
Nature's Protector: Proper Solid Waste Management

In April 2002, Marissa Mercado was hired to work under the National Solid Waste Management Commission-Secretariat as the environmental management specialist.¹ The scope of her work was to prepare technical evaluation and accomplishment reports by analyzing and interpreting waste management data and research from local government units (LGU).²

In August 2006, her boss asked everyone in her office to choose a region or two and focus on the environmental issues the region was facing, especially relevant to solid waste management (SWM). Mercado chose to handle the SWM for Regions 10 and 11 of the Philippines. As a new trainee outside the national capital region, she partnered with the original handler of the region.³ She shadowed every step of her handler until she was ready to assess and evaluate dump sites on her own. After learning the routine, she was assigned to independently check the dump facilities of her chosen regions, especially their solid waste facilities, material recovery facilities, and disposal sites.⁴

The interesting yet challenging part of her job was the implementation of Republic Act (RA) 9003, which was also known as the Ecological Solid Waste Management Act. Mercado said, "RA 9003 institutes several measures to promote a more acceptable system which corresponds to the vision of sustainable development. Generally, it aims to merge environmental protection with economic pursuits, recognizing the re-orientation of the community's view on solid waste, thereby providing schemes for waste minimization, volume reduction, and resource recovery utilization and disposal."⁵

Mercado was expected to scrutinize the submitted data regarding the SWM of LGUs. From there, she would coordinate with the LGUs' material recovery facilities. Mercado and her colleagues wrote letters to the LGUs informing them of inspections. They provided technical assistance if the city or municipality had a problem with the implementation of RA 9003.⁶

Mercado and her colleagues were given "visitorial power" only.⁷ If a dump site was not compliant with the regulations set by RA 9003, Mercado faced a dilemma as to how to ensure an LGU's proper closure of its dump site within time constraints. She wondered how she would get cooperation for the implementation of RA 9003.

Brief History of the Philippine Environmental Management Bureau (EMB)⁸

The Philippine Environment Management Bureau (EMB) was established under the Department of Environment and Natural Resources (DENR) as an independent enforcement authority and a supporting body responsible for prevention and control of pollution. The EMB ran offices from the national level down to the community level. The National Solid Waste Management Commission-Secretariat was under the EMB. The purpose of the National Solid Waste Management Commission (NSWMC) was to identify key issues a community was facing involving solid waste disposal and thus, help develop the community's SWM plan.⁹

Roles of the Department of Environment and Natural Resources (DENR)

The DENR was the primary agency of the NSWMC. It provided capacity building and technical assistance to LGUs, while recommending specific waste reduction programs.¹⁰ This organization guided Mercado and her team every time they evaluated a SWM plan.

Milestone Dates for RA 9003

Below are the milestone dates for RA 9003.

- Jan. 26, 2001 — Approval of RA 9003.
- Feb. 16, 2001 — RA 9003 became effective.
- Dec. 21, 2001 — The Implementing Rules and Regulations of RA 9003 were signed.
- Feb. 16, 2004 — All open dump sites should have been closed or converted to controlled dump sites.
- Feb. 16, 2006 — All controlled dump facilities were to be closed.

Legal and Policy Requirements

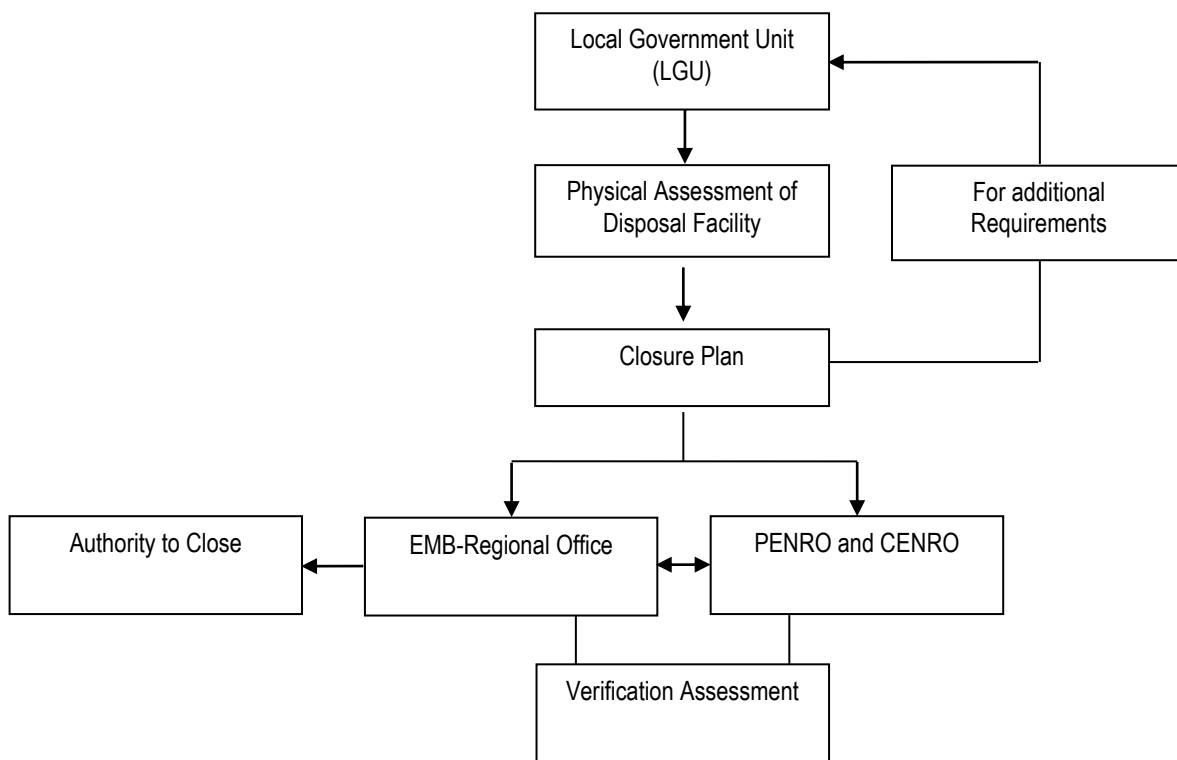
Section 37, RA 9003 mandated the closure of open dumps or their conversion to controlled dumps within three years of the date the act became effective.

On the other hand, Section 1, Rule XIII of the IRR of RA 9003 stated, "...all open dump sites shall be converted to controlled dump sites to operate only within five (5) years and beyond the said period shall be deemed closed and phased out."¹¹

The Provincial Environment and Natural Resources Office (PENRO) and *City Environment and Natural Resources Office* (CENRO) provided technical assistance to LGUs in preparation for closure. The EMB regional office reviewed the closure plans submitted by LGUs. If they were found to be adequate, the EMB regional office would issue an authority to close within 60 days upon receipt of the request (see **Exhibit 1**).

Exhibit 1

Flow Chart for Authority to Close



Source: Mercado, Irish. *Environmental Management Specialist of the National Solid Waste Management Commission-Secretariat*. Personal Interview. 15 August 2015.

Function of the National Solid Waste Management Commission (NSWMC)

The functions of the NSWMC were to oversee the implementation of the SWM plans of LGUs and to prescribe policies to achieve the objectives of the act. It was composed of 17 members with 14 members coming from the government sector and three from the private sector.¹²

The National Solid Waste Management Framework, 2004

The National Solid Waste Management Framework of 2004 called for an implementation plan for the closure of open dump sites. The LGUs acted as the primary agencies in the implementation of the plan. Under Section 3, (e) of the IRR of RA 9003, the DENR extended technical assistance and support to LGUs in the development and implementation of local SWM plans.¹³

Role of the LGUs

LGUs lacked manpower especially during monitoring of material recovery facilities, sanitary landfills, and other waste facilities. The other major problem Mercado encountered in her daily job was time constraints. She needed to attend meetings pertaining to climate change, hazardous waste, and ISO 14001, among other items.¹⁴

In terms of LGU compliance with the law, not all LGUs converted to sanitary landfills; many of them were still operating illegal open dump or controlled dump facilities. The reason for this is that the LGUs lacked the space to establish the required sanitary landfill.

Disposal Facilities

It was reported that numerous LGUs were still operating illegal disposal facilities despite technical assistance from government agencies due to technical and financial constraints (see **Table 1**).

Table 1
Disposal Facilities Under Solid Waste Management, EMB-DENR

Region	OD	OD with SCRP	CDF	CDF with SCRP	SLF
1	23	12	12	44	20
2	13	16	15	10	12
3	32	24	3	5	17
4a	26	11	30	8	16
4b	4	2			7
5	30	25	10	10	2
6	21	14	4	7	7
7	103	14	45	4	8
8	54	9	10	1	9
9	27	2	15	12	1
10	32	5	21	10	3
11	1	1	5	3	4
12	1	8	2	4	16
13	17	17	3	7	2
CAR	19	1	5		5
NCR					2
ARMM	1				1

Legend:

OD - Open dump sites

CDF - Controlled disposal facilities

SLF - Sanitary landfill

SCRP - Safe closure and rehabilitation plan

Source: National Solid Waste Management Commission. "Solid Waste Management - Dashboard." 10 June 2015. Accessed 12 June 2015. <<http://119.92.161.4/nswmc4/default3.aspx>>.

Disposal Management Issues at the LGU Level

LGUs were not in compliance with the act mainly due to the effect of the institutional, technical, environmental, and socio-political issues at play. The development of a more advanced final disposal facility was costly, but addressed environmental, health, and social impacts. The cost for sanitary landfills was disproportionate with the amount of waste generated by LGUs. This depended on the capacity of the LGU to support the appropriation based on its generated income as well as the number of its inhabitants. Finally, in terms of waste recycling, reduction, and reuse were key factors to sustain compliance with the overall waste management program.¹⁵

Action Plan to Address the Closure Deadline

Common hazards at open dumps and controlled disposal facilities were immediately mitigated through proper closure. The LGUs had to be guided by workable parameters for proper closure and as applicable, establish a disposal management facility as part of the implementation of its SWM plan.¹⁶

Open Dumpsites

Open dump sites (see **Exhibit 2**) were land areas with loads of solid waste from industry, households, and construction. The improper disposal of this garbage could attract pests and insects, which could cause disease and illness in neighboring communities. Moreover, liquid residue from organic and inorganic materials could enter the ground and penetrate the community's aquifer.¹⁷

Mercado indicated that much of solid waste disposal was still done through open dumping. There were more than 500 open dump sites that existed in different regions in spite of the prohibition in the act. Mercado and her colleagues found that LGUs had open dump sites with little or no site preparation, no cell disposal planning, an absence of leachate and greenhouse gas (GHG) management, inadequate soil cover, the presence of scavengers, and the uncontrolled presence of pests¹⁸

Exhibit 2

Open Dumpsite



Source: Abida, Diah. "Cavite City Open Dumpsite: A Pile of Lessons. Greenpeace Philippines. 14 January 2014. Accessed 12 June 2015. <<http://www.greenpeace.org/seasia/ph/News/greenpeace-philippine-blog/cavite-city-open-dumpsite-a-pile-of-observati/blog/47867/>>.

Controlled Dump Facilities

Controlled dump sites (see **Exhibit 3**) were land areas that were loaded with solid waste that was properly disposed of. They incorporated features of a sanitary landfill particularly siting of waste materials in relation to hydrogeological suitability, grading, leachate control, partial gas management, regular cover, access control, and controlled waste picking.¹⁹

There were more than 300 controlled dump facilities in the country that were controlled by LGUs, government agencies, and the private sector. The first stage in progressing from open dumping to proper

solid waste management is through controlled dumping. Controlled dumping facilities involve improvement in the development, operation, and management of the dump site.²⁰

Exhibit 3

Controlled Dump Facility



Source: Photobucket. "Payatas Controlled Dump Facility." 2015. 19 September 2015
<http://s702.photobucket.com/user/epwmd_qcph/media/Payatas%20Controlled%20Dump%20Facility/PayatasSlop.jpg.html>.

Sanitary Landfill

In sanitary landfills, various solid waste products were deposited in thin strata which were then compressed by heavy machinery. Each stratum was placed on top of the next and further compressed to form a refuse cell. At the end of each day, these refuse cells were covered with soil to prevent odor and to keep the wind from blowing the debris around. Most modern landfill sites were meticulously prepared and used impermeable synthetic materials as bottom liners to prevent contamination of groundwater. When the landfill in a certain area was completed, it was covered with layers of clay or synthetic liners to prevent water from entering. This was compacted with topsoil that could be used for vegetation, parks, and golf courses.²¹

Sanitary landfills provided control over negative environmental impacts arising from the disposal operation as they considered the physical and hydrogeologic attributes of the site prior to landfill development. There were 86 operational sanitary landfills nationwide (see **Exhibit 4**).²²

Exhibit 4

Sanitary Landfill



Source: Designbinario. "Proengel Sanitary Landfill Transfer Stations and Screening Station of Amalga." Accessed 12 June 2015 <http://www.proengel.pt/admin/imagens_projectos/201212041243-untitled2.jpg>.

The transportation, treatment, and proper disposal of solid waste required intensive labor that was usually completed by a driver and two or more loaders. Another daunting task was the selection of an optimal collection route particularly for densely populated areas such as cities. It involved the most efficient use of labor as well as equipment in collecting industrial and household solid wastes (see **Table 2**).

Table 2

Waste Generation (Tons per day) for the Past Five (5) Years

Region	2012	2013	2014	2015	2016
1	1,709.17	1,739.54	1,769.90	1,800.27	1,830.64
2	1,100.64	1,120.19	1,139.75	1,159.31	1,178.86
3	3,631.99	3,696.52	3,761.05	3,825.58	3,890.12
4a	4,145.52	4,219.18	4,292.83	4,366.49	4,440.15
4b	909.43	925.59	941.74	957.90	974.06
5	1,878.74	1,912.12	1,945.50	1,978.88	2,012.26
6	2,700.14	2,748.11	2,796.09	2,844.06	2,892.04
7	2,605.68	2,651.97	2,698.27	2,744.57	2,790.86
8	1,479.47	1,505.75	1,532.04	1,558.33	1,584.61
9	1,391.95	1,416.68	1,441.41	1,466.15	1,490.88
10	1,693.94	1,724.03	1,754.13	1,784.23	1,814.32
11	1,818.05	1,850.35	1,882.65	1,914.95	1,947.26
12	1,348.20	1,372.15	1,396.10	1,420.06	1,444.01
13	884.69	900.41	916.13	931.85	947.57
CAR	620.64	631.67	642.70	653.72	664.75
NCR	8,601.60	8,754.43	8,907.26	9,060.09	9,212.92
ARMM	907.64	923.76	939.89	956.02	972.14
TOTAL	37,427.46	38,092.46	38,757.46	39,422.46	40,087.46

Source: National Solid Waste Management Commission. "Solid Waste Management - Dashboard." 10 June 2015. Accessed 12 June 2015. <<http://119.92.161.4/nswmc4/default3.aspx>>.

Urban planning leading to sustainable development and a greener environment had to be the priority of all political leaders. Urban planning involved the development of guidelines for the utilization of land area. Technical expertise, political will, public participation, and academic expertise were required to complete the guidelines. It entailed the renewal of goals, data collection and analysis, forecasting, design, and strategic thinking.²³

Other Impacts of Disposal

It was alarming to know that the cause of climate change was mainly human activities of which solid waste management played a part (see **Exhibit 5**).

Exhibit 5

Greenhouse Gas Emissions



Source: National Geographic Society. "Causes of Global Warming." 2015. Accessed 19 September 2015.
<<http://environment.nationalgeographic.com/environment/global-warming/gw-causes>>.

What Causes Global Warming?

Several studies have been conducted to figure out what causes global warming. The culprit so far seems to be GHGs emitted into the air as a byproduct of industrialization, transportation, electricity, and agriculture. The Intergovernmental Panel on Climate Change, a group of scientists formed by the United Nations, met every few years to review the latest scientific findings and write a report summarizing all that was known about global warming. This included a report that represented a consensus among hundreds of leading scientists.

Several GHGs responsible for warming are due to the combustion of fossil fuels in cars, factories, and electricity production. One of these gases is carbon dioxide, which is responsible for the most warming. Traces of other gases also contributed to warming including methane gas released from landfills (see **Exhibit 6**) and agriculture (especially from the digestive systems of grazing animals), nitrous oxide from fertilizers, and gases used for refrigeration and industrial processes.²⁴

Exhibit 6

Burning of Solid Waste



Source: *The Hindu*. "Yet Another Fire in Perungudi Dump Yard." 4 February 2014. Accessed 19 September 2015. <<http://www.thehindu.com/news/cities/chennai/yet-another-fire-in-perungudi-dump-yard/article5650148.ece>>.

Proper Closure of Dump Sites

After Mercado conducted an assessment and evaluation of an LGU's SWM plan, an authorized representative of the LGU prepared a checklist for the closure and rehabilitation of open dump sites and controlled dump facilities. An authority to close was to be complied with in 60 days of receipt with a plan or an option to put up sanitary landfill or residual containment facility for solid waste management.²⁵ Mercado regularly monitored the SWM performance of these LGUs.²⁶

Next Steps

As the environmental management specialist of the NSWMC, Mercado was expected to assess and evaluate implementation of LGU SWM plans and the operation of dump facilities.

With eagerness to do the job, Mercado wondered how to address the issues regarding proper implementation of LGU SWM plans as well as the closure and rehabilitation of dump sites that were not in compliance with RA 9003. In spite of time constraints and a lack of manpower, Mercado wondered which environmental programs she could conduct to minimize or mitigate the increasing production of solid waste while initiating information dissemination about a greener and sustainable environment. She also wondered what she could propose to influence the political will of leaders to strictly implement laws and policies related to SWM without sacrificing a greener and sustainable environment as well as the economic development of communities.

Endnotes

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