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Country Chapter

State of the 3Rs in Asia and the Pacific

The Republic of the Philippines

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Author:
Prof. Vella Atienza
Institute for Governance and Rural Development-College of Public Affairs and Development (IGRD-CPAf), University of the Philippines Los Baños (UPLB)

Member of Drafting Committee of State of the 3Rs in Asia and the Pacific

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Disclaimer

This country chapter for the Philippines was prepared as an input for the 8th 3R Forum in Asia and the Pacific. Purpose of this country report is to assess the status of 3R implementation in Asia and the Pacific and to share the knowledge of 3R activities among the region.

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United Nations Centre for Regional Development (UNCRD)

Author

Prof. Vella Atienza	Institute: Institute for Governance and Rural Development, College of Public Affairs and Development, University of the Philippines Los Banos

Editorial Support

Dr. Chen Liu	IGES
Dr. Yasuhiko Hotta	IGES
Mr. Yoshiaki Totoki	IGES

Editorial Support

Ms. Emma Fushimi	IGES
Ms. Miki Inoue	IGES

Coordinated by:

The Secretariat of the Regional 3R Forum in Asia and the Pacific,
United Nations Centre for Regional Development (UNCRD)
Nagono 1-47-1, Nakamura-ku, Nagoya 450-0001, JAPAN
Tel: (+81-52) 561-9377
Fax: (+81-52) 561-9375
E-mail: 3R@uncrd.or.jp

Institute for Global Environmental Strategies (IGES)
2108-11, Kamiyamaguchi, Hayama, Kanagawa, 240-0115, Japan
Tel: +81-46-855-3700 Fax: +81-46-855-3709
E-mail: iges@iges.or.jp
URL: http://www.iges.or.jp

ABBREVIATION

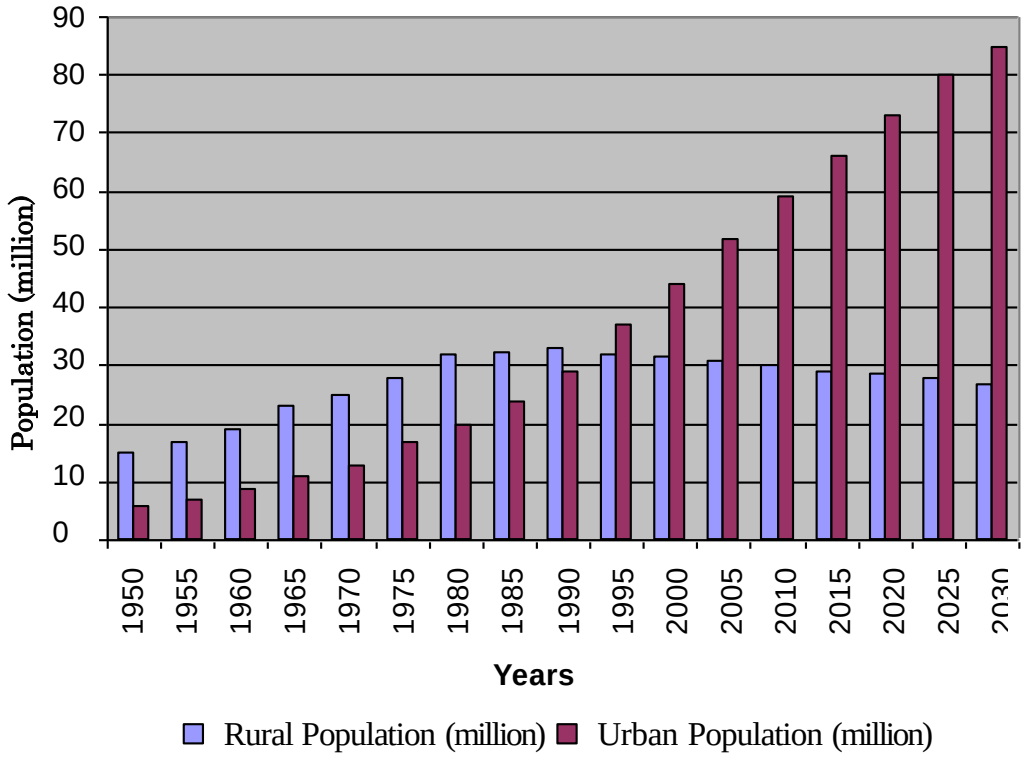
ADB	Asian Development Bank
CY	Calendar Year
DAO	DENR Administrative Order
DENR	Department of Environment and Natural Resources
DMC	Domestic Material Consumption
DOE	Department of Energy
DOH	Department of Health
EE	Energy Efficiency
EMB	Environmental Management Bureau
EPR	Extended Producer Responsibility
ESM	Environmentally Sound Management
ESWM	Ecological Solid Waste Management Act
ESWMA	Ecological Solid Waste Management Act
FAO	Food and Agriculture Organization
GEF	Global Environmental Finance
GHG	Greenhouse gases
GVA	Gross Value Added
IEC	Information, Education and Communication (IEC)
INC	Initial National Communication
LGU	Local Government Unit
LUCF	Land Use Change and Forestry
MMBFOE	million barrels of fuel oil equivalent
MSW	Municipal Solid Waste
NCR	National Capital Region
NSWMC	National Solid Waste Management Commission
PEEP	Philippine Energy Efficiency Project
PSA	Philippine Statistics Authority
RA	Republic Act
RCE	Recycling Collection Events
3Rs	Reduce, Reuse, Recycle
SLF	Sanitary Landfill
SMR	Self Monitoring Report
SNC	Second National Communication
SWAPP	Solid Waste Management Association of the Philippines
SWM	Solid Waste Management
TSDs	Treatment, Storage, Disposals
UN	United Nations
UNEP	United Nations Environment Programme
UNEP-IETC	UNEP-International Environmental Technology Centre
UNDP	United Nations Development Programme
UNFCC	United Nations Framework Convention on Climate Change
WEEE	Waste Electrical and Electronic Equipment

CONTENTS

A: COUNTRY SITUATION

The Philippines is an archipelago of 7,100 islands with a total land area of 300,000 square km. It is divided into three major geographical regions, namely Luzon, Visayas and Mindanao. This archipelagic nature of the country has affected the views and perceptions of the people on waste even though they are residing in the same country. The lack of infrastructure for efficient transportation in the provinces also contributed to the inefficient implementation of solid waste management in the country.

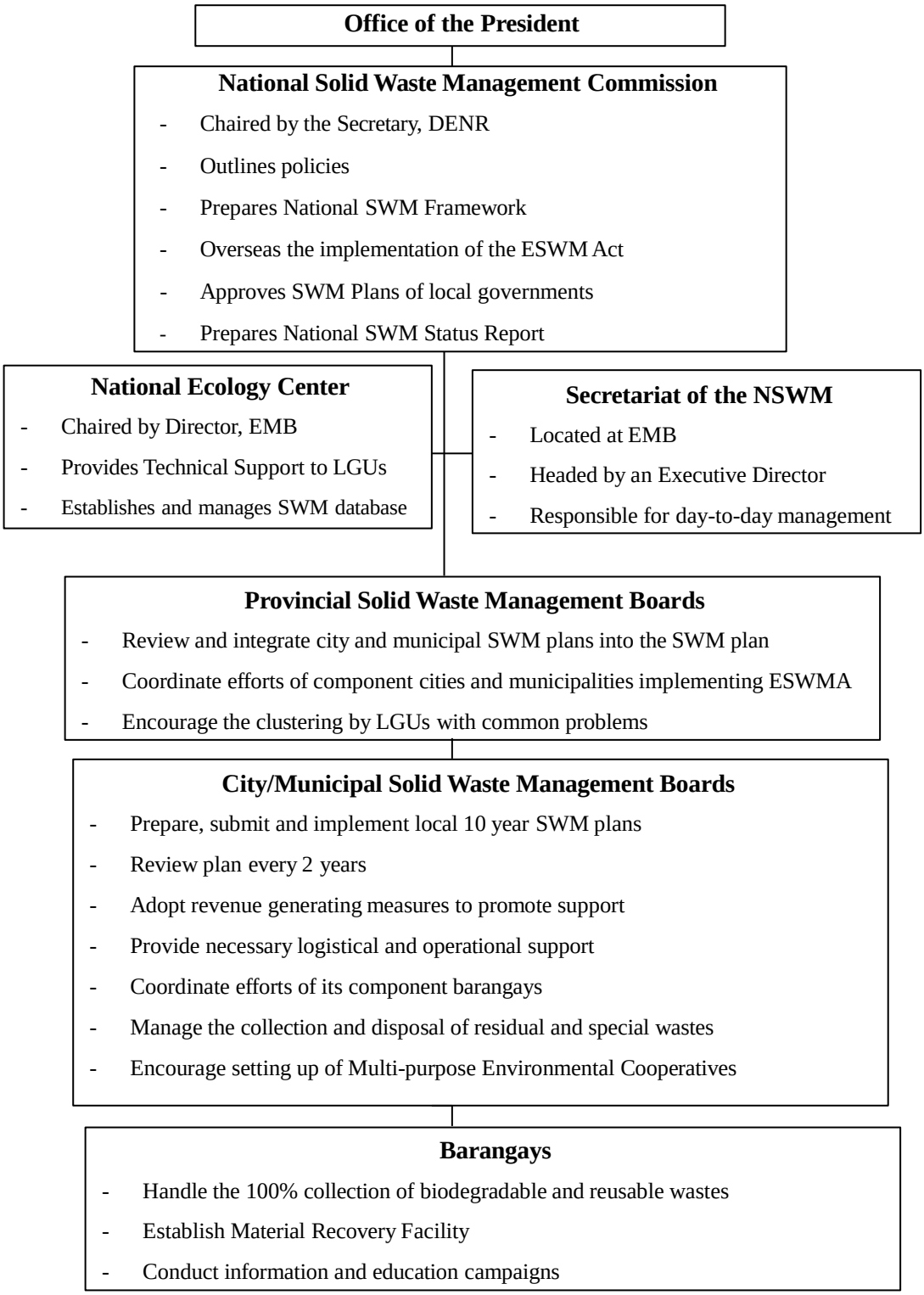
The increasing growth in population and urbanization has resulted in the increasing generation of waste. Although the average annual growth rate decreased from 2.34% (1990-2000) to 1.90% (2000- 2010), the country's population still exhibited a huge increase from 60.70 million in 1990 to 92.34 million in 2010 (PSA 2016). As shown in Figure A-1, the urban population grows at an increasing rate.



Source: Mangahas, Joel V. 2006. "The Philippines," in Roberts, Brian and T. Kanaley, eds. *Urbanization and Sustainability in Asia: Case Studies of Good Practice.*

Figure A-1 Trends in Urban and Rural Population, the Philippines

For the past few decades, the Philippine government has implemented several policies to protect the environment and the health of the people from the hazards caused by improper waste disposal. However, the problems of solid waste management have continued to be one of the pressing issues in the country. Since the enactment of the Ecological Solid Waste Management Act (ESWMA) of 2000 (RA 9003) on January 26, 2001, the implementation of the solid waste management programs in the Philippines is largely based on the mandates cited in the Act. RA 9003 declares the "policy of the state to adopt a systematic, comprehensive and ecological solid waste management program which shall ensure the protection of public health and environment" (Republic of the Philippines, RA 9003, Article 1, Section 2). Figure A-2 shows the institutional arrangements as mandated in RA 9003.



Source: World Bank. 2001. Philippines Environment Monitor 2001

Figure A-2 Institutional Arrangements Mandated by the ESWMA

Pursuant to the Philippine Local Government Code, it is mandated in RA 9003 that the LGUs will be the primary responsible units in the implementation of the Act (Section 10). It also prohibits the operation and establishment of open dumpsites upon the coming into force of the Act. It further states that all open dumpsites should be converted into controlled dumpsites after three years, and that all controlled dumpsites should be closed within five years of the implementation of the Act (Section 37). As an alternative, the construction of sanitary landfill (SLF) is allowed as a final disposal site for residual wastes but it should be in accordance with the criteria provided by the Act (Sections 40, 41, and 42). The Department of Environment and Natural Resources (DENR) and the National Solid Waste Management Commission (NSWMC) provided guidelines on the categorization of final disposal facilities (DENR 2006 and NSWMC 2005) based on the potential net residual solid waste generation of the municipality, and also the environmental, socio-economic and hydro-geological characteristics of the area.

Although the LGUs are primarily responsible for the implementation of the Act, the participation of the private sector and the community is also encouraged (Section 5q). The Act also mandates that the Solid Waste Management Board in every province, city or municipality should have a representative from the NGO sector, recycling industry, and manufacturing or packaging industries (Sections 11, 12). Sections 29 and 30 of the Act prohibit the use of non-environmentally acceptable products and packaging within a year of the Act coming into force, except for those used in hospitals, nursing homes or medical facilities, or those for which there is no commercially available alternatives as identified by the NSWMC. Section 52 allows anyone to file a civil, criminal or administrative action against any individual, institution or agency, or against government officials who violate or fail to comply with the law.

In 2009, the NSWMC and the Solid Waste Management Association of the Philippines (SWAPP) in collaboration with other international organizations, formulated the "National Framework Plan for the Informal Sector in Solid Waste Management" It envisages the informal waste sector as an empowered and recognized partner in the implementation of 3R and it hopes to integrate this sector in the solid waste management system by "providing them with a favorable policy environment, skills development and access to a secured livelihood, employment and social services (NSWMC 2009: 34)."

B: WASTE DEFINITION AND CATEGORIZATION

The definitions of the following terms are quoted from the Philippines RA 9003, Article 2, Section3:

Agricultural waste - refers to waste generated from planting or harvesting of crops, trimming or pruning of plants and waste or run-off materials from farms or fields;

Bulky waste - refers to waste materials which cannot be appropriately placed in separate containers because of either their bulky size, shape or other physical attributes. These include large worn-out or broken household, commercial, and industrial items such as furniture, lamps, bookcases, filing cabinets, and other similar items;

Hazardous waste - refers to solid waste or combination of solid waste which because of its quantity, concentration, or physical, chemical or infectious characteristics may: (1) cause, or significantly contribute to an increase in mortality or an increase in serious irreversible, or incapacitating reversible, illness; or (2) pose a substantial present or potential hazard to human health or the environment when improperly treated, stored, transported, or disposed of, or otherwise managed;

Municipal waste - refers to waste produced from activities within local government units which include a combination of domestic, commercial, institutional and industrial waste and street litter;

Solid waste - refers to all discarded household, commercial waste, nonhazardous institutional and industrial waste, street sweepings, construction debris, agriculture waste, and other non-hazardous/non-toxic solid waste. Unless specifically noted otherwise, the term "solid waste" as used in this Act shall not include:

(1) waste identified or listed as hazardous waste of a solid, liquid, contained gaseous or semisolid form which may cause or contribute to an increase in mortality or in serious or incapacitating reversible illness, or acute/chronic effect on the health of persons and other organisms;
(2) infectious waste from hospitals such as equipment, instruments, utensils, and fomites of a disposable nature from patients who are suspected to have or have been diagnosed as having communicable diseases and must therefore be isolated as required by public health agencies, laboratory waste such as pathological specimens (i.e., all tissues, specimens of blood elements, excreta, and secretions obtained from patients or laboratory animals), and disposable fomites that may harbor or transmit pathogenic organisms, and surgical operating room pathologic specimens and disposable fomites attendant thereto, and similar disposable materials from outpatient areas and emergency rooms; and (3) waste resulting from mining activities, including contaminated soil and debris.

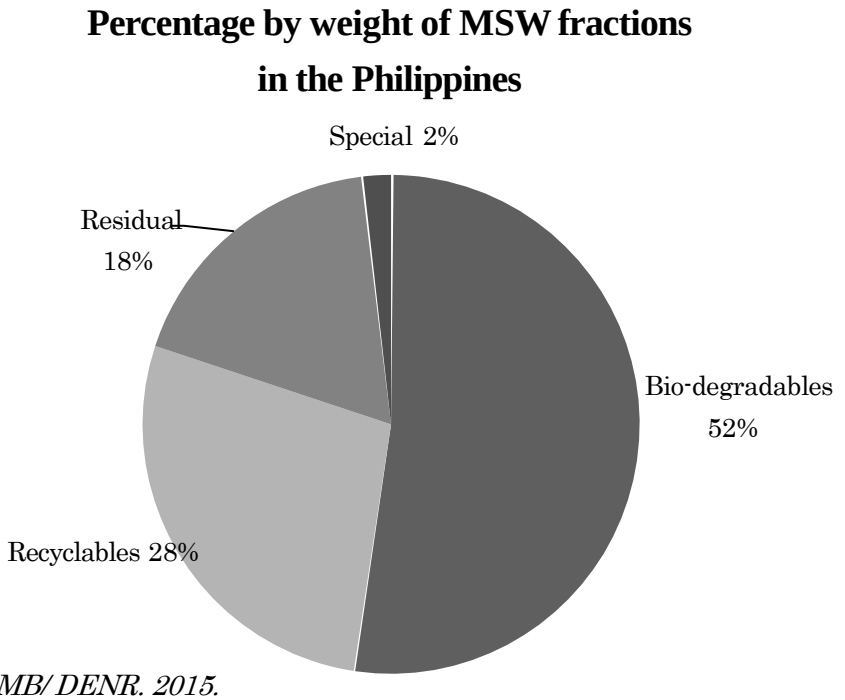
Special waste - refers to household hazardous wastes such as paints, thinners, household batteries, lead-acid batteries, spray canisters and the like. These include waste from residential and commercial sources that comprise of bulky waste, consumer electronics, white goods, and yard waste that are collected separately, as well as batteries, oil, and tires. These waste items are usually handled separately from other residential and commercial wastes;

- White goods - refer to large worn-out or broken household, commercial, and industrial appliances such as stoves, refrigerators, dishwaters, and clothes washers and dryers collected separately. White goods are usually dismantled for the recovery of specific materials (e.g., copper, aluminum, etc.); and
- Yard waste - refers to wood, small or chipped branches, leaves, grass clippings, garden debris, vegetables residue that is recognizable as part of a plant or vegetable and other materials identified by the Commission.

Waste Categories/Characterization

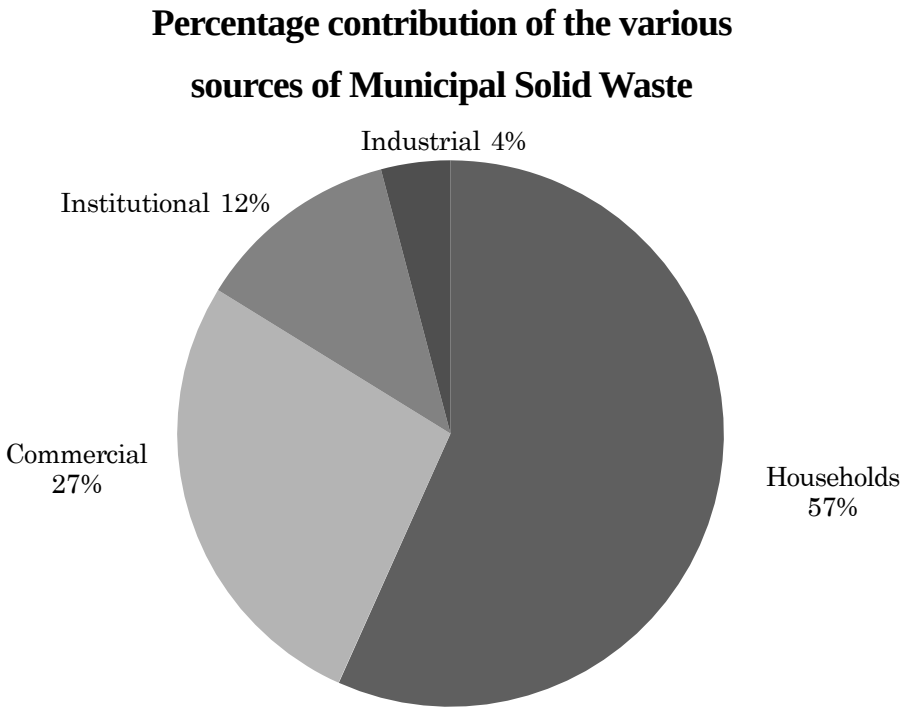
As cited in Section 17 of RA 9003, LGUs are mandated to conduct waste characterization**.** For the initial source reduction and recycling element of a local waste management plan, the LGU waste characterization component shall identify the constituent materials which comprise the solid waste generated within the jurisdiction of the LGU. The information shall be representative of the solid waste generated and disposed of within the 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 materials. Future revisions of waste characterization studies shall identify the constituent materials which comprise the solid waste disposed of at permitted disposal facilities.

The classification of municipal solid waste according to types includes the following: a) biodegradables/ compostables (kitchen waste, garden waste); b) recyclables (paper, plastics, steels, bottles or glasses); c) special waste (household-hazardous waste, bulky waste, e-waste, white goods, yard waste); and d) residuals (waste that cannot be sold or useless, i.e. diapers, sanitary napkins, soiled cloth/ rags/ plastic bags) (RA 9003). As shown in Figure B-1 and Figure B-2, a large amount of wastes are biodegradables and recyclables; and that most of these wastes came from households and commercial establishments. Thus, if only households and establishments will practice waste segregation, there is a great potential for composting and recycling industries in the country.



Source: NSWMC/ EMB/ DENR. 2015.

Figure B-1 Composition of municipal solid waste in the Philippines, 2008-2013



Source: NSWMC/ EMB/ DENR. 2015.

Figure B-2 Sources of municipal solid waste in the Philippines, 2008-2013

C: 3R INDICATORS

I. Total MSW Generated and Disposed of and MSW Generation Per Capita (by weight)

With the increasing population particularly in the urban areas, the amount of solid waste generated per day also increases. The waste generation per person is 0.70kg/day in highly urbanized city areas, 0.60kg/day in urban city areas and 0.30 kg/day in rural areas (Aguinaldo 2010). The increasing amount of waste generation as shown in Table C-1 is due to the rapid increase of population, industrialization and growing economy in the country (NSWMC 2016).

Table C-1 Projected Waste Generation (Tons per day)

Region	2012	2013	2014	2015	2016
1	1709.17	1739.54	1769.90	1800.27	1830.64
2	1100.64	1120.19	1139.75	1159.31	1178.86
3	3631.99	3696.52	3761.05	3825.58	3890.12
4a	4145.52	4219.18	4292.83	4366.49	4440.15
4b	909.43	925.59	941.74	957.90	974.06
5	1878.74	1912.12	1945.50	1978.88	2012.26
6	2700.14	2748.11	2796.09	2844.06	2892.04
7	2605.68	2651.97	2698.27	2744.57	2790.86
8	1479.47	1505.75	1532.04	1558.33	1584.61
9	1391.95	1416.68	1441.41	1466.15	1490.88
10	1693.94	1724.03	1754.13	1784.23	1814.32
11	1818.05	1850.35	1882.65	1914.95	1947.26
12	1348.20	1372.15	1396.10	1420.06	1444.01
13	884.69	900.41	916.13	931.85	947.57
CAR	620.64	631.67	642.70	653.72	664.75
NCR	8601.60	8754.43	8907.26	9060.09	9212.92
ARMM	907.64	923.76	939.89	956.02	972.14
TOTAL	**37427.46**	**38092.46**	**38757.46**	**39422.46**	**40087.46**

Source: NSWMC (2016).

Pursuant to the relevant provisions of R.A. No. 7160, otherwise known as the Local Government Code, the LGUs shall be primarily responsible for the implementation and enforcement of the provisions of RA 9003 within their respective jurisdictions. It mandates the segregation of solid waste at source (Section 21) and the creation of material recovery facility (MRF) in every barangay or cluster of barangays (Section 32). The barangay is responsible for the collection of the segregated biodegradable and recyclable waste while the city or municipality is responsible for the collection of non-recyclable and special waste (RA 9003, Section 10).

RA 9003 prohibits the operation and establishment of open dumpsites upon the coming into force of the Act. It further states that all open dumpsites should be converted into controlled dumpsites after three years, and that all controlled dumpsites should be closed within five years of the implementation of the Act (Section 37). As an alternative, the construction of sanitary landfill (SLF) is allowed as a final disposal site for residual wastes but it should be in accordance to the criteria provided by the Act (Sections 40, 41, and 42).

Due to lack of technical and financial constraints, it is reported that many LGUs in the country are still operating illegal disposal facility (NSWMC, 2016). Thus, it is difficult to collect the amount of waste disposed of at national level. Table C-2 shows the actual waste disposed of at the Metro Manila Development Authority (MMDA) accredited disposal facilities in 2015.

Table C-2 Actual Waste Disposed at the MMDA Accredited Disposal (2015)*

LGUs	Total Volume (cu.m.)
Caloocan	1,253,146.12
Makati	950,338.87
Mandaluyong	247,316.99
Paranaque	523,677.66
Pasay	225,547.60
Pasig	318,878.40
Pateros	20,825.57
San Juan	84,523.38
Taguig	533,627.01
Marikina	275,494.14
Muntinlupa	205,395.95
Valenzuela	300,007.25
Manila	2,571,884.31
Malabon	182,236.31
Navotas	142,633.89
Quezon City	2,300,142.00
Las Pinas	128,571.87
Total	**10,264,247.32**

Source: MMDA, 2015.

**Accredited disposal facilities include the Rizal Provincial SLF, Navotas SLF and the Quezon City SLF*

II. Overall Recycling Rate and Target (%) and Recycling Rate of Individual Components of MSW (Primary Indicator)

RA 9003 mandated all LGUs to divert 25% of their generated waste within five years after the implementation of the Act through composting, re-use and recycling activities. It further states

that the reduction should be increased every three years (Section 20). Waste diversion shall refer to activities which reduce or eliminate the amount of solid wastes from waste disposal facilities. Table C-3 shows the average diversion rate in Metro Manila as reported by the Solid Waste Management Office of the MMDA (MMDA, 2011).

Table C-3 Waste Diversion Rate of Metro Manila from 2006 to 2011

2006	2007	2008	2009	2010	2011 (As of 5/31/2011)
22.22%	25.80%	28.94%	32.46%	33.92%	33.92%

Source: MMDA, 2011.

In terms of recycling rate, it was reported that there was only 31% recycling rate in Metro Manila in 2009, 8 years after the implementation of the RA 9003 in 2001 (Aguinaldo, 2009 as cited in Atienza, 2012). There is no available data for the national level but it is assumed that there is even a lower recycling rate in other parts of the country. However, although there is a low recycling rate in MM, it can also be noted that the rate increased from 13% in 2000, to 25% (2002), 28% (2006) and then to 31% (2009) (*Ibid*.).

Some initiatives to promote waste management and recycling in the country included the following:

a) The DENR's National Search for the Model Cities and Barangays in eco-waste management. Cash and presidential trophies are given to recipients of the awards;
b) Implementation of other programs such as the Incentive Rebates program, waste-for-goods exchange programs, recycling collection events (RCEs), waste markets, among others; and
c) Organizing the informal waste sector to improve the efficiency of recovering recyclable wastes.

III. Amount of Hazardous Waste Generated and Disposed of in Environmentally Sound Manner (Primary Indicator)

As defined in RA 9003 (Section 3), hazardous waste refers to "solid waste or combination of solid waste which because of its quantity, concentration, or physical, chemical or infectious characteristics may: (1) cause, or significantly contribute to an increase in mortality or an increase in serious irreversible, or incapacitating reversible, illness; or (2) pose a substantial present or potential hazard to human health or the environment when improperly treated, stored, transported, or disposed of, or otherwise managed." It is categorized under special waste by the said Act.

Based on the report by the Philippines' Department of Health (DOH), there are 1,952 health care facilities nationwide in 2008 registered as hazardous waste generators, the majority of which are located in the NCR (DOH, as cited in the Philippine National Solid Waste Management (NSWM) Strategy 2012-2016). These facilities are regulated by the DOH while DENR is responsible for issuing guidelines and permits implementing the rules on the transport, storage and disposal of health care waste. This has to be monitored closely to avoid illegal collection and dumping of healthcare waste in disposal facilities. It is often seen in open dumpsites in the country that

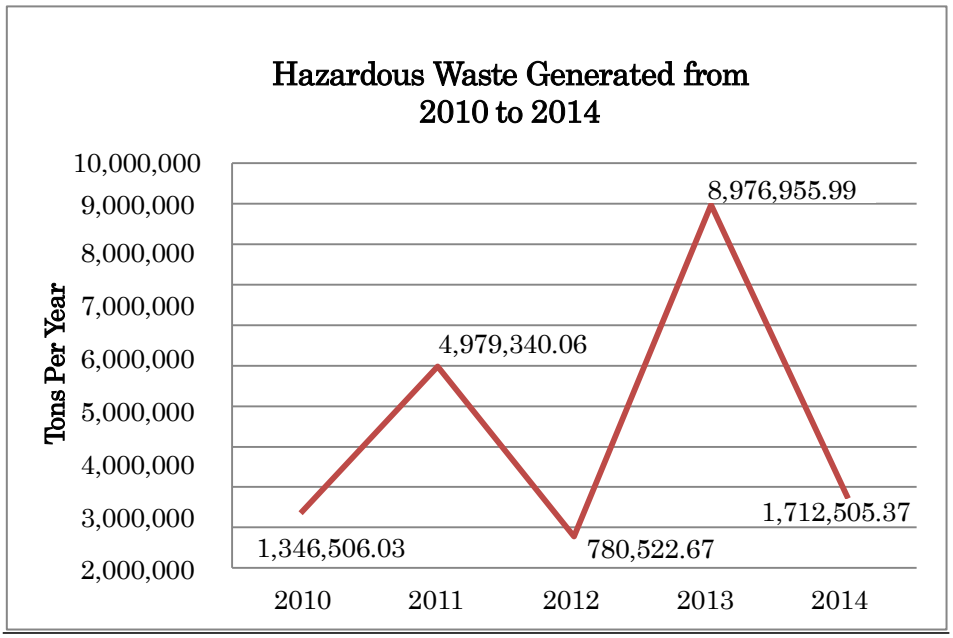
medical waste items such as syringes are dumped together with general waste (NSWMC/EMB/DENR 2016).

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.

Figure C-1 shows the hazardous waste generated from 2010 to 2014 based on the reports submitted by the Environmental Management Bureau (EMB)'s Regional offices to the DENR. For CY 2010- 2013, classification of hazardous waste is based on DENR Administrative Order (DAO) 2004-36, Procedural Manual on Hazardous Waste Management while for 2014 onwards, the classification is based on DAO 2013-22, Revised Procedures and Standards for the Management of Hazardous Wastes (Revising DAO 2004-36).

The types of hazardous waste include the following:

A	(A101-A109)	Waste with Cyanide
B	(B201-B299)	Acid Waste
C	(C301-C399)	Alkali Waste
D	(D401-D599)	Waste with Inorganic Chemicals
E	(E501-E599)	Reactive Chemical Waste
F	(F601-F699)	Inks/Dyes/Pigments/Paint/Latex/Adhesives/Organic Sludge
G	(G703-G704)	Waste Organic Solvent
H	(H801-H802)	Putrescible Organic Waste
I	(I101)	Oil
J	(J201)	Containers
K	(K301-K303)	Immobilized Waste
L	(L401-L406)	Organic Chemicals
M	(M501-505)	Miscellaneous Waste



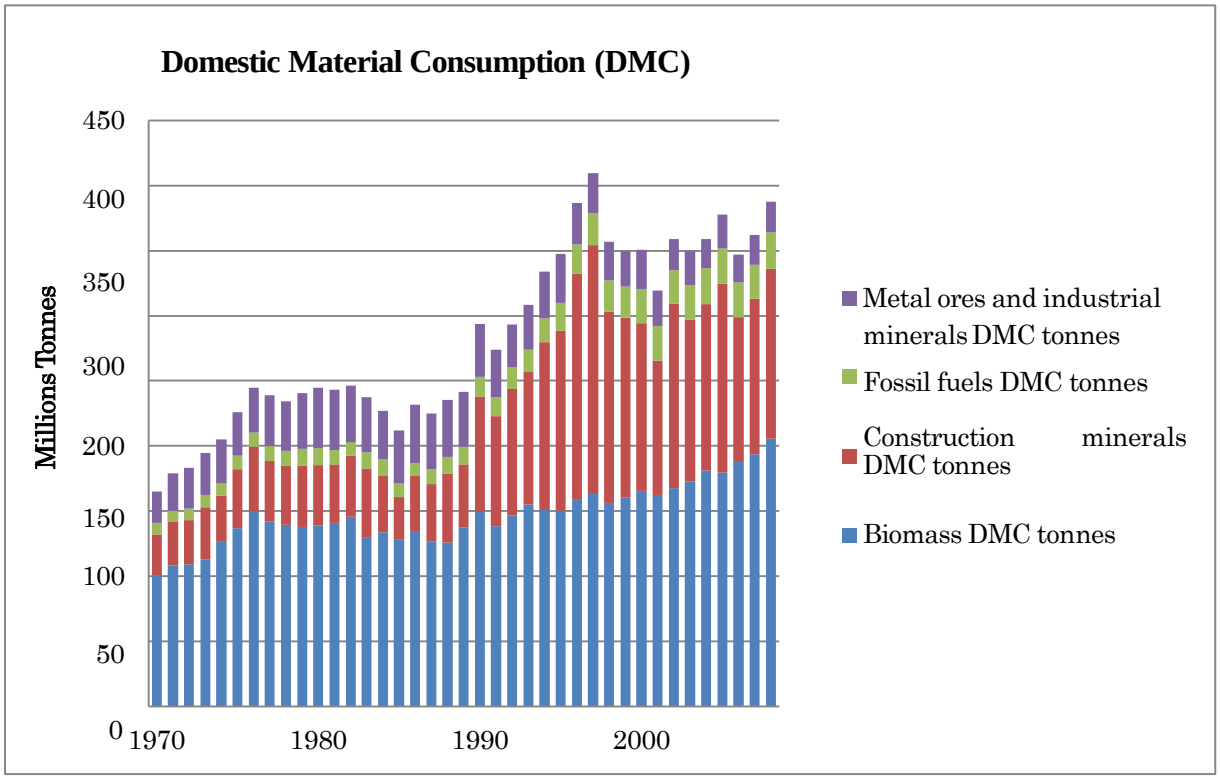
Source: Extracted from the Reports submitted by the EMB Regional Offices to the DENR

Figure C-1 Hazardous Waste Generation from 2010 to 2014

IV. Indicators Based on Macro-Level Material Flows (Secondary Indicator)

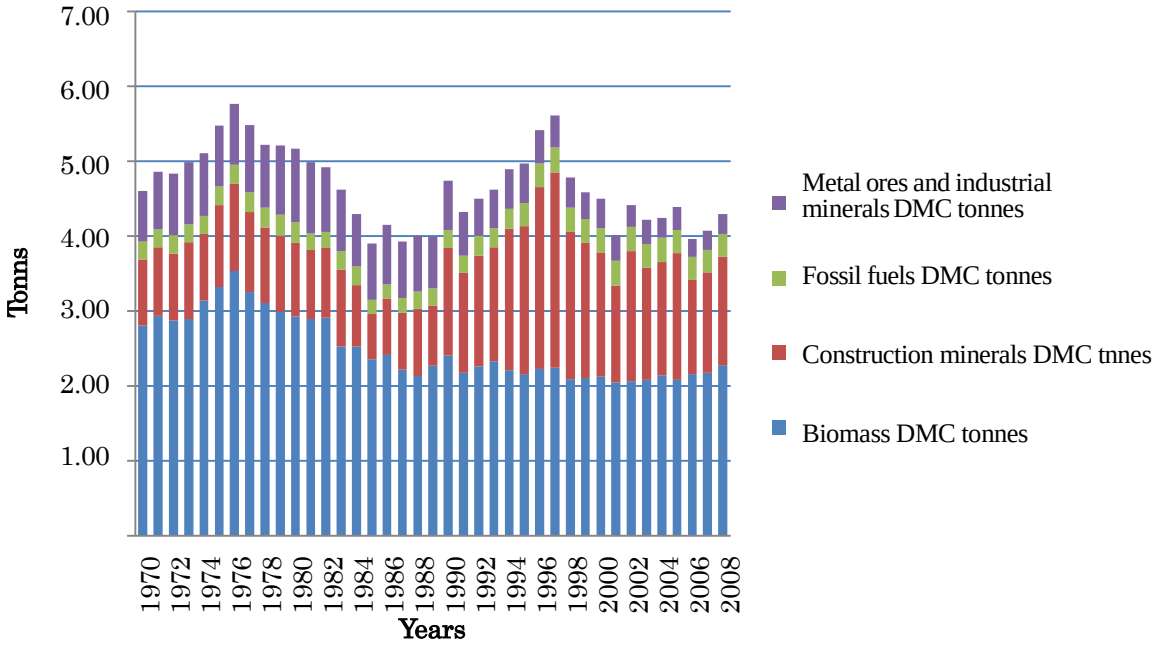
The Philippines has a significant amount of natural resources and is one among the 17 megadiverse countries in terms of biodiversity resources in the world (DENR, 2015 as cited in Schandl, 2015). However, there has been significant environmental degradation over the past few decades due to increasing population, economic activities and the over-exploitation of resources. Other chronic problems in the country are traffic congestion and air pollution in major cities. To address these concerns, the Philippines have developed several policies such as the Biofuels Act of 2006, the National Eco-labelling program and the Green Procurement, among others (Schandl, 2015).

As shown in Figure C-2, the country's Domestic Material Consumption (DMC) of metal ores and industrial minerals and fossil fuel was stagnant, especially between 2000 to 2008, compared to construction minerals and biomass. The average DMC of metal ores and industrial minerals and fossil fuel from 2000 to 2008 was 24,861,390 tonnes and 26,682,684 tonnes respectively. DMC of biomass occupies the highest among the four. In 2008, DMC of biomass was 205,464,939 tonnes and it is 53% of total DMC. As shown in Figure C-3, the per capita DMC of biomass was the also the highest.



Source: Extracted from the CSIRO and UNEP Asia-Pacific Material Flows online database

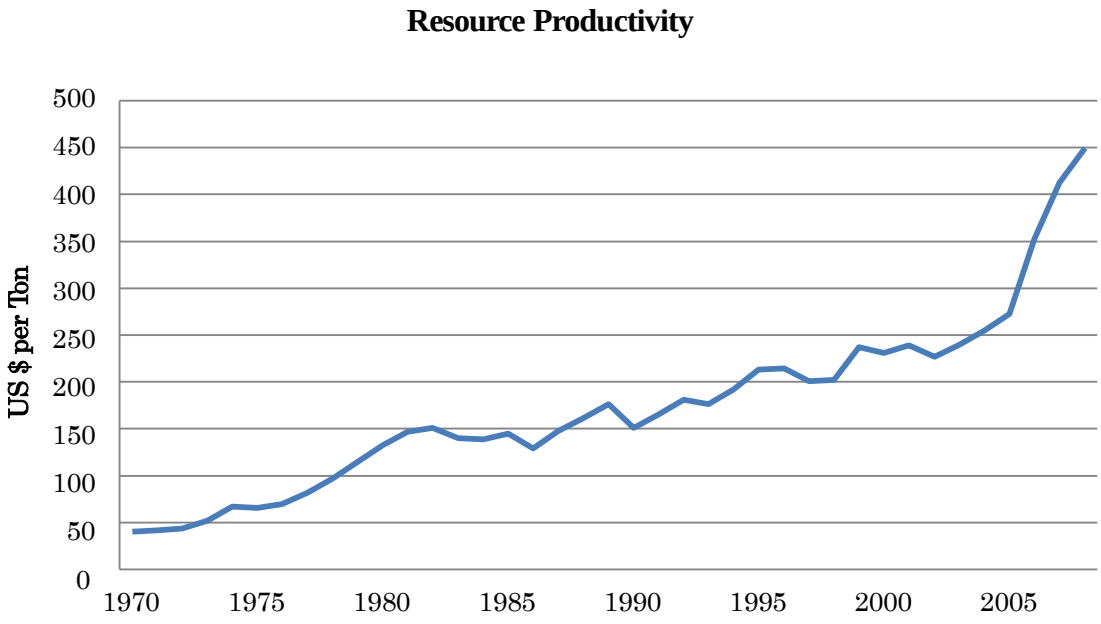
Figure C-2 Domestic Material Consumption from 1970 to 2008



Source: Extracted from the CSIRO and UNEP Asia-Pacific Material Flows online database

Figure C-3 Per- Capita Domestic Material Consumption (DMC)

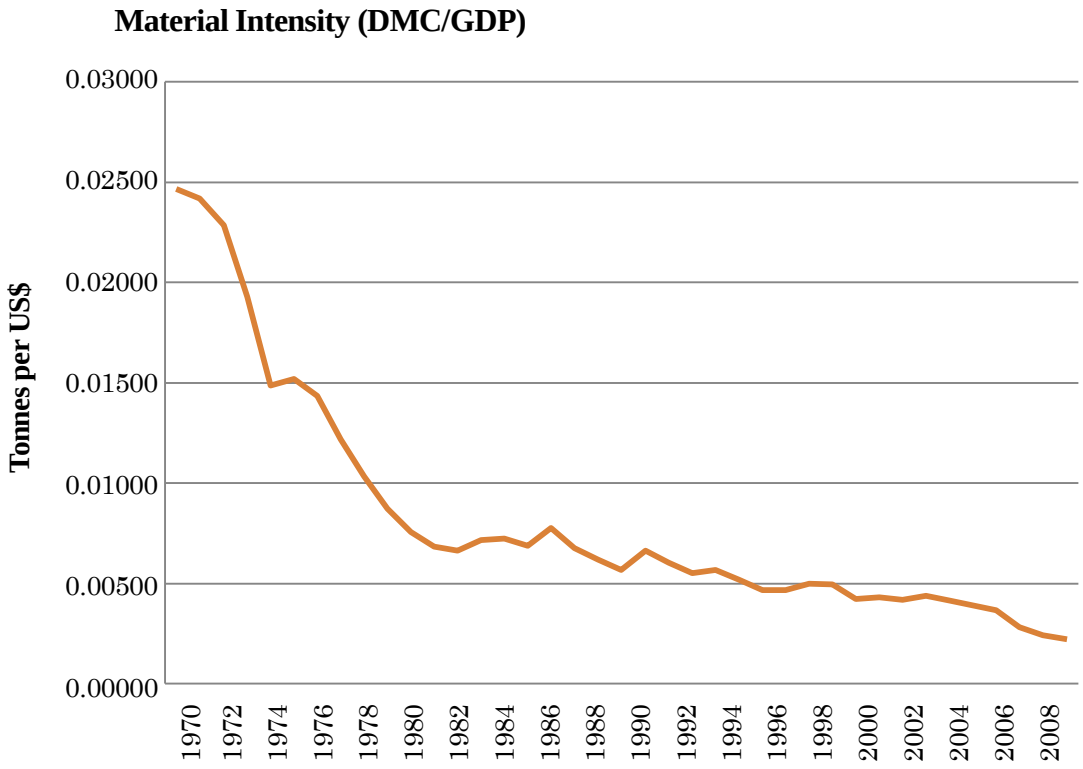
There is gradual increase in the resource productivity (Figure C-4) from 1970 to 2004 with the average incremental of 4.93%. However, there is a great increase of 22.58% between 2005 and 2006.



Source: Extracted from the CSIRO and UNEP Asia-Pacific Material Flows online database

Figure C-4 Resource Productivity from 1970 to 2008

In terms of Material Intensity (Figure C-5), there was a decreasing trend throughout from 1970 to 2008. From 1970 to 1981 Material Intensity was reduced by average of 10.08%per year. From 1982 to 2004, it was fluctuating. However, Material Intensity has dropped by 22.58%from 2005 (0.00367 ton per US$) to 2006, (0.00284 ton per US$). In 2008, the Material Intensity was 0.00223 ton per US$.



Source: Extracted from the CSIRO and UNEP Asia-Pacific Material Flows online database

Figure C-5 Material Intensity

V. Amount of Agricultural Biomass Used (Primary Indicator)

Agriculture which made up of four sectors (crops, livestock, poultry and fisheries) is the main source of livelihood for about 31% of the total labor force (FAO of the UN, 2016). In 2014, it was reported that the Gross Value Added (GVA) in agriculture and fishing went up by 1.60% . This sector accounted for 10% of the country's GDP (PSA, 2016). This indicates that significant amount of biomass is coming from the agricultural sector. Table C-4 shows the top ten agriculture commodities production quantity in 2012. The agricultural waste generation in the country is 0.075 kg/cap/day (World Bank, 2012 as cited by Agamuthu, 2015).

Table C-4 Top Ten Agriculture Commodities Production Quantity (2012)

Rank	Commodity	Quantity (tons)
1	Sugar cane	32,000,000
2	Rice, paddy	18,032,422
3	Coconuts	15,862,386
4	Bananas	9,225,998
5	Maize	7,406,830
6	Vegetables, fresh nes	5,000,000
7	Fruit, tropical fresh nes	3,300,000
8	Pineapples	2,397,628
9	Cassava	2,223,144
10	Meat indigenous, pig	1,678,195

Source: FAOSTAT, FAO of the UN, <faostat.fao.org/site/567/default.aspx> (accessed 4 February 2015)

As cited in the Philippines' NSWM Strategy (2012-2016), it was estimated that the country's agriculture sector was expected to reach a biomass supply potential of 323.1 million barrels of fuel oil equivalent (MMBFOE) by 2012 (NSWMC/EMB/DENR 2016). The most common agricultural waste in the Philippines includes rice husk, rice straw, coconut husk, coconut shell and bagasse. Rice being the staple food in the Philippines, Filipinos are among the world's biggest consumers of rice (Zafar, 2015). One of the concerns cited in the NSWM Strategy (2012-2016) is the lack of inventory of agricultural waste (NSWMC/EMB/DENR 2016).

The Department of Energy (DOE) reported that in terms of geographical biomass supply, there is abundant supply of bagasse in Regions III, IV, VI and VII; coconut residues in Regions IV, VIII, IX, and rice hull in Regions II, III, IV and VI. Currently, the biomass technologies being utilized in the country include the following: a) bagasse as boiler fuel for cogeneration; b) rice/ coconut husks dryers for crop drying; c) biomass gasifiers for mechanical and electrical applications; and d) fuelwood and agri-waste for oven, kiln, furnace, and cookstoves for cooking and heating purposes (DOE as cited in the NSWMC/EMB/DENR 2016).

VI. Marine and Coastal Plastic Waste

Plastics ending up in the marine environment are of increasing concern because of the negative effects on the oceans, wildlife, and humans (Thompson, R.C. et al., 2009 as cited in Jambeck, et al. 2015). In the Philippines, plastic waste contributes significantly to the problems of waste management in the country. It was observed that uncollected plastic waste clogged waterways causing flooding especially during typhoon seasons. According to the waste audit organized by the environmental groups during the International Plastic Bag-Free Day on July 3, 2014, it was found out that plastic bags are the most common type of garbage found in Manila Bay. Of the 1,594 liters of garbage collected, 23.2% are plastic bags. Consistent with this finding, the same environmental groups found that 75.5% of waste in the bay were plastic discards in 2010. Of this,

27.7% were plastic bags (Ranada, 2014). In the study, "Plastic waste inputs from land into the ocean" (Jambeck, et al. 2015), the Philippines ranked third among countries with the highest mass of mismanaged plastic waste, next to China and Indonesia.

Based on the report by the Ocean Conservancy's International Cleanup in 2014, plastic waste is included in the top 10 items collected during the activity. For the Philippines, from the 2,031,420 total items collected, 52% (1,053,865 pieces) are plastic. The types of plastic waste items collected during the activity included the following: food wrappers (candy, chips) – 544,974 pieces (26.82%); Plastic beverage bottles – 53,373 pieces (2.62%); Plastic bottle caps – 77,466 pieces (3.81%); Straws, Stirrers – 100,048 pieces (4.92%); Other plastic bags - 114,889 pieces (5.65%); Plastic grocery bags – 110,225 pieces (5.42%); and Plastic cups and plates – 52,890 pieces (2.60%) (Ocean Conservancy's ICC 2015 Report).

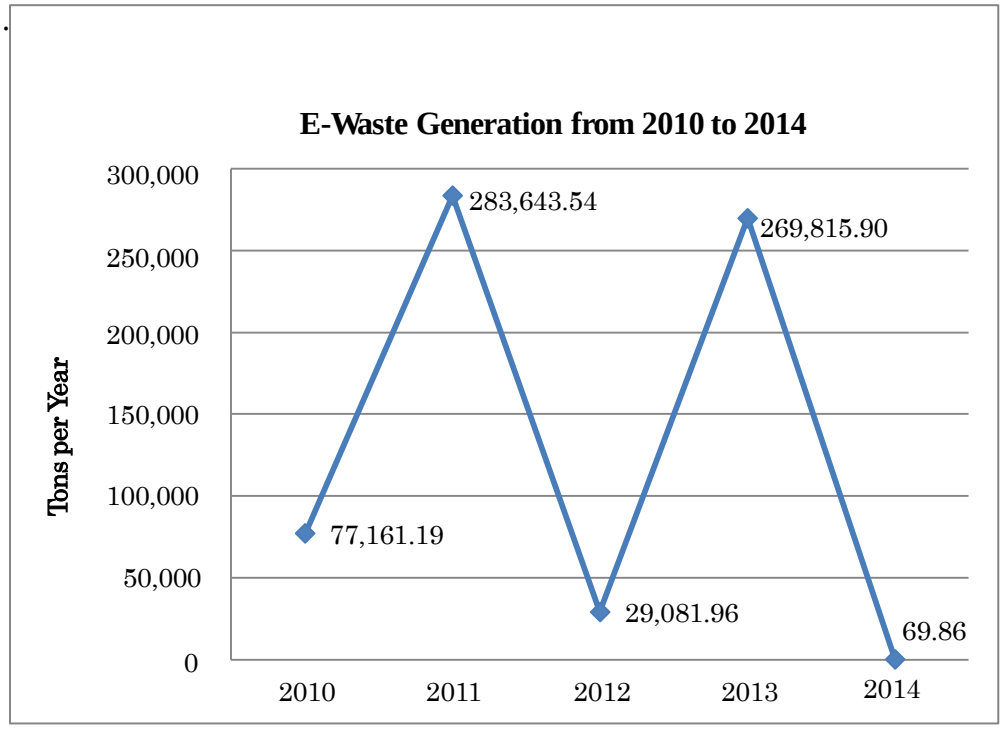
Given this situation, several NGOs and decision-makers in the Philippines have called for the banning the use of plastic items in the country. Many LGUs have started creating local ordinances banning the use of plastic items in households and commercial establishments.

VII. Amount of E-waste Generation, Disposal and Recycling. Existence of Policies and Guidelines for E-waste Management (Primary)

In RA 9003, e-waste is classified under special waste, and usually handled separately from other residential and commercial wastes (Section 3). Special waste consisting of healthcare waste, waste electrical and electronic equipment (WEEE) and other hazardous materials accounts for about 1.93% of municipal solid waste (NSWMC/EMB/DENR 2016). E-waste or WEEE became a specific hazardous waste stream (M506) with the issuance of DAO 2013-22. Previously, e-waste was classified under "waste with inorganic chemicals" or D series. For CY 2010-2013, e-waste generated is reported under the D series while for CY 2014, it is reported as M506. Figure C-6 shows the e-waste generated from 2010 to 2014 based on the reports submitted by the Environmental Management Bureau (EMB)'s Regional offices to the DENR.

In the Philippines, the collection of special waste including e-waste is the responsibility of the city or municipality. There are also registered Treatment, Storage, Disposal (TSDs) which can collect and treat hazardous waste including e-waste. However, most of the registered TSDs are located in the National Capital Region (NCR) and other Luzon areas, and only few in the Visayas and Mindanao regions. Thus, a large portion of WEEE are disposed of along with the waste stream or recovered in an unsafe manner by the informal sectors.

As of this date, there is no existing national policy on e-waste, but the DENR has developed Guidelines on the Environmentally Sound Management (ESM) of WEEE. This hopes to provide the framework mechanism for the appropriate mechanism of WEEE.



Source: Extracted from the Reports submitted by the EMB Regional Offices

Figure C-6 E-waste Generation from 2010 to 2014

VIII. Existence of Policies, Guidelines, and Regulations Based on the Principle of Extended Producer Responsibility (EPR)

As of this date, there is no existing policy yet in the Philippines. But the DOE, through the Asian Development Bank (ADB) implemented the Philippine Energy Efficiency Project (PEEP) from 2009 to 2013. This initiative would address the key public health issue of residual mercury that would likely to increase, through the implementation of these EE projects through the establishment of Lamp Waste Management Facility (LWMF). This facility is composed of a set of equipment capable of recovering mercury from lamp waste. It was operated by DOE during the pilot phase and then it could either be auctioned off to the private sector or donated to a LGU preferably in Metro Manila that would be willing and capable to operate LWMF. It is believed that its operation will be sustainable if EPR is in place (De Guzman, n.d.).

As an initiative on EPR, "Lighting Industry Waste Management Guidelines" were issued through the Joint DENR-DOE Administrative Order No. JAO 2013-09-0001 in 2013. These cite that all producers shall jointly work together in coming up with a Lamp Waste Management Plan and in setting up a Lamp Wastes Management System Operator.

IX. Greenhouse Gas (GHG) Emissions from Waste Sector

As party to the United Nations Framework Convention on Climate Change (UNFCCC), the Philippines submitted an Initial National Communication (INC) in 2000 with 1994 as the baseline for its GHG Inventory, and the Second National Communication (SNC) for the 2000 inventory. The five sectors covered in the inventory are emissions from Energy, Industrial Processes, Agriculture, Land Use Change and Forestry (LUCF) and Waste. Based on the report, GHG emissions from the waste sector increased by 64% (4,505.07 Gg of CO_2-eq Emission) from the INC (7,094 Gg of CO_2-eq Emission) to SNC (11,599.07 Gg of CO_2-eq Emission) (Table C-5). The waste sector contributed 7% of the total GHG emissions in the country. Emissions from this sector are mainly CH_4 (GEF/ UNDP, 2010). Table C-6 shows that the large of the emissions (60%) came from solid wastes (brought to solid waste disposal facilities (*Ibid*.)

Table C-5 GHG Emissions from the Waste Sector

Sub Sector	CO2 Emissions (ktons)	Percentage
Solid wastes	4,253	60%
Municipal wastewater	966	14%
Industrial wastewater	920	13%
Human sewage	954	13%
Total	**7,094**	**100%**

Source: The Philippines' Initial National Communication on Climate Change, 1999 as cited in the GEF/ UNDP, 2010

Table C-6 Comparison between 1994 & 2000 Waste Sector GHG Inventories for the Philippines

INC		SNC			
Sub sector	CO_2 Emissions (ktons or Gg)	Sub sector	CO_2 Emissions (ktons or Gg)	Increase/ Decrease (Gg)	% Increase/ Decrease
Solid wastes	4,253	Solid waste disposal on land	5,447.19		
Municipal wastewater	966	Waste water handling	6,151.88		
Industrial wastewater	920				
Human sewage	954				
Total	**7,094**	**Total**	**11,599.07**	**4,505.07**	**64 %**

Source: GEF/ UNDP, 2010.

D: EXPERT'S ASSESSMENT ON 3R POLICY IMPLEMENTATION

The increasing trend in the volume of waste generation due to modernization, growing population and urbanization in the Philippines and the threats it poses both to the environment and human health if left unmanaged, calls for an urgent need for strict implementation of SWM policies particularly 3R.

In terms of policies, as shown in this study, the Philippines has successfully created "very good or ideal" policies, but the problem or challenge is on effective implementation. Thus, it is important to identify what the issues and challenges are that delay or hinder the implementation of these policies. It is illogical to design a so-called "perfect technical system or set of policies if they cannot be implemented." By careful consideration of the available resources and the constraints, we can avoid the common mistake of "determining what should be, and instead concentrate on what is possible" (UNEP-IETC 1996: 16 as cited in Atienza, 2013).

The problem on waste is often treated as a technical one, and thus technical solutions are offered. However, it is more of a behavioral problem, thus needing strong information, education and communication (IEC) campaigns to promote awareness to the community and make citizens empowered and accountable in managing their waste. This entails dealing with the political, economic, environmental and social factors for effective 3R policy implementation. The common problems for weak implementation of 3R policies are lack of technical, human and financial resources. However, by looking on the composition and sources of waste in the Philippines as shown in Figure B-1 & Figure B-2 in this report, it clearly shows that if only households and commercial establishments would practice waste segregation and manage the biodegradables and recyclables, only very small percentage of residual waste will be left for final disposal. Therefore, expensive and advance technologies may not always be necessary in the Philippines and other developing countries. Instead, the promotion of 3R and the use of simple, local and low-cost technologies should be strengthened. This will reduce pressure on the nation's finite natural resources and can address not only environmental but also economic and social problems by turning waste into a resource (Atienza, 2013).

In terms of 3R accomplishment, although the country is way behind its goals for achieving at least 25% waste diversion (in 2006), the rate is increasing from 22.22% in 2006; 25.80% in 2007; 28.94% in 2008; 32.46% in 2009; and 33.92% in 2010 in Metro Manila (MMDA, 2011). In terms of data, there is a lack of or limited credible and available data. Thus, there is a need to improve or strengthen the evaluation and monitoring system among LGUs. Based on DENR, one of their current initiatives is to put the Self Monitoring Report (SMR) online for effective monitoring among LGUs and TSDs.

In addition, the author further recommends the need to review the current 3R policies and programs especially in identifying the mechanisms and approaches towards effective implementation; and the institutionalization of effective 3R programs and best practices so that these would be sustainable despite the change of leadership both in the national and local government units.

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