies in SWM at the national, regional and local levels** | |
| **Component 2**<br>Social Marketing and Advocacy | |
| **Objective 2.2**<br>Engaging the support of all SWM stakeholders through increased awareness and participation | **Strategy 2.2.1**<br>Capacitate information channels, advocates, practitioners, policy-makers and SWM focal persons |
| **Lead Agency** | NSWMC – DENR and EMB |
| **Cooperating Partners** | Academic and research institutions, CHED, DENR-EMB-EEID, DENR-EMB-HRD, DepEd, DILG-LGA, NEC/RECs, NSWMCS, PLLENRO |
| **General Description** | Policy-makers, implementers and stakeholders at the local level need to be capacitated and updated on SWM and SWM planning. Empowered local key actors, particularly the SWM Boards, translate to better planning and implementation of RA 9003 according to their specific needs and situations.<br><br>To capacitate LGUs more efficiently, information channels and advocates need to be capacitated first. Trainers could come from national and regional representatives of national government agencies (NGAs) and NGOs, which usually form the NEC and RECs. The level of their understanding of RA 9003 and SWM, as well as their skills as trainers and facilitators have to be evaluated prior to actual trainers' trainings. |
| **Indicative Actions** | 1. Develop instruments (e.g., survey forms, weaknesses in 10-year plans, HR tools and techniques) needed to establish the Training and Development Needs Assessment system.<br>2. Conduct TDNA and analyze data. |
| **Target Period/Date of Accomplishment:** | Q3/2011 to Q4/2016 |
| **Geographical Scope/Target Groups:** | National level – NGAs, NSWMCS and NEC<br>Regional level – RECs, EMB-ROs, DENR – PENROs and CENROs<br>Local level – LGUs, LSWMBs, LGU ENROs and Planners |
| **Special Requirements** | |
| **Possible Sources** | Regular funds from NEC, DILG-LGA, DENR-EMB with support from other partners |

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| ***Key Initiative 2.2.1.2:*** **Develop standardized modules for SWM capacity development and training of trainers** | |
| **Component 2**<br>Social Marketing and Advocacy | |
| **Objective 2.2**<br>Engaging the support of all SWM stakeholders through increased awareness and participation | **Strategy 2.2.1**<br>Capacitate information channels, advocates, practitioners, policy-makers and SWM focal persons |
| **Lead Agency** | NSWMC – NEC and DILG |
| **Cooperating Partners** | Academe/HEIs, DILG-LGA, NEC/RECs, TESDA, Knowledge Development Centers |
| **General Description** | NSWMC should develop standardized SWM training-of-trainers modules for pilot-testing and eventual utilization and customization of trainers and advocates in SWM. Such will ensure the quality of information being transferred to LGUs and supporters as well as serve as a guide for interested parties in conducting SWM trainings to reach a wider audience. |
| **Indicative Actions** | 1. Conduct an inventory of all knowledge products in all aspects and functional elements of SWM, particularly communication and technical skills training modules and workshop designs;<br>2. Consolidate, develop or customize SWM training-of-trainers training modules for utilization of information channels, educational institutions and advocates, including the use of visual aids and instructional manuals;<br>3. Finalize the training modules by pilot-testing them at national and regional levels;<br>4. Evaluate the standardized training modules, adopt and package them for groups of audiences; and<br>5. Continuously update and improve the trainers' training and SWM training modules. |
| **Target Period/Date of Accomplishment:** | Q1/2011 to Q1/2013 |
| **Geographical Scope/Target Groups:** | National Level – NSWMC members, Other NGAs, NEC, Civil society, Private sector, Foreign-assisted projects<br>Regional and Local Levels –DENR-PENROs/CENROs, Provincial government and the provincial SWM board, KDCs |
| **Special Requirements** | Standardized training materials from GIZ-AHT SWM4LGUs and other projects and program partners |
| **Possible Sources** | Regular funds from lead and cooperating agencies and provincial governments, Donor agencies and partner institutions |

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| ***Key Initiative 2.2.1.3:*** **Conduct regular SWM trainings on values formation, communication, technical skills and financial management for trainers, organizations, SWM focal persons and advocates** | |
| **Component 2**<br>Social Marketing and Advocacy | |
| **Objective 2.2**<br>Engaging the support of all SWM stakeholders through increased awareness and participation | **Strategy 2.2.1**<br>Capacitate information channels, advocates, practitioners, policy-makers and SWM focal persons |
| **Lead Agency** | NSWMC – NEC, TESDA and DILG-LGA |
| **Cooperating Partners** | Academic and research institutions, DENR and DENR-EMB (SWM Units and HRDs), Environmental NGOs, KMCs, LGRCs, NEC/RECs, NSWMCS |
| **General Description** | The NSWMC, NEC/RECs, universities, NGOs and other advocacy groups have the power and influence to serve as multipliers in enhancing the technical knowledge of SWM professionals and improving the mindset and behavior of people towards proper SWM. |
| **Indicative Actions** | 1. Identify potential information channels, venues and funding sources for SWM capacity building, values formation, communication and facilitation skills trainings;<br>2. Customize the training modules for different audiences (DENR and DILG field personnel, city/municipal officials, LGU technocrats, barangay officials, religious and community leaders, etc.) and for different durations (semestral, week-long short courses, seminars, etc.);<br>3. Conduct trainers' trainings and accredit the trainers in accordance with NSWMC resolution No. 36 and related policies of other government agencies;<br>4. Conduct technical and soft skills trainings, including hands-on application of developed skills (with skills evaluation and improvement) to trainers, professors, advocates and LGU supporters (Note: LGU experts can also be trained as trainers);<br>5. Conduct annual regional SWM Summits, capacity development activities and other awareness-building campaigns together with partners for each target group; and<br>6. Monitor the impacts of social marketing and advocacy campaigns and adjust strategies. |
| **Target Period/Date of Accomplishment:** | Q3/2011 to Q4/2016 |
| **Geographical Scope/Target Groups:** | Nationwide – NSWMC members, Other NGAs, NEC, Civil society, Private sector, Academe/HEIs<br>Regional and Local Levels – RECs, DENR PENROs/CENROs, Academe/HEIs, All LGUs, All LSWMBs |
| **Special Requirements** | Seminar and training expenses<br>Reproduction of training modules |
| **Possible Sources** | Regular funds from lead and cooperating agencies and support from other partners |

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| ***Key Initiative 2.2.1.4:*** **Assess and certify SWM professionals (practitioners), particularly LGU SWM focal persons through competitive assessment or examination system** | |
| **Component 2**<br>Social Marketing and Advocacy | |
| **Objective 2.2**<br>Engaging the support of all SWM stakeholders through increased awareness and participation | **Strategy 2.2.1**<br>Capacitate information channels, advocates, practitioners, policy-makers and SWM focal persons |
| **Lead Agency** | NSWMC - TESDA and Higher Education Institutions (HEIs) |
| **Cooperating Partners** | CSC, DILG, NEC/RECs, PRC |
| **General Description** | Provincial, city and municipal ENROs and/or SWM focal persons need to build their capacities for eventual certification as SWM professionals. NSWMC, DENR and/or the universities can issue guidelines or implement this certification program through competitive evaluation or examination systems.<br><br>In the case of HEIs, one of the outputs of GIZ-AHT's SWM4LGUs Project is the compilation and pilot-testing of eighteen (18) training modules encompassing the fundamental elements of implementing an integrated SWM system. These modules were officially handed over to Central Philippine University (CPU) to pilot-test its conversion into university-based curricula. |
| **Indicative Actions** | 1. Review RA 9003 mandates and other governing laws of public service and university degree programs in the professional accreditation or certification of SWM professionals;<br>2. Set the criteria and identify mechanisms for training and recognition of SWM professionals, including portfolio assessment, and adopt/modify guidelines as necessary;<br>3. Issue NSWMC Resolution requiring SWM focal persons to undergo assessment and certification process with supporting appropriate legal instrument(s);<br>4. Implement accreditation, certification or recognition programs and issue licenses or any other means of professional qualification for trained SWM professionals through competitive evaluation systems; and<br>5. Establish and maintain a roster of accredited SWM trainers and trained professionals |
| **Target Period/Date of Accomplishment:** | Q2/2012 onwards |
| **Geographical Scope/Target Groups:** | All Levels –NEC, RECs, Higher education institutions (HEIs), All LGUs |
| **Special Requirements** | |
| **Possible Sources** | Donors, DENR-EMB, Academe/HEIs |

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| ***Key Initiative 2.2.2.1:*** **Develop and implement a social marketing plan for NSWMC and its members** | |
| **Component 2**<br>Social Marketing and Advocacy | |
| **Objective 2.2**<br>Engaging the support of all SWM stakeholders through increased awareness and participation | **Strategy 2.2.2**<br>Establish partnerships and engage the support of local policy- and decision-makers in prioritizing SWM in their agenda |
| **Lead Agency** | NSWMC – PIA |
| **Cooperating Partners** | Academe/HEIs, All NSWMC and TWG member agencies, Marketing Association of the Philippines, Media, NGOs, NSWMCS |
| **General Description** | NSWMC needs to formulate, adopt and implement a holistic and integrated social marketing and advocacy plan to engage the support of policy-makers, implementers and other groups to enhance SWM sector development. |
| **Indicative Actions** | 1. Review and synthesize RA 7160 (Local Government Code), RA 9003, RA 9512 and other relevant policies that mandates policy makers, national agencies and LGUs, including barangays, to prioritize SWM in their agenda, e.g., through local development plans, annual investment plans, fund allocation, etc.;<br>2. Conduct a baseline study on the behavioral factors influencing SWM;<br>3. Review previous social marketing plans and identify areas or programs that need to be improved, e.g., national and local environmental governance, strategic social marketing advocacies, etc.;<br>4. Draft a comprehensive social marketing plan for NSWMC members, LGUs and other stakeholders in SWM;<br>5. Conduct consultative discussions to finalize the national SWM social marketing and advocacy plan;<br>6. Adopt the plan and issue NSWMC Resolution when necessary and<br>7. Disseminate and implement the plan together with partners by mainstreaming it into their respective work and financial plans. |
| **Target Period/Date of Accomplishment:** | Q2/2012 to Q4/2015 |
| **Geographical Scope/Target Groups:** | National Level – NSWMC Members, Other NGAs, NEC, Philippine Congress, Civil Society, Private Sector, Other Champions<br>Regional and Local Levels – RECs, LGUs (Provinces, Cities, Municipalities and Barangays), Local SWM Boards |
| **Special Requirements** | Experts' advice on social marketing and communications strategy |
| **Possible Sources** | Regular funds from lead and cooperating agencies and support from other partners |

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| ***Key Initiative 2.2.2.2:*** **Establish formal partnerships with the civil society, private sector, media and other interested partners in social marketing and advocacy** | |
| **Component 2**<br>Social Marketing and Advocacy | |
| **Objective 2.2**<br>Engaging the support of all SWM stakeholders through increased awareness and participation | **Strategy 2.2.2**<br>Establish partnerships and engage the support of local policy- and decision-makers in prioritizing SWM in their agenda |
| **Lead Agency** | NSWMC - NEC |
| **Cooperating Partners** | RECs, Civil society, Private sector, NGOs, Religious groups, Media, Educational institutions, All NSWMC and TWG member agencies, NSWMCS |
| **General Description** | To extend its coverage and scope in social marketing and advocacy, NSWMC needs to partner with communicators, educators, trainers, mentors and champions in influencing SWM implementers to prioritize SWM in their agenda. |
| **Indicative Actions** | 1. Forge partnerships and resource-sharing arrangements with various SWM stakeholder groups, including volunteers, through formal agreements or memorandum of understanding. In the case of NEC and RECs, mobilize members and provide them with skills and other resources;<br>2. Conduct joint activities such as annual SWM Summits, capacity development activities and other awareness-building campaigns utilizing the quad-media;<br>3. Monitor the impacts of such partnerships on the awareness and buy-ins of SWM policy- and decision makers; and<br>4. Recognize partners and supporters in SWM advocacy campaigns |
| **Target Period/Date of Accomplishment:** | Q1/2011 to Q4/2015 |
| **Geographical Scope/Target Groups:** | National Level – NSWMC Members, Other NGAs, NEC, Civil society, Private sector, PCOs, Journalists, Other champions<br>Regional and Local Levels – RECs, LGUs (Provinces, Cities, Municipalities and Barangays), Local SWM Boards |
| **Special Requirements** | |
| **Possible Sources** | Regular funds from lead and cooperating agencies and support from other partners |

## Component 3 **Sustainable SWM Financing**

Writeshops were conducted to diagnose the current SWM situation in the Philippines. LGU representatives cited the following reasons, among others, for low RA 9003 compliance:

- Lack of funds – the establishment of SLFs require high capital investments
- Lack of expertise – only a few cities have SWM units with technically capable staff
- Difficulty of finding a suitable site for SLFs – in many cases, the citizens of the targeted barangays have a strong "NIMBY" (not-in-my-backyard) attitude.

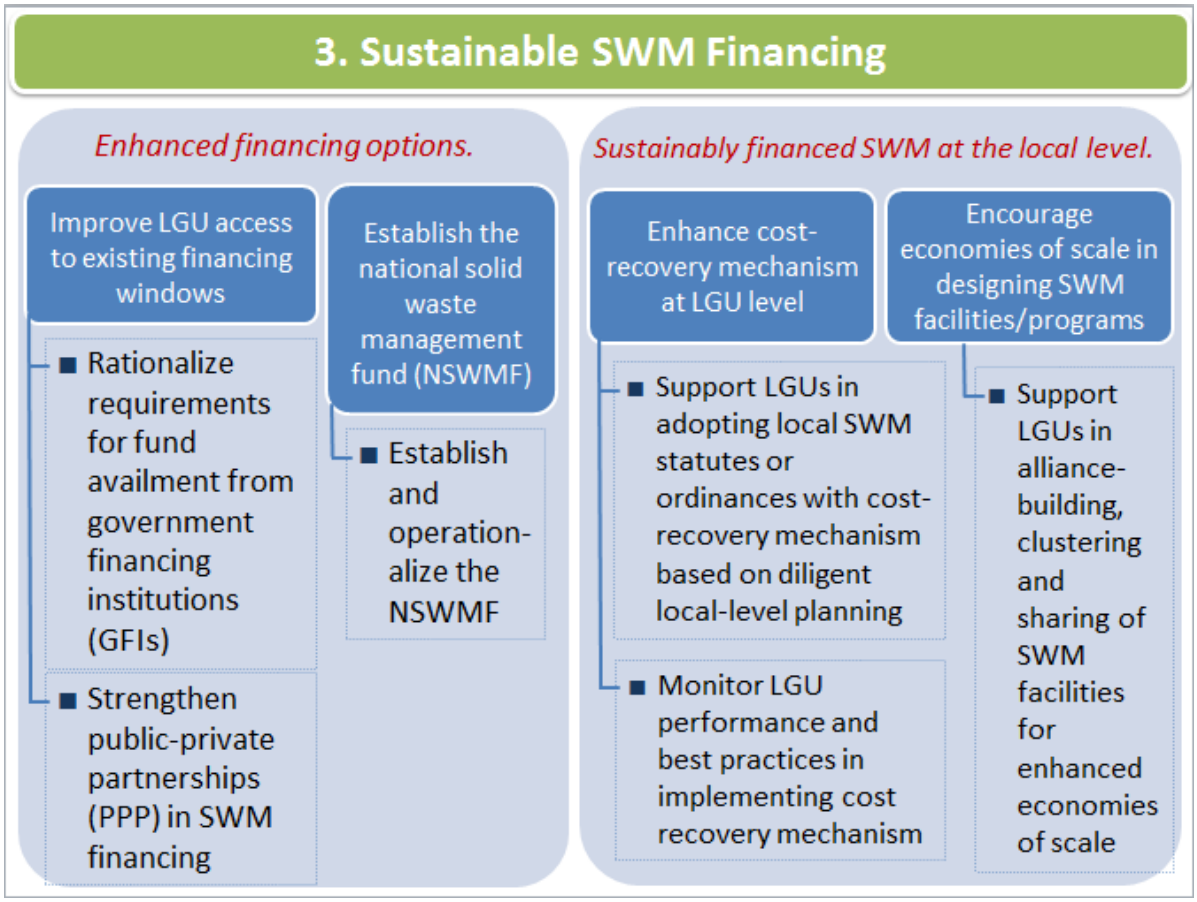
Financing has always been a critical aspect in SWM work, both at national and local levels. It is also an important sustainability indicator. This urgent need to address SWM Financing issues and concerns arose from the unavailability of resources that hinder the effective implementation of the law even as RA 9003 provides the mechanisms for solid waste management financing and cost recovery.

The following factors are obstacles for effective implementation of RA 9003 in the aspect of SWM financing, incentives and cost recovery:

a. No regular and low allocation/appropriation;
b. National Solid Waste Management Fund (NSWMF) is not established;
c. Voluminous documentary requirements of GFIs for fund availment;
d. Misuse of funds;
e. Low level of public-private partnership;
f. The move from subsidized SWM services to SWM services with cost recovery;
g. Low level of willingness to pay SWM fees by households;
h. High cost of investing on technologies and processes; and
i. No full cost accounting at the LGU level.

Failure to address the above can lead to the shortage of resources to successfully implement RA 9003. For LGUs, high capitalization entails knowledge of available finance windows, capacities for undertaking cost-benefit analysis, public-private partnership and clustering options to enhance economies of scale. Thereafter, LGUs have to deal with financial management options for annual operating and maintenance expenses associated with SWM services. To minimize depletion of financial resources by continuous subsidies, LGUs have to contend not only with the constituents' low willingness to pay for SWM services, but its own internal assessment of its willingness-to-charge waste management fees.

To support the LGUs financing needs, the NSWMC shall, within the next five years, strive to achieve the following objectives through the strategies and key initiatives proposed below.




Objective 3.1 Enhanced financing options

Strategy 3.1.1 Improve LGU access to existing financing windows

Key Initiative 3.1.1.1 Rationalize requirements for fund availment from government financing institutions (GFIs)

Key Initiative 3.1.1.2 Strengthen public-private partnerships (PPP) in SWM financing

Strategy 3.1.2 Establish the national solid waste management fund (NSWMF)

Key Initiative 3.1.2.1 Establish and operationalize the NSWMF

Objective 3.2 Sustainably financed SWM at the local level

Strategy 3.2.1 Enhance cost recovery mechanism at LGU level

Key Initiative 3.2.1.1 Support LGUs in adopting local SWM statutes or ordinances with cost-recovery mechanism based on diligent local-level planning

Key Initiative 3.2.1.2 Monitor LGU performance and best practices in implementing cost recovery mechanism

Strategy 3.2.2 Encourage economies of scale in designing SWM facilities/programs

Key Initiative 3.2.2.1 Support LGUs in alliance-building, clustering and sharing of SWM facilities for enhanced economies of scale

| ***Key Initiative 3.1.1.1:*** **Rationalize requirements for fund availment from government financing institutions (GFIs)** | |
|---|---|
| **Component 3**<br>Sustainable SWM Financing Mechanisms | |
| **Objective 3.1**<br>Enhanced financing options | **Strategy 3.1.1**<br>Improve LGU access to existing finance windows |
| **Lead Agency** | NSWMC – DILG |
| **Cooperating Partners** | DBM, DOF-BLGF, DOF-MDFO, GFIs, LGU Leagues, NSWMCS, NSWMC-TWG, Other concerned institutions[1] |
| **General Description** | There should be streamlined systems to guide LGUs in understanding and tapping existing finance windows to fund SWM services and infrastructures, particularly those offered by GFIs. Documentary requirements also need to be evaluated, e.g., varying requirements, BLGF certification on LGU's borrowing capacity, profitability statement, etc. |
| **Indicative Actions** | 1. Review, document and update all windows available for LGUs to finance SWM projects;<br>2. Conduct consultative discussions with GFIs, LGUs and other concerned institutions to gather inputs on how to streamline processes and requirements to avail of such funds;<br>3. Work with GFIs and other financial institutions in improving the system;<br>4. Recommend to concerned agencies the issuance of DAO, JAO, MC or any appropriate legal instrument;<br>5. Partner with GFIs in the dissemination or marketing of these finance windows; and<br>6. Establish database to monitor fund availment by LGUs. |
| **Target Period/Date of Accomplishment:** | Q2/2012 to Q4/2013 |
| **Geographical Scope/Target Groups:** | Nationwide – All LGUs |
| **Special Requirements** | Reproduction of updated dossier of SWM finance windows for LGUs |
| **Possible Sources** | Regular budgets of DILG and DENR-EMB |

| ***Key Initiative 3.1.1.2:*** **Strengthen public-private partnerships (PPP) in SWM financing** | |
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| **Component 3**<br>Sustainable SWM Financing Mechanisms | |
| **Objective 3.1**<br>Enhanced financing options | **Strategy 3.1.1**<br>Improve LGU access to existing finance windows |
| **Lead Agency** | NEDA |
| **Cooperating Partners** | DILG, DOF, DTI (BOI and SBC), LGU Leagues, NSWMCS, NSWMC-TWG |
| **General Description** | PPP schemes are gradually being recognized as an alternative option to financing relatively huge capital investments, particularly in establishing SWM infrastructures, and LGUs should have access to these options. NSWMC, through the NEC, is also documenting PPP initiatives on SWM to facilitate replication by other LGUs. |
| **Indicative Actions** | 1. Compile a directory of private enterprises involved in SWM equipment and services;<br>2. Review and propose enabling policies or systems to clarify legal and institutional support mechanisms in undertaking PPP, e.g., BOT, DBO;<br>3. Compile and document all possible PPP modalities, including its advantages, tradeoffs and case studies, which can be considered by LGUs in implementing SWM projects and programs;<br>4. Disseminate PPP fact sheets to LGUs via various channels;<br>5. Work with donor and government agencies in capacitating LGUs in PPP, e.g., PPP 101 for LGUs, preparation of feasibility studies or PPP project proposals, etc.; and<br>6. Facilitate business matching of the LGUs' investment portfolio with private enterprises involved in SWM products and services. |
| **Target Period/Date of Accomplishment:** | Q2/2012 to Q4/2013 |
| **Geographical Scope/Target Groups:** | National Level – Government agencies involved in promoting PPP, LGUs, Private sector |
| **Special Requirements** | Resource persons or experts on PPP<br>Reproduction and dissemination of documented PPP case studies |
| **Possible Sources** | Include in budget of NEDA and other concerned agencies |

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| ***Key Initiative 3.1.2.1:*** **Establish and operationalize the national solid waste management fund (NSWMF)** | |
| **Component 3**<br>Sustainable SWM Financing Mechanisms | |
| **Objective 3.1**<br>Enhanced financing options | **Strategy 3.1.2**<br>Establish the national solid waste management fund (NSWMF) |
| **Lead Agency** | NSWMCS |
| **Cooperating Partners** | COA, DBM, DENR, DILG, DOF, LGU Leagues, OP, Philippine Congress |
| **General Description** | Part IV, Rule XV of the IRR of RA 9003 mandates the creation of NSWMF as a special account to be administered by NSWMC for the benefit of LGUs. Its creation entails high-level discussions as to the sources and requirements for LGUs to avail of the said 'catalytic fund'.<br><br>Specifically, Section 46 of RA 9003 states that the "NSWMF shall be created as a special account in the National Treasury and to be administered by NSWMC. Such fund shall be sourced from (a) fines and penalties imposed … donations, endowments, grants and contributions from domestic and foreign sources; and (b) amounts specifically appropriated for the Fund under the annual General Appropriations Act (GAA) … The fines collected under Sec. 49 shall be allocated to the LGU where the fined prohibited acts are committed in order to finance the solid waste management of said LGU. Such allocation shall be based on a sharing scheme between the Fund and the LGU concerned … LGUs are entitled to avail of the Fund on the basis of their approved solid waste management plan. Specific criteria for the availment of the Fund shall be prepared by the NSWMC." |
| **Indicative Actions** | 1. Discuss with Department of Budget and Management (DBM) on how to establish the NSWMF as well as explore with relevant agencies other possible sources of funds, e.g., CDF, tobacco excise tax, sin taxes, PAGCOR, special shares in the proceeds from national taxes, fines and penalties, private sector, domestic and foreign sources, etc.;<br>2. Present recommendations to the NSWMC to facilitate the issuance of a resolution that would open a separate account under the National Treasury and the subsequent allocation of funds from GAA and other sources;<br>3. NSWMC, or an appropriate body identified by the NSWMC, to comply with the necessary requirements per DBM guidelines and lobby for the inclusion in the General Appropriations Act (GAA);<br>4. Establish procedural guidelines on how LGUs or cluster of LGUs can tap the NSWMF, including criteria to determine qualified SWM projects, to be recommended for adoption by NSWMC;<br>5. Recommend to concerned agencies the issuance of DAO, JAO, MC or any appropriate legal instrument to serve as implementing rules and regulations (IRR) of the approved NSWMF guidelines; and |

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| | 6. Disseminate NSWMF information to LGUs and other stakeholders. |
| **Target Period/Date of Accomplishment:** | Q2/2012 to Q4/2013 |
| **Geographical Scope/Target Groups:** | National Level –Donor agencies, Financing institutions<br>Local Level – All LGUs, NGOs, Academe and other stakeholders |
| **Special Requirements** | Seed fund for NSWMF<br>Resource persons or experts on fund establishment and management |
| **Possible Sources** | Regular budget of DENR-EMB, Development partners and donor agencies |

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| ***Key Initiative 3.2.1.1:*** **Support LGUs in adopting local SWM statutes or ordinances with cost-recovery mechanism based on diligent local-level planning** | |
| **Component 3**<br>Sustainable SWM Financing Mechanisms | |
| **Objective 3.2**<br>Sustainably financed SWM at the local level | **Strategy 3.2.1**<br>Enhance cost-recovery mechanism at the LGU level |
| **Lead Agency** | NSWMC - NEC, NSWMC – DILG |
| **Cooperating Partners** | DBM, DENR-EMB, DOF-BLGF, LGU Leagues, NSWMCS |
| **General Description** | Section 47 of RA 9003 states that LGUs shall impose fees in amounts sufficient to pay the costs of preparing, adopting, and implementing their SWM plans. Per Rule XIX Section 4 of the IRR, LGUs shall be required to pass SWM ordinances based on RA 9003 that suit its local situation. These local statutes are also pre-requisites to implementing cost-recovery mechanisms within their jurisdiction. Challenges in the willingness to pay by constituents as well as the willingness to charge by local leaders can be addressed through careful planning and implementation by the LGUs. |
| **Indicative Actions** | 1. Review existing local SWM ordinances and related national policies on its cost-recovery features and strategies, e.g., sticker system, integrated utilities billing system, pay-as-you-throw systems, business licensing, income generation, charges for special waste management, etc.;<br>2. Compile local SWM statutes with cost-recovery mechanism and develop pro forma ordinance as a guide for LGUs;<br>3. Capacitate all LGUs (cities, municipalities and barangays)in replicating or customizing their own ordinances through the following<br>a. Activation of the local SWM boards (LSWMBs), including a focal person, who will be in charge of reviewing and recommending waste fees and tariffs, as well as fines and penalties;<br>b. Full-cost accounting (FCA) of SWM services;<br>c. Conduct of public perception, demand analysis and capacity- and willingness-to-pay surveys through a generic format;<br>d. Creation of a separate SWM account under to general funds to 'ring-fence' collected waste fees, including procedures on how to tap these funds for LGU projects and SWM Board activities;<br>e. Formulation of the ordinance with localized cost-recovery mechanism, which should also be consistent with the 10-year SWM plan of the LGU.<br>4. Ensure that ordinances are adopted and strictly implemented by LGUs. |
| **Target Period/ Accomplishment:** | Q4/2011 to Q4/2013 |
| **Geographical Scope/Target Groups:** | Regional Level – RECs and other local supporters<br>Local Level – All LGUs, LSWMBs, Sanggunian |
| **Special Requirements** | Reproduction and dissemination of pro forma SWM ordinance with CR<br>Expert advice on local SWM financing and fund management |
| **Possible Sources** | Regular budget of DENR-EMB, Development partners and donor agencies |

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| ***Key Initiative 3.2.1.2:*** **Monitor LGU performance and best practices in implementing cost recovery mechanism** | |
| **Component 3**<br>Sustainable SWM Financing Mechanisms | |
| **Objective 3.2**<br>Sustainably financed SWM at the local level | **Strategy 3.2.1**<br>Enhance cost-recovery mechanism at the LGU level |
| **Lead Agency** | NSWMCS and DILG |
| **Cooperating Partners** | DENR-EMB Regional Offices, DOF-BLGF, LGU Leagues |
| **General Description** | In response to the LGUs' perennial problem on financing SWM, the NSWMC or NEC can maintain a database of the financial situation of the LGUs, particularly on available funds, related expenses and percentage (%) cost-recovery through waste fee systems. Section 12 of RA 9003 states that "LSWMBs shall adopt specific revenue-generating measures to promote the viability of its SWM Plans". Cost-recovery performance of LGUs could be reviewed by the respective LSWMBs at least quarterly. |
| **Indicative Actions** | 1. Integrate financial data as parameter(s) in the online SWM compliance/performance monitoring database of LGUs (NSWMC and/or LGPMS) including, but not limited to, the annual SWM budgets allocated by LGUs from their IRA or Development Funds;<br>2. Regularly update the financial (full-cost accounting data) and cost-recovery performance of LGUs;<br>3. Analyze cost-recovery performance of LGUs and issue policies, guidelines or recommendations, as needed; and<br>4. Document, disseminate and recognize various best practices in ring-fencing and cost-recovery strategies. |
| **Target Period/Date of Accomplishment:** | Q1/2012 to Q4/2016 |
| **Geographical Scope/Target Groups:** | Regional Level - RECs<br>Local level – LSWMBs, LGU focal person on SWM financing/cost-recovery |
| **Special Requirements** | Online SWM database system<br>Expert advice on local SWM financing and fund management |
| **Possible Sources** | Regular budget of DENR-EMB and DILG |

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| ***Key Initiative 3.2.2.1:*** **Support LGUs in alliance-building, clustering and sharing of SWM facilities for enhanced economies of scale** | |
| **Component 3**<br>Sustainable SWM Financing Mechanisms | |
| **Objective 3.2**<br>Sustainably financed SWM at the local level | **Strategy 3.2.1**<br>Encourage economies of scale in designing SWM programs and facilities |
| **Lead Agency** | NSWMC-DILG and NSWMCS |
| **Cooperating Partners** | Academe/HEIs, CHED, DepEd, LGU Leagues, NEC/RECs, Relevant professional associations, Research institutions |
| **General Description** | The Philippine Constitution, the Local Government Code (RA 7160) and RA 9003 all encourage LGUs to address common problems by sharing of resources or clustering of SWM facilities. It was also observed that there are cases when the implementation of MRFs at the barangay level or sanitary landfills at the municipal level may not be practical and sustainable. NSWMC shall encourage LGUs, particularly through provincial governments, to build alliances and share common SWM facilities and/or programs.<br><br>In general, clustering refers to the pooling of efforts and/or resources of neighboring or group of LGUs to address common local challenges. Among its inherent advantages are enhanced economies of scale, higher financial base and more flexibility, which all contribute to the overall improvement of locality's environmental situation. NSWMC and its national and regional partners can provide technical assistance or advice to a group of LGUs in assessing the economies of scale of proposed SWM cluster initiatives. Prioritizing LGU cluster initiatives in NSWMF allocation can also help in promoting alliance-building. |
| **Indicative Actions** | 1. Review and document existing and successful LGU alliances and clustered SWM facilities, including its advantages and tradeoffs, in comparison with the technical and financial requirements at the barangay level (materials recovery and composting) and municipal/city levels (sanitary landfills);<br>2. Develop guidelines and/or pro forma memoranda of understanding/ agreement (MOU/MOA) formats for inter-municipal, provincial government-led and private sector-led clustering approaches, including incentive options for host LGUs;<br>3. Capacitate all LGUs (cities, municipalities and barangays), especially provincial LGUs, in replicating or customizing clustered approaches through the following:<br>a. Disseminate these fact sheets to the LGUs via various channels;<br>b. Provide advice to LGUs, in coordination with concerned agencies, on contracts management and financial feasibility analysis; and<br>4. Monitor performance of LGU clusters and recognize best practices. |
| **Target Period/Date of** | Q3/2011 to Q4/2016 |

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| **Accomplishment:** | |
| **Geographical Scope/Target Groups:** | Regional Level – RECs, DENR-P/CENROs<br>Local Level – LGUs (Provinces, Cities, Municipalities and Barangays) |
| **Special Requirements** | Reproduction and dissemination of documented clustering case studies<br>Experts' advice on contracts management and LGU clustering |
| **Possible Sources** | Regular budget of DENR-EMB and DILG |

## Component 4 **Creating Economic Opportunities**

Experience has shown us that we do not have a full grasp of the market for recyclables and recycled (including compost) products, thus we lack an appreciation of the available products, the market place, supply and demand, and the players—producers, sellers, buyers and potential investors.

The issue begins with the scarcity of market. Recycled products such as compost, charcoal briquettes, bricks, etc., while available and certified, are hardly patronized by consumers due to their prohibitive costs.

The situation trickles down to the big producers who consider continuing their endeavor a futile exercise. Not only are they challenged by the scarceness of market where the buyers are, they are also faced with a huge responsibility of recovering their investments.

The new and small producers, on the other hand, are faced with improving product quality to make it to the market however scarce it is. Faced with technical and financial challenges, they continue to seek support from LGUs and other entities in enhancing and marketing their products. Other producers, e.g., small-scale barangay-based composting facilities, would find it expensive to have their products tested for nutrient values or heavy metal contents just to penetrate the fertilizer market.

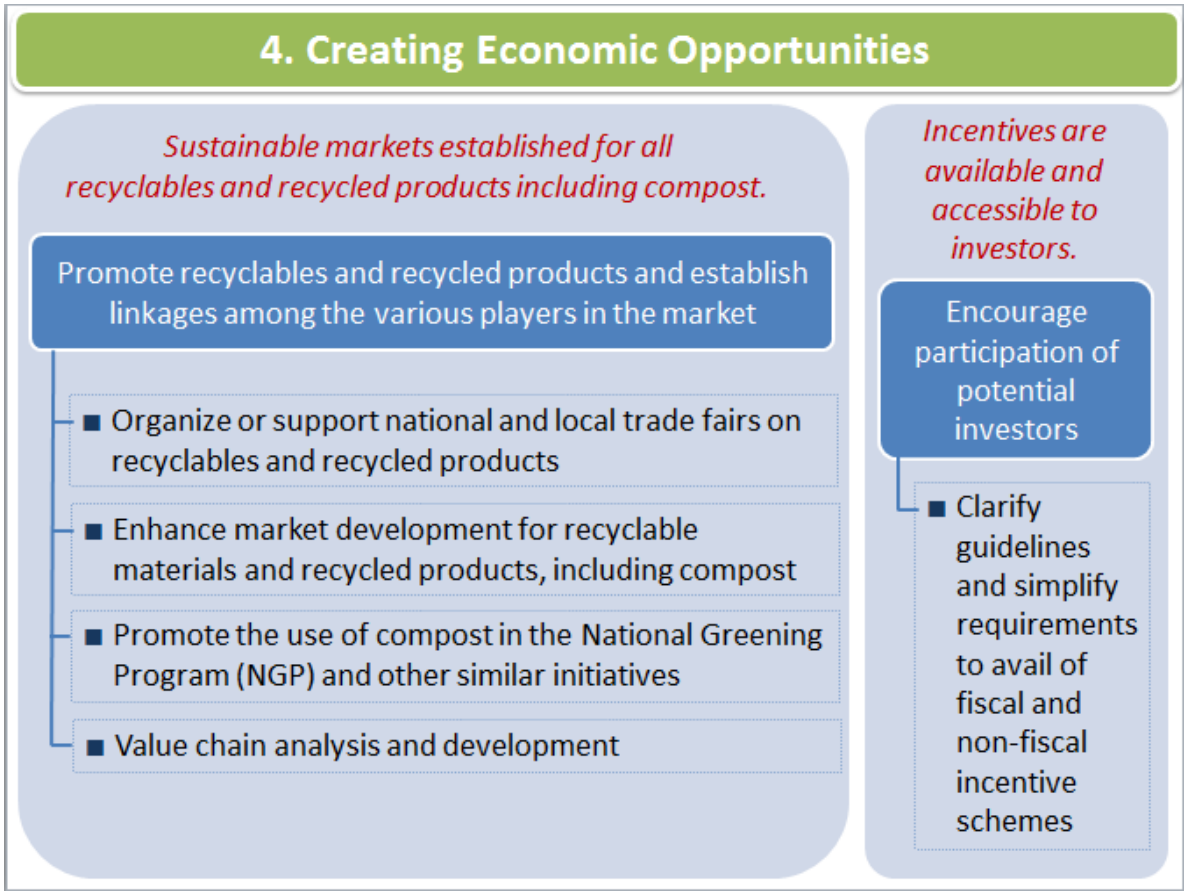
The full implementation and impact assessment of eco-labeling programs also need to be undertaken to identify opportunities for product marketing. The limited access to government institutions that provide support to recycled products endeavors contribute to the slow take up of potential producers. The recyclables, recycling and composting industry therefore misses on potential investors in the end.

This strategic component also relates to the challenges identified in Component 5: Support for knowledge management on technology, innovation and research and Component 1: Bridging policy gaps and harmonizing policies. Before market or even product development, the question arises on which type of waste can really be recycled.

If the issues on product development and marketing are not addressed, the following consequences could arise:

a. Recyclables, if not patronized by consumers, could be an eye-sore.
b. Less market for recycled products means less employment opportunities.
c. Accumulation of more wastes could impact on people's health.
d. More waste could shorten the life span of landfill.

The full potential of creating economic opportunities from recyclable and recycled products shall be realized if the NSWMC shall, within the next five years, strive to achieve the following objectives through the strategies and key initiatives proposed below.




Objective 4.1 Sustainable markets established for all recyclables and recycled products including compost

Strategy 4.1.1 Promote recyclables and recycled products and establish linkages among the various players in the market

Key Initiative 4.1.1.1 Organize or support national and local trade fairs on recyclables and recycled products

Key Initiative 4.1.1.2 Enhance market development for recyclable materials and recycled products, including compost

Key Initiative 4.1.1.3 Promote the use of compost in the National Greening Program (NGP) and other similar initiatives

Key Initiative 4.1.1.4 Value chain analysis and development

Objective 4.2 Incentives are available and accessible to investors

Strategy 4.2.1 Encourage participation of potential investors

Key Initiative 4.2.1.1 Clarify guidelines and simplify requirements to avail of fiscal and non-fiscal incentive schemes

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| ***Key Initiative 4.1.1.1:*** **Organize or support national and local trade fairs on recyclables and recycled products** | |
| **Component 4**<br>Creating Economic Opportunities | |
| **Objective 4.1**<br>Sustainable markets established for all recyclables and recycled products including compost | **Strategy 4.1.1**<br>Promote recyclables and recycled products and establish linkages among the various players in the market |
| **Lead Agency** | NSWMC - DTI (BDT and CITEM) |
| **Cooperating Partners** | CDA, CHED, DENR, DepEd, DILG, DOT, Industry groups, LGU Leagues, LGUs, MMDA, NEC/RECs, NEDA/RDCs, NGOs, PIA, TESDA |
| **General Description** | This key initiative should help address the strategic issues that stakeholders do not have a full grasp of markets for recyclables and recycled products as well as limited access to government institutions that provide support to these endeavors.<br><br>The DTI is identified as the lead agency for this activity because it is in line with the agency's strategic priority to support and strengthen MSMEs and to contribute to the national goal to create more jobs, sustained economic growth and improved quality of life for every Filipino. In addition, the DTI is mandated under RA 9003 to publish a study of existing markets for processing and purchasing recyclable materials and the potential steps necessary to expand these markets (Section 26) and formulate and implement a coding system for packaging materials and products to facilitate waste recycling and re-use. (Section 27). The NSWMC together with the NEC, the DTI and the DoF shall establish procedures, standards and strategies to market recyclable materials and develop the local markets for recycled goods (Section 31). |
| **Indicative Actions** | 1. Conduct baseline study on market, demand and quality of recyclables and recycled products;<br>2. Draft a proposal for the conduct of national and local trade fairs;<br>3. Present the proposal to the members of the NSWMC-TWG for endorsement and approval of NSWMC;<br>4. Create a core team at the national level composed of the lead agency and the cooperating agencies through a Resolution and JAO to come up with different approaches and an Action Plan for the continuous and effective implementation of this initiative (i.e., branding of products, setting of affordable prices, pay later scheme for compost, etc.); and giving special function to DILG for the implementation of trade fairs at the local level;<br>5. Conduct scheduled Trade Fairs at the national, regional and local levels with media involvement; and<br>6. Conduct regular review and assessment of the impacts of the trade fairs and post results to NSWMC website. |
| **Target Period/Date of** | Q1/2012 – Q4/2016 |

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| **Accomplishment:** | |
| **Geographical Scope/Target Groups:** | National Level – All Stakeholders<br>Regional Level – DTI Offices and Trade groups and associations |
| **Special Requirements** | |
| **Possible Sources** | Regular budget of DENR-EMB, Development partners, Cooperating agencies, Industry groups, Trade associations, LGU Funds |

<table>
<tr><td colspan="2">Key Initiative 4.1.1.2: Enhance market development for recyclable materials and recycled products, including compost</td></tr>
<tr><td colspan="2">Component 4<br>Creating Economic Opportunities</td></tr>
<tr><td>Objective 4.1<br>Sustainable markets established for all recyclables and recycled products including compost</td><td>Strategy 4.1.1<br>Promote recyclables and recycled products and establish linkages among the various players in the market</td></tr>
<tr><td>Lead Agency</td><td>NSWMC – DTI (BOI and BSMED) and DA</td></tr>
<tr><td>Cooperating Partners</td><td>CDA, DA-FPA, DENR, DepEd, DOST-TAPI, LGU Leagues, MMDA, NEC/RECs, PIA, Recycling industry, TESDA</td></tr>
<tr><td>General Description</td><td>Section 31 of RA 9003 on Recycling Market Development specifies that NSWMC together with the NEC, DTI and DoF shall 1] establish procedures, standards and strategies to market recyclable materials and 2] develop the local market for recycled goods. Guarantees by the national and local governments to purchase a percentage of the output of the facility are specified under this Section.<br><br>Compost products are included in this key initiative since it is considered as a recycled material. The agency that is tasked to publish an inventory of existing markets and demands for compost is DA. It shall also assist the compost producers to ensure that the compost products conform to standards for organic fertilizers if such products are intended for commercial distribution.<br><br>The NEC is tasked to promote the development of a recycling market through the establishment of a national recycling network that will enhance the opportunity to recycle. Green Choice Philippines is the national eco-labeling program recognized by the Global Eco-labeling Network13, a nonprofit association of third party, environmental performance labeling organizations which aims to identify environmentally responsible products in the market. The objective of eco-labeling programs is to eliminate the least efficient products from the market, by informing consumers which products can help them reduce their resource consumption. This change in demand will again encourage manufacturers to improve product efficiency, thus contributing to reduce GHG emissions.<br><br>DOST was not mentioned in Section 31 of RA 9003. However, its mandate to initiate the study on the alternative usage of non-recyclable and non-reusable materials, ETV program, clean technology (CT)/production (CP) program, development and application of methods on waste-to-energy, improvement of utilization of various types of organic materials and conduct of study and development of new uses or recovered resources are all related to the development of this market.</td></tr>
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| | The DTI is identified as the lead agency for this activity because it is line with the agency's strategic priority to support and strengthen MSMEs and to contribute to the national goal to create more jobs, sustained economic growth and improved quality of life for every Filipino.<br><br>This key initiative shall help address the strategic issues on the scarcity of market; prohibitive cost of the products; cost and investments recovery; improvement of product quality; as well as limited access to government institutions that provide support to these endeavors. |
| **Indicative Actions** | 1. Update the study of existing markets for processing and purchasing recyclable and recycled materials including compost and the potential steps necessary to expand these markets;<br>2. Present the status of the said existing markets to the NSWMC-TWG for endorsement to the NSWMC;<br>3. Through a Resolution and a Joint Administrative Order, create a core team composed of lead and cooperating agencies to determine the necessary steps to establish markets for products with limited markets as well as enhance opportunities for saleable products, including guarantees by the national and local governments to purchase a percentage of the output of MRFs and similar facilities and compliance to the Green Procurement Policy (EO 301); and<br>4. Create, publish and regularly update a comprehensive directory of markets and current prices of recyclables, recycled materials including compost and products of alternative technologies through the website and NEC. |
| **Target Period/Date of Accomplishment:** | Q1/2012 to Q4/2016 |
| **Geographical Scope/Target Groups:** | National Level – All stakeholders |
| **Special Requirements** | |
| **Possible Sources** | Regular fund of DENR-EMB, Development partners, Cooperating agencies |

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| ***Key Initiative 4.1.1.3:*** **Promote the use of compost in the National Greening Program and other similar initiatives** | |
| **Component 4**<br>Creating Economic Opportunities | |
| **Objective 4.1**<br>Sustainable markets established for all recyclables and recycled products including compost | **Strategy 4.1.1**<br>Promote recyclables and recycled products and establish linkages among the various players in the market |
| **Lead Agency** | NSWMC – DA |
| **Cooperating Partners** | DA-DAR-DENR National Convergence Initiative (NCI) Secretariat, DILG and NGP partners |
| **General Description** | On February 24, 2011, President Benigno S. Aquino III signed Executive Order (EO) No. 26, which aims to plant 1.5 billion trees covering about 1.5 million hectares for a period of six (6) years, from 2011 to 2016. The National Greening Program (NGP) brings together the DENR, DA and DAR to systematically undertake ways to percolate the country's green renaissance as envisioned in EO 23 & 26 under a convergence framework towards a unified intervention to achieve sustainable rural development.<br><br>A major part of this undertaking goes beyond mere tree planting. It includes poverty alleviation, food security and even values formation of Filipinos on looking at the country's precious forest resources. It is under this program that the utilization of compost produced from the biodegradable fractions of municipal solid waste can be realized, particularly for non-fruit bearing trees or landscape plants. |
| **Indicative Actions** | 1. Propose the use of compost produced from municipal solid waste in seedling production and early tree growth and present to the members of the NSWMC;<br>2. Through a Resolution and a Joint Administrative Order, create a core team composed of the lead and cooperating agencies to formulate and implement relevant policies and guidelines to NGP implementers and partners to patronize the use of compost out of biodegradable municipal waste;<br>3. Evaluate and publish the impacts of the initiative; and<br>4. Enhance/formulate new policies for possible implementation to other programs on organic farming i.e. organic agriculture, urban agriculture. |
| **Target Period/Date of Accomplishment:** | Q4/2011 to Q4/2016 |
| **Geographical Scope/Target Groups:** | National Level – DA, DAR, DENR, DILG<br>All levels – National Greening Program Partners; LGU Agriculture Officers |
| **Special Requirements** | Technical working group (TWG) meeting expenses<br>Resource persons |
| **Possible Sources** | Regular funds of National Greening Program (NGP) agencies and partners; DENR Budget for Procurement of Compost |

| ***Key Initiative 4.1.1.4:*** **Value chain analysis and development** | |
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| **Component 4**<br>Creating Economic Opportunities | |
| **Objective 4.1**<br>Sustainable markets established for all recyclables and recycled products including compost | **Strategy 4.1.1**<br>Promote recyclables and recycled products and establish linkages among the various players in the market |
| **Lead Agency** | NSWMC – DTI (BOI) |
| **Cooperating Partners** | Academe/HEIs, DA, DENR, DOST-TAPI, GFIs, Industry groups, LGU Leagues, MMDA, PIA, Recycling and manufacturing industries, PLLENRO |
| **General Description** | As discussed in the reference document titled "Accessing Markets through the Value Chain Approach" by GIZ, "value chain analyzes and describes the linking and coordinating arrangements among subsector institutional players that include producers, processors, traders and distributors of a particular product. It is also defined as a sequence of productive processes (functions) from a provision of specific inputs for a particular product to primary production, transformation, marketing and up to final consumption".<br><br>"Value chain development is a systematic approach to examine the value and identify various interventions to address gaps in the growth and development of its competitive advantage." Source: GIZ through the Philippine Commission on Women 2010<br><br>Value chain development as a key initiative is consistent with the provisions of RA 9003 on Market Development that requires the review and making any necessary changes in the collection or processing of materials to improve their marketability.<br><br>DTI is the most appropriate agency to lead this key initiative. In January 2011, the agency conducted a value chain workshop for the six identified priority industry sectors in Region IX. Based on the press release of PIA dated January 11, 2011 "Following an intensive analysis and mapping of the supply chain, the group at the end of the workshop had successfully drafted the individual action plan for each of the six regional priority industries." |
| **Indicative Actions** | 1.Draft a concept paper for the piloting and implementation of value chain analysis and development for the SWM sector;<br>2. Present to the NSWMC-TWG for endorsement to NSWMC for its approval;<br>3. Through a Resolution and a Joint Administrative Order, create a core team composed of the lead and cooperating agencies to prepare the necessary criteria and action plan for the piloting and implementation of VCA and its development;<br>4. Conduct value chain analysis for the SWM sector based on criteria and action plan; and |

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| | 5. Publish and disseminate the results for possible improvement and replication. |
| **Target Period/Date of Accomplishment:** | Q3/2012 to Q1/2016 |
| **Geographical Scope/Target Groups:** | National Level |
| **Special Requirements** | |
| **Possible Sources** | Regular fund of DENR-EMB, OP, DTI, Development partners and cooperating agencies |

| ***Key Initiative 4.2.1.1:*** **Clarify guidelines and simplify requirements to avail of fiscal and non-fiscal incentives** | |
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| **Component 4**<br>Creating Economic Opportunities | |
| **Objective 4.2**<br>Incentives are available and accessible to investors | **Strategy 4.2.1**<br>Encourage participation of potential investors |
| **Lead Agency** | NSWMC – DOF and DTI (BOI) |
| **Cooperating Partners** | *For fiscal incentives:* DOF-BIR, DOF-BOC, DTI-BOI, PEZA, LGU Leagues, Philippine Congress<br>*For non-fiscal incentives:* DA-FPA, DENR, DILG, DOST, DOT, MMDA, NEC, NSWMCS, Philippine Congress |
| **General Description** | The review and strengthening of the implementation of fiscal and non-fiscal incentive schemes is the key initiative identified to encourage the participation of potential investors from both government and private sectors. It shall help address the strategic issue on scarcity of market, prohibitive cost, investments and cost recovery, improvement of product quality, technical and financial challenges as well as limited access to government institutions that provide support to these endeavors.<br><br>Section 45 of RA 9003 states that "An incentive scheme is hereby provided for the purpose of encouraging LGUs, enterprises, or private entities, including NGOs, to develop or undertake an effective SWM, or actively participate in any program geared towards the promotion thereof as provided for in this Act. Consistent with the IRR of RA 9003, the DOF is identified as the lead agency, while DTI is co-chair, for the review and strengthening of the fiscal incentive scheme. The DENR is identified as the lead agency for non-fiscal incentive scheme including simplified bureaucratic procedures and reduced paper requirements.<br><br>For Fiscal Incentives: Consistent with the provisions of E.O. 226 otherwise known as the Omnibus Investments Code, the following tax incentives shall be granted: (a) Tax and duty exemption on imported capital equipment and vehicles within 10 years upon the effectivity of this Act … (b) Tax credit on domestic capital equipment … (c) Tax and duty exemption of donations, legacies and gifts.<br><br>For Non-Fiscal Incentives: LGUs, enterprises or private entities availing of tax incentives under this Act shall also be entitled to applicable non-fiscal incentives provided for under E.O. 226. The NSWMC shall provide incentives to businesses and industries that are engaged in the recycling of wastes … [which] shall include simplified procedures for the importation of equipment, spare parts, new materials, and supplies, and for the export of processed products."<br><br>For DTI, all incentives schemes are governed by EO 226. The general |

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| | policies are laid down in the booklet containing the IPP. BOI promotes the development of MSMEs by providing (a) exemption from application and registration fees for micro-enterprises, (b) 75% reduction in the application and registration fees for small industries and (c) 1-day processing of applications for micro- and small industries. LGUs do not qualify for registration under EO 226 as LGUs cannot be considered as "enterprises" in view of Article 32 (Qualification of a registered enterprise) in relation to Article 15 (Definition of "Philippine National") and Article 17 (Pioneer activities). DTI-BOI recommends: (a) for LGUs go incorporate an entity to undertake the project, or (b) amend Articles 32, 15 and 17.<br><br>But even if LGUs qualify for incentives, the grace period of 10 years provided by RA 9003 has already lapsed. It is necessary to revisit the incentives schemes on the investment priorities plan (IPP). |
| **Indicative Actions** | 1. Through an NSWMC resolution, create the Committees on Fiscal and Non-Fiscal Incentives headed by DOF and DTI, and DENR, respectively, and formulate action plans for each committee;<br>2. Review enabling policies or systems to clarify legal and institutional support mechanisms in the availment of fiscal and non-fiscal incentives;<br>3. Assess the experiences of LGUs, enterprises and private entities, including SWM technology and service providers, who were able, as well as those who failed, to avail of fiscal and non-fiscal incentives as provided by RA 9003 vis-à-vis EO 226 and other related incentive schemes;<br>4. Present recommendations to the NSWMC to facilitate the issuance of a corresponding resolution clarifying and streamlining the availment of incentives by the SWM sector, including, but limited to, extension of effectivity period, one-stop shop access, assessment of viability and impacts of incentives, etc.<br>5. Recommend to concerned agencies, including even LGUs themselves, the issuance of DAO, JAO, MC, ordinance or any appropriate legal instrument in support of the NSWMC Resolution;<br>6. Recommend to Congress provisions that may require amendment to RA 9003;<br>7. Disseminate information on policies and guidelines to SWM stakeholders; and<br>8. Establish database to monitor and continuously improve availment of incentives by LGUs, enterprises and private entities. |
| **Target Period/Date of Accomplishment:** | Q4/2011 to Q4/2016 |
| **Geographical Scope/Target Groups:** | National Level – Other concerned agencies, Joint Congressional Oversight Committee (JCOC)<br>Local Levels – LGUs, enterprises, NGOs, cooperatives and private entities |
| **Special Requirements** | Resource persons / legal experts on fiscal and non-fiscal incentives |
| **Possible Sources** | Regular budgets of DENR-EMB, DOF and DTI, including contributions from development partners and other agencies |

## Component 5 Support for Knowledge Management on Technology, Innovation and Research

Most LGUs do not have the means to access appropriate technologies on solid waste management and to conduct necessary research studies for a variety of reasons. More than 50% of municipalities in the country are classified as low income communities and are only dependent on Internal Revenue Allotment (IRA) shares and thus do not have the funds. Some of them may have the resources but lack the capacity. Others may have the capacity but have no resources. Still a few others have limitations on both. Moreover, some stakeholders need technical assistance and guidance in accessing suitable SWM technologies.

This strategic component has a link to Component 2: Social Marketing and Advocacy. Researches and studies done by different institutions and government agencies are available. However, the technical arms of the NSWMC, that is, the National and Regional Ecology Center (NEC/RECs) grapple with lack of personnel to collate and create a data base of researches and studies; and popularize, disseminate and provide technical assistance to LGUs and stakeholders. As a result, LGUs are not able to access and use said researches and studies because of lack of information on their existence, availability, and access to the service.

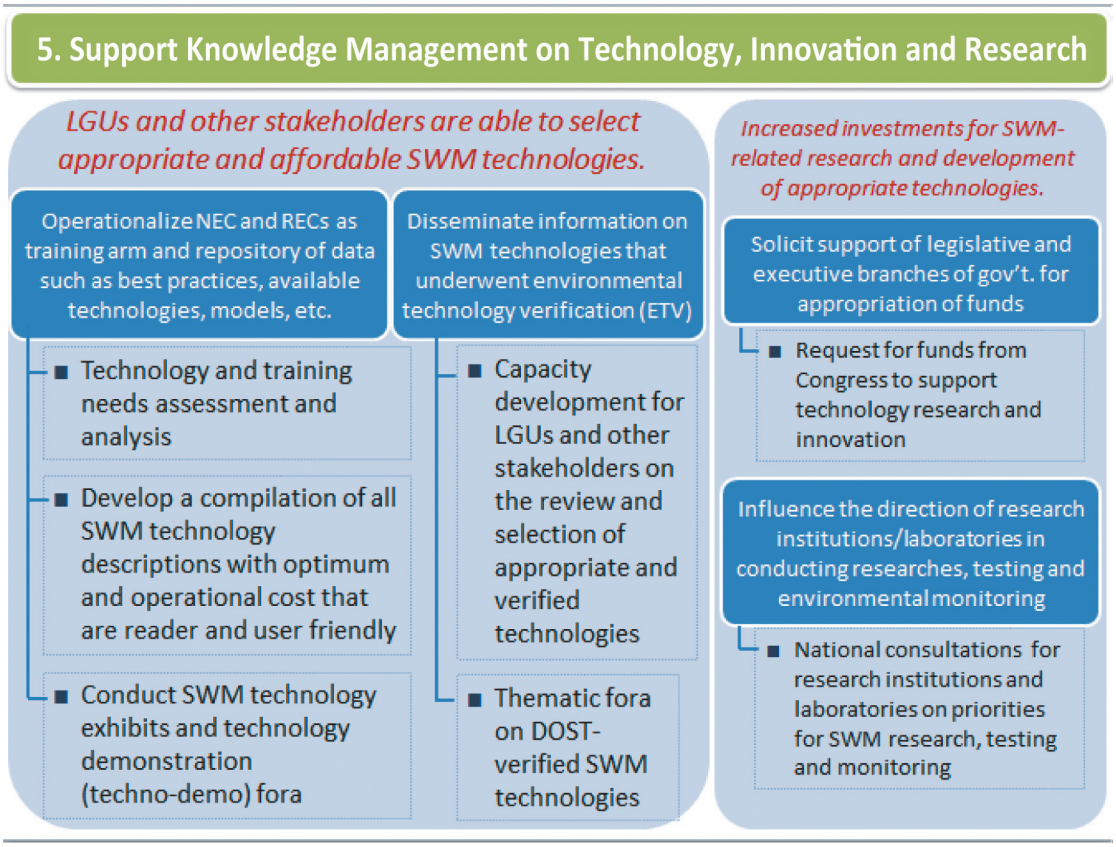
This strategic component also links to Component 3: Sustainable SWM Financing. While the NSWMC provides LGUs and other stakeholders information on appropriate SWM technologies, they are not able to acquire and adopt such. The prohibitive cost of technologies remains a challenge to the LGUs and stakeholders due to insufficient funds. The costs of technologies and processes also have to be rationalized.

The absence of SWM technologies on the ground will not only fail the NSWMC in its mandate and goals, but in the long run fail the country in its solid waste management efforts. The absence of technologies not only deprives us of more systematic and productive ways of handling solid waste, but ultimately brings about environmental degradation, to the detriment of the lives of the Filipino people.

The absence of researches and studies on other important SWM aspects, which provide scientific and intelligent information, will render plans for future SWM actions inadequate or even flawed. We cannot undermine the negative impact of actions that are based on wrong assumptions.

It is therefore imperative to also link this component to Component 1: Bridging Policy Gaps and Harmonizing Policies. Prior to policy development, the functionality and practicality of technologies need to be studied and established. Although vendor-driven and not mandatory, the Joint DENR-DOST Administrative Order (JAO) 2006-01 on Environmental Technology Verification (ETV) already provides a tool to do this.

To support LGUs and other stakeholders in finding the appropriate technology for their varied contexts, the NSWMC shall, within the next five years, strive to achieve the following objectives through the strategies and key initiatives proposed below.




Objective 5.1 LGUs and other stakeholders are able to select appropriate and affordable SWM technologies

Strategy 5.1.1 Operationalize NEC and RECs as training arm and repository of data such as best practices, available technologies, models, etc.

Key Initiative 5.1.1.1 Technology and training needs assessment and analysis

Key Initiative 5.1.1.2 Develop a compilation of all SWM technology descriptions with optimum and operational cost that are reader and user friendly

Key Initiative 5.1.1.3 Conduct SWM technology exhibits and technology demonstration (techno-demo) fora

Strategy 5.1.2 Disseminate information on SWM technologies that underwent environmental technology verification (ETV)

Key Initiative 5.1.2.1 Capacity development for LGUs and other stakeholders on the review and selection of appropriate and verified technologies

Key Initiative 5.1.2.2 Thematic fora on DOST-verified SWM technologies

Objective 5.2 Increased investments for SWM-related research and development of appropriate technologies

Strategy 5.2.1 Solicit support of legislative and executive branches of government for appropriation of funds for research and innovation

Key Initiative 5.2.1.1 Request for funds from Congress to support technology research and innovation

Strategy 5.2.2 Influence the direction of research institutions/laboratories in conducting researches, testing and environmental monitoring

Key Initiative 5.2.2.1 National consultations for research institutions and laboratories on priorities for SWM research, testing and monitoring

| ***Key Initiative 5.1.1.1:*** **Technology and training needs assessment and analysis** | |
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| **Component 5**<br>Support for Knowledge Management on Technology, Innovation and Research | |
| **Objective 5.1**<br>LGUs and other stakeholders are able to select appropriate and affordable SWM Technologies | **Strategy 5.1.1**<br>Operationalize NEC and RECs as training arm and repository of data such as best practices, available technologies, models, etc. |
| **Lead Agency** | NSWMC – NEC |
| **Cooperating Partners** | ATI, CHED, DepEd, DOST, HEIs, Research institutions, TESDA |
| **General Description** | The conduct of training and technology needs assessment is identified to operationalize NEC and RECs as training arm and repository of best practices, available technologies, models, etc. It is in line with the function of the NEC and RECs to facilitate training and education in ESWM and to establish and manage a comprehensive database and dissemination system. This key initiative shall help address the strategic issue that LGUs do not have access on appropriate technologies, among others. |
| **Indicative Actions** | 1. Prepare a proposal for the conduct of Training and Technology Needs Assessment and present to the NSWMC-TWG for endorsement to NSWMC for approval;<br>2. Create a core team at the national level composed of the lead agency and the cooperating agencies through a Resolution and a Joint Administrative Order to conduct Technology Needs Assessment on SWM technologies as well as Training Needs Assessment (TNA) with corresponding guidelines on how to conduct the activity;<br>3. Utilize the results of the Technology Needs Assessment and TNA for the development of programmatic training programs for LGUs and private sector on the proper management of solid wastes including applicable topics on appropriate technologies; techno-transfer modules;<br>4. Develop the training program on the technical operation of solid waste management facilities and appropriate technologies;<br>5. Design training programs applicable to LGUs, private sector, IWS and other stakeholders;<br>6. Develop an assessment guidelines/tool of the training program for possible enhancement; and<br>7. Review applicability of the TNA conducted. |
| **Target Period/Date of Accomplishment:** | Q1/2012 onwards |
| **Geographical Scope/Target Groups:** | National Level – All stakeholders<br>Regional Level – All stakeholders, including REC members, LGUs, private sector and IWS |
| **Special Requirements** | |
| **Possible Sources** | Regular fund of the DENR-EMB, NEC, Development partners, Lead and cooperating agencies |

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| ***Key Initiative 5.1.1.2:*** **Develop a compilation of all SWM technology descriptions with optimum and operational cost that are reader and user friendly** | |
| **Component 5**<br>Support for Knowledge Management on Technology, Innovation and Research | |
| **Objective 5.1**<br>LGUs and other stakeholders are able to select appropriate and affordable SWM Technologies | **Strategy 5.1.1**<br>Operationalize NEC and RECs as training arm and repository of data such as best practices, available technologies, models, etc. |
| **Lead Agency** | NSWMC – NEC |
| **Cooperating Partners** | Academe/HEIs, DENR-EMB, DILG, DOST-ITDI, DTI (IPOPHL), Environmental NGOs, Industry groups, Information divisions of all national government agencies as NEC members, Investors' groups, LGUs, Philippine Marketing Association and advertisement groups |
| **General Description** | This is in line with the establishment and management of a comprehensive SWM information database and dissemination system that will also focus on the solid waste management techniques and information on cleaner production/cleaner technologies that promote efficient SWM. |
| **Indicative Actions** | 1. Prepare a proposal for the development of a compilation of SWM technology descriptions that includes optimum and operational cost (with and without ETV) that are reader and user friendly and present to the NSMWC-TWG for endorsement to the NSWMC for approval;<br>2. Create a core team at the national level composed of the lead agency and cooperating agencies with defined functions through a Resolution that will prepare and implement the work program for the development of the compilation of SWM technology descriptions;<br>3. Design the work program that includes activities such as mapping, inventory of all available SWM technologies, checking of propriety rights, publication of the compilation the through the NEC and REC database and dissemination system, web, ESWM kits, NSWMCS capacity development activities; review of relevance, applicability, appropriateness and effectiveness of the developed and published compilation; and enhancement/revision of the compilation based on the review; among others; and<br>4. Implement the work program. |
| **Target Period/Date of Accomplishment:** | Q1/2012 - 2016 |
| **Geographical Scope/Target Groups:** | National Level – All stakeholders |
| **Special Requirements** | |
| **Possible Sources** | Regular fund of the DENR-EMB, DTI, DOST, NEC, Development partners, Lead and cooperating agencies |

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| ***Key Initiative 5.1.1.3:*** **Conduct SWM technology exhibits and technology demonstration (techno-demo) fora** | |
| **Component 5**<br>Support for Knowledge Management on Technology, Innovation and Research | |
| **Objective 5.1**<br>LGUs and other stakeholders are able to select appropriate and affordable SWM Technologies | **Strategy 5.1.1**<br>Operationalize NEC and RECs as training arm and repository of data such as best practices, available technologies, models, etc. |
| **Lead Agency** | NSWMC – NEC |
| **Cooperating Partners** | Academe/HEIs, CHED, DA, DENR-EMB, DOST, DTI (BDT and CITEM), Foundations, HEIs, Industry groups, Inventors' groups, LGUs, Malls/associations, PIA, Trade associations |
| **General Description** | This is in line with the establishment and management of a comprehensive SWM information database and dissemination system that will also focus on the solid waste management techniques and information on cleaner production/cleaner technologies that promote efficient SWM. |
| **Indicative Actions** | 1. Prepare a proposal for the conduct of SWM technology exhibits and technology demonstration (techno-demo) fora and present to the NSWMC-TWG for endorsement to the NSWMC for approval;<br>2. Create a core team at the national level composed of the lead agency and cooperating agencies with defined functions through a Resolution that will prepare and implement the work program for the conduct of SWM technology exhibits and technology demonstration (techno-demo) fora.<br>3. Implementation of the work program that includes activities such as scheduling; actual conduct with complete demonstration set up on recycling resource recovery, composting and with complete documentation; publish of documentation through the NEC and REC database and dissemination system, web, ESWM kits, and NSWMCS capacity development activities; analysis and assessment on the relevance and impact of the activity, enhancement of the program based on the assessment among others. |
| **Target Period/Date of Accomplishment:** | Q2/2012 – 2016 |
| **Geographical Scope/Target Groups:** | National Level – All stakeholders |
| **Special Requirements** | |
| **Possible Sources** | Regular funds of NEC, DENR-EMB, DTI, DOST, Development partners, Lead and cooperating agencies |

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| ***Key Initiative 5.1.2.1:*** **Capacity development for LGUs and other stakeholders on the review and selection of appropriate and verified technologies** | |
| **Component 5**<br>Support for Knowledge Management on Technology, Innovation and Research | |
| **Objective 5.1**<br>LGUs and other stakeholders are able to select appropriate and affordable SWM Technologies | **Strategy 5.1.2**<br>Disseminate information on verified SWM technologies |
| **Lead Agency** | NSWMC – DOST |
| **Cooperating Partners** | Academe/HEIs, CHED, DTI-IPOPHL, LGUs, NEC/RECs, Philippine technology councils, Research institutes |
| **General Description** | This is "pursuant to the provisions of the Revised Administrative Code (Executive Order 292), Book IV Title XVIII Chapter 1 Section 3, the Department of Science and Technology (DOST), is mandated to promote, assist and where appropriate, undertake scientific and technological research and development, promote the development of indigenous technology and adaptation of suitable imported technology, and, in this regard, undertake technology development and undertake policy research, technology assessment, among others.." DENR-DOST Joint Administrative Order (JAO) 2006-01 Adopting the Environmental Technology Verification Protocol (ETVP) covers the technology review and verification of new and modified technology for the following: 1] use of technology in the treatment, storage and disposal of wastes; 2] use of technology in pollution control and abatement; 3] best environmental technology; and 4] cleaner production technologies.<br><br>It is also in line with the function of the NEC and the REC to establish a comprehensive SWM information database and dissemination system focusing on information on cleaner production/cleaner technologies that promote efficient solid waste management and as clearinghouse for cleaner production/cleaner technologies on solid waste management. |
| **Indicative Actions** | 1. Prepare a proposal for the conduct of capacity development for LGUs and other stakeholders on the review and selection of appropriate verified SWM technologies and present to the NSMWC-TWG for endorsement to the NSWMC for approval;<br>2. Create a core team at the national level composed of the lead agency and cooperating agencies with defined functions through a Resolution that will prepare and implement the work program for the conduct of capacity development for LGUs and other stakeholders on the review and selection of appropriate verified SWM technologies;<br>3. Implementation of the work program that includes activities such as analysis of the result of technology and training needs assessment per group; scheduling; actual conduct of capacity development activities on the review, assessment, selection, hands-on training with the suppliers/manufacturers with complete documentation; publication of documents through the NEC and REC database and dissemination |

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| | system, web, etc.; analysis and assessment on the relevance and impact of the activity using feedback mechanism, enhancement of the program based on the assessment; among others. |
| **Target Period/Date of Accomplishment:** | Q2/2012 - 2016 |
| **Geographical Scope/Target Groups:** | All stakeholders |
| **Special Requirements** | |
| **Possible Sources** | Regular fund of DENR-EMB, NEC, DOST, DTI, Development partners, Lead and cooperating agencies, Private sector |

| ***Key Initiative 5.1.2.2:*** **Thematic fora on DOST-verified SWM technologies** | |
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| **Component 5**<br>Support for Knowledge Management on Technology, Innovation and Research | |
| **Objective 5.1**<br>LGUs and other stakeholders are able to select appropriate and affordable SWM Technologies | **Strategy 5.1.2**<br>Disseminate information on SWM technologies that underwent Environmental Technology Verification (ETV) |
| **Lead Agency** | NSWMC - DOST |
| **Cooperating Partners** | Academe, DA, DENR, DTI (BOI and RODG), HEIs, LGU Leagues, MMDA, NEC/RECs, PIA |
| **General Description** | The conduct of Thematic Fora on verified technologies is among the identified key initiatives to support and enhance the technical operations of NEC and REC. It serves as an effective tool in promoting the alternative technologies for Ecological Solid Waste Management (ESWM).<br>It is in line with the function of the NEC and the RECs to promote cleaner and appropriate technologies that the LGUs and other stakeholders would utilize for an integrated ESWM.<br><br>This key initiative will address the strategic issue that LGUs do not have access to appropriate technologies to their specific needs. The NSWMC and NEC is identified lead agency because it is one of its functions. |
| **Indicative Actions** | 1. Lead agency will develop a proposal for the conduct of Thematic Fora for presentation to the TWG and approval by NSWMC;<br>2. Issuance of a resolution by the NSWMC, creating a core team composed of the lead and cooperating agencies that work on a full blown plan as well as the mechanics and logistics to implement the initiative; and<br>3. Conduct of Scheduled Thematic Fora. |
| **Target Period/Date of Accomplishment:** | Q3/2012 to 2016 |
| **Geographical Scope/Target Groups:** | National Level – All stakeholders |
| **Special Requirements** | |
| **Possible Sources** | Regular budgets of lead and cooperating agencies, Donor agencies, Private sector |

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| ***Key Initiative 5.2.1.1:*** **Request for funds from Congress to support technology research and innovation** | |
| **Component 5**<br>Support for Knowledge Management on Technology, Innovation and Research | |
| **Objective 5.2**<br>Increased investments for SWM-related research and development of appropriate technologies | **Strategy 5.2.1**<br>Solicit support of legislative and executive branches of government for appropriation of funds for research and innovation |
| **Lead Agency** | NSWMC – DOST-PCIEERD |
| **Cooperating Partners** | Academe/HEIs, CHED, DA-BAR, DBM, DENR, DTI (BOI), Inventors' groups, LGU Leagues, TESDA |
| **General Description** | There is a need to develop appropriate SWM-related technologies to respond to the ever increasing demands to manage solid wastes along the entire functional elements of their management (generation at source to final disposal). Both government and private research and development (R&D) organizations, including academe, can provide requirements for such technologies. Among the government agencies, DOST is the main department tasked with the conduct of R&D activities on environmentally-sound technologies.<br><br>The key initiative to achieve this objective is to solicit support from legislative and executive branches of government for appropriation of funds for research and innovation. |
| **Indicative Actions** | 1. Lead agency shall develop an ESWM Science and Technology (S&T) Roadmap;<br>2. Prepare program and project proposals detailing mechanics and logistics of the Roadmap;<br>3. Formulate and have an approved legal instrument to support the road map.<br>4. Integrate request for appropriation of funds in budget hearings. |
| **Target Period/Date of Accomplishment:** | 2013 - 2016 |
| **Geographical Scope/Target Groups:** | Nationwide – All stakeholders |
| **Special Requirements** | |
| **Possible Sources** | Regular Budget of DOST-PCIEERD, Development and funding agencies |

| ***Key Initiative 5.2.2.1:*** **National consultations for research institutions and laboratories on priorities for SWM research, testing and monitoring** | |
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| **Component 5**<br>Support for Knowledge Management on Technology, Innovation and Research | |
| **Objective 5.2**<br>Increased investments for SWM-related research and development of appropriate technologies | **Strategy 5.2.2**<br>Influence the direction of research institutions/laboratories in conducting researches, testing, and environmental monitoring |
| **Lead Agency** | NSWMC – NEC/RECs |
| **Cooperating Partners** | Academe/HEIs, DOST, Laboratories, LGU Leagues, Research institutions |
| **General Description** | The conduct of national consultations/fora with research institutions and laboratories on priorities for SWM research, testing and monitoring and how they could support the LGUs and other stakeholders for effectively implementing ESWM is one of the key initiatives identified to operationalize NEC and RECs as repository of data (best practices, available technologies, models, etc.) and training arm.<br><br>It is in line with the function of the NEC/REC to facilitate technology development in integrated ESWM and to establish and manage a comprehensive database and dissemination system. And this key initiative will help set a demand-driven direction for research and testing. |
| **Indicative Actions** | 1. Lead agency to identify research institutions to partner with in preparing a proposal for the conduct of national consultations/fora<br>2. Develop a proposal or a research agenda and present to the members of the NSWMC-TWG and for approval and issuance of a resolution by NSWMC;<br>3. The core team composed of the cooperating partners shall work on the logistics as well as the continuity and improvement of the initiative.<br>4. Implementation of the approved proposal including the actual conduct of National/Regional Consultations |
| **Target Period/Date of Accomplishment:** | Q2/2012 – 2016 |
| **Geographical Scope/Target Groups:** | Nationwide – All stakeholders |
| **Special Requirements** | |
| **Possible Sources** | Regular budget of lead and cooperating agencies and funding institutions |

## Component 6 Organizational Development and Enhancing Inter-Agency Collaboration

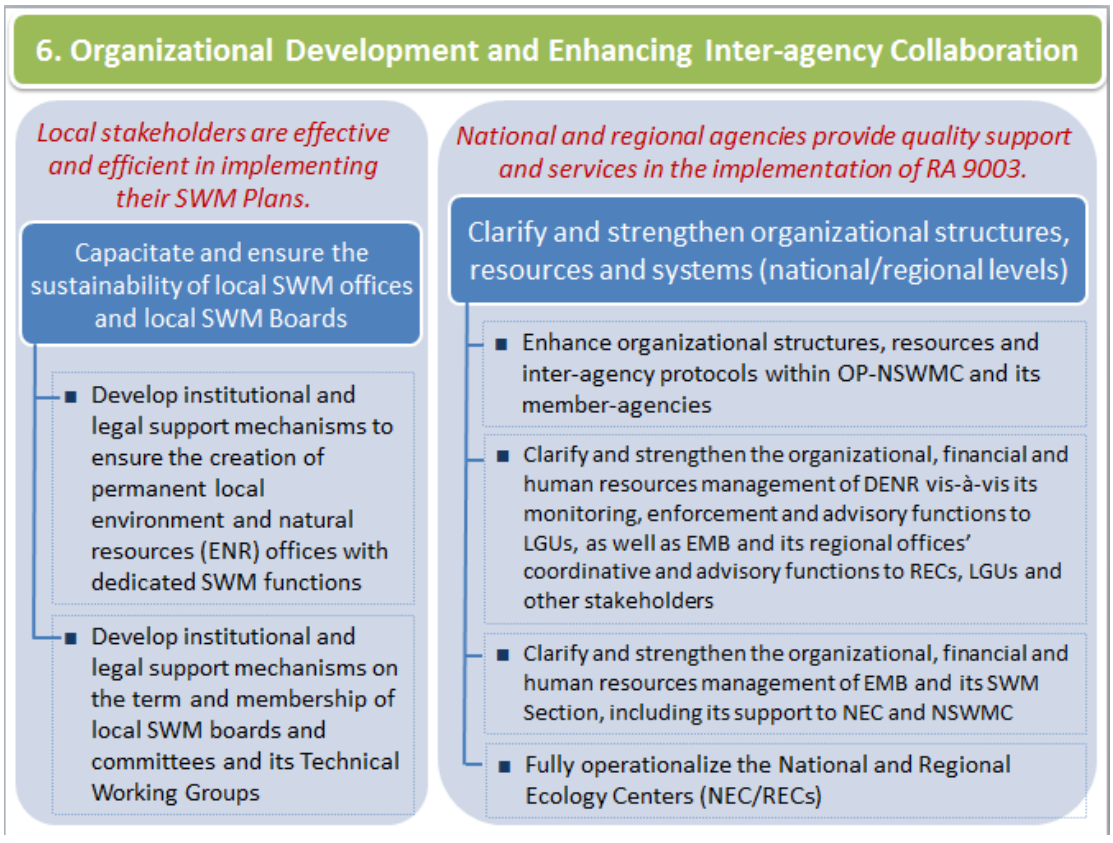
There is a need to strengthen the commitment of internal and external stakeholders and increase their capacities to effectively respond to the clients' needs. Today, there is still low level of commitment of internal and external stakeholders resulting in a relatively low compliance despite efforts that have been in place since the law took effect in 2001.

The following factors are seen to hinder strong commitment among stakeholders:

a. No integration/institutionalization/ linkage and unclear delineation of functions within the same agency and among other agencies;
b. Security, permanent within the primary agency and its partners;
c. Insufficiency of resources, capabilities and expertise;
d. Least among the priorities; and
e. Low level of recognition given to performing stakeholders.

Failure to address the hindering factors could lead to a low level of accountability and efficiency in delivering SWM services.

To capacitate NSWMC, NSWMCS, other agencies at the national and local level as well as LGUs, the NSWMC shall, within the next five years, strive to achieve the following objectives through the strategies and key initiatives proposed below.



Objective 6.1 Local stakeholders are effective and efficient in implementing their SWM Plans

Strategy 6.1.1 Capacitate and ensure the sustainability of local SWM offices and local SWM Boards

Key Initiative 6.1.1.1 Develop institutional and legal support mechanisms to ensure the creation of permanent local environment and natural resources (ENR) offices with dedicated SWM functions

Key Initiative 6.1.1.2 Develop institutional and legal support mechanisms on the term and membership of local SWM boards and committees and its Technical Working Groups

Objective 6.2 National and regional agencies provide quality support and services in the implementation of RA 9003

Strategy 6.2.1 Clarify and strengthen organizational structures, resources and systems

Key Initiative 6.2.1.1 Enhance organizational structures, resources and inter-agency protocols within OP-NSWMC and its member-agencies.

Key Initiative 6.2.1.2 Clarify and strengthen the organizational, financial and human resources management of DENR vis-à-vis its monitoring, enforcement and advisory functions to LGUs, as well as EMB and its regional offices' coordinative and advisory functions to RECs, LGUs and other stakeholders

Key Initiative 6.2.1.3 Clarify and strengthen the organizational, financial and human resources management of EMB and its SWM Section, including its support to NEC and NSWMC

Key Initiative 6.2.1.4 Fully operationalize the National and Regional Ecology Centers (NEC/RECs)

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| ***Key Initiative 6.1.1.1:*** **Develop institutional and legal support mechanisms to ensure the creation of permanent local environment and natural resources (ENR) offices with dedicated SWM functions** | |
| **Component 6**<br>Organizational Development and Enhancing Inter-Agency Collaboration | |
| **Objective 6.1**<br>Local stakeholders are effective and efficient in implementing their SWM Plans | **Strategy 6.1.1**<br>Capacitate and ensure the sustainability of local SWM offices and local SWM Boards |
| **Lead Agency** | NSWMC – DILG |
| **Cooperating Partners** | CSC, DBM, DENR, LGU Leagues, NSWMCS, PLLENRO |
| **General Description** | Section 484 of the Local Government Code of 1991 or RA 7160 states that, "The appointment of the environment and natural resources officer is optional for provincial, city, and municipal governments." And even if the LGUs wish to, many small municipalities with insufficient funds and have already reached their personnel services (PS) budget cap are not allowed by DBM to create such an office especially when 'mandatory' offices have not yet been established. In the light of the many devolved environmental laws passed since then, it is already high time to revisit these RA 7160 provisions and recommend its amendments. This key initiative is also related to Component 1: Bridging Policy Gaps and Harmonizing Policies. |
| **Indicative Actions** | 1. Review the provisions of the RA 7160 (Sections 484, 443b and 454b), RA 9003 and any proposed bills vis-à-vis the need to institutionalize dedicated focal SWM offices in each LGU;<br>2. Propose policies and recommendations for congressional action to amend RA 7160, specifically on the mandatory creation of local ENR offices and in the identification of dedicated focal SWM units with corresponding organizational structure, powers and functions; and<br>3. Promote to LGUs with financial and legal capabilities the creation of Provincial Government (PG), City, Municipal, and even Barangay, ENRO offices with dedicated SWM units. |
| **Target Period/Date of Accomplishment:** | Q1/2012 to Q4/2016 |
| **Geographical Scope/Target Groups:** | National Level: DILG, Philippine Congress<br>Regional and Local: LGUs and Local ENR Officers |
| **Special Requirements** | |
| **Possible Sources** | Regular budget of LGU Leagues and PLLENRO |

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| ***Key Initiative 6.1.1.2:*** **Develop institutional and legal support mechanisms on the term and membership of local SWM boards and committees and its Technical Working Groups** | |
| **Component 6**<br>Organizational Development and Enhancing Inter-Agency Collaboration | |
| **Objective 6.1**<br>Local stakeholders are effective and efficient in implementing their SWM Plans | **Strategy 6.1.1**<br>Capacitate and ensure the sustainability of local SWM offices and local SWM Boards |
| **Lead Agency** | NSWMC – DILG |
| **Cooperating Partners** | DENR, LGU Leagues, NSWMCS |
| **General Description** | Most local SWM boards have short tenure of 3 years, usually coinciding with the political term of the local chief executives. There are cases where some concerned sectors are not represented. There are also instances when some LGUs select the vice mayor or councilor to serve as chair while the Local ENRO or SWM focal person serves as co-chair. But the functionality of these boards is critical in ensuring the sustainability of SWM programs.<br><br>As a policy making body, NSWMC, through the DILG, may review and recommend measures to safeguard the functions, tenure and membership of provincial, city and municipal SWM boards as well as barangay SWM committees. For example, sustainability amidst political transitions may be safeguarded when the terms of office of the members of local SWM boards and committees overlap the tenure of elected officials by a few months. Furthermore, the presence of a technical working group on SWM may help fast track the implementation of policies and plans formulated by the LSWMBs. Implementing rules may be embedded in the form of a joint administrative order or any appropriate legal instrument. |
| **Indicative Actions** | 1. Review the provisions of RA 9003 and its IRR with regard to the creation, membership, functions, budget and tenure of the Local SWM Boards and Committees, including the periodic affirmation or reconstitution of representatives, its in-house rules and regulations, the possibility of institutionalizing a local technical working group on SWM, inclusion of indigenous groups, etc.;<br>2. Set policies to clarify membership and functions of the Local SWM Boards and Committees, including proper turnover protocols, as well as to set guidelines on the tenure of its members;<br>3. Recommend to concerned agencies the issuance of Resolution, DAO, JAO, MC or any appropriate legal instrument; and<br>4. Ensure that all LGUs have at least created their respective SWM Boards or Committees. |
| **Target Period/Date of Accomplishment:** | Q1/2012 to Q4/2012 |

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| **Geographical Scope/Target Groups:** | Local Level – LGUs and SWM Boards/Committees, Sectoral representatives |
| **Special Requirements** | Resource persons on organizational and legal matters |
| **Possible Sources** | Regular fund and support from DENR-EMB and DILG |

<table>
<tr><td colspan="3">Key Initiative 6.2.1.1: Enhance organizational structures, resources and inter-agency protocols within OP-NSWMC and its member-agencies.</td></tr>
<tr><td colspan="3">Component 6<br>Organizational Development and Enhancing Inter-Agency Collaboration</td></tr>
<tr><td colspan="2">Objective 6.2<br>National and regional agencies provide quality support and services in the implementation of RA 9003</td><td>Strategy 6.2.1<br>Clarify and strengthen organizational structures, resources and systems</td></tr>
<tr><td>Lead Agency</td><td colspan="2">NSWMC and OP</td></tr>
<tr><td>Cooperating Partners</td><td colspan="2">All NSWMC member agencies, DBM, NSWMCS, Philippine Congress</td></tr>
<tr><td>General Description</td><td colspan="2">Section 4 of RA 9003 states that “there is hereby established a National Solid Waste Management Commission (NSWMC) under the Office of the President, [which] shall be composed of fourteen (14) members from the government sector and three (3) members from the private sector. The government sector shall be represented by the heads of the following agencies in their ex officio capacity: DENR, DILG, DOST, DPWH, DOH, DTI, DA, MMDA, LPP, LCP, LMP, LnB, TESDA and PIA … Provided, that the Secretaries of the member agencies of the Commission shall formulate action plans for their respective agencies to complement the National Solid Waste Management Framework.”<br><br>“The private sector shall be represented by (a) A representative from nongovernment organizations (NGOs) whose principal purpose is to promote recycling and the protection of air and water quality; (b) A representative from the recycling industry; and (c) A representative from the manufacturing or packaging industry. … The [DENR] Secretary and a private sector representative of the Commission shall serve as chairman and vice chairman, respectively …The NSWMC may, from time to time, call on any other concerned agencies or sectors as it may deem necessary.” Over the past decade, however, the need to recognize some agencies as regular NSWMC members has become apparent, e.g., DepEd, CHED, DOF, NEDA, DBM, NCIP, etc.<br><br>RA 9003 also states that “the [DENR], through the [EMB], shall provide secretariat support to the Commission. The Secretariat shall be headed by an executive director who shall be nominated by the members of the Commission and appointed by the chairman.”<br><br>Nevertheless, there were some observations that having a Secretariat under the DENR limits the independence of the NSWMC as a stand-alone commission. Under such an arrangement, there are fears, for example, that the NSWMF may not be established or sustained.</td></tr>
<tr><td>Indicative Actions</td><td colspan="2">1. Evaluate the mandates, functions, organizational structure, operational guidelines and needs of NSWMC, NSWMC-TWG, NSWMC members and</td></tr>
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| | agencies identified under RA 9003 and identify others with potential SWM roles, including the study of proposals to make NSWMC a stand-alone (as opposed to an inter-agency commission), to create plantilla positions for commissioners and secretariat, and to include NSWMC's budget in the GAA similar to the Civil Service Commission;<br>2. Prepare draft resolutions based on organizational, operational and resource requirements and endorse to NSWMC for approval;<br>3. Recommend to OP and concerned agencies the issuance of EO, DAO, JAO, MC or any appropriate legal instrument supporting the NSWMC Resolution, e.g., possible inclusion of other government agencies as NSWMC members, operationalization of the NSWMC's TWG, designation of ESWM focal offices with budgetary support from among the member agencies and regional offices, mainstreaming of NSWMC initiatives into their regular work and financial plans, integration of SWM into other agencies' major final outputs (MFO), possibility of requiring each member agency to provide personnel complement to NSWMCS, mobilization of their regional and field offices, etc.;<br>4. Recommend to Congress provisions that may require amendment to RA 9003;<br>5. Develop resource mobilization schemes and linkages, e.g., submission of proposals for supplementary projects to funding institutions and other partners; and<br>6. Disseminate available services and programs being offered by NSWMC and its member agencies to LGUs and other stakeholders; and<br>7. Establish a feedback mechanism to evaluate the quality of service delivered by NSWMC. |
| **Target Period/Date of Accomplishment:** | Q1/2011 to Q2/2013 |
| **Geographical Scope/Target Groups:** | National and Regional Levels – NSWMC member agencies and its SWM focal offices and coordinators |
| **Special Requirements** | Organizational development and legal experts |
| **Possible Sources** | Regular fund from DENR-EMB and NSWMC member agencies, as well as support from other partners |

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| ***Key Initiative 6.2.1.2:*** Clarify and strengthen the organizational, financial and human resources management of DENR vis-à-vis its monitoring, enforcement and advisory functions to LGUs, as well as EMB and its regional offices' coordinative and advisory functions to RECs, LGUs and other stakeholders. | |
| **Component 6**<br>Organizational Development and Enhancing Inter-Agency Collaboration | |
| **Objective 6.2**<br>National and regional agencies provide quality support and services in the implementation of RA 9003 | **Strategy 6.2.1**<br>Clarify and strengthen organizational structures, resources and systems |
| **Lead Agency** | NSWMC – DENR and EMB |
| **Cooperating Partners** | DBM, NSWMCS |
| **General Description** | Improving key systems and procedures will lead to better and timely delivery of services to RA 9003's main implementers – the LGUs. The NSWMCS needs to clarify its secretariat functions in consideration of NEC/REC functions and EMB law enforcement roles. DENR's main function is defined by EO 192 and has regional and community-level field offices, e.g., PENROs/CENROs. Meanwhile EMB deals on various urban environmental laws and most field offices extend only down to regional level.<br><br>While RA 9003 explicitly states that the NEC shall be under the Commission, it also states that it shall be headed by the Director of the EMB in his ex officio capacity. The Act assigns to DENR visitorial powers, technical assistance and monitoring roles. However, it is unclear which office from the DENR is responsible for said roles. Although there have been good initiatives in different regions to assign focal persons/offices on SWM at the regional and P/CENRO levels, it is recommended to evaluate the key processes of DENR and EMB to improve quality of service to LGUs and other stakeholders.<br><br>Rule XIX, Section 3 of the IRR of RA 9003 states that "The Commission shall define the roles of the [DENR], other concerned agencies, LGUs and any other agency deemed responsible for the implementation and enforcement of the Act and its IRRs. It shall also promulgate detailed procedures and protocols for such implementation and enforcement of the Act and its IRRs at the Commission and local governmental level." |
| **Indicative Actions** | 1. Evaluate the functions, mandates, key processes and resource requirements of DENR and EMB, including its regional and field offices (P/CENROs), in reference to RA 9003, EO 192 and other SWM-relevant policies;<br>2. Consult with DENR and EMB regional and field offices about the recommendations on delineation of roles and responsibilities vis-à-vis |

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| | monitoring, visitorial powers and technical assistance;<br>3. Through an NSWMC resolution, recommend to DENR and EMB the issuance of DAO, SO, RSO or any appropriate legal instrument clarifying and strengthening the organizational, financial and human resources management of DENR vis-à-vis its monitoring, enforcement, advisory and other functions to LGUs, as well as EMB and its regional offices' coordinative, advisory and other functions to RECs, LGUs and other stakeholders;<br>4. Propose to DBM the budgetary requirements for the revitalized functions of the DENR and EMB in the implementation of the ESWM as mandated by RA 9003 and EO 192;<br>5. Recommend to Congress provisions that may require policy amendment(s);<br>6. Implement changes in systems and processes to operationalize the proposed policies.<br>7. Develop resource mobilization schemes and linkages, e.g., submission of proposals for supplementary projects to funding institutions and other partners;<br>8. Disseminate available services and programs being offered by DENR, EMB and its regional offices to LGUs and other stakeholders; and<br>9. Establish a feedback mechanism to evaluate the quality of service delivered by DENR and EMB to LGUs and other stakeholders. |
| **Target Period/Date of Accomplishment:** | Q1/2012 to Q4/2012 |
| **Geographical Scope/Target Groups:** | National and Regional Levels – DENR and EMB SWM focal offices and coordinators |
| **Special Requirements** | Organizational development and legal experts |
| **Possible Sources** | GAA and support from other partners |

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| ***Key Initiative 6.2.1.3:*** Clarify and strengthen the organizational, financial and human resources management of EMB and its SWM Section, including its support to NEC and NSWMC | |
| **Component 6**<br>Organizational Development and Enhancing Inter-Agency Collaboration | |
| **Objective 6.2**<br>National and regional agencies provide quality support and services in the implementation of RA 9003 | **Strategy 6.2.1**<br>Clarify and strengthen organizational structures, resources and systems |
| **Lead Agency** | NSWMC – DENR and NSWMCS |
| **Cooperating Partners** | CSC, DBM |
| **General Description** | RA 9003 states that the DENR, through the EMB, shall provide secretariat support to NSWMC. The director and regional directors of EMB are also mandated to chair the NEC and RECs. Furthermore, EMB is responsible for the implementation of major urban environmental laws, which include permitting and monitoring. All these functions need to be clarified. |
| **Indicative Actions** | 1. Review and identify delineation of functions of EMB's SWM section and its support to NEC and NSWMC, and its optimum human resource requirements, including key individual and team competencies, with consideration of existing and proposed financial/organizational policies;<br>2. With policy support from NSWMC, propose to EMB-DENR further enhancement of the existing organizational structure and lobby for identified additional plantilla positions to DBM;<br>3. Propose additional budgetary requirements, e.g., MOOE and capital outlay, for the revitalized functions of EMB's SWM Section, including its mandates to support the NEC and NSWMC, in the implementation of the ESWM as mandated by RA 9003;<br>4. Issuance of DAO, SO or any appropriate legal instrument redefining the organizational structure and operational functions of EMB's SWM Section, including its support functions to NEC and NSWMC;<br>5. Implement enhancements in systems and processes to operationalize the improved organizational structure;<br>6. Develop resource mobilization schemes and linkages, e.g., submission of proposals to partner institutions for supplementary projects; and<br>7. Establish periodic evaluation of the accomplishments vis-à-vis work program and mandates, and identify further needs of the SWM Section. |
| **Target Period/Date of Accomplishment:** | Q3/2011 to Q2/2013 |
| **Geographical Scope/Target Groups:** | National Level – EMB |
| **Special Requirements** | Organizational development and legal experts<br>Approved plantilla and regular budget for EMB's SWM Section |
| **Possible Sources** | GAA and support from other partners |

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| ***Key Initiative 6.2.1.4:*** Fully operationalize the National and Regional Ecology Centers (NEC/RECs) | |
| **Component 6**<br>Organizational Development and Enhancing Inter-Agency Collaboration | |
| **Objective 6.2**<br>National and regional agencies provide quality support and services in the implementation of RA 9003 | **Strategy 6.2.1**<br>Clarify and strengthen organizational structures, resources and systems |
| **Lead Agency** | NSWMC – DENR and EMB |
| **Cooperating Partners** | All concerned agencies, All NSWMC members, NSWMCS, Partner organizations and experts |
| **General Description** | The full operations of NEC requires for the establishment of pool of experts. The experts shall serve as advisory group to the NSWMC on technical matters regarding SWM. This potential service is currently not utilized due to the non-operation of NEC. Yet once it becomes operational, the NEC can also serve as an umbrella to all the existing and future RECs in the country.<br><br>For budget appropriations, Section 58 of RA 9003 states that for the initial operating expenses of NSWMC and the NEC as well as the expenses of the LGUs to carry out its mandates PhP 20 Million is appropriated from the Organizational Adjustment Fund on the year RA 9003 is approved. Thereafter, it shall submit to the DBM its proposed budget for inclusion in the GAA. |
| **Indicative Actions** | 1. Review the functions and needed core competencies of the NEC and RECs as stipulated in RA 9003 and its IRR, its current initiatives and accomplishments, and other similar bodies in other countries;<br>2. Based on NSWMC Resolution No. 51, enhance proposed operational guidelines for the NEC and RECs;<br>3. Adopt operational guidelines of NEC/RECs in the form of DAO, JAO or any appropriate legal instrument;<br>4. Establish the NEC and RECs, e.g., organize pool of experts, identify committees, formalize partnerships, identify sources of funds, develop annual work programs, etc.;<br>5. Operationalize the NEC and RECs, e.g., maintain database system, conduct regular trainings, networking, technical assistance, Annual SWM Summits, etc.;<br>6. Develop resource mobilization schemes and linkages, e.g., submission of proposals for supplementary projects to funding institutions and other partners as well as joint research and training programs with partners; and<br>7. Establish periodic evaluation of the accomplishments vis-à-vis work program and mandates, and identify further needs of the NEC and RECs. |
| **Target** | Q4/2011 to Q4/2012 |

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| **Period/Date of Accomplishment:** | |
| **Geographical Scope/Target Groups:** | All Levels – NEC and REC members, experts and stakeholders |
| **Special Requirements** | Regular NEC and REC funds from GAA<br>Organizational development and legal experts<br>GIZ-AHT SWM4LGUs recommendations to operationalize the RECs |
| **Possible Sources** | GAA and support from other partners, Donor agencies, DENR-EMB |

## Component 7 **Compliance Monitoring, Enforcement and Recognition**

To strengthen the participation of different stakeholders in monitoring and enforcement, the following must be addressed:

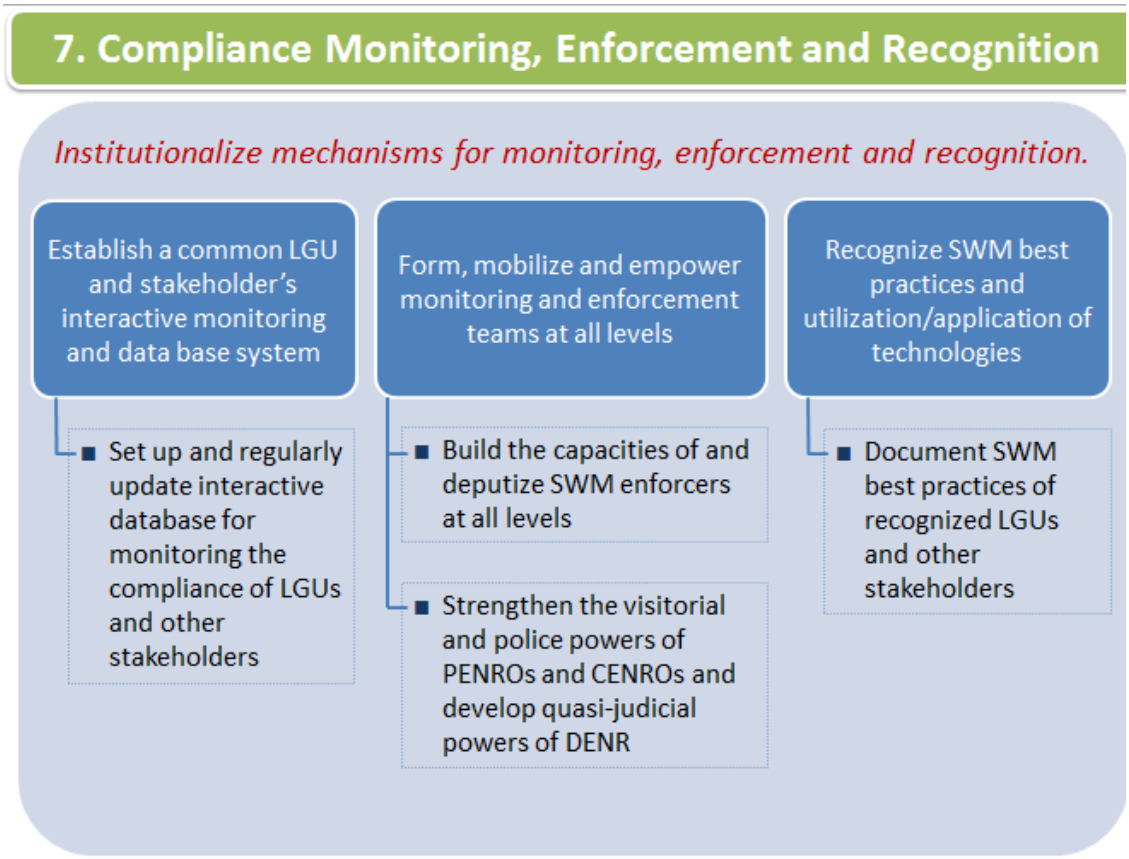
a. Monitoring and enforcement schemes for waste avoidance and diversion (e.g., 3Rs in the context of sustainable production and consumption, green procurement, database on waste reduction, diversion rates, etc.);
b. Systems for monitoring and enforcement by LGUs (prohibited acts, segregation at source and segregated collection, haulers and service providers, use of weighbridge, hazardous components of municipal solid waste stream, 'bulasi' on trucks);
c. Systems for monitoring and enforcement of LGUs (clarification of overlapping functions, entity responsible to file cases against non-complying LGUs, contracts with haulers and service providers, use of RCAs/MRFs due to lack of communal storage areas, safeguards in siting facilities at critical sites);
d. Financial requirements (e.g., deputized enforcers, monitoring equipment)

RA 9003 mandates NSWMC to develop a mechanism to impose sanctions for violations of environmental rules and regulations. Without a mechanism for monitoring and enforcement, sectors that do not comply are not penalized; while those that comply are not recognized. The lack of an institutionalized system could continue to encourage non-compliance, where implementers and concerned sectors could just ignore their mandate. Enforcement provides the 'stick' in the carrot-and-stick policy to motivate implementers to do their work in timely and technically-sound ways. Regular monitoring and evaluation also improves the management cycle in implementing RA 9003, i.e., through proactive responses.

If the root causes of improper resource management remain unabated, depletion of resources could continue. In addition, malpractices that lead to environmental degradation may not be corrected immediately after they are detected. Institutionally, unclear mandates among agencies with visitorial powers, including field enforcers, could lead to complacency, which in turn results in a culture of apathy.

Furthermore, harnessing participation of different sectors in monitoring and enforcement is important. Participation of concerned sectors promotes checks and balances in monitoring and enforcement. Delineation and complementation of monitoring and enforcement roles are necessary to leverage capacities, stretch available resources, and improve coverage of the regulating community. Uncoordinated enforcement could lead to inconsistencies and abuses and the program could become cost-inefficient and limited in scope. Perceived biases and inconsistencies could also lead to potential conflicts.

To effectively address these pressing monitoring, enforcement and recognition issues and concerns, the NSWMC shall implement the strategies presented below that will help achieve the following objectives:




Objective 7.1 Institutionalize mechanisms for monitoring, enforcement and recognition

Strategy 7.1.1 Establish a common LGU and stakeholder's interactive monitoring and data base system

Key Initiative 7.1.1.1 Set up and regularly update interactive database for monitoring the compliance of LGUs and other stakeholders

Strategy 7.1.2 Form, mobilize and empower monitoring and enforcement teams at all levels.

Key Initiative 7.1.2.1 Build the capacities of and deputize SWM enforcers at all levels

Key Initiative 7.1.2.2 Strengthen the visitorial and police powers of PENROs and CENROs and develop quasi-judicial powers of DENR

Strategy 7.1.3 Recognize SWM best practices and utilization/application of technologies

Key Initiative 7.1.3.1 Document SWM best practices of recognized LGUs and other stakeholders

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| ***Key Initiative 7.1.1.1:*** **Set up and regularly update interactive database for monitoring the compliance of LGUs and other stakeholders** | |
| **Component 7**<br>Compliance Monitoring, Enforcement, and Recognition | |
| **Objective 7.1**<br>Institutionalize mechanisms for monitoring, enforcement and recognition | **Strategy 7.1.1**<br>Establish a common LGU and stakeholder's interactive monitoring and data base system |
| **Lead Agency** | NSWMC – DENR and NEC |
| **Cooperating Partners** | DENR-P/CENROs, DILG, LGU Leagues, PEMOs/PG-ENROs, RECs |
| **General Description** | Setting up and regular updating of an interactive SWM monitoring system is one of significant key initiatives. The system shall have a baseline profile of LGU and other stakeholders' compliance which shall be regularly updated. It is in line with the function of the NEC and the REC as stated in RA 9003, to establish and manage a comprehensive SWM information database and dissemination system. Section 11 of RA 9003 also states that the Provincial SWMBs are responsible to "convene joint meetings of the provincial, city and municipal SWMBs at least every quarter for purposes of integrating, synchronizing, monitoring and evaluating the development and implementation of its provincial solid waste management plan. The updating of database is necessary to effectively monitor performance levels of LGUs in their SWM activities.<br><br>DILG-BLGS has established a focal office, the Environmental Compliance Assessment (ECA) Section, to monitor LGU compliance to RA 9003. In addition to LGUs, sectors that also need to be monitored include privately-operated waste management facilities, industrial zones and parks, industries, schools and universities, etc. |
| **Indicative Actions** | 1. Establish a standard process flow in data gathering and agree on the parameters for LGU compliance monitoring per RA 9003 (down to the barangay level), in coordination with DILG;<br>2. Issue NSWMC Resolution and any subsequent supporting legal instrument(s) to be issued by cooperating agencies, adopting the official template of monitoring parameters for the interactive database system;<br>3. Develop and pilot-test the national online database that can be regularly updated by authorized EMB SWM coordinators;<br>4. Input existing LGU information into the database;<br>5. Designate dedicated database encoder at the NEC and recommend to regional offices the appointment of IT database managers in all RECs;<br>6. Capacitate regional EMB SWM coordinators, IT database personnel, PG-ENROs and other frontline sources of information on the use of interactive database software, including data analysis;<br>7. Capacitate and assist all levels of LGUs in data gathering, filling up of the official compliance monitoring forms, and setting up internal |

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| | monitoring systems in support to the online database;<br>8. Issue a memorandum to all regional offices / RECs to consolidate, validate and update the database on or before the end of every quarter; and<br>9. Evaluate LGU compliance monitoring data using results-based monitoring schemes and make available to the general public. |
| **Target Period/Date of Accomplishment:** | Q2/2011 to Q4/2016 |
| **Geographical Scope/Target Groups:** | Regional Level – RECs, EMB and DILG regional offices; DENR-PENROs;<br>Local Levels – All LGUs, Local SWM stakeholders, e.g., NGOs, civil society, DepEd, youth, senior citizens, private sector, etc. |
| **Special Requirements** | Database system and IT equipment<br>GIZ-AHT SWM4LGUs recommendations on data requirements |
| **Possible Sources** | DENR-EMB funds for database management;<br>DENR, EMB and DILG for field monitoring and validation<br>LGU funds for the monitoring of constituent LGUs (e.g., Province to component municipalities/cities; Municipalities and cities for barangays) |

| ***Key Initiative 7.1.2.1:*** **Build the capacities of and deputize SWM enforcers at all levels** | |
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| **Component 7**<br>Compliance Monitoring, Enforcement, and Recognition | |
| **Objective 7.1**<br>Institutionalize mechanisms for monitoring, enforcement and recognition | **Strategy 7.1.2**<br>Form, mobilize and empower monitoring and enforcement teams at all levels. |
| **Lead Agency** | NSWMC – DENR and DILG |
| **Cooperating Partners** | DSWD, Environmental Courts, DOJ, IBP, JCOC, NSWMCS, Office of the Ombudsman, PCG, PNP |
| **General Description** | Section 49 of RA 9003 stipulates that "(a) Any person who violates Section 48, paragraph (1) shall, upon conviction, be punished with a fine … or render community service … to an LGU where such prohibited acts are committed, or both". Meanwhile, the IRR of RA 9003 states that "the DILG, through the Philippine National Police, the Department of National Defense and the Philippine Coast Guard, shall help enforce compliance to Sections 48 and 49 of the said prohibited acts of this Law."<br><br>Solid waste enforcers or "eco-wardens" need to be equipped with knowhow on RA 9003 implementation, enforcement and apprehension procedures for the violators of the law. They need to undergo training and be deputized as solid waste enforcers before actual discharge of functions. Rule XIX, Section 5 of the IRR of RA 9003 provides for the deputization of SWM officers. It states that "The Commission shall be authorized to deputize persons, individuals or entities to be Solid Waste Management Officer, giving them authority to effect the arrest of violators in accordance with the law, for purposes of enforcing and implementing the Act, its IRRs and other rules and regulations governing solid waste management. Provided however, that no person is deputized until they have completed the necessary training and capacity building, required by the NEC, for the effective implementation of the Act and its IRRs."<br><br>The most common RA 9003 violations at the community level are non-segregation of waste, littering and dumping of waste at water bodies. LGUs' non-compliance are usually those related to unsegregated collection and illegal operation of dumpsites.<br><br>In the imposition of fines and penalties to violators, clarifications have to be made as to its general provisions under RA 7160 as opposed to the special provisions under RA 9003. There are also gray areas as to the enforcement jurisdictions of DENR (based on RA 9003) and the LGUs (through its ordinance) especially when dealing with the same violator. |
| **Indicative Actions** | 1. Develop guidelines on the deputation of national and local SWM enforcers with corresponding provisions for qualifications; honoraria/allowances; mechanics for apprehension, including terms of engagement and issuance of citation tickets; specific guidelines for |

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| | enforcing LGUs, private sector and juvenile violators; common RA 9003 offenses; accountability of past and present chief executives, enforcers' identification system, enforcers' legal protection, management of database for violations, management of proceeds from fines/penalties, DENR-LGU-PNP-PCG agreements, citizen's suits, support for countersuits, etc.;<br>2. Develop guidelines on the institutionalization, monitoring and maintaining a roster of SWM enforcers and enforcement groups at the national and local levels, e.g., generic ordinances, task force, text brigade systems;<br>3. Issue NSWMC Resolution and any subsequent supporting legal instrument(s) to be issued by local government units, cooperating agencies and other authorized entities;<br>4. Develop training modules and standardized operations manual;<br>5. Pool trainers for would-be enforcers;<br>6. Conduct legal training and practicum on SWM enforcement at all levels;<br>7. Deputize enforcers after competitive examination or evaluation; and<br>8. Recognize performing enforcers. |
| **Target Period/Date of Accomplishment:** | Q3/2011 to Q4/2016 |
| **Geographical Scope/Target Groups:** | National – DENR and EMB personnel, DILG-PNP, PCG, NGOs, Media, Prosecutors<br>Local – All LGU Levels, LSWMBs, Barangay enforcers (e.g., sanitary inspectors, tanods), Medical society, NGOs, Local prosecutors |
| **Special Requirements** | Training modules on SWM enforcement<br>Logistical support for enforcers<br>Regular funds for enforcement system |
| **Possible Sources** | DENR and DENR-EMB budget; National SWM Fund; OP funds; LGU funds |

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| ***Key Initiative 7.1.2.2:*** **Strengthen the visitorial and police powers of PENROs and CENROs and develop quasi-judicial powers of DENR** | |
| **Component 7**<br>Compliance Monitoring, Enforcement, and Recognition | |
| **Objective 7.1**<br>Institutionalize mechanisms for monitoring, enforcement and recognition | **Strategy 7.1.2**<br>Form, mobilize and empower monitoring and enforcement teams at all levels. |
| **Lead Agency** | NSWMC – DENR |
| **Cooperating Partners** | DENR-EMB, DILG, OSG, Environmental courts, IBP, NGOs, NSWMCS, Other concerned agencies |
| **General Description** | Section 8 of RA 9003 mandates the DENR to "… (g) Exercise visitorial and enforcement powers to ensure strict compliance with this Act; (h) Perform such other powers and functions necessary to achieve the objectives to this Act; and (i) Issue rules and regulations to effectively implement the provisions of this Act." In addition, Section 9 states that "The Department [of Environment and Natural Resources] or its duly authorized representative shall have access to, and the right to copy therefrom, the records required to be maintained pursuant to the provisions of this Act. The [DENR] Secretary or the duly authorized representative shall likewise have the right to enter the premises of any generator, recycler or manufacturer, or other facilities any time to question any employee or investigate any fact, condition or matter which may be necessary to determine any violation, or which may aid in the effective enforcement of this Act and its implementing rules and regulations. This Section shall not apply to private dwelling places unless the visitorial power is otherwise judicially authorized."<br><br>In 2007, the Supreme Court has designated 117 trial courts as 'environmental courts' to hear cases involving violations of laws protecting the country's natural resources and to speed up their resolution. On April 29, 2009, the Supreme Court of the Philippines has put into effect the "Rules of Procedure for Environmental Cases". The rules include provisions for: (1) citizen suits, (2) consent decrees, (3) environmental protection orders (EPOs), (4) Writ of Kalikasan (Nature), (5) Writ of Continuing Mandamus, (6) Strategic Lawsuits against Public Participation (SLAPP), and (7) Precautionary Principle. The link between the visitorial powers of the DENR and the green courts has yet to be clarified and disseminated. |
| **Indicative Actions** | 1. Review legal framework and existing monitoring and enforcement mechanisms within the DENR and environmental courts; 2. Propose guidelines and procedures on the visitorial, police and quasi-judicial powers of of the DENR on SWM, e.g., apprehension, prosecution, filing of cases, referral to environmental courts, etc.;<br>a. Secure the assistance of Legal Offices of the DENR and other groups that will develop the procedures for prosecution;<br>b. Prepare position paper on potential policy impacts on the different |

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| | stakeholders; and<br>c. Secure consent from the DOJ in relation to the creation of DENR's quasi-judicial powers similar to Pollution Adjudication Board (PAB) in the prosecution of RA 9003 violators.<br>3. Issue NSWMC Resolution and recommend the issuance of subsequent supporting DAO, JAO or any legal instrument(s) to be issued by cooperating agencies and other authorized entities, including a possibility for congressional amendment of RA 9003; and<br>4. Implement and regularly monitor the system and make necessary adjustments. |
| **Target Period/Date of Accomplishment:** | Q2/2012 to Q4/2016 |
| **Geographical Scope/Target Groups:** | National and Regional Levels – PENROs and CENROs<br>Local Level – All LGUs |
| **Special Requirements** | Legal and adjudication expertise |
| **Possible Sources** | Regular DENR budget |

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| ***Key Initiative 7.1.3.1:*** **Document SWM best practices of recognized LGUs and other stakeholders** | |
| **Component 7**<br>Compliance Monitoring, Enforcement, and Recognition | |
| **Objective 7.1**<br>Institutionalize mechanisms for monitoring, enforcement and recognition | **Strategy 7.1.3**<br>Recognize SWM best practices and utilization/application of technologies |
| **Lead Agency** | NSWMC – DENR and NEC |
| **Cooperating Partners** | DILG, DOH, DOST, EMB ROs, LGU Leagues, NSWMCS, PIA, RECs, Other existing and potential institutions and networks |
| **General Description** | Section 45 of RA 9003 states that "Rewards, monetary or otherwise, shall be provided to individuals, private organizations and entities, including NGOs, that have undertaken outstanding and innovative projects, technologies, processes and techniques or activities in re-use, recycling and reduction. Said reward shall be sourced from the Fund herein created."<br><br>One way of recognizing best efforts of LGUs and other entities is the giving of awards and incentives to best implementers or utilizers of appropriate technologies. In order to sustain the rewards and incentives programs, there is a need to institutionalize the system and partner with existing institutions. The foremost requirement in the implementation of rewards and incentive programs is the documentation of best practices which would then serve as basis in the validation of compliance based on approved criteria. Well documented best practices can also serve as models for other LGUs in their compliance with the law.<br><br>Over the past few years, a number of searches and awards have been developed and implemented to champion RA 9003 implementation. Among these are NSWMC's Zero Basura Olympics, DILG's Excel Awards, DENR-EMB's Search for Sustainable and Eco-friendly Schools, DOH's Sanitary Barangays, etc., which have been implemented together with the civil society, NGOs and the private sector. Many of these necessitate mainstreaming and institutionalization of initiatives and programs. |
| **Indicative Actions** | 1. Forge partnerships with institutions and networks supportive in giving awards and recognitions;<br>2. Review, and revise if necessary, existing criteria and assessment forms for recognizing SWM best practices and develop standardized evaluation schemes applicable for each sector or category, i.e., provinces, cities/municipalities, barangays, private sector, schools, etc.;<br>3. Disseminate mechanics, organize teams, and conduct desktop evaluation, field validation and awarding;<br>4. Develop a generic template for documenting SWM best practices, e.g., as fact sheets;<br>5. Document and disseminate SWM best practices through quad-media for |

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| | further replication by LGUs and other sectors; and<br>6. Continually enhance and institutionalize existing rewards and incentive systems, including a monitoring period for sustainability of SWM programs. |
| **Target Period/Date of Accomplishment:** | Q4/2011 to Q4/2016 |
| **Geographical Scope/Target Groups:** | Nationwide – All LGUs, NGOs, Private sector, Office of the President |
| **Special Requirements** | Field validation<br>Documentation and publication of best practices<br>Awards and incentives<br>Government and non-government websites to promote awards system |
| **Possible Sources** | DENR, DENR-EMB, Office of the President, Provincial LGU, Partners and networks |

## Component 8a **Cross-cutting Issue: Good Governance**

Every Filipino in the country generates 0.3 to 0.7 kilos of waste per day. In 2010, Metro Manila's daily waste generation is approximately 8,400 metric tons per day. It is estimated that from 2004 to 2024, Metro Manila will generate 70 million tons of solid waste. Collection of this huge amount of waste will require a line of waste trucks that goes three times around the earth and over halfway to the moon with a cumulative travel distance equal to a distance of over 4,000 times around the earth and to the sun, and at a cost of over PhP 100 billion (ADB Study, 2004).

The mountains of garbage in the infamous Smoky Mountain in Tondo, Manila and the Payatas dumpsite, which claimed many lives, make garbage and proper waste management an issue to environmentalists, civil society groups and the general public. The situation is a consequence of improper SWM behavior of waste generators and LGU mixed-waste collection and dumping for many years. The tragic consequences of these practices were dramatically realized in the Payatas trash slide in July 2000 with hundreds of lives lost. Lawmakers, at the prompting of civil society groups, swiftly passed RA 9003, "An act providing for an Ecological Solid Waste Management Program, creating the necessary institutional mechanisms and incentives, declaring certain acts prohibited and providing penalties, appropriating funds therefore, and for other purposes."

But even after the law was enacted, dumpsites continued to proliferate. The government and its citizens have not taken full responsibility for the waste they have generated. The Philippine government and its people lack the motivation to properly manage their waste because of the lack of knowledge of the value and benefits of ESWM. Hence, environmental education is necessary.

Moreover, ESWM is seen as a cost rather than income-generating mechanism for the LGU. As a result, the local chief executive does not prioritize ESWM in resource allocation. Environmental cost accounting is not factored in when planning for ESWM systems.

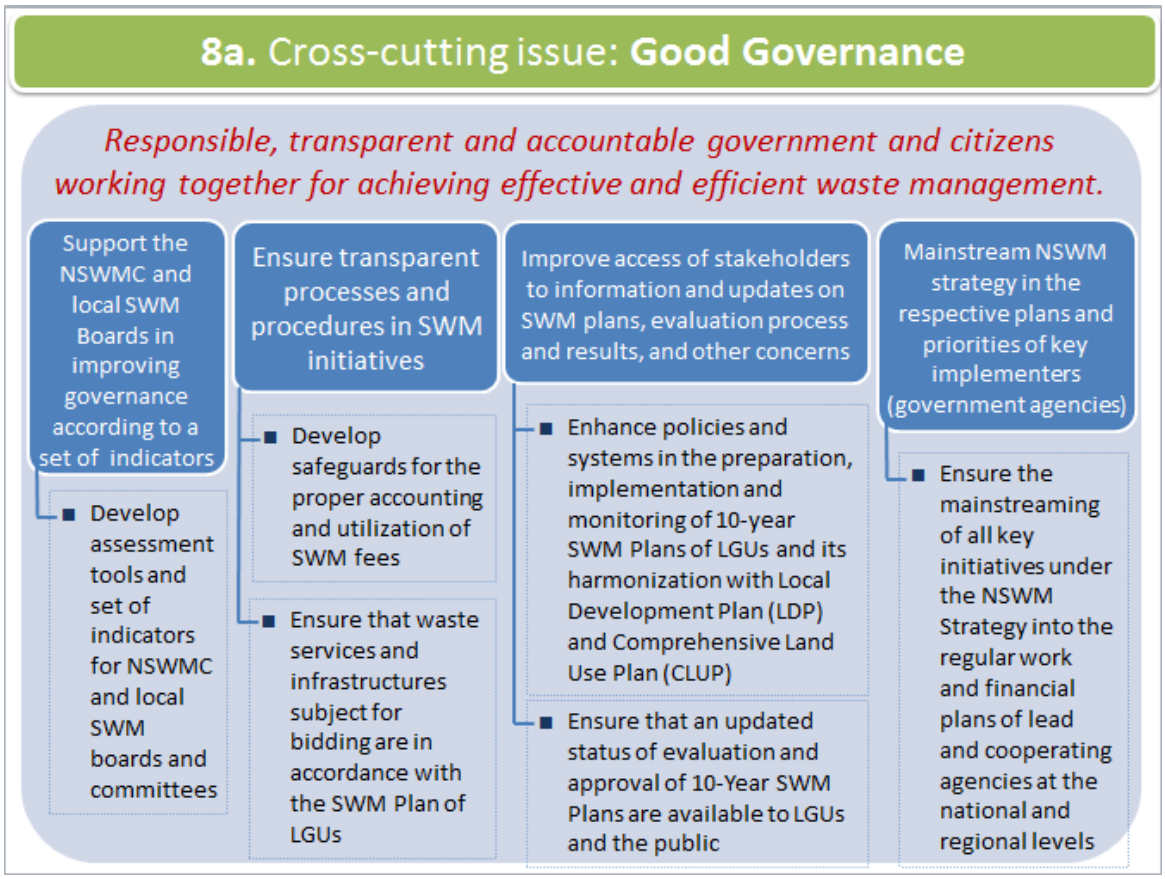
There is likewise a lack of policy and/or poor enforcement in regulating public-private investments in waste facilities and services. At times, this system is not transparent and is prone to corrupt practices. The general public is a passive recipient of waste services. People have an attitude or viewpoint that waste services are free and should be the sole responsibility of the government.

The United Nations (UN) emphasizes reform through human development and political institution reform. According to the UN, good governance has eight characteristics, which are:

a. transparent – information is freely available and accessible to all
b. accountable – answerable to the public and to their institutional stakeholders
c. participatory – men and women, including the vulnerable sectors of society, are included in decision-making

d. consensus-oriented – considering different viewpoints, including mediation of different interests in society
e. follows the rule of law – fair legal framework
f. responsive – serve all stakeholders within a reasonable time frame
g. effective and efficient – doing the right things (effective) and doing things right (efficient) while making the best use of resources at their disposal
h. equitable and inclusive – each member of the society feels that they have a stake in it and that they do not feel excluded.

Acknowledging that Good SWM Governance is a key factor that shall enable stakeholders to sustainably implement SWM plans, the NSWMC shall, within the next five years, strive to achieve the following objectives through the strategies and key initiatives proposed below.



Objective 8a.1 Responsible, transparent and accountable government and citizens working together for achieving effective and efficient waste management

Strategy 8a.1.1 Support the NSWMC and local SWM Boards in improving governance according to a set of indicators

Key Initiative 8a.1.1.1 Develop assessment tools and set of indicators for NSWMC and local SWM boards and committees

Strategy 8a.1.2 Ensure transparent processes and procedures in SWM initiatives

Key Initiative 8a.1.2.1 Develop safeguards for the proper accounting and utilization of SWM fees

Key Initiative 8a.1.2.2 Ensure that waste services and infrastructures subject for bidding are in accordance with the SWM Plan of LGUs

Strategy 8a.1.3 Improve access of stakeholders to information and updates on SWM plans, evaluation process and results, and other concerns

Key Initiative 8a.1.3.1 Enhance policies and systems in the preparation, implementation and monitoring of 10-year SWM Plans of LGUs and its harmonization with Local Development Plan (LDP) and Comprehensive Land Use Plan (CLUP)

Key Initiative 8a.1.3.2 Ensure that an updated status of evaluation and approval of 10-Year SWM Plans are available to LGUs and the public

Strategy 8a.1.4 Mainstream NSWM strategy in the respective plans and priorities of key implementers (government agencies)

Key Initiative 8a.1.4.1 Ensure the mainstreaming of all key initiatives under the NSWM Strategy into the regular work and financial plans of lead and cooperating agencies at the national and regional levels

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| ***Key Initiative 8a.1.1.1:*** **Develop assessment tools and set of indicators for NSWMC and Local SWM Boards and Committees** | |
| **Component 8a**<br>Cross-cutting issue: Good Governance | |
| **Objective 8a.1**<br>Responsible, transparent and accountable government and citizens working together for achieving effective and efficient waste management | **Strategy 8a.1.1**<br>Support the NSWMC and local SWM Boards in improving governance according to a set of indicators |
| **Lead Agency** | NSWMCS |
| **Cooperating Partners** | COA, DILG, LGU Leagues, Selected active LGUs including their PG-ENRO, City ENROs and MENROs |
| **General Description** | The commission needs to develop a set of indicators and assessment tools for provincial, city and municipal SWM Boards as well as SWM Committees at the barangay level. This will help guide the actions/plans and programs of the SWM Boards and ensure that priority policy issues are addressed. This key initiative supports strategies under Component 6 (sustainability of SWM boards) and Component 7 (LGU compliance monitoring). |
| **Indicative Actions** | 1. Develop a standard set of indicators and assessment tools, which include gender and culture sensitivity, poverty alleviation, conflict management and others in line with the elements of good governance;<br>2. Present the indicators and self-assessment tools developed and the benefits that can be derived from this to the NSWMC;<br>3. Prepare a draft resolution adopting the indicators and assessment tools.<br>4. Review draft resolution by NSWMC-TWG and endorse to NSWMC for approval;<br>5. Pilot test the assessment tools to a representative sample of LGUs; and<br>6. Endorse to DILG by NSWMC for integration to the Local Government Performance Monitoring System (LGPMS). |
| **Target Period/Date of Accomplishment:** | Q2/2012 to Q4/2012 |
| **Geographical Scope/Target Groups:** | National Level – NSWMCS and DILG |
| **Special Requirements** | |
| **Possible Sources** | Regular budget of DENR-EMB, Development and donor partners |

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| ***Key Initiative 8a.1.2.1:*** **Develop safeguards for the proper accounting and utilization of SWM fees** | |
| **Component 8a**<br>Cross-cutting issue: Good Governance | |
| **Objective 8a.1**<br>Responsible, transparent and accountable government and citizens working together for achieving effective and efficient waste management | **Strategy 8a.1.2**<br>Ensure transparent processes and procedures in SWM initiatives |
| **Lead Agency** | NSWMC – DILG and NSWMCS |
| **Cooperating Partners** | BIR, COA, DBM (for any fund downloaded to LGUs), LGU Leagues, Private sector |
| **General Description** | The NSWMC needs to develop safeguards for the proper accounting and utilization of SWM fees through the issuance of supplemental guidelines and conduct of capacity development in financial management in SWM. |
| **Indicative Actions** | 1. Review of legal and institutional framework in the collection and utilization of SWM fees;<br>2. Through consultations with legal and accounting experts and LGUs, develop guidelines for the SWM Boards on proper accounting, safeguarding and utilization of SWM fees, including rulings on the donations, which are tax deductible, of private corporations to LGUs;<br>3. Pilot test the guidelines to selected active LGUs for fine tuning;<br>4. Prepare a draft resolution on the proposed accounting and utilization of fees for adoption of the NSWMC;<br>5. Incorporate the approved accounting and utilization guidelines to the training module on SWM Fund Management; and<br>6. Disseminate and capacitate LGUs on SWM Fund Management through their accountants to reach Barangay Captains and treasurers. |
| **Target Period/Date of Accomplishment:** | Synchronize with Component 3<br>Q2/2012 to Q4/2012 |
| **Geographical Scope/Target Groups:** | Nationwide – All LGUs |
| **Special Requirements** | Financial and legal expertise |
| **Possible Sources** | Regular budget of lead and cooperating agencies, Development partners |

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| ***Key Initiative 8a.1.2.2:*** **Ensure that waste services and infrastructures subject for bidding are in accordance with the SWM Plan of LGUs** | |
| **Component 8a**<br>Cross-cutting issue: Good Governance | |
| **Objective 8a.1**<br>Responsible, transparent and accountable government and citizens working together for achieving effective and efficient waste management | **Strategy 8a.1.2**<br>Ensure transparent processes and procedures in SWM initiatives |
| **Lead Agency** | NSWMC-DILG, NSWMCS |
| **Cooperating Partners** | COA, DBM-GPPB (Government Procurement Policy Board), DILG |
| **General Description** | The Commission needs to develop safeguards to ensure bidding processes for waste services and infrastructure are transparent and in line with the 10-year SWM plans of the LGUs. |
| **Indicative Actions** | 1. Prepare a draft resolution requesting the DILG to issue a Memorandum Circular to all LGUs that all biddings for infrastructure and waste services conform to the provisions of RA 9003, SWM Plan (approved by the Sanggunian) and the Annual Investment Plan (AIP), in addition to RA 9184;<br>2. Review by NSWMC TWG for endorsement to NSWMC and latter's subsequent approval; and<br>3. Update status of MC with DILG and monitor compliance of LGUs. |
| **Target Period/Date of Accomplishment:** | Q4/2012 to Q2/2013 |
| **Geographical Scope/Target Groups:** | Local Level – LGU and Local SWM Boards, Bids and Awards Committees |
| **Special Requirements** | |
| **Possible Sources** | Regular budget of DENR-EMB |

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| ***Key Initiative 8a.1.3.1:*** **Enhance policies and systems in the preparation, implementation and monitoring of 10-Year SWM Plans of LGUs and its harmonization with Local Development Plan (LDP) and Comprehensive Land Use Plan (CLUP)** | |
| **Component 8a**<br>Cross-cutting issue: Good Governance | |
| **Objective 8a.1**<br>Responsible, transparent and accountable government and citizens working together for achieving effective and efficient waste management | **Strategy 8a.1.3**<br>Improve access of stakeholders to information and updates on SWM plans, evaluation process and results, and other concerns |
| **Lead Agency** | NSWMC – DENR |
| **Cooperating Partners** | DILG, HUDCC, NEC/RECs |
| **General Description** | Section 16 of RA 9003 states that, "The province, city or municipality, through its local solid waste management boards, shall prepare its respective 10-year solid waste management plans consistent with the National Solid Waste Management Framework … The SWM plan of the LGU shall ensure the efficient management of solid waste generated within its jurisdiction." The plan shall contain all the components provided in Section 17 of [RA 9003] and a timetable for the implementation of the SWM program … Provided, That it shall be reviewed and updated every year by the provincial, city or municipal SWM board."<br><br>Through experience and in consideration of the emerging needs in SWM, there is a need to enhance the contents of the annotated outline currently being used by LGUs. Among the proposed amendments include discussions on climate change implications and preparedness of SWM facilities and systems, localization of the informal sector framework, harmonization with local development, climate change action and comprehensive land use plans, etc. |
| **Indicative Actions** | 1. Review policies, processes, guideline documents (e.g., annotated outline) and lead agency to assist LGUs in the preparation, implementation and monitoring of 10-Year SWM Plans;<br>2. Consider recommendations and endorse for approval as NSWMC resolution(s);<br>3. Recommend to concerned agencies the issuance of EO, DAO, JAO, MC, ordinance, or any appropriate legal instrument supporting the NSWMC Resolution, e.g., improvements in the contents of annotated outline, identification of lead agency to assist LGUs in SWM plan preparation, assessment of LGU capacities, integration of SWM components into the LGUs' local development plan (LDP) and comprehensive land use plan (CLUP), etc.;<br>4. Recommend to Congress provisions that may require amendment to RA 9003;<br>5. Disseminate policies and systems, including capacity development and |

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| | technical assistance, to LGUs and other stakeholders; and<br>6. Establish a feedback mechanism to monitor and evaluate implementation of the SWM Plans. |
| **Target Period/Date of Accomplishment:** | Q1/2012- Q4/2016 |
| **Geographical Scope/Target Groups:** | National Level – DENR and DILG SWM focal offices and coordinators<br>Local Level – All LGUs and LSWMBs |
| **Special Requirements** | |
| **Possible Sources** | Regular budget of DENR-EMB, Development and donor partners |

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| ***Key Initiative 8a.1.3.2:*** **Ensure that an updated status of evaluation and approval of 10-Year SWM Plans are available to LGUs and the public** | |
| **Component 8a**<br>Cross-cutting issue: Good Governance | |
| **Objective 8a.1**<br>Responsible, transparent and accountable government and citizens working together for achieving effective and efficient waste management | **Strategy 8a.1.3**<br>Improve access of stakeholders to information and updates on SWM plans, evaluation process and results, and other concerns |
| **Lead Agency** | NSWMCS |
| **Cooperating Partners** | DILG, NEC/RECs |
| **General Description** | According to Section 16 of RA 9003, "all local government SWM plans shall be subjected to the approval of the NSWMC. The plan shall be consistent with the national framework and in accordance with the provisions of this Act and of the policies set by the Commission ..." |
| **Indicative Actions** | 1. Adopt policies streamlining the processes for evaluation and approval of 10-year SWM plans, including committing to maximum number of days allowed at each stage of the process;<br>2. Regularly update the NSWMC website on the status of the submitted SWM plans to facilitate tracking by LGUs; and<br>3. Communicate with LGUs the status of the SWM Plan upon receipt and once evaluation is completed. |
| **Target Period/Date of Accomplishment:** | Q4/2011- Q4/2016 |
| **Geographical Scope/Target Groups:** | Nationwide – All LGUs and other stakeholders |
| **Special Requirements** | Reliable ISPs, Additional Trained Manpower to the Lead Agency |
| **Possible Sources** | Regular budget of DENR-EMB, Development and donor partners |

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| ***Key Initiative 8a.1.4.1:*** **Ensure the mainstreaming of all key initiatives under the NSWM Strategy into the regular work and financial plans of lead and cooperating agencies at the national and regional levels** | |
| **Component 8a**<br>Cross-cutting issue: Good Governance | |
| **Objective 8a.1**<br>Responsible, transparent and accountable government and citizens working together for achieving effective and efficient waste management | **Strategy 8a.1.4**<br>Mainstream NSWM strategy in the respective plans and priorities of key implementers (government agencies) |
| **Lead Agency** | NSWMC – DENR |
| **Cooperating Partners** | All NSWMC member agencies, Concerned non-NSWMC member agencies, DBM, NEDA, NSWMCS, OP |
| **General Description** | Section 4 of RA 9003 states that "the Secretaries of the member agencies of NSWMC shall formulate action plans for their respective agencies to complement the National Solid Waste Management Framework".<br><br>The NSWMC needs to conduct action planning with respective heads of offices (national to regional) of the NSWMC member agencies. This will help mainstream SWM in each agency's work and financial plan. |
| **Indicative Actions** | 1. Conduct national consultations for the NSWM strategy and integrate comments and suggestions from SWM stakeholders;<br>2. Adopt the NSWM Strategy through a Resolution;<br>3. Disseminate NSWM Strategy through national and regional events e.g., conferences and other proper avenues e.g. websites, etc.;<br>4. Present the NSWM Strategy and secure endorsement from the OP;<br>5. Conduct high-level dialogue with lead and cooperating agencies, including OP, DBM, DENR and development partners in identifying resource requirements for implementing the NSWM Strategy;<br>6. Conduct planning workshops with NSWMC members and other concerned lead and cooperating agencies in the integration of their specific tasks in the NSWM Strategy into their own work and financial plans, including their respective regional and field offices;<br>7. Conduct donor's fora, e.g., Philippine Development Forum, to forge potential partnerships especially in innovative measures;<br>8. Conduct quarterly reporting, annual monitoring and mid-term review of the NSWM Strategy's key initiatives by assigned agencies, feedback to OP and recognize performance. |
| **Target Period/Date of Accomplishment:** | Q4/2011 to Q4/2016 |
| **Geographical Scope/Target Groups:** | National Level – Secretaries or Undersecretaries of the agencies, Philippine Development Forum (PDF)<br>Regional and Local Levels – DENR-EMB regional offices, Regional offices of concerned national agencies, All LGUs |

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| **Special Requirements** | |
| **Possible Sources** | Regular budget of DENR-EMB, NSWMC members and Concerned agencies, Development and donor partners |

## Component 8b **Cross-cutting Issue: Caring for Vulnerable Groups**

The informal waste sector (IWS) is considered as the most vulnerable group in municipal solid waste management. Based on GIZ's study entitled: "Economic Aspects of the Informal Sector in Solid Waste Management", the 'informal sector in SWM' refers to individuals, families, and private sector (micro-) enterprises working in waste management services and valorization, whose activities are neither organized, sponsored, financed, contracted, recognized, managed, taxed, nor reported upon by the formal solid waste authorities. The IWS consists mainly of waste pickers in dumpsites and communal waste collection points, informal waste collectors, itinerant waste buyers, small junkshop dealers, "jumpers" (those who jump into collection trucks to recover recyclables), and *paleros* (garbage trucks crew). Communities who live within or near the SWM facilities are likewise considered vulnerable.

The ESWM system in the Philippines includes thousands of informal waste workers, among them women, children and elderly, who depend on informal waste collection and recovery as a means of livelihood. In RA 9003, waste-picking and unauthorized waste collection activities are prohibited. But the lack of livelihood and educational opportunities push them to do informal waste work. It provides them the opportunity to earn on a daily basis, if they so wish, without the competitive job requirements of paid employment. As their work is not regulated under the law, they do not have secure access to the sites nor have spaces or facilities where they can work under safe and sanitary conditions. They are vulnerable to health risks and hazards due to their prolonged exposure to toxic, hazardous and infectious materials from the waste stream.

Local governments save money on waste collection and disposal due to the recovery activities done by the IWS. However, members of this sector face a variety of risks. They are vulnerable to the uncertainty of their livelihood. Thousands of waste pickers are being displaced as a result of dumpsite closures. Many barangay-managed materials recovery facilities and government-paid eco-aides displace them from their source of income.

Prices of recyclables fluctuate causing traders to postpone buying certain waste materials. Informal waste workers lack the capital and thus are vulnerable to exploitative arrangements established by those who provide them capital by dictating the prices. They have poor bargaining power because they are mostly unorganized.

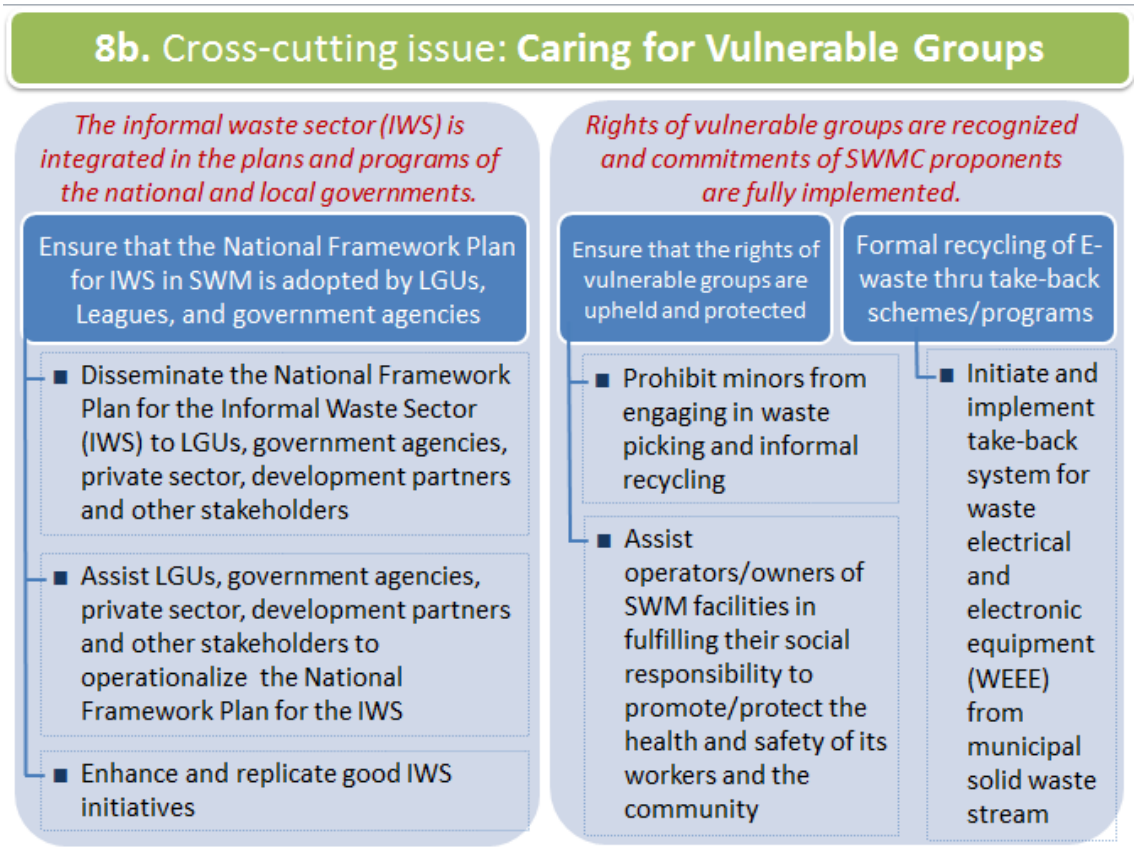
Failure to integrate the informal waste workers in the ESWM system will perpetuate the cycle of poverty. It will not help the Philippines meet its Millennium Development Goals in poverty reduction and its health goals. Informal recycling results in environmental problems, such as contamination of land and water by heavy metals. Moreover, it causes prolonged exposure of women and children to the health impacts of toxic, hazardous and infectious materials in the solid waste stream

thereby creating huge social health costs.

Informal waste workers have expertise in waste recovery. Their work contributed to savings in waste collection and disposal. Local governments will potentially incur more costs in waste collection, processing, and recovery if they do not integrate the sector in their ESWM system.

In May 2009, the NSWMC, with support from UNEP and development partners, prepared the National Framework Plan for the Informal Sector in Solid Waste Management, which recognizes their important contribution and hence formulated a holistic plan for their development. LGUs have yet to develop and implement their plans for this sector.

To protect, uphold and fulfill the rights of vulnerable groups, the NSWMC shall endeavor to achieve the following objectives through the strategies and key initiatives proposed below.



Objective 8b.1 The informal waste sector (IWS) is integrated in the plans and programs of the national and local governments

Strategy 8b.1.1 Ensure that the National Framework Plan for IWS in SWM is adopted by LGUs, Leagues, and government agencies

Key Initiative 8b.1.1.1 Disseminate the National Framework Plan for the Informal Waste Sector (IWS) to LGUs, government agencies, private sector, development partners and other stakeholders

Key Initiative 8b.1.1.2 Assist LGUs, government agencies, private sector, development partners and other stakeholders to operationalize the National Framework Plan for the Informal Waste Sector

Key Initiative 8b.1.1.3 Enhance and replicate good IWS initiatives

Objective 8b.2 Rights of vulnerable groups are recognized and commitments of SWMC proponents are fully implemented

Strategy 8b.2.1 Ensure that the rights of vulnerable groups are upheld and protected.

Key Initiative 8b.2.1.1 Prohibit minors from engaging in waste picking and informal recycling

Key Initiative 8b.2.1.2 Assist operators/owners of SWM facilities in fulfilling their social responsibility to promote/protect the health and safety of its workers and the community

Strategy 8b.2.2 Formal recycling of e-waste thru take-back schemes/programs

Key Initiative 8b.2.2.1 Initiate and implement take-back system for waste electrical and electronic equipment (WEEE) from municipal solid waste stream

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| ***Key Initiative 8b.1.1.1:*** **Disseminate the National Framework Plan for the Informal Waste Sector (IWS) to LGUs, government agencies, private sector, development partners and other stakeholders** | |
| **Component 8b**<br>Cross-cutting issue: Caring for Vulnerable Groups | |
| **Objective 8b.1**<br>The IWS is integrated in plans and programs of the national/local government | **Strategy 8b.1.1**<br>Ensure that the National Framework Plan for IWS in SWM is adopted by LGUs and government agencies |
| **Lead Agency** | NSWMC-NGO Representative |
| **Cooperating Partners** | Industry groups, LGU Leagues, Multi-sectoral committee for capacity development of IWS (per NSWMC Resolution No. 2010-48), NEC/RECs, NEDA/RDCs |
| **General Description** | The Commission needs to disseminate the National Framework Plan for the IWS in SWM to LGUs and government agencies. |
| **Indicative Actions** | 1. Print and reproduce (e-copy) the National Framework Plan and distribute to the LGUs and other stakeholders;<br>2. Present the National Framework Plan to the different agencies by the NSWMC – NGO Representative;<br>3. Adopt the Framework Plan through the issuance of appropriate and binding legal instrument(s) by the agencies concerned; and<br>4. Present the National Framework Plan to LGUs through the different LGU Leagues. |
| **Target Period/Date of Accomplishment:** | Q1/2012to Q4/2012 |
| **Geographical Scope/Target Groups:** | National Level – National government agencies (NGAs); NGOs ; LPP; LCP; LMP; private sector; other stakeholders<br>Regional/Local Level – Regional government agencies, LGUs, Private sector, and other stakeholders |
| **Special Requirements** | Printing and copying |
| **Possible Sources** | Regular budget of DENR-EMB, MSC member agencies, Development partners |

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| ***Key Initiative 8b.1.1.2:*** **Assist LGUs, government agencies, private sector, development partners and other stakeholders to operationalize the National Framework Plan for the Informal Waste Sector** | |
| **Component 8b**<br>Cross-cutting issue: Caring for Vulnerable Groups | |
| **Objective 8b.1**<br>The IWS is integrated in plans and programs of the national/local government | **Strategy 8b.1.1**<br>Ensure that the National Framework Plan for IWS in SWM is adopted by LGUs and government agencies |
| **Lead Agency** | NSWMC- NGO Representative - MSC |
| **Cooperating Partners** | LGU Leagues, MSC member agencies, NSWMC member agencies |
| **General Description** | The Commission needs to assist NGAs, LGU leagues and LGUs in the conduct of workshops to integrate the NFP for the IWS in their programs. |
| **Indicative Actions** | 1. Facilitate discussion among agencies, LGU Leagues and LGUs on the integration of the NFP for the IWS.<br>2. Leagues to issue a resolution(s) or memorandum circular(s) to LGUs for the development of action plans for the operationalization of the NFP and integration of the IWS in their SWM Plans;<br>3. LGUs to Integrate the IWS in their SWM Plans;<br>4. Issuance of a Memorandum by each concerned agency to operationalize the NFP for the IWS based on their mandates; and<br>5. Monitor the implementation of the NFP by the NGAs and LGUs. |
| **Target Period/Date of Accomplishment:** | Q4/2012 to Q4/2013 |
| **Geographical Scope/Target Groups:** | Nationwide – IWS, LGUs, Private sector and other stakeholders |
| **Special Requirements** | |
| **Possible Sources** | Regular budget of lead and cooperating agencies, Donor agencies |

| ***Key Initiative 8b.1.1.3:*** **Enhance and replicate good IWS initiatives** | |
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| **Component 8b**<br>Cross-cutting issue: Caring for Vulnerable Groups | |
| **Objective 8b.1**<br>The IWS is integrated in plans and programs of the national/local government | **Strategy 8b.1.1**<br>Ensure that the National Framework Plan for IWS in SWM is adopted by LGUs and government agencies |
| **Lead Agency** | NSWMC—NGO Representative-MSC |
| **Cooperating Partners** | CDA, DOLE, DSWD, LGU Leagues, Multi-sectoral committee for capacity development of IWS, NEC, NGO, NSWMC member agencies, PCUP |
| **General Description** | Identify, document and assist existing IWS initiatives to strengthen their participation in SWM. |
| **Indicative Actions** | 1. Provide assistance in the documentation of all existing IWS initiatives;<br>2. Provide assistance in the setting up and maintenance of database or in linking up with the NEC database;<br>3. Conduct thematic forum for information dissemination and possible replication of good initiatives; and<br>4. Assist IWS in project development/enhancement of their SWM initiatives. |
| **Target Period/Date of Accomplishment:** | Q1/2012 to Q4/2016 |
| **Geographical Scope/Target Groups:** | Nationwide – LGUs, IWS |
| **Special Requirements** | Documenters/success story writers<br>Community Organizers |
| **Possible Sources** | Regular budget of DENR-EMB, Development partners |

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| ***Key Initiative 8b.2.1.1:*** **Prohibit minors from engaging in waste picking and informal recycling** | |
| **Component 8b**<br>Cross-cutting issue: Caring for Vulnerable Groups | |
| **Objective 8b.2**<br>Rights of vulnerable groups are recognized and commitments of SWMC proponents are fully implemented | **Strategy 8b.2.1**<br>Ensure that the rights of vulnerable groups are upheld and protected. |
| **Lead Agency** | NSWMCS |
| **Cooperating Partners** | DOLE, DSWD, LGU Leagues |
| **General Description** | The presence of minors at dumpsites and their participation in informal recyclables collection is often ignored by the authorities because their parents are usually the ones pushing them to do so. However, there are existing laws that prohibit child labor and protect their welfare in all cases, much more in hazardous working environments such as waste facilities.<br><br>Republic Act no. 7610, an act providing for stronger deterrence and special protection against child abuse, exploitation and discrimination, refers to "children" as those below 18 years of age or older but are incapable of taking care of themselves. Article VIII, Section 12 of RA 7610 states that "Children below 15 years old may be employed except: when a child works directly under the sole responsibility of his parents or legal guardian and where only members of the employer's family are employed: provided, however, that his employment neither endangers his life, safety and health and morals, nor impairs his normal development". It provides, further, the said minor child with primary and/or secondary education. |
| **Indicative Actions** | 1. Consult with DSWD and DOLE to clearly define the scope of the prohibition including a survey of children involved;<br>2. Prepare a draft resolution requesting DSWD and DOLE to develop a plan to provide a just transition from waste picking and informal recycling, i.e., tie up with conditional cash transfer, provision of livelihood options, warn/issue notices to parents etc.;<br>3. Endorse to NSWMC for approval and / or issue joint DILG-NSWMC-DSWD-DOLE circular; and<br>4. Monitor the enforcement of the prohibition by LGUs by the DILG or any appropriate body. |
| **Target Period/Date of Accomplishment:** | Q2/2012 to Q2/2013 |
| **Geographical Scope/Target Groups:** | Nationwide – All LGUs, Families of IWS |
| **Special Requirements** | |
| **Possible Sources** | Regular budget of lead and cooperating agencies, Development partners |

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| ***Key Initiative 8b.2.1.2:*** **Assist operators/owners of SWM facilities in fulfilling their social responsibility to promote/protect the health and safety of its workers and the community** | |
| **Component 8b**<br>Cross-cutting issue: Caring for Vulnerable Groups | |
| **Objective 8b.2**<br>Rights of vulnerable groups are recognized and commitments of SWMC proponents are fully implemented | **Strategy 8b.2.1**<br>Ensure that the rights of vulnerable groups are upheld and protected. |
| **Lead Agency** | NSWMC – DENR and DILG |
| **Cooperating Partners** | DENR-EMB-EIAD, DOLE-OSHC, LGU Leagues |
| **General Description** | Communities hosting SWM facilities and its workers are vulnerable to environmental and health risk. Its owners/operators must ensure that their social development plans or corporate social responsibility programs for the communities and workers in SWM facilities respond to these risks. The latter should be capacitated in occupational health and safety measures. |
| **Indicative Actions** | 1. Issue a Memorandum Circular to LGUs to initiate discussion between LGUs and operators to work out commitments of the operators in ensuring the health and safety of workers at the waste management facilities as well as the affected communities;<br>2. Draft a resolution for the creation of a team to develop a policy, for the promotion and protection of vulnerable groups, including the provision of hazard pay for waste management personnel, proper protective equipment, health hazard risk reduction, multi-partite monitoring, alternative sources of livelihood, etc.;<br>3. Review draft resolution for endorsement and approval of NSWMC;<br>4. Develop said policy with EMB's EIA Division, LGU Leagues, DILG and operators;<br>5. Adoption of policy with a resolution that covers both those with and without ECC; and<br>6. Monitor the activities and working conditions of the IWS, workers and the host communities of SWM facilities. |
| **Target Period/Date of Accomplishment:** | Q1/2012 to Q4/2013 |
| **Geographical Scope/Target Groups:** | National Level – NSWMCS, Leagues, EMB EIA Division, DILG<br>Regional and Local Level – EMB regional offices, LGUs, Operators/Owners of SWM facilities |
| **Special Requirements** | |
| **Possible Sources** | Regular budget of lead and cooperating agencies, Development partners |

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| ***Key Initiative 8b.2.2.1:*** **Initiate and implement take-back system for waste electrical and electronic equipment (WEEE) from municipal solid waste stream** | |
| **Component 8b**<br>Cross-cutting issue: Caring for Vulnerable Groups | |
| **Objective 8b.2**<br>Rights of vulnerable groups are recognized and commitments of SWMC proponents are fully implemented | **Strategy 8b.2.2**<br>Formal recycling of E-waste thru take-back schemes/program |
| **Lead Agency** | NSWMC – DENR and NEC |
| **Cooperating Partners** | DENR-EMB, DTI, Industry groups, LGU Leagues, NSWMCS, Recycling groups, Trade associations, TSD operators |
| **General Description** | Informal recycling of e-waste is stopped/eliminated by instituting e-waste take-back programs. This will also address the problem of burning of e-waste or its by-products by informal recyclers. It is thus necessary to improve systems for segregating, collecting, processing and managing waste electronics and electrical equipment (WEEE) from households and commercial establishments. |
| **Indicative Actions** | 1. Provide the template for the inventory of existing outlets of surplus products, e-wastes, CFC-based materials, etc. at the LGU level;<br>2. Conduct consultations with concerned stakeholders;<br>3. Develop guidelines for the e-waste take-back system and prohibition of informal recycling of e-waste by junk shops;<br>4. Draft a resolution for review of NSWMC-TWG and approval of the commission; Adoption of guidelines with a resolution; and<br>5. Disseminate and monitor implementation of the system. |
| **Target Period/Date of Accomplishment:** | Q2/2013 to Q4/2016 |
| **Geographical Scope/Target Groups:** | Nationwide – E-waste generators, haulers, IWS, junkshop operators, LGUs |
| **Special Requirements** | Consultation expenses |
| **Possible Sources** | Regular budget of lead and cooperating agencies, Development partners, LGU funds for inventory |

## Component 8c **Cross-cutting Issue: Reducing Disaster and Climate Change Risks**

An efficient implementation of RA 9003 contributes to climate change mitigation and disaster risk reduction. Climate change and SWM are interrelated and affect one another. Poor waste management practices such as open burning, dumping in creeks and water bodies, as well as non-segregation of waste result in greenhouse gas (GHG) emissions. Landfilling of biodegradables wastes and continued operation of open and controlled dumpsites lead to the release of GHGs. Thus, waste prevention, recycling and composting are effective ways to mitigate climate change.

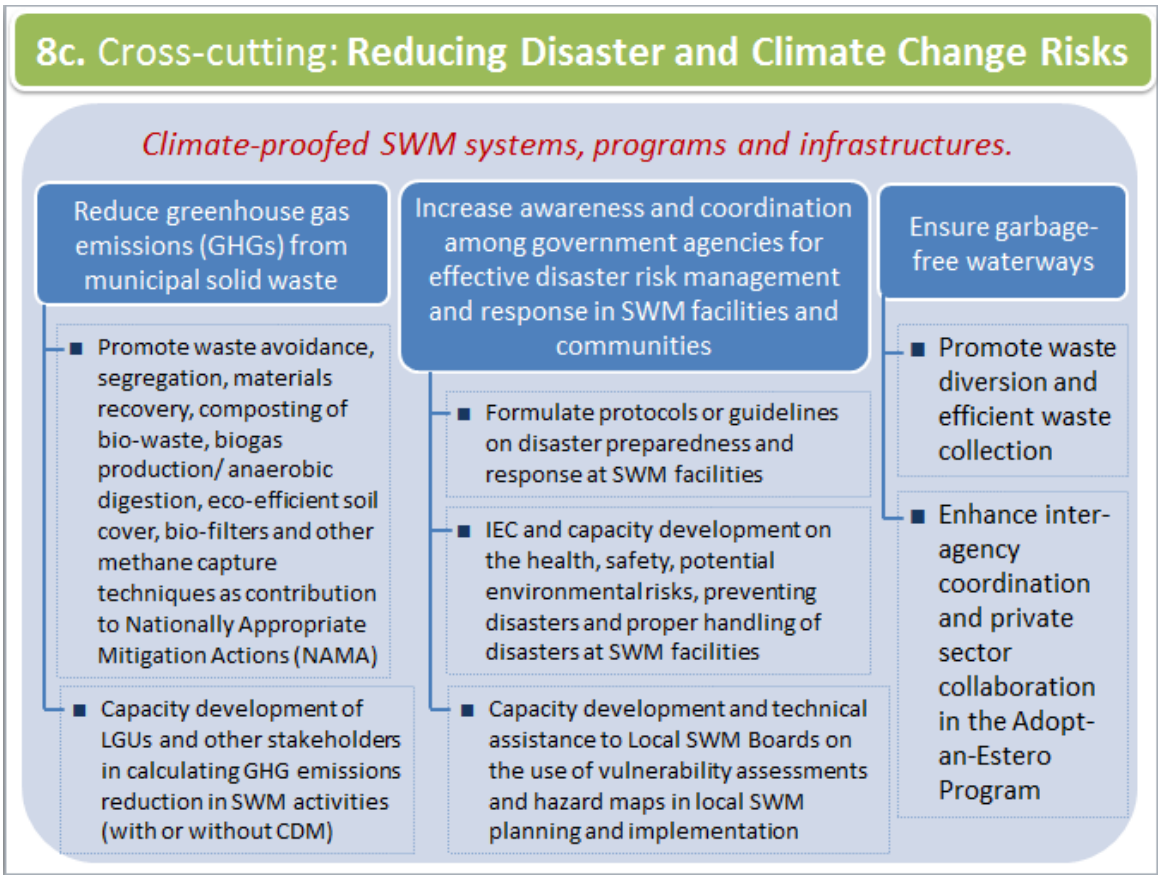
Similarly, waste management systems and infrastructures may also be prone to disasters. Climate change causes extreme rainfall in some areas and effects can be compounded by uncollected waste, exposing the dangers of mismanaged garbage. This results in massive flooding that cause damages to properties and human lives. Likewise, millions are spent just to clean up, declog and dredge waterways. Agricultural production and logistics are affected as well. Inundated farms and damaged crops can impact food security and result in scarcity of resources.

Another disaster-related occurrence was the Payatas garbage-slide. On July 10, 2000, tragedy befell a slum community in Payatas, Quezon City when a hill of garbage caved in, killing 218 people and leaving 300 families homeless. This incident was triggered by heavy rains and buildup of combustible gases from the waste body. Similar events happened in Cebu City when the Inayawan disposal facility caught fire in April 2009, and in Baguio City when Typhoon 'Mina' triggered an avalanche of waste from Irisan dumpsite in August 2011 burying houses downstream.

Heavy rains can also delay the planning, construction and operation of waste management facilities such as sanitary landfills. For example, DENR Administrative Order (DAO) Nos. 98-50 and 2001-34 discourage the siting of SLFs in hazard-prone areas (flood and landslide prone, fault lines, etc.). In July 2009, the perimeter wall of the Rizal Provincial landfill collapsed amidst heavy rains albeit later investigations found the possibility of the facility's unprotected steep slope as another culprit. While these site suitability criteria are in the process of being revised, it may also be important to consider revising DAO 2006-09 and/or supplement DAO 2006-10 to mainstream disaster risk reduction and other safety nets to the changing climate.

Climate change can also cause the spread of diseases. New strains of airborne disease-causing organisms can spread out. Wastes affect air, land and water ecosystems, resulting in an imbalance of nature. Ground contamination results in health problems and is a main reason for the spread of water-borne diseases, which in turn will affect the health of the community especially the children.

Having acknowledged the potential contribution of ESWM to reducing disaster and climate change risks, the NSWMC shall implement these strategies to achieve the following objectives:




Objective 8c.1 Climate-proofed SWM systems, programs and infrastructures

Strategy 8c.1.1 Reduce greenhouse gas emissions (GHGs) from municipal solid waste

Key Initiative 8c.1.1.1 Promote waste avoidance, segregation, materials recovery, composting of bio-waste, biogas production/anaerobic digestion, eco-efficient soil cover, bio-filters and other methane capture techniques as contribution to Nationally Appropriate Mitigation Actions (NAMA)

Key Initiative 8c.1.1.2 Capacity development of LGUs and other stakeholders in calculating greenhouse gas (GHG) emissions reduction in SWM activities (with or without CDM)

Strategy 8c.1.2 Increase awareness and coordination among government agencies for effective disaster risk management and response in SWM facilities and communities

Key Initiative 8c.1.2.1 Formulate protocols or guidelines on disaster preparedness and response at SWM facilities

Key Initiative 8c.1.2.2 IEC and capacity development on the health, safety, potential environmental risks, preventing disasters and proper handling of disasters at SWM facilities

Key Initiative 8c.1.2.3 Capacity development and technical assistance to Local SWM Boards on the use of vulnerability assessments and hazard maps in local SWM planning and implementation

Strategy 8c.1.3 Ensure garbage-free waterways

Key Initiative 8c.1.3.1 Promote waste diversion and efficient waste collection

Key Initiative 8c.1.3.2 Enhance inter-agency coordination and private sector collaboration in the Adopt-an-Estero Program

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| ***Key Initiative 8c.1.1.1:*** **Promote waste avoidance, use of environment-friendly indigenous materials, segregation, materials recovery, composting of bio-waste, biogas production/anaerobic digestion, eco-efficient soil cover, biofilters and other methane capture techniques as contribution to Nationally Appropriate Mitigation Actions (NAMA)** | |
| **Component 8c**<br>Cross-cutting issue: Reducing Disaster and Climate Change Risks | |
| **Objective 8c.1**<br>Climate-proofed SWM systems, programs and infrastructures | **Strategy 8c.1.1**<br>Reduce greenhouse gas emissions (GHGs) from municipal solid waste |
| **Lead Agency** | NSWMC – DENR and Climate Change Commission |
| **Cooperating Partners** | Academic and research institutions, DA, DENR-EMB-Climate Change Office, DILG, DOE, LGU Leagues, MMDA, NDRRMC, NSWMCS |
| **General Description** | The NSWMC needs to emphasize the climate change mitigation contribution of the main provisions of the Ecological Solid Waste Management Act of 2001 and pilot test or issue guidelines on the new and emerging SWM techniques that minimize greenhouse gas (GHG) emissions from wastes and SWM facilities. In 2000, the National Framework Strategy on Climate Change has identified the waste sector as the third largest GHG contributor at 11,599 Gg $CO_2$e.<br><br>The Philippine Climate Change Commission (CCC) has also released the National Climate Change Action Plan 2011-2028 identifying SWM measures as key contributor to strategic the objective "Climate change-resilient, eco-efficient and environment-friendly industries and services, and sustainable towns and cities promoted, developed, and sustained". |
| **Indicative Actions** | 1. Identify areas where NSWMC and CCC can mainstream climate change mitigation options through proper SWM (e.g., waste avoidance, use of environmentally friendly products and packaging materials, 3Rs, waste segregation, composting, materials recovery, anaerobic digestion, eco-efficient soil cover at disposal facilities and other methane capture techniques) particularly in its regular policy formulation, technology transfer, PPP, financing and capacity development programs;<br>2. Identify areas where NSWMC and CCC can support agencies and partner institutions involved in climate change in the mainstreaming of proper SWM options as means to mitigate GHG emissions, particularly in the implementation of National Appropriate Mitigation Actions (NAMA) and establishment of Monitoring, Reporting and Verification (MRV) guidelines;<br>3. Formulate guidelines to mainstream and strengthen the implementation of methane avoidance, reduction and capture approaches as sectoral contribution of SWM in the establishment of NAMA in the Philippines, including the possibility of setting overall or SWM sector-specific mitigation targets;<br>4. Draft resolution(s) for approval of NSWMC and CCC; |

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| | 5. Recommend to concerned government agencies the issuance of joint or department administrative orders or any appropriate legal instrument to support the implementation of corresponding commission resolutions;<br>6. Conduct trainings and social marketing campaigns to align SWM measures and technologies as climate change mitigation strategy;<br>7. Enhance inter-agency coordination in mainstreaming and promoting SWM measures in the context of the NAMA framework. |
| **Target Period/Date of Accomplishment:** | Q3/2011 to Q4/2016 |
| **Geographical Scope/Target Groups:** | National Level – All government and private offices<br>Regional and Level – RECs, Regional Climate Change Offices, All LGUs, Other Stakeholders |
| **Special Requirements** | Printing and reproduction of IEC materials |
| **Possible Sources** | GAA from concerned government agency budgets; Development agencies, NGOs |

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| ***Key Initiative 8c.1.1.2:*** **Capacity development of LGUs and other stakeholders in calculating greenhouse gas (GHG) emissions reduction in SWM activities (with or without CDM)** | |
| **Component 8c**<br>Cross-cutting issue: Reducing Disaster and Climate Change Risks | |
| **Objective 8c.1**<br>Climate-proofed SWM systems, programs and infrastructures | **Strategy 8c.1.1**<br>Reduce greenhouse gas emissions (GHGs) from municipal solid waste |
| **Lead Agency** | NSWMC – DENR and Climate Change Commission |
| **Cooperating Partners** | DENR-EMB-Climate Change Office, DILG-LGA, DOST, LGU Leagues, MMDA, NSWMCS |
| **General Description** | The NSWMC, together with the Climate Change Commission, can promote the use of GHG calculators and other assessment tools to aid LGUs and other stakeholders in properly planning and evaluating the climate-friendliness of its SWM programs and activities. |
| **Indicative Actions** | 1. Consolidate or secure all GHG and carbon footprint assessment and calculation tools that stakeholders can utilize specifically for SWM planning and evaluation;<br>2. Evaluate the different tools available and identify the most user-friendly tool(s) for LGUs and other stakeholders;<br>3. Identify partners, experts and supporters in GHG calculation training-workshops, including the conduct of trainer's training programs;<br>4. Capacitate stakeholders on GHG emissions reduction through appropriate waste management activities and on the use of GHG evaluation tools, including the preparation of PDD for CDM or the implementation of measurement, reporting and verification (MRV) of GHG emissions for interested LGUs, through its regular training programs; and<br>5. Obtain and compile all GHG data from various SWM activities and technologies and integrate into the NEC/REC database for future references in policy analysis, e.g., guide for design of nationally appropriate mitigation actions (NAMA), requirements for landfill management and operations, etc. |
| **Target Period/Date of Accomplishment:** | Q2/2012 to Q4/2016 |
| **Geographical Scope/Target Groups:** | National Level – NEC and RECs, EMB-ROs, DENR P/CENROs<br>Regional and Local Level – RECs, LGUs |
| **Special Requirements** | Provision of experts on greenhouse gas calculation tools |
| **Possible Sources** | GAA from CCC, EMB and other concerned government agency budgets, Development agencies, NGOs, LGUs |

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| ***Key Initiative 8c.1.2.1:*** **Formulate protocols or guidelines on disaster preparedness and response at SWM facilities** | |
| **Component 8c**<br>Cross-cutting issue: Reducing Disaster and Climate Change Risks | |
| **Objective 8c.1**<br>Climate-proofed SWM systems, programs and infrastructures | **Strategy 8c.1.2**<br>Increase awareness and coordination among government agencies for effective disaster risk management and response in SWM facilities and nearby communities |
| **Lead Agency** | NSWMC – DENR, National Disaster Risk Reduction and Management Council (NDRRMC) |
| **Cooperating Partners** | Academic and research institutions, CCC, DENR-EMB-CCO, DENR-MGB, DILG, DILG-BFP, DOST-PAGASA, DOST-PHIVOLCS, DND-OCD, LGU Leagues, MMDA, NSWMCS |
| **General Description** | Possible disasters that may happen at SWM sites include: garbage-slide flooding, leachate runoff, earthquakes, fires and explosions. Relevant protocols need to be formulated to guide LGUs and other stakeholders in minimizing risks and responding to disasters at SWM facilities, especially at waste processing and disposal sites. Such guidelines need to be localized and integrated into the regular plans of the LGUs. |
| **Indicative Actions** | 1. Conduct of discussions on all SWM policy issuances that have relevance to disaster preparedness and response, e.g., SLF site selection, SLF engineering design, MRF construction, IEE/ECC requirements, annotated outline in the preparation of 10-year SWM plans;<br>2. Prepare draft guidelines and/or amend existing guidelines vis-à-vis mainstreaming disaster preparedness action plans at SWM facilities, including strict ban on open burning, integration of disaster risk reduction and management (DRRM) into the LGUs' 10-Year SWM and Climate Change Action Plans, mainstreaming into comprehensive land use plans (CLUPs), etc.;<br>3. Conduct consultations with concerned agencies and stakeholders;<br>4. Adopt such guidelines as NSWMC resolutions, following recommendations to concerned government agencies for the issuance of supporting joint or department administrative orders or any appropriate legal instrument; and<br>5. Disseminate guidelines to LGUs and other stakeholders. |
| **Target Period/Date of Accomplishment:** | Q2/2012 to Q4/2012 |
| **Geographical Scope/Target Groups:** | National and Regional Levels –DENR and EMB central and field offices, NDRRMC members<br>Local Level – Local Disaster Risk Reduction and Management Councils (LDRRMCs), LSWMBs, LGUs |
| **Special Requirements** | Resource persons and experts on disaster risk reduction and management at SWM facilities |
| **Possible Sources** | GAA from NDRRMC, CCC, EMB and other concerned government agencies, Development agencies, NGOs |

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| ***Key Initiative 8c.1.2.2:*** **IEC and Capacity development on the health, safety, potential environmental risks, preventing disasters and proper handling of disasters at SWM facilities** | |
| **Component 8c**<br>Cross-cutting issue: Reducing Disaster and Climate Change Risks | |
| **Objective 8c.1**<br>Climate-proofed SWM systems, programs and infrastructures | **Strategy 8c.1.2**<br>Increase awareness and coordination among government agencies for effective disaster preparedness and response in SWM facilities and nearby communities |
| **Lead Agency** | NSWMC – NEC, National Disaster Risk Reduction and Management Council (NDRRMC) |
| **Cooperating Partners** | Academic and research institutions, CCC, DND-OCD, DENR-EMB-CCO, DILG-BFP, DILG-LGA, DOH, DOST, MMDA, NSWMCS, PIA, RECs |
| **General Description** | The Commission and/or its partners need to capacitate LGUs and other sectors engaged in waste management services in implementing disaster prevention and emergency response programs at SWM facilities. |
| **Indicative Actions** | 1. Develop or customize IEC materials and disaster management training modules specifically for SWM facility design, construction, operations and monitoring;<br>2. Coordinate with relevant organizations and agencies in organizing trainings for SWM focal persons, communities and local disaster coordinators;<br>3. Conduct trainings to concerned sectors (host communities/vulnerable groups) and implementers on a regular basis; and<br>4. Include SWM facilities in the monitoring being done by LDRRMCs. |
| **Target Period/Date of Accomplishment:** | Q3/2012 to Q4/2016 |
| **Geographical Scope/Target Groups:** | National and Regional Levels –DENR and EMB central and field offices, NDRRMC members<br>Local Level – Local Disaster Risk Reduction and Management Councils (LDRRMCs), LSWMBs, LGUs |
| **Special Requirements** | Resource persons and experts on disaster risk reduction and management at SWM facilities |
| **Possible Sources** | GAA from NDRRMC, CCC, DENR-EMB and other concerned government agencies; Development agencies, NGOs |

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| ***Key Initiative 8c.1.2.3:*** **Capacity development and technical assistance to Local SWM Boards on the use of vulnerability assessments and hazard maps in local SWM planning and implementation** | |
| **Component 8c**<br>Cross-cutting issue: Reducing Disaster and Climate Change Risks | |
| **Objective 8c.1**<br>Climate-proofed SWM systems, programs and infrastructures | **Strategy 8c.1.2**<br>Increase awareness and coordination among government agencies for effective disaster preparedness and response in SWM facilities and nearby communities |
| **Lead Agency** | NSWMC – NEC, National Disaster Risk Reduction and Management Council (NDRRMC) |
| **Cooperating Partners** | Academic and research institutions, CCC, DENR-EMB-CCO, DENR-MGB, DENR-NAMRIA, DILG-LGA, HLURB, MMDA, NEDA, NSWMCS, RECs |
| **General Description** | The Commission can spearhead and coordinate capacity development and technical assistance programs to LGUs on the use of vulnerability assessments and hazard maps in SWM planning and implementation. This will be done in close coordination with the Mines and Geosciences Bureau (MGB), which is the agency tasked to conduct hazard mapping in the country. |
| **Indicative Actions** | 1. Review and consolidate all relevant policies and available resources (regional and vulnerability assessment studies, hazard maps, service providers, experts, etc.) that can be of use to LGUs in SWM planning;<br>2. Conduct consultations with concerned agencies and stakeholder groups on how to guide LGUs in mainstreaming disaster preparedness and planning tools in their SWM programs and in the preparation of CLUPs;<br>3. Conduct regular trainings to the relevant LGU departments and local key players involved in disaster management and SWM implementation, and partner with concerned agencies to provide technical assistance whenever necessary; and<br>4. Obtain, compile, document and disseminate all vulnerability assessment and hazard mapping applications in SWM planning for future references, e.g., inclusion in NEC database, policy development, guide for design of nationally appropriate mitigation actions (NAMA), requirements for site selection of SWM facilities, etc. |
| **Target Period/Date of Accomplishment:** | Q3/2012 to Q4/2016 |
| **Geographical Scope/Target Groups:** | National and Regional Levels –DENR and EMB central and field offices, NDRRMC members<br>Local Level – Local Disaster Risk Reduction and Management Councils (LDRRMCs), LSWMBs, LGUs |
| **Special Requirements** | Resource persons and experts on vulnerability and hazard mapping |
| **Possible Sources** | GAA from NDRRMC, CCC, DENR-EMB and other concerned government agencies; Development-agencies, NGOs |

| ***Key Initiative 8c.1.3.1:*** **Promote waste diversion and efficient waste collection as climate change adaptation measure** | |
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| **Component 8c**<br>Cross-cutting issue: Reducing Disaster and Climate Change Risks | |
| **Objective 8c.1**<br>Climate-proofed SWM systems, programs and infrastructures | **Strategy 8c.1.3**<br>Ensure garbage-free waterways |
| **Lead Agency** | NSWMC – DILG and DENR |
| **Cooperating Partners** | Academic and research institutions, CCC, DENR-EMB-EEID, DILG-LGA, DPWH, DRRMO/DRRMC at all levels, LGU Leagues, MMDA, NEC/RECs, NGOs, NSWMCS, PIA |
| **General Description** | The Commission already has a number of policies and projects concerning waste diversion and efficient waste collection strategies but these activities can be further mainstreamed in the context of ensuring garbage-free waterways as climate adaptation measures.<br><br>In addition, the Supreme Court of the Philippines has issued on December 18, 2008 an order (mandamus) to all concerned government agencies to coordinate in the clean-up, restoration, and preservation of Manila Bay. In a unanimous decision, the Court ordered petitioner government agencies to coordinate the cleanup, restoration, and preservation of the water quality of the Manila Bay, in line with the country's development objective to attain economic growth in a manner consistent with the protection, preservation, and revival of marine waters. The petitioners include MMDA, DENR, DepEd, DOH, DA, DPWH, DBM, PCG, PNP Maritime Group and the DILG. |
| **Indicative Actions** | 1. Identify existing and planned NSWMC policies to eliminate disposal of wastes into built or natural surface waters;<br>2. Develop IEC programs and disseminate IEC materials to promote garbage-free waterways; and<br>3. Collaborate with the civil society, private sector, communities and LGUs in promoting waste avoidance, diversion and efficient waste collection as measures to prevent prohibited acts of waste dumping in water bodies by waste generators and collectors. |
| **Target Period/Date of Accomplishment:** | Q4/2011 to Q4/2016 |
| **Geographical Scope/Target Groups:** | Nationwide – All LGUs (Provinces, Cities/Municipalities and Barangays) and Communities |
| **Special Requirements** | Printing and reproduction of IEC materials |
| **Possible Sources** | GAA from concerned government agency budgets; Development agencies, NGOs |

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| ***Key Initiative 8c.1.3.2:*** **Enhance inter-agency coordination and private sector collaboration in the Adopt-an-Estero Program** | |
| **Component 8c**<br>Cross-cutting issue: Reducing Disaster and Climate Change Risks | |
| **Objective 8c.1**<br>Climate-proofed SWM systems, programs and infrastructures | **Strategy 8c.1.3**<br>Ensure garbage-free waterways |
| **Lead Agency** | NSWMC – DENR, EMB |
| **Cooperating Partners** | DENR-EMB-EEID, DOT, DPWH, DSWD, Industry groups, LLDA, MMDA, NGOs, NSWMCS, POs, Private sector |
| **General Description** | The Commission can coordinate and collaborate with the agencies and sectors involved in implementing the 'Adopt-an-Estero Program'. |
| **Indicative Actions** | 1. Investigate waste dumping practices at esteros (e.g., public perception and behavior, waste collection service coverage and frequency) and benchmark preventive and enforcement mechanisms (e.g., LGU's role in the relocation of informal settlers along creeks, mandatory cleanup as condition to DSWD's conditional cash transfer program for estero residents);<br>2. Identify areas where NSWMC can be involved in the 'Adopt-an-Estero' Program, in coordination with EMB-EEID and LLDA;<br>3. Collaborate with the Department of Tourism (DOT) in maintaining "historical esteros" for tourism purposes;<br>4. Ensure availability of funds and implement collaborative projects with partner agencies and organizations, especially barangays, sangguniang kabataan (SK), and homeowners' associations;<br>5. Monitor the results of the programs implemented based on set of indicators, e.g., presence of floating debris, ambient water quality, livelihood programs, reduction in flood subsidence time, community participation, support SWM infrastructure, increase in cleanup, de-clogging and dredging activities along riverbanks, lakeshores, and coastal areas, etc.; and<br>6. Recognize best practices and LGUs with clean waterways (e.g., Dangal ng Ilog, Lason Awards, etc.). |
| **Target Period/Date of Accomplishment:** | Q2/2011 to Q4/2016 |
| **Geographical Scope/Target Groups:** | Nationwide – 'Adopt-an-Estero' agencies and partners<br>Regional and Local Levels – 'Adopt-an-Estero' partners and other LGUs, Barangays and Homeowners' associations (HOAs), NGOs, POs |
| **Special Requirements** | Adopt-an-Estero MOAs |
| **Possible Sources** | Integrate in regular budgets of respective agencies and partners |