

Chapter 8.

Environment Sector

Waste Generation

The advent of industrialization in the province brought about the challenge of managing the wastes generated not just by the industries but also of the incessantly increasing number of populace.

Wastes are all materials that are deemed unwanted, either by a household or an industry. The major sources of wastes in the province of Cavite are residences, industrial and markets. The volume of wastes is generally affected by the population as well as the type of industries that thrives in the area. Appropriate and environmentally accepted manner of waste management is necessary in order to promote environmental protection and development.

Proper management of waste is an attribute of maintaining the well-being of people. As of December 2014, the highest volume of residential wastes was observed in the City of Bacoor with 260 tons of wastes daily. It is followed by the City of Dasmariñas which is producing residential wastes of 250 tons per day. The third residential waste producer is the City of Imus with 130 tons.

In terms of market wastes, it is also the City of Bacoor that produces the highest volume of market wastes with 23.76 tons per day. The municipality of Naic also produces a large volume of market wastes at 4.12 tons followed by Kawit with 3.96 tons.

Bacoor is the locality producing the highest volume of wastes per day. Considering this, it is necessary that Bacoor come up with an effective waste management system in order to control and manage the wastes production and disposal. The second largest producer of waste is the City of Dasmariñas (252 tons/day) and City of Imus (133 tons/day) (Table 8A).

Table 8A Volume of Residential Wastes and Market Wastes Generated, Province of Cavite: as of December 2014

City/Municipality	Residential Wastes (tons/day)	Market Wastes (tons/day)	Total (tons/day)
1st District			
Cavite City	15	25	40
Kawit	30	3.96	33.96
Noveleta	7	1	8
Rosario	128	1	129
2nd District			
Bacoor	260	23.76	283.76
3rd District			
City of Imus	130	3	133
4th District			
City of Dasmariñas	250	2	252
5th District			
Carmona	44.87	2.24	47.11
Silang	69	3	72
Gen. M. Alvarez	40	4	44
6th District			
Trece Martires City	17		17
Amadeo	5	0.8	5.8
Gen. Trias	75	2	77
Tanza	60	6	66
7th District			
Tagaytay City	10.4	8	18.4
Alfonso	1.15		1.5
Gen. Emilio Aguinaldo	2	0.07	2.07
Indang	3	1	4
Magallanes	0.0004	0.21	.2104
Maragondon	5	2.2	7.2
Mendez	7.16	1.5	5.5
Naic	62.5	4.12	66.62
Ternate	2	1	3
TOTAL	1,224.08	95.86	1,319.94

Source: Provincial Government Environment and Natural Resources Office

Solid Waste Disposal System

The issues of climate change raised the awareness of people regarding environment protection. These issues are main concerns of the government nowadays.

During the past years, the country experienced natural calamities that caused tremendous damages, both on lives and properties. The uncontrollable environmental degradation that brought about the damaging natural disasters in the country led to the passing of Solid Waste Management Act. According to this act, wastes should be segregated at source, transported separately, stored, transferred, processed and treated. It likewise stipulates for the proper disposal of solid wastes and all other waste management activities which do not harm the environment.

The Province of Cavite crafted the Solid Waste Management Plan 2011-2020 in support of the Solid Waste Management Act. The challenge lies on the implementation of the plan. Given this definition, the province has a long way to go in complying with the provisions of the law. The most appropriate manner of solid waste disposal in the province considering the type and volume of wastes is through a sanitary landfill. Currently, there is no sanitary landfill yet that would address the waste disposal challenges of Cavite. Despite this, the local government units are doing its best in conforming to RA 9003 thru various means like recycling, composting, etc.



Composting System

Composting is defined as the controlled decomposition of organic matter by micro-organisms, mainly bacteria and fungi, into a humus-like product. Composting is the environment friendly way of disposing biodegradable wastes. These wastes are subjected to composting process in order to be used as fertilizer. For some, this system is being utilized to create value added products which are being sold in order to serve as income generating activity. Some of the products of composting are organic fertilizers, fish meals, animal feeds, among others. The product of composting is called Compost.



Compost is an organic matter that has been decomposed and recycled as a fertilizer and soil amendment. Compost is a key ingredient in organic farming. At the simplest level, the process of composting simply requires making a heap of wetted organic matter (leaves, "green" food waste) and waiting for the materials to break down into humus after a period of weeks or months. Modern, methodical composting is a multi-step, closely monitored process with measured inputs of water, air and carbon-and nitrogen-rich materials. The decomposition process is aided by shredding the plant matter, adding water and ensuring proper aeration by regularly turning the mixture. Worms and fungi further break up the material. Aerobic bacteria

manage the chemical process by converting the inputs into heat, carbon dioxide and ammonium. The ammonium is further converted by bacteria into plant-nourishing nitrites and nitrates through the process of nitrification.

Compost can be rich in nutrients. It is used in gardens, landscaping, horticulture, and agriculture. The compost itself is beneficial for the land in many ways, including as a soil conditioner, a fertilizer, addition of vital humus or humic acids, and as a natural pesticide for soil. In ecosystems, compost is useful for erosion control, land and stream reclamation, wetland construction, and as landfill cover. Organic ingredients intended for composting can alternatively be used to generate biogas through anaerobic digestion. Anaerobic digestion is fast overtaking composting in some parts of the world including central Europe as a primary means of down-cycling waste organic matter. (Wikipedia)

Composting has been largely advocated by the government as a measure in waste management. This has been known as one of the most environment friendly method to lessen the wastes and produce other value added products from it like the compost fertilizer and ammonium gas supply.

For the year 2014, there are thirteen (13) cities/municipalities that are practicing composting with a total of nineteen (19) composting centers. No increase in the number of composting centers was recorded from 2012.

Table 8B Barangays with Composting Facility by City/ Municipality and Congressional District, Province of Cavite: 2014

City/Municipality	Barangays with Composting Facility
1st District	
Cavite City	Bagong Pook, San Antonio
Kawit	
Novelita	Poblacion, San Antonio I
Rosario	
2nd District	
Bacoor	
3rd District	
City of Imus	Alapan I-A, Tanzang Luma IV
4th District	
City of Dasmariñas	Eco-Center at Central Market
5th District	
Carmona	Carmona Ecology Center
Silang	
Gen. M. Alvarez	Olaes, Poblacion I, Poblacion V
6th District	
Trece Martires City	
Amadeo	
Gen. Trias	
Tanza	Tanza Public Market, Bunga
7th District	
Tagaytay City	
Alfonso	Marahan I
Gen. Emilio Aguinaldo	
Indang	Banaba Lejos
Magallanes	Kabulusan, Bendita I
Maragondon	Layong Mabilog
Mendez	Asis II
Naic	Sabang
Ternate	

Source: Provincial Government Environment and Natural Resources Office

Material Recovery Facility (MRF) System

The Republic Act No. 9003 or the Ecological Solid Waste Management Act of 2000 provided specific and strict guidelines on the manner of solid waste disposal in the country. The passing of the law was called for in response to problems encountered due to climate change. RA. 9003 defines material recovery facility or MRF as a facility designed to receive, sort, process, and store compostable and recyclable materials efficiently and in an environmentally sound manner.

The objective of the law is to reduce the volume of solid waste through recycling. In other countries, this system has long been in effective practice. Through the establishments of MRFs, solid wastes will be sorted into biodegradable and non-biodegradable. The biodegradable materials will be subjected to composting in order to produce compost fertilizers. On the other hand, the non-biodegradables are further classified into recyclables and non-recyclables. The recyclables will then be recycled in order to be re-used while those that are non-recyclable shall be brought to sanitary landfills for disposal.

The establishment of a material recovery facility in every locality is mandated both under the Local Government Code of 1991 as well as Republic Act 9003. Section 17 of the Local Government Code of 1991 states that local government units shall likewise exercise such other powers and discharge such functions and responsibilities as are necessary, appropriate, or incidental to efficient and effective provision of such basic services and facilities such as solid waste disposal system or environmental management system and services or facilities related to general hygiene and sanitation.

Correspondingly, Section 12 of Republic Act No. 9003, provides that local government units should develop a solid waste management plan and, all the same time, adopt specific revenue generating measures to promote the viability of the said waste management plan. Likewise, Section 32 of the same Republic Act likewise provides that "There shall be established a Material Recovery Facility (MRF) in every barangay or cluster of barangays. The MRF receives mixed waste for final sorting, segregation, composting and recycling. Under this law, the Cavite Solid Waste Management Plan 2011-2020 was crafted.

Despite being mandated by law, out of 829 barangays in Cavite, there are only ninety-nine (99) MRFs in the entire province. Majority of the MRFs are located in the City of Imus and municipality of Carmona with 39 and 31 MRFs, respectively. Centralized MRF are those that cater to the entire city/municipality. The facility can accept a bigger volume of wastes and they usually have better equipment and machineries. Out of 23 cities/municipalities, only sixteen (16) of them has centralized MRFs. The province of Cavite still has no sanitary landfill at present (Table 8B and Table 8C).

Table 8C Barangays with Material Recovery Facility by City/ Municipality and Congressional District, Province of Cavite: 2014

City/Municipality	Barangays with Material Recovery Facility
1st District	
Cavite City (0)	
Kawit (0)	
Noveleta (1)	San Antonio I
Rosario (0)	
2nd District	
Bacoor (1)	Phase 6, Bahayang Pag-Asa
3rd District	
City of Imus (39)	Brgy. Alapan 1- A, Brgy. Alapan 1- B, Brgy. Alapan 1-C, Brgy. Alapan 2- A, Brgy. Anabu 1-A , Brgy. Anabu 1-B Brgy. Anabu 1-D, Brgy. Anabu 1-F, Brgy. Anabu 2-A, Brgy. Anabu 2-B, Brgy. Anabu 2-C, Brgy. Anabu 2-D Brgy. Anabu 2-F, Brgy. Bayan Luma 1, Brgy. Bagong Silang, Brgy. Buhay na Tubig, Brgy. Carsadang Bago 2 Brgy. Magdalo, Brgy. Malagasang 1-B, Brgy. Malagasang 1-E, Brgy. Malagasang 2-A, Brgy. Malagasang 2-C Brgy. Malagasang 2-E, Brgy. Malagasang 2-G, Brgy. Mariano Espleta 1, Brgy. Mariano Espleta 2, Brgy. Mariano Espleta 3, Brgy. Medicion 2-B, Brgy. Pag-asa 1, Brgy. Pag-asa 2, Brgy. Pag-asa 3, Brgy. Poblacion 1-A, Brgy. Poblacion 4-A, Brgy. Poblacion 4-C, Brgy. Tanzang Luma 1, Brgy. Tanzang Luma 2, Brgy. Tanzang Luma 3, Brgy. Tanzang Luma 4, Brgy. Toclong 2-B
4th District	
City of Dasmariñas (3)	Brgy. San Agustin III, Salitran 1, Zone IV
5th District	
Carmona (31)	Barangay 1,Barangay 2, Barangay 4, - St. Joseph Parish, Barangay 5, Barangay 6, Barangay 7,Barangay 8 Barangay 10, Barangay 11, Barangay 12, Barangay Patindig Araw, Barangay Oregano, Barangay Altarez Barangay Maduya - Main , Barangay Maduya – Oregano, Barangay Maduya – Altarez, Barangay Cabilang Baybay, Barangay Mabuhay - City Land, Barangay Milagrosa - Proper , Barangay Milagrosa – Townhomes, Barangay Milagrosa - Phase 1, Barangay Milagrosa - Phase 2, Barangay Milagrosa - Phase 3, Barangay Lantic – Main, Barangay Lantic - Kinnari Subdivision , Barangay Lantic - Cedar Subdivision, Barangay Bancal, Carmona National Highschool, Kinnari 1, Kinnari 2, CES (PDAO)
Silang (0)	
Gen. M. Alvarez (6)	Brgy. Maderan, Brgy. De las Alas, Brgy. R. Cruz, Brgy. Lumbrenas, Brgy. Poblacion V, Brgy. Poblacion I
6th District	
Trece Martires City (5)	Brgy. Inocencio, Brgy. De Ocampo, Brgy. Gregorio, Brgy. Cabezas, Ciudad Adelina
Amadeo	
Gen. Trias (0)	
Tanza (4)	Brgy. Santol, Brgy. Julugan I, Brgy. Bunga, Brgy. Julugan VIII
7th District	
Tagaytay City (2)	Brgy. Kaybagal South, Brgy. Maitim II-Central
Alfonso (1)	Marahan I
Gen. Emilio Aguinaldo (1)	Brgy. Castaños Lejos
Indang (2)	Brgy. Kayquit II, Brgy. Kayquit III
Magallanes (1)	Kabulusan
Maragondon (0)	
Mendez (0)	
Naic (0)	
Ternate (0)	

Source: Provincial Government Environment and Natural Resources Office

Table 8D Locations of Centralized Material Recovery Facilities (MRF) by City/Municipality, Province of Cavite: 2014

City/Municipality	Location of Centralized MRF
1st District	
Cavite City	Brgy. Bagong Pook
Kawit	
Noveleta	Brgy. Poblacion
Rosario	Brgy. Kanluran
2nd District	
Bacoor	
3rd District	
City of Imus	Brgy. Alapan I-A
4th District	
City of Dasmariñas	
5th District	
Carmona	Carmona Ecology Center at Brgy. Lantic
Silang	
Gen. M. Alvarez	Brgy. Olaes, Brgy. Poblacion V and Brgy. Poblacion I
6th District	
Trece Martires City	
Amadeo	
Gen. Trias	
Tanza	
7th District	
Tagaytay City	Brgy. Maitim II
Alfonso	Brgy. Marahan I
Gen. Emilio Aguinaldo	
Indang	Brgy. Banaba Lejos
Magallanes	Sitio Kayhabal, Brgy. Ramirez
Maragondon	Brgy. Layong Mabilog
Mendez	Brgy. Asis II
Naic	Brgy. Sabang
Ternate	Brgy. Sapang I
16 Centralized Material Recovery Facilities	

Source: Provincial Government Environment and Natural Resources Office

Solid Waste Disposal System Status in Cavite

All local government units in Cavite have clear manner of waste disposal except for Magallanes. However, there are accepted manner such as sanitary landfill and the harmful manner of open dumpsite. Among the twenty-three localities, twelve (12) are using dumpsite wherein six of which are open and the remaining six are controlled. The remaining ten LGUs are engaged into a contract to a particular sanitary landfill.

Table 8E Waste Disposal System by City/Municipality, Province of Cavite: 2014

City/Municipality	Type of Disposal	Location	Land Area
1st District			
Cavite City	By Contract/ Sanitary Landfill	Brgy. De Ocampo, Trece Martires City	0.01 ha. 0.15 ha.
Kawit	Open Dumpsite	Brgy. Batong Dalig	
Noveleta	By Contract/ Sanitary Landfill	Brgy. De Ocampo, Trece Martires City	
Rosario	By Contract/ Sanitary Landfill	Brgy. De Ocampo, Trece Martires City	
2nd District			
City of Bacoor	By Contract/ Sanitary Landfill	Montalban, Rizal	
3rd District			
City of Imus	By Contract/ Sanitary Landfill	Brgy. Pasong Buaya	
4th District			
City of Dasmariñas	Open Dumpsite	Brgy. Salawag	6.0 ha.
5th District			
Carmona	By Contract/ Sanitary Landfill	San Pedro, Laguna	1.2 ha
Silang	Open Dumpsite	Brgy. Lalaan I	
Gen. M. Alvarez	By Contract/ Sanitary Landfill	Brgy. De Ocampo, Trece Martires City	
6th District			
Trece Martires City	By Contract/ Sanitary Landfill	Brgy. De Ocampo, Trece Martires City	.
Amadeo	Controlled Dumpsite	Brgy. Poblacion V	0.18 ha.
Gen. Trias	Open Dumpsite	Brgy. Tapia	1.5 ha.
Tanza	Open Dumpsite	Brgy. Sahud-Ulan	5.0 ha.
7th District			
Tagaytay City	By Contract/ Sanitary Landfill	San Pedro, Laguna	0.4 ha. 1.25 ha.
Alfonso	Controlled Dumpsite	Brgy. Marahan I	
Gen. Emilio Aguinaldo	Open Dumpsite	Brgy. Lumipa	
Indang	By Contract/ Sanitary Landfill	Laguna	
Magallanes			
Maragondon	Controlled Dumpsite	Brgy. Layong Mabilog	1.6 ha.
Mendez	Controlled Dumpsite	Brgy. Asis II (Eco-Center)	0.75 ha,
Naic	Controlled Dumpsite	Brgy. Sabang	1.3 ha.
Ternate	Controlled Dumpsite	Brgy. Sapang II	3.0 ha.

Source: Provincial Government Environment and Natural Resources Office

Waste Disposal Equipment and Machineries

The main waste disposal system among residential and industrial areas in Cavite is through garbage collection. Except for Magallanes, the rest of the province implements garbage collection. Garbage collection can be classified into two; Domestic waste collection coming from the residential areas and industrial waste or those coming from public markets and other industrial establishments. In terms of waste disposal equipment and machineries, the province has 7 waste compactors, 34 big garbage trucks and 121 small garbage trucks. Considering the number of population and correspondingly the volume of waste being produced, the City of Dasmariñas has the most number of big garbage trucks amounting to twelve. This is complemented by an additional of three small garbage trucks. Similarly, the populous town of Imus also has numerous garbage trucks. Despite having only two big garbage truck, there are twenty small garbage trucks roaming the entire town for garbage collection. It can be noted that the municipality of Magallanes do not have any garbage truck at all. It can also be observed that the garbage collection schedule for public markets is more frequent than the schedule for residential areas.

Table 8F Inventory of Waste Disposal Equipment and Machineries and Frequency of Garbage Collection by City/Municipality, Province of Cavite: 2014

City/Municipality	Number of Compactors	Number of Big Garbage Truck	Number of Small Garbage Truck	Frequency of Garbage Collection
1st District				
Cavite City		1	4	Main roads/market – Daily ; City Streets – Twice a week
Kawit			3	Daily
Noveleta			3	2 trips/Truck/ day
Rosario	1	2	6	Daily / Twice a day
2nd District				
Bacoor			6	Daily
3rd District				
Imus		2	20	Market - Daily ; Barangays – Once a week
4th District				
City of Dasmariñas	5	12	3	Daily
5th District				
Carmona	1	3	7	Twice a week
Silang		3	6	Public Market – Daily ; Barangays – Once a week
Gen. M. Alvarez			7	Thrice a week
6th District				
Trece Martires City		2	3	10-12 times / day
Amadeo			2	Thrice a week
Gen. Trias		3	17	Twice a week
Tanza			18	Twice a week
7th District				
Tagaytay City		5	5	Daily
Alfonso		1	2	Twice a week
Gen. Emilio Aguinaldo			1	10 Trips/ week
Indang			2	Daily except Saturday
Magallanes				-
Maragondon			2	Daily
Mendez			2	Five times a week
Naic			3	Once or twice a week
Ternate			1	Daily
TOTAL	7	34	121	

Source: Provincial Government Environment and Natural Resources Office

Solid Waste Management Plan

It is a commitment of the Provincial Government to widely implement the provisions of Republic Act 9003. This includes the creation of Solid Waste Management Plan in the local level. For 2014, 6 cities/municipalities are in on-going formulation of their plan. On the other hand, 12 cities/municipalities already submitted their plan to Department of Environment and Natural Resources - Environmental Management Bureau Region IV-A for review. Four (4) cities/municipalities have already submitted their plan to National Solid Waste Management Commission (NSWMC). One Plan, Amadeo, is undergoing review by PGENRO (Table 8G).

Generally, the Province of Cavite thru the supervision of the Provincial Government Environment and Natural Resources Office is 100% complying with the requirement of RA 9003 as far as the Solid Waste Management Plan is concerned.

Table 8G Status of Solid Waste Management Plan Compliance by City/Municipality, Province of Cavite: as of December 2014

City/Municipality	Status
1st District	
Cavite City	On-going formulation and WACS already conducted
Kawit	On-going formulation
Noveleta	On-going formulation
Rosario	Submitted the copy of their plan at DENR-EMB Region IV-A Office last November 17, 2014
2nd District	
Bacoor	Submitted a copy of the plan to DENR-EMB IV-A; Conducted WACS for their 10-YEAR SWMP last March 2014
3rd District	
Imus	Conducted WACS in 2013 ; Submitted a copy of their 10-Year SWMP to DENR-EMB IV-A last November 10, 2014
4th District	
City of Dasmariñas	Submitted a copy of their plan to NSWMC
5th District	
Carmona	WACS result submitted to NSWMC last October 2014
Silang	On-going formulation
Gen. Mariano Alvarez	Submitted the copy of their plan at DENR-EMB IV-A last November 17, 2014
6th District	
Trece Martires City	Submitted the copy of their plan at DENR-EMB IV-A last November 17, 2014
Amadeo	Reviewed by PGENRO last July 05, 2013
Gen. Trias	Submitted the copy of their plan at DENR-EMB IV-A last November 17, 2014
Tanza	Submitted the copy of their plan at DENR-EMB IV-A last November 17, 2014
7th District	
Tagaytay City	Submitted the copy of their Plan to NSWMC
Alfonso	Submitted the copy of their plan at DENR-EMB IV-A last November 17, 2014
Gen. Emilio Aguinaldo	On-going formulation
Indang	Submitted the copy of their plan at DENR-EMB IV-A last November 17, 2014
Magallanes	Submitted the copy of their Plan to NSWMC
Maragondon	Submitted the copy of their plan at DENR-EMB IV-A last November 17, 2014
Mendez	Submitted the copy of their plan at DENR-EMB IV-A last November 17, 2014
Naic	Submitted the copy of their plan at DENR-EMB IV-A last November 17, 2014
Ternate	On-going formulation

Source: Provincial Government Environment and Natural Resources Office

Special Waste Treatment

According to RA 9003, "special wastes" include consumer electronics such as worn-out, broken, and other discarded items such as radios, stereos, and TV sets. It shall also refer to household hazardous wastes such as paints, thinners, household batteries, lead-acid batteries, spray canisters and the like. These include wastes from residential and commercial sources that comprise of bulky wastes, consumer electronics, and white goods, yard wastes that are collected separately, batteries, oil, and tires. These wastes are usually handled separately from other residential and commercial wastes.

The RA 9003 stipulates that the special waste component shall include existing waste handling and disposal practices for special waste or household hazardous wastes, and the identification of current and proposed programs to ensure the proper handling, re-use, and long-term disposal of special wastes.

Given these, there are operating Special Waste Treatment companies in the province to cater the needs of the industries in Cavite, as well as the medical wastes. There are seventeen (17) special waste treatment companies in Cavite, 15 of which cater to hazardous wastes, one (1) for busted fluorescent lamps. There are also two (2) which accepts electronic scraps and two are accepting hospital wastes (Table 8H).



Table 8H Special Wastes Treatment Companies in Cavite: 2014

Company Name	Address	Type of Special Waste Treated
Asia Metal Trading Corporation	Gen. Trias	Electronic Scraps and Hazardous Wastes
Dome Consolidated Corporation	Bacoor	Hazardous Waste
Cleanway Technology Corporation	Silang	Hazardous and Hospital Waste
E-Technology Philippines	Rosario	Hazardous Waste
Fujihiro Philippines	Gen. Trias	Hazardous Waste
Green Globe Environmental	Carmona	Hazardous Waste
Green Korea, Inc.	Rosario	Electronic Scraps
Integrated Waste Management Inc.	Trece Martires City	Hospital Waste ; Hazardous Waste
JORM Environmental	Gen. Trias	Hazardous Waste
JRC Industrial Sales	Bacoor	Hazardous Waste
Koki Phils. Inc.	City of Dasmariñas	Hazardous Waste
OM Mfg. Phil. Inc.	Rosario	Hazardous Waste
Solvtech Consultancy	Silang	Hazardous Waste
Southwing Enterprises	Gen. Trias	Hazardous Waste
Southcoast Metal Ent.	Rosario	Electronic Scraps and Hazardous Waste
Sarido Industries	Tanza	Busted Fluorescent Lamps
Donchem Waste Management Services	Imus	Hazardous Wastes

Source: Provincial Government Environment and Natural Resources Office