

The Philippine Environmental Governance 2 Project

DEVELOPING THE BASIS FOR PHASED COMPLIANCE IN SOLID WASTE DISPOSAL

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TABLE OF CONTENTS

ACRONYMS.....	ii
SOLID WASTE DISPOSAL SITUATIONER.....	1
NON SUSTAINABLE OPERATIONS OF PHILIPPINE SANITARY LANDFILLS.....	2
CONSIDERATIONS FOR PHASED COMPLIANCE	4
1. Income Class	4
2. Waste Generation with Diversion	4
PROPOSED PHASED COMPLIANCE AND GUIDELINES.....	6
REFERENCES.....	9

LIST OF TABLES

Table 1. Listing of Potential Landfill Sites	1
Table 2. Disposable Waste Range of LGUs.....	5
Table 3a. LGUs with Disposable Waste between 76 to 200 tpd.....	5
Table 3b. LGUs with Disposable Waste between 76 and 200 tpd.....	6
Table 4. LGUs with Waste Generation exceeding 200 tpd.....	6
Table 5. Summary of Features of Proposed Categories of Disposal Facilities	7

LIST OF FIGURES

Figure 1. Evolutionary Improvement in Solid Waste Management	3
Figure 2. Range of Disposable Waste of LGUs.....	4

ACRONYMS

ADB	-	Asian Development Bank
CDC	-	Clark Development Corporation
DENR	-	Department of Environment and Natural Resources
ECC	-	Environmental Compliance Certificate
IRR	-	Implementing Rules and Regulations\
LGU	-	Local Government Unit
NCR	-	National Capital Region
NSO	-	National Statistics Office
RA	-	Republic Act
SLF	-	Sanitary Land fill
USAID	-	United States Agency for International Development

DEVELOPING THE BASIS FOR PHASED COMPLIANCE IN SOLID WASTE DISPOSAL

SOLID WASTE DISPOSAL SITUATIONER

Five years after the passage of the Ecological Solid Waste Management Act of 2001 (RA 9003), the Philippines continue to be confronted with the problem of solid waste disposal. As stipulated in Article 6, Section 37 of RA 9003 and in Rule 13, Section 1 of its Implementing Rules and Regulations (IRR), all open dumps must be closed by 2004 or converted to controlled dumps. By February 2006, the operation of controlled dumps will no longer be allowed. LGUs must dispose their solid waste into disposal facilities better than these dumpsites as defined in RA 9003.

As of January 2005, the National Solid Waste Management Commission has listed 214 sites deemed suitable for development into a sanitary landfill (Table 1). These are distributed into the 15 regions of the country. Fifteen of these sites have been identified to accommodate the waste from Metro Manila. An analysis of these data has shown that the most of these sites have reached only the pre-feasibility or initial assessment stage. The conduct of the feasibility studies, acquisition of environmental permit and social acceptance and the eventual construction could take over 2 to 3 years assuming the concerned LGUs have the financial capability to fund the undertakings.

Currently, there are four operational engineered disposal facilities in the country, namely the Bais SLF at Negros Oriental, the CDC SLF in Capas, Tarlac, the Puerto Princesa SLF in Palawan and the Rodriguez disposal site¹. The CDC SLF was built and is currently being operated by a German company. The Bais SLF in Negros Oriental is a small facility built with the assistance from the German government. German government assistance has facilitated the on going construction of the small SLF in Dalaguete, Cebu.

Out of over 1,600 LGUs, only four have made their own significant strides towards the development and operation of their respective engineered disposal facilities. These are Rodriguez in Rizal province, Puerto Princesa in Palawan and San Fernando in La Union and Bais in Negros Oriental. The recently opened Puerto Princesa SLF was constructed through an ADB loan. The San Fernando SLF in La Union is currently being constructed through a loan from Logofind. The Rodriguez facility was developed and

Region	Number of Proposed SLF Sites
1	4
2	2
3	29
4A	17
4B	8
5	2
6	41
7	21
8	3
9	3
10	32
11	17
12	14
13	5
CAR	16
Total	214

¹An ECC has been issued by DENR allowing the adjacent 14 hectare lot to be developed as a sanitary landfill

operated by a local contractor in coordination with the local government unit. The Bais sanitary landfill was developed with German assistance.

With less than 6 months left before the deadline, it is now considered unlikely that most of the remaining LGUs or cluster of LGUs will be able to develop their respective sanitary landfills or disposal facilities as defined under RA 9003. These LGUs are expected to continue using open dumps with a few attempting to convert them to a controlled dump status. This condition continues to affect the quality of the environment within the immediate vicinity of the dumps and contribute to the degradation of the quality of both surface and groundwater resources.

NON SUSTAINABLE OPERATIONS OF PHILIPPINE SANITARY LANDFILLS

Prior to the passage of RA 9003, 4 sanitary landfills have been developed and operated in the Philippines. These are the Carmona (Cavite), San Mateo (Rizal), Subic Base (SBMA) and Inayauan (Cebu) SLFs. Thereafter, the Bais (Negros Oriental), CDC (Tarlac), Rodriguez (Rizal) and Puerto Princesa (Palawan) disposal facilities were constructed.

The Carmona and San Mateo SLFs were developed and initially operated by the Department of Public works and Highways for Metro Manila though financing by the World Bank. These facilities began operations in 1990 and 1992, respectively. The Carmona SLF ceased operations in 1998. The San Mateo SLF stopped operations in 2000. The stoppage of operations of these disposal facilities were brought about by then mounting opposition not only by the communities surrounding them but by the residents occupying the roads leading to these facilities. These stakeholders complained about the unpleasant odor, contamination of surface and groundwater, presence of pests and vectors and the traffic and accidents brought about by the garbage trucks.

The Cebu sanitary landfill, which was built in the mid 90's was reportedly beset by financial, technical and administrative problems and soon deteriorated into an open dump. The SBMA managed sanitary landfill within the former American base operated marginally as an engineered disposal facility. The Bais sanitary landfill was completed in 2004 and has been operational since then. The Rodriguez disposal facility which receives the waste of 10 LGUs of Metro Manila is reportedly operated as a controlled dump although it contains the basic engineering features of a sanitary landfill. The CDC SLF has continued to operate as a sanitary SLF.

The foregoing experiences have indicated that in general, the LGUs and even the major agencies do not have enough experience, technical know-how, financial capability and political will to sustain the operation of an engineered disposal facility such as a sanitary landfill. The setbacks we experienced in operating the Carmona, San Mateo and Cebu sanitary landfills clearly stress this point. Moreover, the limited number of SLFs which were built and operated prior to RA 9003 and those built after the passage of the

Ecological Solid Waste Management Act represent efforts by national agencies or donor western countries and not the real capability of the LGUs.

Considering its history and current state, waste disposal management in the Philippines falls within the lower level of the graph of the evolutionary improvement in solid waste management as prepared by Philip Rushbrook and Michael Pugh² for the World Bank in 1999 (Figure 1).

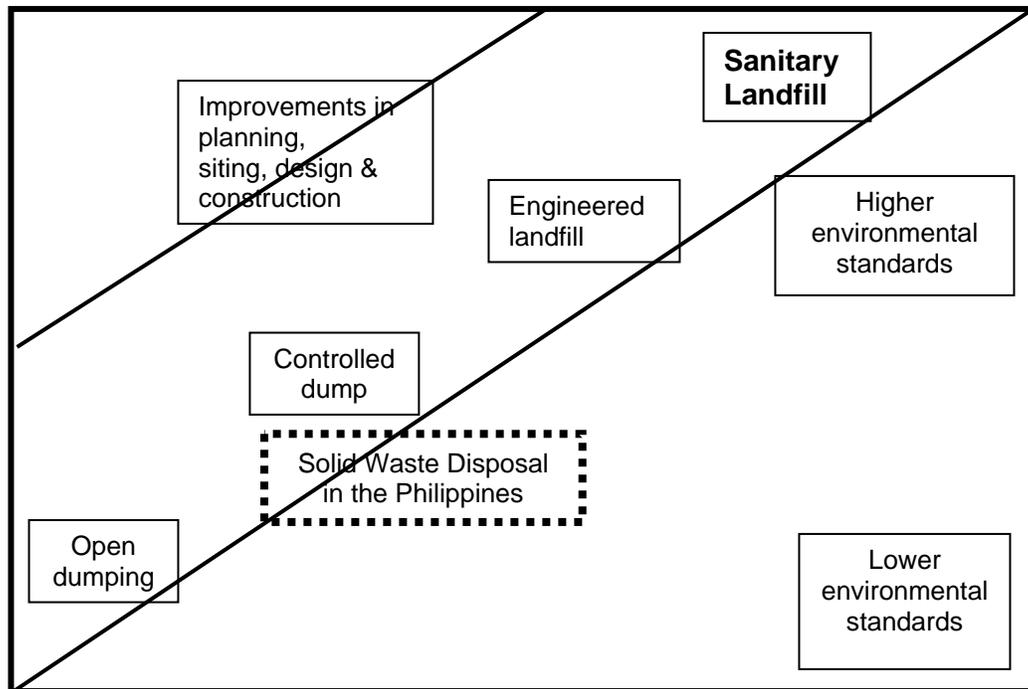


Figure 1. Evolutionary Improvement in Solid Waste Management

As in most developing countries, it will take some time before the LGUs can move forward to the engineered and sanitary landfills for solid waste disposal. In the case of the Philippines, slow pace of development from open dumps to controlled dumps to engineered and sanitary landfills can be attributed to a combination of technical, financial, institutional, environmental and political issues which the LGUs are trying to but generally cannot resolve within the deadline set by RA 9003.

For the Philippines to effectively address its solid waste disposal problem within the limited capability of the local government units, the most practical approach is progressively move in phases from the basic waste containment to the more sophisticated method of disposal.

² Solid Waste Landfills in Middle and Lower Income Countries, A Technical Guide to Planning, Design and Operations, World Bank, 1999

CONSIDERATIONS FOR PHASED COMPLIANCE

1. INCOME CLASS

The use of income class for determine the level of sanitary landfill to be used by the LGUs was initially suggested in Department Administrative Order (DAO) 98-49 which provided the guidelines for the development and operations of a sanitary landfill¹ and sanitary landfill 2.

The ongoing JICA study recommends a similar approach which likewise categorizes the various types of landfill stages based on income class.

The two proposals obviously considered the potential ability of the LGU to finance the development and operation of a disposal facility. Both would have to take into account the following:

- Low income LGUs do not consistently have low potential waste generation rates
- High income LGUs do no consistently have high potential waste generation rates

Income class alone therefore cannot be used as the sole screening criterion for determining the type of disposal facility for an LGU.

2. WASTE GENERATION WITH DIVERSION

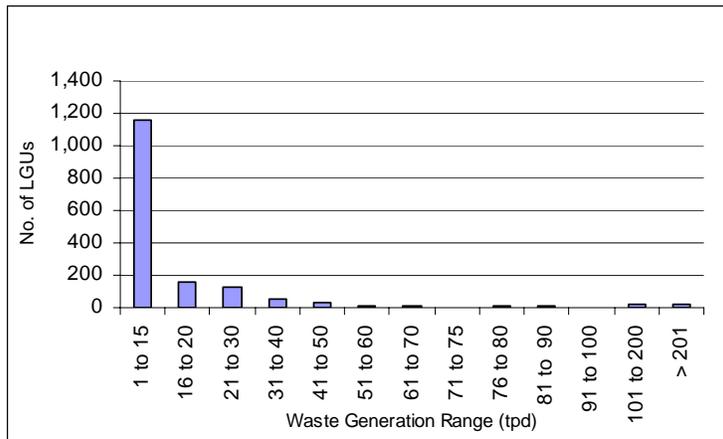


Figure 2. Range of Disposable Waste of LGUs

for rural areas, 0.5 kg/day for urban areas and 0.7 kg/day for the National Capital Region⁴ and 0.4 kg per day for capitals. Figure 2 shows the plot of the potential waste for disposal by the LGUs after the required percentage of diversion. Four potential LGU

This proposal recommends the use of potential solid waste generation as the basis for setting the entry level of LGUs into the various phases of disposal facility.

The potential daily waste that can be generated by the 1,610 LGUs in 2006 was estimated using projected NSO population data and applying the following per capita generation rates³: 0.3 kg/day

³ Must be adjusted per LGU if per capita generation from Waste Characterization Study is available

⁴ The Philippines Environment Monitor 2001, World Bank

groupings are evident in the graph. These are the > 15 tpd, the 16 to 75 tpd, the 76 to 200 tpd and the > 200 tpd. A comparison with the income class classification show that the LGUs with less than 75 tpd fall under the low income bracket⁵. The LGUs with disposable waste above 75 tpd generally include the higher income municipalities and cities⁶. Table 2 shows the number and percentage of LGUs under this potential grouping.

Waste Gen Range (tpd)	No. of LGUs	% of LGUs	Total Waste Gen (tpd)	% Total Waste Gen
1 to 15	1,163	72.24	8,948	26.62
16 to 75	386	23.98	10,548	31.38
76 to 200	40	2.48	4,442	13.21
> 200	21	1.30	9,675	28.78
	1,610	100	33,613	100

A total of 1,163 LGUs or about 72% fall within the range of less than or equal to 15 tpd. About 386 LGUs or nearly 24% fall within the range of 16 to 75 tpd.

Forty (40) LGUs or about 2.5% are within the range of 76 to 200 tpd while 21 LGUs or 1.3% generate more than 200 tpd.

The LGUs with disposable waste range exceeding 75 tpd generally include the cities and some urbanized municipalities. Table 3 shows the list of LGUs within the 76 to 200 tpd group while Table 4 present the LGUs exceeding the 200 tpd disposable waste range.

On a regional basis, most of the LGUs falling within the 76 to 200 tpd range belong to either NCR or Region 4. The rest correspond to the cities and urbanized municipalities in Regions 1, 3, 4, 5, 6, 7, 8, 9, 11, 12 and Caraga.

The LGUs exceeding 200 tpd consist of Metro Manila cities (NCR) and those in Regions 4, 6, 7, 9, 10 and 11.

LGU	tpd	Region
Cabanatuan City	79	3
Naga City	80	5
Bago City	82	6
San Juan	82	NCR
Sta Rosa	83	4
Biñan	84	4
Binangonan	84	4
City of Kabankalan	86	6
Cadiz City	86	6
Pagadian City	87	9
Ormoc City	88	8
Lipa City	89	4
Calbayog City	91	8
Malolos	91	3
Taytay	93	4
San Pedro	97	4
Legaspi City	105	5
Cainta	106	4
San Carlos City	106	6
Cotobato City	107	12

⁵ This refer to the 4th, 5th and 6th class municipalities

⁶ This refers to the 3rd, 2nd, 1st class municipalities and cities

PROPOSED PHASED COMPLIANCE AND GUIDELINES

Four categories of waste disposal facilities are proposed which consider potential waste generation of LGUs reckoned from the projected 2006 population and the 25 percent diversion as required by RA 9003. Each LGU or a cluster of LGUs may develop and operate their respective facilities and progressively move from a lower to a higher level facility as the amount of disposable waste increase over time.

LGU	tpd	Region
Tacloban City	110	8
San Fernando	114	1
Puerto Princesa City	116	4
City of Tagum	142	11
Olongapo City	143	3
Lucena City	147	4
Calamba	149	4
Bacoor	150	4
Lapu-Lapu City (Opon)	153	7
Baguio City	153	1
Butuan City	162	Caraga
Batangas City	163	4
Iligan City	177	12
Angeles City	183	3
City of Tarlac	188	3
Navotas	79	NCR
San Jose del Monte	80	3
Dasmariñas	82	4
Mandaue City	82	7
City of Mandaluyong	82	NCR

LGU	tpd	Region
Iloilo City	204	6
Pasay City	210	NCR
Malabon	230	NCR
Bacolod City	232	6
City of Muntinlupa	249	NCR
Cagayan de Oro City	243	10
Gen. Santos City	271	11
City of Makati	281	NCR
City of Marikina	305	NCR
City of Antipolo	341	4
Zamboanga City	366	9
City of Parañaque	372	NCR
City of Pasig	384	NCR
City of Valenzuela	385	NCR
City of Las Piñas	389	NCR
Cebu City	397	7
Taguig	418	NCR
Davao City	671	11
Kalookan City	976	NCR
Manila	1,048	NCR
Quezon City	1,692	NCR

Category 1

Category 1 disposal facility shall be applied to LGUs generating wastes equal or less than 15 MT a day. It shall also apply to a cluster of LGUs with a collective disposable waste of less than or equal to 15 tons per day.

Category 2

Category 2 disposal facility shall be applied to LGUs generating waste greater than 15 but equal or less than 75 MT a day. It shall also apply to a cluster of LGUs with a collective disposable waste greater than 15 or equal or less than 75 MT a day.

Category 3

Category 3 disposal facility shall be applied to LGUs generating waste greater than 75 MT a day but equal or less than 200 MT per day. It shall also apply to a landfill operated by a cluster of LGUs with a collectively disposable waste greater than 75 MT a day but equal or less than 200 MT per day.

Category 4

Category 4 disposal facility shall be applied to LGUs generating waste greater than less than 200 MT per day. It shall also apply to a landfill operated by a cluster of LGUs with a collective disposable waste greater than 200 MT per day.

The summary of the basic features of the proposed category of disposal facilities is presented in Table 5.

Table 5
Summary of Features of Proposed Categories of Disposal Facilities

Features	Category 1 ≤ 15 tpd	Category 2 > 15 tpd, ≤ 75 tpd	Category 3 > 75 tpd, ≤ 200 tpd	Category 4 > 200 tpd
Daily and Intermediate Soil Cover	√	√	√	√
Embankment/Cell Separation	√	√	√	√
Drainage Facility	√	√	√	√
Gas Venting	√	√	√	√
Leachate Collection	√	√	√	√
Leachate Treatment	Pond system	Pond system	Pond system	Combination of physical, biological & chemical
Leachate Re-circulation	At a later stage of operation	At a later stage of operation	At a later stage of operation	
Clay liner	√ ⁷	√ ⁸		
Clay liner and/or synthetic liner			√ ⁹	√ ¹⁰
Permit ¹¹	Checklist	Checklist	ECC ¹² via IEE ¹³	ECC via IEE

⁷ Clay liner be at least 60 cm thick and has a permeability of 10-5 cm/sec

⁸ Clay liner must be at least 75 cm thick and has a permeability of 10-6 cm/sec

⁹ Clay liner at least 75 cm thick clay liner with a permeability of 10-7 cm/sec or better, if not available, an equivalent replacement would be a composite liner consisting of at least 1.5mm thick HDPE membrane over at least 60 cm thickness of compacted fine materials with permeability no more than 10-6 cm/sec.

¹⁰ Synthetic liner at least 1.5mm thick HDPE membrane over at least 60 cm thickness of compacted clay materials with permeability no more than 10-7 cm/sec.

¹¹ Facilities exceeding a daily disposal of 1000 tpd must prepare an environmental impact assessment

¹² Environmental Compliance Certificate

¹³ Initial Environmental Examination

Each category of disposal facility must satisfy the basic siting criteria of RA 9003 and meet the following requirements.

- a) Planned capacity with phased cell development
- b) Site preparation and containment engineering
- c) Compaction of waste to minimum specified target densities
- d) Specified operational procedures to protect amenities
- e) Fence, gate and other site infrastructure with surfaced primary access road
- f) Full record of waste volumes, types and source
- g) Special provisions and procedures for dealing with special waste¹⁴
- h) Fully trained staff and experienced site management
- i) Provision for aftercare following site restoration and closure
- j) No waste picking

¹⁴ Applies only to Category 1 and Category 2 disposal facilities

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