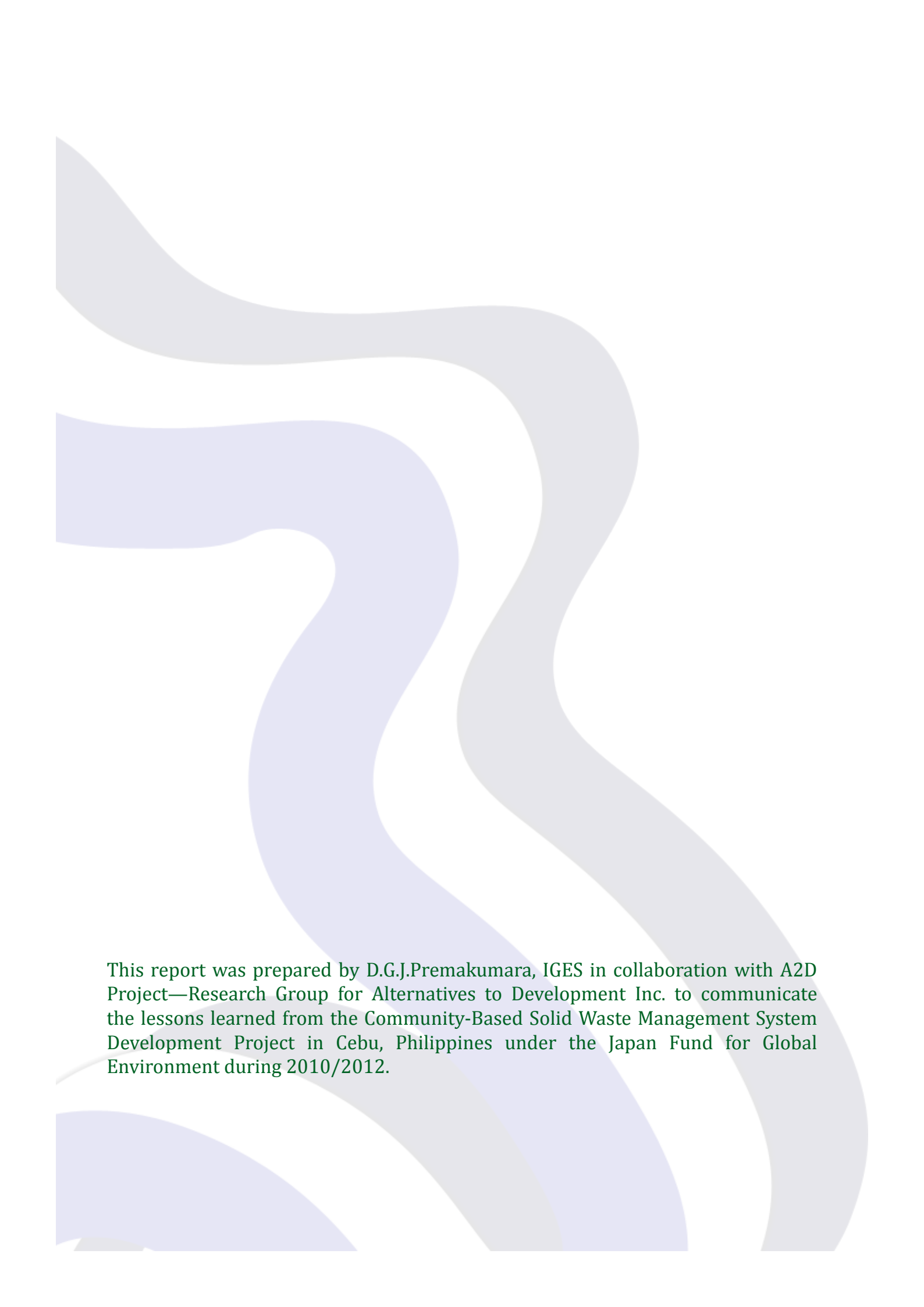




Best Practices and Innovations in Community-Based Solid Waste Management in Cebu



Kitakyushu International Techno-cooperative Association
provides international cooperation aiming at harmony
between industrial development and environmental conservation



This report was prepared by D.G.J.Premakumara, IGES in collaboration with A2D Project—Research Group for Alternatives to Development Inc. to communicate the lessons learned from the Community-Based Solid Waste Management System Development Project in Cebu, Philippines under the Japan Fund for Global Environment during 2010/2012.

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Foreword

The partnership undertaken by the City of Cebu (Philippines) and Kitakyushu City, Japan to promote a decentralized, community-based composting system through the KitaQ System Composting in Asia Project and the success attained are affirmations that much can be achieved if citizens are taught environmentally sustainable principles and provided the logistical and policy support to practice effective methods in their respective communities. Methods and approaches similar to the KitaQ System Composting are essential in any participatory environmental management program. This has been confirmed through the recognition bestowed to some local government units and entities practicing similar programs.

Indeed, the challenges posed by an increasing volume of solid waste in a rapidly growing society, exacerbated by a “throw away” mentality, continue to hound economies in many parts of the globe.

This becomes a governance issue as well because ineffective solid waste management affects public health, contributes to greenhouse gas (GHG) emission, aggravates climate change, and derails any attempt to attain sustainable development.

The situation becomes untenable such that some government leaders and policy makers resort to technologies that claim to be the panacea to all solid waste problems. Most often, such approaches are contrary not only to universally accepted environmental standards but also to the basic principle that working with communities rather than just relying on technologies is essential in resolving problems of this magnitude.

We, therefore, need to sustain projects and collaborations utilizing effective approaches such as the KitaQ System Composting, to continue promoting the same in the communities, and to pursue active information campaign. Such campaign should mobilize the citizens to practice waste avoidance and resource recovery and to employ source reduction and waste minimization measures, such as composting and recycling.

For the City of Cebu, we maintain our faith in promoting composting both in the household and barangay levels, thus the continuing pursuit to teach Cebuanos the Takakura composting method and to help barangays establish composting and material recovery facilities.

I am expressing my deep appreciation to our Kitakyushu City partners, the Kitakyushu International Techno-Cooperative Association (KITA) and the Institute for Global Environmental Strategies (IGES), for providing their knowledge, time and resources to help empower communities and make them responsive to the challenges on solid waste management.

Nida C. Cabrera

City Councilor – North District, City of Cebu

Chairperson – Committee on Parks and Playground, Wildlife, Ecology and Environmental Management, Cebu City Council

Cebu City, Philippines

Introduction

The island of Cebu is located in Central Philippines, about 600 km south of Manila, the country’s capital. Metro Cebu, the second largest metropolis in the Philippines, is a coastal urban sprawl comprising four (4) cities of Cebu, Mandaue, Lapu-lapu and Talisay; and six (6) municipalities of Compostela, Lilo-an, Consolacion, Cordova, Minglanilla and Naga. It has an approximate total land area of 74,209 hectares and accomodates about 1.6 million people according to the year 2000 census. About 70% of the economic activities of the region are concentrated in Metro Cebu (Cebu City, 2007).

Solid Waste Management (SWM) is considered to be one of the most serious environmental issues confronting urban areas in Metro Cebu. Rapid urbanization and economic growth in the region have resulted in a corresponding growth of solid waste, which local governments find difficult to manage.

SWM is primarily the responsibility of local governments. It is the largest single budget allocation, though many local governments in the region are struggling to provide at least the most basic level of waste services to its citizens. Typically, one to two thirds of the solid waste generated in the region is not collected. The uncollected

waste, which is often mixed with human and animal excreta, is dumped indiscriminately in the streets and in drains, thus contributing to flooding. The urban poor, who are living in the low-income areas, suffer most from the life-threatening conditions deriving from deficient management of solid waste.

The most common existing treatment method throughout the region is land filling, as it remains the cheapest and easiest way to dispose of waste. However, many landfills in developing countries are poorly designed and uncontrolled, effectively turning into open, unsanitary dumpsites. The existing dumpsites have most often reached their maximum capacity and finding new sites is becoming an increasingly

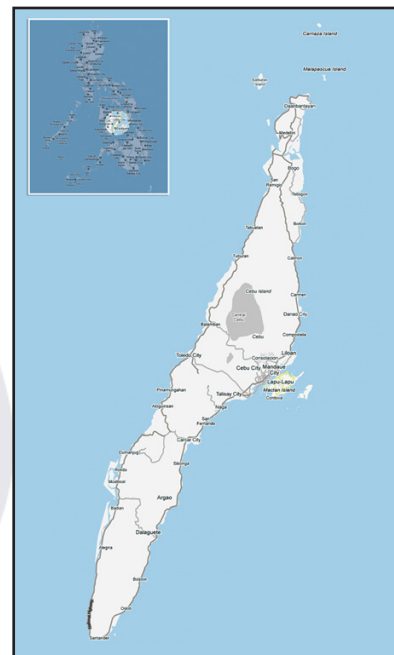


Figure 1: The Location of Cebu
Source: <http://www.cebuan-guages.com>

Table 1: Population, Density and Growth Rate in Metro Cebu, Province and Philippines
(Source: City Planning and Development Office, Cebu City, 2007)

	Total Population in 2000	Population Density in 2000 (pr sq.km.)	Annual Growth Rate, 1995-2000 (%)
Cebu city	718,821	2,204	1.77
Mandaue city	259,728	6,743	6.36
Lapu Lapu city	217,019	2,933	4.88
Talisay city	148,110	3,062	4.56
Naga city	80,189	702	3.27
Minglanilla city	77,268	1,277	4.64
Liloan	64,970	1,130	5.33
Consolacion city	62,298	1,170	5.18
Cordova city	34,032	3,146	5.41
Metro Cebu	1,693,831	1,990	2.26
Province	2,377,588	603	3.07
Philippines	76,498,735	229	2.36

difficult task for local governments due to the scarcity of suitable land within their boundaries and the increasing costs and land values. This results in serious local, regional and global public and environmental health problems, including air pollution, soil and groundwater contamination and emission of greenhouse gases (GHGs).

The Republic Act (RA) 9003 or Ecological Solid Waste Management Act of 2000, was ratified for providing the legal framework in establishing an integrated solid waste management system based on 3Rs (Reduce, Reuse and Recycle) and trying to reduce the amount of waste generated at the source, rather than later at the end-of-cycle.

Under the RA 9003, local governments are responsible for SWM planning, implementation and enforcement, including the creation of SWM board, preparation of SWM plan, establishment of the material recovery facility (MRF), composting and establishment of sanitary landfill for final disposal. However, only a few local governments in the region are able to prepare, implement their plans and sustain their activities. There are still many cases of improper waste disposal, lack of policy enforcement at the local level, and lack of awareness and participation in both the private and public sectors.

Despite this, there are some successful local initiatives utilizing an integrated, decentralized, and sustainable municipal waste management approach. A central feature of this approach is the implementation of waste separation at source, promotion of recycling, and composting; and building partnership among the community, the private sector and the local government. However, opportunities to share these good practices are hampered by the lack of documentation. Thus, this report shares some best practices in community-based solid waste management and composting in the Metro Cebu. They include case studies from Cebu, Mandaue, Talisay, Lapulapu and San Francisco and cover the efforts of local governments, the private sector and community groups.



Figure 2: Inayawan Landfill Site, Cebu City.
Source: Premakumara, IGES, 2010



Figure 3: Uncollected waste dump in open spaces in Cebu.
Source: Premakumara, IGES, 2010

Table 2: Common Waste Disposal Methods in Metro Cebu, 2000
(Source: UNEP, 2009)

Method of Waste Disposal	Household	
	Total Number	Percentage (%)
Collection by garbage trucks	212,652	31.5
Illegal dumping	71,192	10.5
Burning	331,762	49.1
Composting	16,891	2.5
Burying	16,891	2.5
Feeding to animals	11,929	1.8
Others	4,272	0.6

Municipal Solid Waste Management System and Practices in Cebu City

Since the enactment of RA 9003, Cebu, as one of the leading cities in the region, has taken innovative efforts to manage its municipal solid waste based on the concept of the 3Rs (Reduce, Reuse and Recycling). Some of these innovative policies and practices are described briefly in this section.

Solid Waste Management Regulations

Cebu City promulgated several ordinances to strengthen the policy framework in implementing the ecological solid waste management under the requirements of RA 9003.

Establishment of Solid Waste Management Board (SWMB)

A Solid Waste Management Board (SWMB) was established in 2003 under the chairmanship of the Mayor to take necessary policy, legal and institutional recommendations in implementing the SWM programmes. A 10-year Plan for Solid Waste Reduction in Cebu City was drafted in 2005 with the technical assistance of Fort Collins, Colorado, USA, under the Resource Cities Programme of the International City/County Management Association. Under the Kitakyushu Initiative Network for a Clean Environment (2000/2010), which was initiated by Kitakyushu City and the IGES with the assistance of the United Nations Economic and Social Commission for Asia and the Pacific (UNESCAP), Cebu City had also set a target to reduce waste to be land filled by 50% by 2015. For the implementation of the SWM plan at the barangay level, the Barangay Solid Waste Management Committee (BSWMC) was established under the leadership of the barangay captain.

- City Ordinance No. 2243 (the Sustainable Development Ordinance of the City of Cebu) provides for preservation and protection of the environment for future generations.
 - City Ordinance No. 2017 (the ordinance of the Cebu City Solid Waste Management Board [SWMB] and appropriating funds) ensures the adoption and formulation of an integrated, comprehensive and ecological SWM programme through the participation of community, NGOs, and the private sector.
 - City Ordinance No. 2031 promotes solid waste segregation at the source by enforcing the No Segregation, No Collection policy, providing penalties thereof and the creation of a special funds for incentives.
 - City Ordinance No. 1361 details the system of waste collection, imposing fees thereof and expropriating funds for it and for other related purposes.
- (Source: UNEP, 2009)

The major functions of the SWMB

- Prepare, submit and implement a ten-year SWM plan for the city and develop specific guidelines for its implementation;
- Review plan every two years and monitor its implementation;
- Adopt revenue-generating measures to promote support;
- Provide necessary logistical and operational support;
- Coordinate efforts of its component Barangays;
- Manage the collection and disposal of residual and special wastes;
- Encourage setting up of multi-purpose Environmental Cooperatives;
- Enforce City Ordinance No. 2243 (the Sustainable Development Ordinance of the City of Cebu)

The major functions of the BSWMC

- Formulate a solid waste management programme consistent with the city municipality plan;
 - Segregate and collect biodegradable, compostable, reusable wastes;
 - Establish a material recovery facility;
 - Allocate Barangay funds and look for outside sources of funds;
 - Organize core coordinators; and
 - Submit monthly report to the city.
- (Source: UNEP, 2009)

Creation of New Carder System

The Cebu Environmental Sanitation Enforcement Team (CESET) was formed for mobilizing the participation of communities in enforcing the environmental laws and policies. Further, a system of Barangay Environmental Officers (BEOs) was established, recruiting five staff members for each barangay based on the community leader elements. The BEOs were trained to play an effective role as information providers in their respective barangays and also to take responsibility in enforcing the municipal policies, monitoring proper waste collection, assisting in establishing the Material Recovery Facility (MRF) and managing the composting schemes.

Enforcement of No Segregation No Collection Policy

Since April 2011 the city has strictly enforced the No Segregation, No Collection Policy and started to educate citizens to separate waste at source into biodegradable, non-biodegradable, recyclable and residual in its aim to meet the goals of RA 9003. The CESET is active in monitoring policy implementation and seeing that violators are fined or imprisoned under City Ordinances No.1361 and No.2031.

Supportive Strategies for Establishing Material Recovery Facility (MRF) at Barangay Level

The city has introduced several supportive strategies to encourage the barangay staff in establishing the MRFs. The annual municipal budget (20,000 pesos for each barangay) was allocated based on the demand-driven approach to support the efforts of barangays in establishing MRF and composting centres. This budget can be used for covering the construction costs and buying required tools and equipment. In addition, the city has provided necessary trainings for the barangay staff. Further, a number of competitions, including the best environmental barangay and the cleanest sitio, were started in partnership with the private sector and the media to motivate and strengthen community participation, and encourage them to improve their neighbourhood environment.

Promotion of composting city-wide

Since 2010 Cebu City, in collaboration with its counterparts in the Japanese city of Kitakyushu, has started to promote composting city-wide.

URGENT NO SEGREGATION NO COLLECTION

MALATA SALIN SA PAKAON UTANON DAHON PANIT SA PRUTAS PAPEL TINA-E SA ISDA HUGAW SA HAYOP CARTON	D-MALATA PLASTIC BAGS TINIDOR O PLASTIC STRAW PUTOS SA ICE WATER JUNK FOODS SCOTCH TAPE STYROFOAM TETRA PACKS	RESIDUAL NAPKINS DIAPERS TRAPO BATTERY FLOURESCENT BOTILYA NGA DI MAGAMIT
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BALAOB SA REPUBLIC ACT 9003
Clean Air Act 8749 ug CITY ORDINANCE 1361 UC 2031

MGA GINADILI:

- PAGLABAY UG MGA BASURA SA MGA PUBLIKONG LUGAR.
- ANG DILI PAGLAIN-LAIN O PAGBAHIN-BAHIN SA MGA BASURA.
- PAG SAĞOL-SAĞOL SA MGA NAĞKALAIN-LAIN NGA BASURA.
- GINADILI ANG BASURA NGA MAKATAĞ S KA METROS PALIBOT SA MGA PARIŁ O KORAL SA MGA BALAY O "BUILDING".
- MGA LUGAR PATIGAYONAN KINAHANĀLAN DUNAY SUDLANAN SA MGA BASURA UG DILI MAKASAMOK SA MGA TAONG LUMALABAY.
- PAĞLUWA, PAĐPANĀHI, PAĐKALIBANG SA PUBLIKONG LUGAR.
- ANG PAĐPAĐAWAS SA BASURA SA DILI PA TANDANG ORAS O SCHEDULE
- PAĐSUNOD SA BISAN UNSANG BASURA, LABI NA ANG PLASTIC UG GOMA
- PAĐLABAY SA BISAN UNSA NGA BASURA SA MGA SAPA UG KANAL.

SCHEDULE SA PAG KOLEKTAA!!!

MONDAY, WEDNESDAY, FRIDAY & SUNDAY
MALATA OR BIODEGRADABLE WASTE UG NILAHI NGA RESIDUAL/SPECIAL WASTE

TUESDAY, THURSDAY & SATURDAY
DILI MALATA – NON BIODEGRADABLE WASTE UG NILAHI NGA RESIDUAL/SPECIAL WASTE

MGA SILOT OG MULTA

*Compromise Fee: P500.00-5,000.00
*Usa (1) hangtud unom ka bulan nga pagkabilanggo depende sa desisyon sa korte
Alang sa mga pangutana o reklamo palihug tawag sa CESET tel.2551685, 2563108 DfPS office 2329271

Figure 4: No Segregation, No Collection Policy Issued by Cebu City. Source: Cebu City, 2012

While over 50% of municipal waste includes the organic materials, the bulk of other recyclables being separated at source or taken out later, composting remains of great interest for reduction of waste to be landfilled. Thus, the city has taken an initiative to establish model composting schemes at different scales and different levels, such as household, neighbourhood initiatives or barangay composting schemes; small-scale private sector composting enterprises; and initiatives of companies and institutions in composting on their premises. In addition to vermin compost, a traditional compost method practiced in Cebu City, the Japanese project introduced a Takakura Compost Method, a method initiated by Koji Takakura, an expert from the JPOWER/Jpec Group Inc. in Kitakyushu, based on the use of fermentative microorganisms. Because of its low cost, ease in learning, and practical applicability as well as a speedy decomposition process, the method was getting popular as one of the effective composting methods in the city.

The Takakura Method of Composting

Dr. Koji Takakura, Coordinator (Senior compost expert) of the Wakamatsu Environment Research Institute, invented this composting method. It has three key elements: fermentative microorganisms, moisture/water content, and aerobic fermentation.

Certain types of fermentative microorganisms, which include the following, aid the 3-stage composting:

- mould fungi and bacteria (decomposes carbon hydrate, protein, and fat)
- actinomycete bacteria (decomposes cellulose and hemicellulose)
- basidiomycete bacteria (decomposes lignin)

Kitchen garbage is chopped and mixed to seed compost every day. Chopping them up into smaller pieces also hastens decomposition.

In the Kalunasan composting center, large amounts of seed compost are piled up. Organic wastes from the market are then mixed into these and are left to decompose for 2 days. The compost is then shredded before they are arranged in heaps to ferment for 10 days. The appropriate moisture content for compost heaps is between 40-60%. Workers regularly mix and turn the heaps to encourage aerobic decomposition.

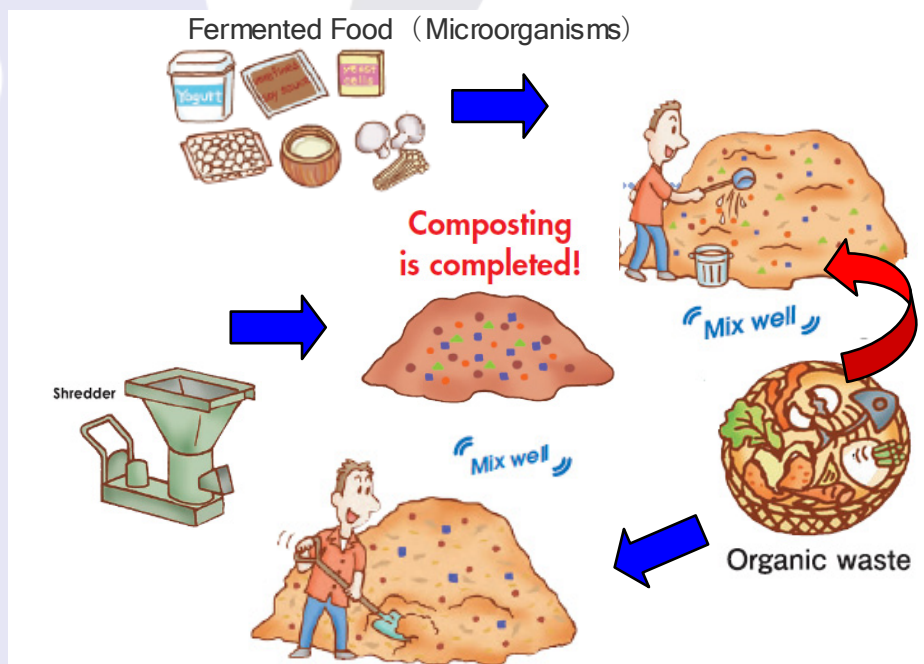
Preparation

- Rice husk
- Rice bran
- Fermented foods
- (such as: Lactopafi, Tuba coconut wine, dry yeast)
- Humus(forest soil)
- Mushroom
- Sugar

How to make Seed compost

Fermentation microorganisms can be found in the local area. We can collect the microorganisms from fermented foods. Actionmycete and Basidiomycete can be collected from forest soil and mushroom respectively. At first, Rice husk and Rice bran mixed well. Fermentation foods, Humus, Mushroom and sugar are mixed with water and treated to the above fermenting bed. Adjust the moisture level to 40~60% by adding water. Keep it about 3~5 days for fermentation in it (complete seed compost).

(Takakura, 2011)



“Aside from hosting the city’s main composting center, I think one of the best practices of Kalunasan is its commitment to strictly observe city ordinances on solid waste management and promote knowledge sharing in schools.”

-Jovencio T. Lopez, Barangay Administrator

Distribution of compost baskets to individual households

Cebu City distributed composting baskets as a simple way to treat organic waste in the household. The BEOs share information on household composting and educate residents in their barangays with the assistance of the women’s organizations, homeowners associations and NGOs about the benefits of keeping the environment clean and green. Households that gained sufficient knowledge of the functions of the compost basket and shown interest in its use were selected to receive the free baskets from the city. People were educated about the way to cut their kitchen waste into small pieces and put them into the compost basket. In two to three weeks, the organic waste is converted into compost that is commonly used to grow vegetables and herbal plants in their home gardens. The recyclable materials are collected separately and sold to the junk shops. To date, the city officials have already distributed about 2,350 baskets within the city limit. However, it was identified that this approach could be very effective in the barangays where residents have a good education on the environment, basic knowledge on how to make composting, commitment to use the basket and availability of effective follow-up and monitoring system. At present, BOEs are involved in following up and monitoring the household baskets and troubleshooting by helping households with their composting activities.

Table 3: The distribution list of Composting Basket in Cebu City (Source: Cebu City. Compiled by Premakumara, 2010/2011)

Name of the Barangay	No. of Baskets
Barangay Punta Princesa	71
Barangay Inayawan	51
Barangay Quiot	134
Barangay T. Padilla	4
Barangay Capital Site	13
Barangay Ermita	29
Barangay Guadalupe	136
Barangay Labangon	183
Barangay Sambag 11	20
Barangay Tisa	30
Barangay Tag Bao	40
Barangay Mambaling	71
Barangay Luz	25
Barangay Carrita	25
Cebu Environmental Sanitation Enforcement Team (CESET)	465
Others	1053
Total	2,350

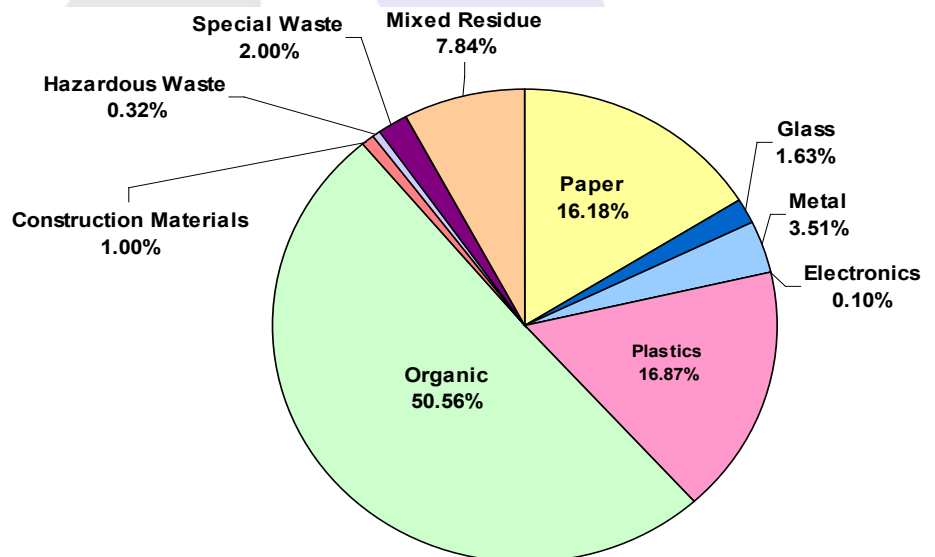


Figure 5: The Composition of Municipal Solid Waste in Cebu City. Source: Cebu City, 2012



Figure 6: Training and distribution of compost baskets to the residents. Photo: Premakumara, 2010/2011

Construction and operation of model composting schemes at barangay level

With the technical and financial assistance of Cebu City, some barangays have established their own composting schemes. These composting schemes are small in scale (less than one ton/day) and largely rely on segregated waste from nearby residents and/or market waste. The residents are educated to separate waste at source. Separated organic waste is then collected by the BEOs and transported to the composting facility. In some cases the waste collectors also sort mixed waste into different piles during the collection process, as not all segregate the biodegradable pile. At the composting facility, biodegradable waste is treated by using vermin composting (with special types of worms, such as the redworm, the African nightcrawler and

the European crawler, that can multiply fast and sell at a high price) and/or a windrow method with the fermented microorganism (the popular method now widely known as the “Takakura Method”). The compost product is mainly used for the greenery of the barangay or sold within the barangay, where marketing strategies are limited to personal contact among the collectors or core members of the associations. Compost prices have ranged from 8 to 20 pesos which also reflect the middle and high income users targeted in the areas where these schemes are often located. The main challenges for these schemes are cooperation of residents, finding land in suitable locations, odour complaints by the nearby residents, especially for vermin compost facilities and the lack of capacity, interest and willingness of the barangay staff.



Figure 7: Composting facilities in barangay Talamban and Luz. Photo: Premakumara, 2010/2011

Medium-scale business oriented enterprises

These composting schemes are run by individual entrepreneurs, NGOs and cooperatives at barangays, who have identified the organic waste treatment and recycling as a business opportunity and found a market for the end products. Entrepreneurs have invested private money in the business or taken loans. The cooperatives, on the other hand, got financial assistance from their barangays and private ventures to cover the initial capital costs. They all focus on pure organic waste streams such as waste from vegetable, fruits or flower markets as well as residuals from business premises rather than household collections. The scale of the composting facilities is varied from one to two tons/day and the composting methods are usually similar to the ones already mentioned. After the compost is matured, it will be packed and ready to market. Each composting facility has its own marketing strategies and most commonly the compost product is sold through a fertilizer distribution company. For additional income, some entrepreneurs act as consultants for associations or companies wanting to start composting activities or cross-subsidize the composting activities with the revenues from waste collection fees and selling of the recyclable materials. These composting facilities with a business approach provide job opportunities to low income groups. Both male and female workers profit from the business; they are employed for waste collection, sorting, composting or as drivers. The key challenges faced by these composting facilities are finding a suitable land, initial capital for covering the cost, difficulties in covering the cost only through the sale of composting, scarcity of documentation of waste flows and unclear

financial figures, some complaints from nearby residents, and lack of support from the barangay and the city government.

Composting at institution and company premises

These composting schemes are set in different organizational setups. They are initiated and operated by the institution or company to treat the organic waste generated within their own premises. The decision to start the composting facility results from an unreliable waste collection service of the barangay, from cost saving, and/or from environmental consciousness. The employees of the institution operate the facilities themselves. The composting methods and scales of operation that are chosen in these schemes are usually similar to the ones already mentioned. The most common method was bin or box composting in combination with windrow/native microorganism method. Most of the compost produced is used on the premises, but some are marketed. While a company or institution has to pay the barangay for transport of waste from their premises to the landfill, savings in collection and transport fees can be achieved by recycling and composting. The advantage of this type of composting scheme is the relative ease and speed of decision making as well as tight monitoring of the scheme. Decisions are usually taken by the one in charge of the environmental department of the organization and are less dependent on municipal collaboration. However, by offering incentives and technical assistance to companies, the municipality can facilitate the process of initiating composting programmes at the institutional level.



Figure 8: Composting facilities at SunPride Company and Handuraw Pizza Restaurant. Photo: Premakumara, 2010/2011

Composting Plant of Bio Nutrient Waste Management Inc. in Inayawan

This project was started by Emma Rama and two of her friends from the Permaculture Learning Group in Cebu City as a solution to treat organic waste discharged by her neighbour, Creative Cuisine, a well-known catering service company located in the residential sub-division of barangay Lahug. The uncollected stock of left-over food and kitchen waste of the catering company created an unhealthy environment in the neighbourhood. One day Emma Rama and her team proposed the idea of composting as a solution to the problem and negotiated with the owner of the catering company to give them organic waste every day. The owner of the catering company found the idea good, because he could then save on the monthly fee of 4,000 pesos for a private company to transport his waste to a landfill, even though the waste collection service was not satisfactory. Emma's team established a small composting plant in her vacant land and started to make compost, accepting about 0.3 tonnes of organic waste daily from the catering company and from her own residence. One of the team members, Cassy, who knows the Takakura Composting Method, helped her to train a worker on how to make compost effectively. The compost plant required about 25,000 pesos for initial costs and 6,000 pesos monthly for its operation and management. While Emma has a passion for and some experience in organic farming, she started to grow herbal plants using the compost products and sell them to the nearby supermarkets and malls in addition to selling the compost product at 10 pesos/kg. Gradually, she found a good demand for both her herbal plants and the compost products.

After a year of operation, the team expanded the composting activities to address the large demand for organic composting not only within Cebu City but also from the entire region. A new company called Composting Plant Bio Nutrient Waste Management Inc. was established in partnership with Cebu Solid Waste Management Inc, a waste recycling company and a new compost plant that was constructed in the site next to the landfill site in Inayawan. Currently, the compost plant of simple structure accepts about 12 tonnes of organic waste per day from the markets and shopping malls. The private collection companies transport the waste to the compost plant free of charge. At the compost plant, about 10-15 workers and one supervisor are recruited to separate waste and operate the compost piles. After segregation, the larger materials are shredded and manually fed to the compost plant daily. Most of these workers are scavengers who were in the landfill site and now earn about 200 peso/day. The payment for the supervisor is about 300 pesos/day.

While the compost plant is at an experimental stage, it is very difficult to analyze the cost and benefits. However, the data gathered from personal communication indicate that estimated income of the plant is enough to cover the operational costs easily. The daily operation cost is about 9,300 pesos (personnel cost is about 3,300 and other management costs are about 6,000), which can be covered by the daily income of 12,000 pesos (sale of 3,000 kg of compost at 4 pesos/kg). The compost plant is now negotiating with Cebu City for the processing of 50 tonnes of market waste from the Carbon market, with a tipping fee of 700 pesos/ton, the introduction of some mechanical applications for the operation, agreeing on a business strategy and getting a composting certificate from the Agricultural Department.



Benefits of Community-Based Solid Waste Management and Composting

The experiences of Cebu have identified the enormous potential of community-based SWM and composting in achieving sustainable development with strong economic, social and environmental benefits.

Achieving Waste Reduction Targets

The successful community-based SWM and composting programmes reduce the waste to be landfilled by diverting a larger amount of waste from the municipal stream close to the source of generation. As Figure 9 shows, the municipal waste generation in Cebu City has increased from 212 tonnes/day in 1982 to 470 tonnes/day in 2010. However, since the city has taken efforts to

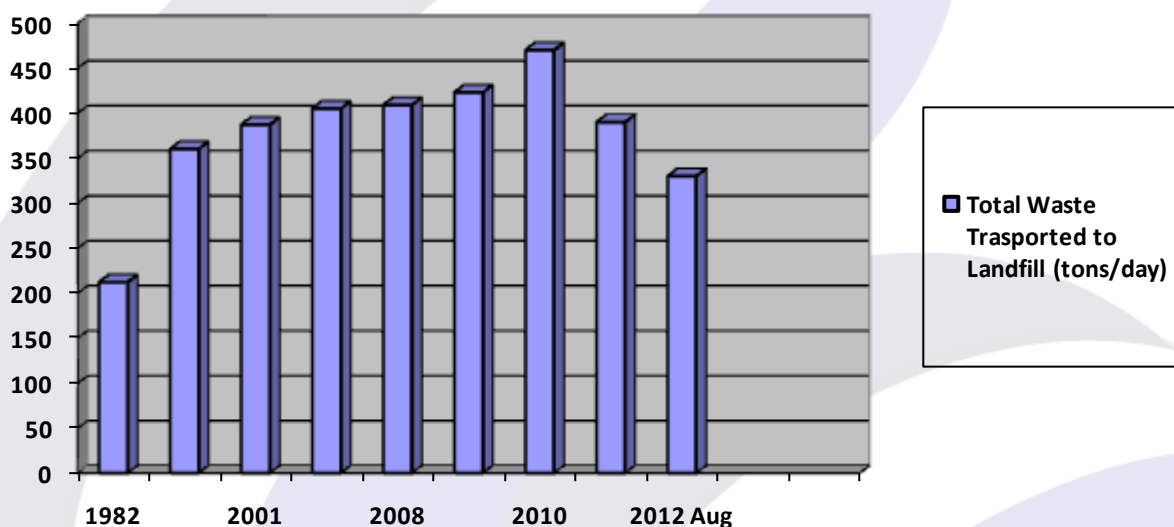
introduce waste separation at source, recycling and composting activities at community-scale, about 30% waste reduction target was achieved by 2012.

Reducing Municipal Budget for Waste Management

The reduction of waste to be landfilled brings a significant reduction of the municipal budget for waste collection, transportation, and landfill management, which can be used for further upscale of the community-based SWM activities in the city or any other development activity in the barangays.

The estimation shows that reduction of 30% or 140 tonnes/day waste to be landfilled brings the following cost savings for Cebu City. (Source: Personal communication with the Director Engineer of DPS, 2012)

- Cost for waste collection and transport to the Inayawan landfill (800 pesos/ tonne x 140 tonnes) = 112,000 pesos
- Cost pay for the private company for waste transportation from Inayawan to Consolacion final landfill site (200 pesos/tonne X 140 tonnes) = 28,000 pesos
- Tipping fee for waste dumping at the Inayawan landfill (750 pesos x 140 tonnes) = 105,000 pesos



Generating Livelihood and Strengthening Local Economy

The experiences of Cebu City have also recognized the potential of community-based SWM and composting activities in generating livelihood and creating local economic opportunities for community members through the promotion of recycling, hiring waste collectors, and establishing composting facilities. As shown in barangay Luz, one of the successful model barangays in Cebu City, its Kuwarta Sa Basura Programme (KSBP) has benefited the residents by creating livelihood and

local economic opportunities for them, especially poor housewives. A Bayanihan center was formed in each sitio to buy the recyclable materials and train a pool of trainers to make handicraft, such as bags, plant hangers, and flower pots using the collected recyclable materials. Composting is promoted at both household and community scales to treat the collected organic waste. As Table 4 shows this programme has resulted in creating about 338 new job opportunities for the poor residents, giving them additional income of 404,500 pesos per month.

Table 4: The creation of job opportunities through composting and material recovery facility in barangay Luz in 2011 (Source: Barangay Luz. Compiled by Premakumara and St. Teresas College, 2012)

	No of new job opportunities are created	Average monthly income in Peso	Total monthly income generated in Peso
Direct job opportunities at the composting facility and the material recovery facility			
Waste separation, collection and transport to the facility	15	6,000	90,000
Composting facility	6	6,000	36,000
Eco centre assistant	2	3,000	6,000
In-direct job opportunities created with the programme			
Collection of recyclable materials	40	1,500	60,000
Production of handicrafts from the recyclable materials	75	1,500 – 3,000	112,500
Household composting and cultivating worms for selling	200	500 – 1,000	100,000
Total	338		404,500



Figure 9: Community Recycling Activities in Barangay Luz. Source: Cebu City, 2012

Strengthening Community Cohesion

These experiences have also highlighted the importance of community participation in community-based SWM and composting throughout the project cycle. The programmes have created space for community involvement in local decision making, raised awareness and understanding on environmental issues, developed partnership, trust and understanding among service providers and different groups in the community, and enhanced opportunities for vulnerable groups to take part in meaningful activity.

Improving Local and Global Environment

The community-based SWM and composting programmes often bring environmental and health benefits to the residents through improving the primary waste collection and treatment at the neighbourhood level. Uncollected waste provides breeding grounds for disease vectors, such as those of 22 human diseases identified as linked to improper SWM (World Bank, 1999). Improper waste dumping had blocked urban waterways in the barangays which cause flooding during the rainy season. However, the communities which have proper SWM system noticed less impact on flooding incidents in their place.

From the global perspective, composting practices certainly produce a valuable enhancement to soil for agriculture. Despite significant increases in

crop production, the green revolution had caused negative side effects through excessive use of chemical fertilizers causing depletion of top soils and ground water pollution. The high organic matter content in compost will help to re-establish the natural soil structure leading to improved crop production. Urban agriculture plays an exceptional role in the provision of fresh food for urban dwellers and the realization of a good market for compost production.

Improper waste disposal has also received increasing attention in relation to climate change, particularly as a significant contributor to greenhouse gases (GHG). One measure for reducing GHG emissions at lowest cost and in a sustainable way in developing cities is the promotion of composting. Composting falls under the category of greenhouse-gas-avoiding measures. Organic waste, which is composted under aerobic conditions, produces less greenhouse effect (in terms of CO₂ equivalents) than organic waste dumped in landfills. As landfills are typically anaerobic, the waste generates methane, which has a 21-fold stronger impact on global warming than CO₂. The rough estimation based on the UNFCCC report “Avoided emissions from organic waste composting at landfill sites” (UNFCCC, 2005) suggests that there has also been a reduction of greenhouse gases generated in landfills through composting in Cebu City as equal to 12,000 tonnes of CO₂ equivalent in 2012.

Community-based SWM and Composting in Barangay Agsungot

Agsungot, a small mountain barangay in Cebu City, is the winner of best model barangay in 2011 under the category of small barangays. It received this award for the promotion of organic waste composting to achieve food security and malnutrition. Twenty (20) families in this barangay came together to form a network for establishing backyard gardening using the product of community compost.



Lessons Learned

The cases presented in this report cover a wide range of innovative practices and initiatives in addressing the problem of SWM in Cebu. Experience shows that the conventional way of waste management by relegating responsibilities solely to the government officials has proven to be no longer effective. As can be seen in the cases documented in this report, successful community-based waste management practices are multi-faceted, involving several stakeholders in the process of implementation. To implement an innovative community-based SWM and composting programme city-wide, careful planning, organization and cooperation among these stakeholders are needed. As shown in Figure 10, national and state governments can create the enabling policy environment needed to support the community-based SWM and composting programmes; local governments can

establish a shared vision and strategic framework among stakeholders, secure the political will, enable and regulate the national policies, involve the community and private sectors, manage the implementation, and lead ongoing, systematic monitoring and evaluation activities; communities can organize the members, raise community awareness, and implement the community-based practices; households can segregate waste at source and participate in the community activities; the local private sector can promote/produce sustainable technology, develop financing mechanisms, and pursue partnership; and development partners can contribute technical guidance to facilitate research, planning, design, capacity building, implementation, and monitoring activities. The important lessons that were gained from the case study assessments include:



Figure 10: Partnership Model for Implementing Community-based SWM and Composting. Source: By Authors, 2012

Promote public education and capacity building

Community-based SWM and composting will not be successful unless serious attention is focused on public education and awareness. A strong emphasis should be placed on capability building and raising public awareness on the importance of proper waste segregation at source. These initiatives are cost-effective since the cost it requires is relatively low, but they have long-term and far-reaching impacts.

Institutionalize community-based composting

Community-based composting should be integrated into the Barangay Solid Waste Management Program. Composting is an effective way to reduce the waste that will go into the main waste stream and is cost-effective in managing biodegradable organic waste. Studies have shown that composting can also reduce substantially the volume of wastes that end up in the landfill. However, the success of community-based composting lies in the strong cooperation and involvement of communities. There should also be a strong emphasis placed on segregation of wastes at source in order to effectively implement composting. Massive information dissemination and enforcement of waste segregation at the source are needed to address this concern.

Adopt appropriate technology for solid waste management

One of the essential elements in solid waste management is the technology. Finding the appropriate, cost-efficient technology is challenging for many cities and municipalities. To do this, a strong focus should be placed on state-of-the-art technologies that use sustainable design principles for implementing the 3Rs (Reduce, Reuse and Recycle) programs in municipal solid waste management. Support in the form of subsidies from the government should also be provided to stakeholders adopting local technologies that are proven to have worked effectively in managing specific types of wastes.

Key Points

- The successful implementation of community-based SWM and composting programmes city-wide requires building partnership among all stakeholders—national, state, and local governments, communities, the local private sector, and development partners, with local government positioned at the center to manage implementation.
- A strong supportive enabling environment needs to be developed and maintained at national and local government levels.
- Establishing a shared vision and strategy among stakeholders and securing the political will to implement them are essential.
- Progress needs to be measured using simple and easy-to-measure indicators.
- Cost-effective implementation is key in promoting community-based activities city-wide.
- Capacity-building is necessary and efforts may include work with local government, the local private sector, and resource agencies.
- The programme should mobilize both private investments by households and private sector as well as public investments by government for the majority of funds required for project implementation, capacity building and program management.

Develop incentives for businesses to implement waste reduction programs

Businesses are important partners of local governments in reducing wastes. In order to encourage businesses to implement waste reduction programs in their respective companies, the government must offer incentives (or disincentives) to companies implementing such programs. This measure can substantially reduce the cost of collection and disposal of wastes for cities and municipalities. Rewarding business establishments, for example, with a tax relief incentive can encourage companies to adopt a waste reduction scheme, which in turn eases pressure to a great extent on the landfill requirements of cities and municipalities.

Establish partnerships between communities and the private sector

The private sector is an essential partner of communities in management of wastes. As illustrated by the case of Barangay Luz, the community has collaborated with Cebu Holdings Inc. (see Best Practices below) through a waste collection partnership agreement. As a result of this partnership, the community has created livelihood opportunities for community members by making products out of recyclable materials from the wastes of Cebu Holdings. However, partnerships such as this will not be effective and sustainable unless there are incentives for the community and private sector as well to enter into collaborative projects. In addition, there should be a strong emphasis on the culture of collaboration between the private sector and the community in addressing the need for waste reduction and recycling. A caveat must be mentioned since forging a meaningful partnership between the two sectors is not an easy task to achieve. Both sectors have to have openness and shared commitments to pursue common goals and objectives in order to have an enduring and lasting partnership.

Provide institutional support to strengthen community participation

The success of solid waste management program depends on the participation of stakeholders from the local government down to the community. However, community participation is more often a case of lip service than a reality. This is why the case of the municipality of San Francisco, Camotes stands out because the local government has ensured that institutional support mechanisms are in place to allow an environment for community participation. Conducive policies and an enabling institutional environment are necessary for community participation to take place. It is for this reason that the purok (sub-village) system functions effectively. More importantly, this environment could not have happened without a strong local leadership. The challenge is therefore how to create more local leaderships that are committed to building capacities of communities.

Barangay Kalunasan: Providing Mother Compost for a Metropolis

Best Practices

In 2011, the office of councilor Nida Cabrera initiated a composting project in Barangay Kalunasan, a mountain barangay in Cebu City. This was after the Institute of Global Environmental Strategies (IGES) and Kitakyushu International Techno-cooperative Association (KITA) introduced the Takakura method of composting. The Japanese partners held a trainers' training and distributed baskets for household composting. A total of 50 participants from 19 organizations attended.

According to Mr. Valeriano Dela Cruz Jr. of the Cebu Environmental Sanitation Enforcement Team (CESET), this project was born out of the need to address the heavy volume of biodegradable waste, particularly fruit and vegetable peelings, from Cebu City's central wet market in Carbon. Kalunasan was chosen because it had enough space required for the project.





ORDERS OF KALUNASAN MOTHER COMPOST		
DATE	PARTICULARS	RECEIVER
May 2012	33 kilos of Takakura compost	Cebu Institute of Technology
May 2012	6 kilos of Takakura compost	Sunny Hills
May 2012	6 kilos of Takakura compost	Paradise Village
11 July 2012	18 sacks of mother compost	Guba
	24 sacks of mother compost	Emma Ramas
19 June 2012	2 kilos of mother compost	Emma Ramas
22 June 2012	2 kilos of mother compost	Emma Ramas
12 July 2012	20 Baskets with Takakura compost	Sto. Nino Village
13 July 2012	10 Baskets with Takakura compost	
16 July 2012	2 baskets with 3 kilos mother compost; 18 kilos mother compost	DENR

The composting site in Kalunasan has provided mother compost to multiple sites in Cebu City since 2011. The two main composting sites employ the Takakura method. There is also a small vermicomposting facility.

Recently, SM City started delivering its organic waste to the facility for composting. Since April 2012, a total of 23.84 metric tons kilos of biodegradable waste from the mall have been delivered to Kalunasan for composting.

As more people are oriented about the Takakura method, more organizations from the city have ordered mother compost to start their own composting activities. Some of the organizations that have started Takakura composting are listed in the table on the left.

Best Practices

**Barangay Luz:
Engaging the Private Sector in a Sustainable Partnership**

Barangay Luz barangay is a class-A local government unit located in the North District of Cebu City, between barangays Hipodromo and Mabolo. It has a total population of 16,238. From being a largely residential community, the barangay evolved in over half a century to become a bustling commercial area. It is now home to a major mall, several high-rise office buildings, and hotels. With urbanization and rapid population growth, Barangay Luz, like other areas in the city, eventually encountered a big stumbling block in its solid waste management.

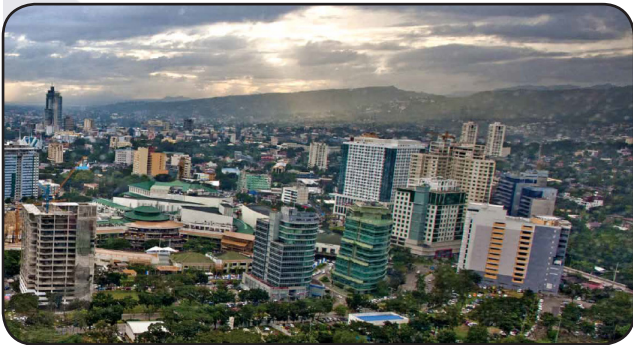
In response, Barangay Luz was one of the first to strictly implement R.A. 9003 at the barangay level. In 2007, it entered into a partnership with Cebu Holdings Incorporated (CHI), to collect all biodegradable wastes from its buildings and offices in Cebu Business Park, which is located within the barangay.

Cebu Holdings Incorporated is a local company engaged in real property ownership, development, and management. It was founded in 1988 and soon after established its corporate headquarters in Cebu Business Park, a real estate development designated for corporate and commercial buildings located in Barangay Luz

Barrio Luz’ partnership with CHI led to the building and establishment of Tugkaran, a green space and composting facility located in Cebu Business Park. The composting facility occupies a 2,800 square-meter lot located at Phase 3 of the Cebu Business Park. It processes tons of biodegradable wastes from ACC (Ayala Center Cebu), particularly fruit and vegetable peelings from food merchants (CHI Annual Report, 2011). In 2011, the bulk of biodegradable wastes from CHI properties were collected by Barangay Luz (see table on the right).



Solid Waste Management	Solid Waste	
Properties	Volume (kg)	Disposal Method
ESTATE		
Cebu Business Park	553,598	Dumping site
Cebu I.T. Park	90,694	
OFFICE BUILDINGS		
Cebu Holdings Center	12,658	Bgy. Luz collectors
Ayala Life-FGU Center	16,793	
eBloc Tower 1	40,520	Bgy. Luz collectors
RESIDENTIALS		
Park Tower One	15,106	Bgy. Luz collectors
Park Tower Two	15,791	
Amara	17,833	Liloan Municipality
SPORTS CLUB		
City Sports Club Cebu	25,140	Bgy. Luz collectors
MALL/RETAIL		
Ayala Center Cebu	246,012	Bgy. Luz collectors
The Walk	56,575	Bgy. Apas collectors



Because of the partnership with Cebu Holdings Incorporated, many barangay residents were given regular employment. Among them were:

- 21 employed as waste collectors for Ayala Center Cebu and Cebu Business Park
- 2 Eco Center personnel
- 220 out-of-school youth hired at Ayala Center Cebu establishments
- 4 *tanods* (watch patrol) to enforce environmental ordinances

Cebu Holdings Incorporated provided vocational scholarships for a Barista Course from the University of Southern Philippines Foundation, an academic institution located in neighboring barangay Lahug. Successful trainees were hired by Ayala Center Cebu coffee and beverage merchants Bo's Coffee, Figaro, Gloria Jeans, and Seattle's Best Coffee. Part of their success is credited to the barangay-initiated review classes for pre-employment examinations.

“Our partnership with CHI opened a lot of opportunities to our community, like scholarships for our youths and employment for jobless fathers who are doing the segregation and composting of wastes from the mall and Cebu Business Park. We are grateful that Barangay Luz has been chosen as their partner in their corporate social responsibility programs.”

**-Ronilio M. Sab-a,
Barangay Secretary**

Employment of Out-of-School Youth

Year	No. of youths hired per year
2008	120
2009	160
2010	220
2011	1000

Barangay Talamban: Adopting New Technology for Sustainable SWM



Consumption of petroleum worldwide, based on the latest statistics, is nearly 82.4 million barrels per day or almost 30 billion barrels each year. However, petroleum production is only 26 billion barrels per year. Out of the 195 countries, there are only 40 countries that produce petroleum. This means that the rest of the world has to import petroleum for fuel, which often causes major economic drain, with the high prices of oil on the world market (Sarker, Rashid, & Molla, 2012).

This situation led to efforts in finding alternative sources of fuel. One of the new technologies discovered is converting organic compounds into hydrocarbon fuel. Much of the work on this technology has focused on biomass, but deriving fuels from waste plastic material has been proven to be as feasible.

Talamban is one of the biggest and oldest barangays in Cebu City. In the past, residents earned a living by working on what was once a productive agricultural and pastoral land. Among the products were guava, santol, jackfruit, and papaya with sugar cane and corn as the major products. Today, the barangay is a commercial, residential, and educational area. Barangay Talamban has a total population of 29,531 as of 2012 spread out across 792 hectares of what was once corn and sugarcane fields.



As an initial response to the solid waste problem, Barangay Talamban adopted Cebu City ordinances 1361 and 2031 as prescribed by R.A. 9003. There are several opportunities that Barangay Talamban is harnessing in order to mitigate and hopefully solve the solid waste management problem in a sustainable and long-term fashion. One such activity is the proposed introduction of the plastic-to-fuel and pelletizer method, which is to be implemented early next year as spearheaded by the city level in partnership with barangay Talamban as the pioneering area (Cebu City Converting Waste Plastics to Fuel Baseline Project, 2011).



At the national level, the Poly-green Technology and Resources, a Philippine-based company, has created a system that converts plastic waste into fuel. Its inventor, Jayme Navarro, discovered the process while trying to convert plastic waste back into its original virgin form. Pyrolysis is a fairly simple process. It starts by drying plastics to be processed. They are then shredded into smaller pieces, and heated in a thermal chamber. The melted plastic is continually heated until it boils and produces vapors. The vapor is passed into cooling pipes and distilled into a liquid, which is chemically identical to regular fuel. The thermal chamber used in the process is designed to have very low oxygen, causing the plastics to melt into a liquid rather than burn. The vapor it produces is similar to that of the boiling water. Not only is the process producing a cheaper and cleaner fuel and reducing plastic trash and pollution, but it's also an environment-friendly process. A Pyre-Green

INGREDIENTS OF PLASTIC-TO-FUEL

1ST MIXTURE	2ND MIXTURE
400g of coconut husk (20%)	200g of coconut husk (10%)
200g of mango seeds (10%)	400g of mango seeds (20%)
1.4kg of shredded plastic (10%)	1.4kg of shredded plastic (7%)
TOTAL: 2 kilograms	TOTAL: 2 kilograms
Equipment: Shredder, Mixer, & Pelletizer Machine	
Pelletizer Machine: preheat 60°C Processing: 5 months Output: 13/4	Pelletizer Machine: preheat 140°C Processing: 5 months Output: 13/4

plant has now been running for three months, producing 1600 liters of fuel from 2 metric tons of plastic daily. The fuel produced is being tested in vehicles and so far they have very good results (www.gotecotech.com, July 2012).

Based on the initial results made by the Pyro-Green Company, an initial implementation of such system at the barangay level si milar to that of barangay Talamban will contribute to environmental conservation and may significantly reduce the country's garbage problems particularly that of the non-biodegradable wastes. It will also serve as an alternative source of fuel and may decrease pollution in terms of vehicle emissions.



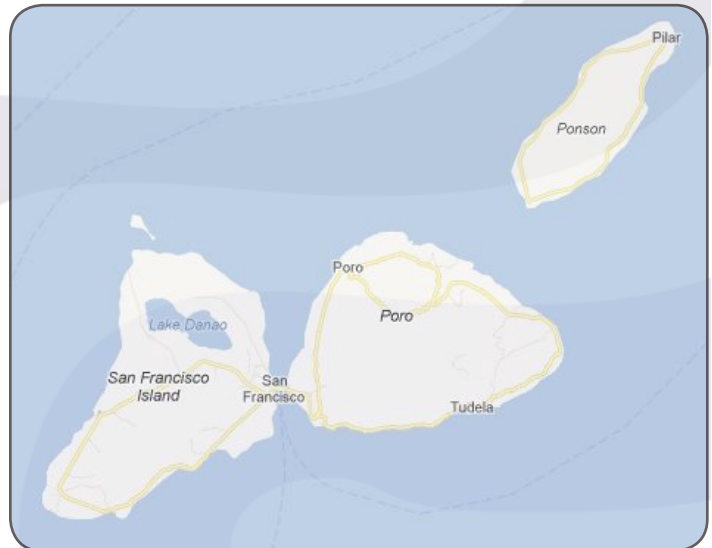
Best Practices**San Francisco:
Harnessing the Purok for Community-based SWM**

The municipality of San Francisco lies in the northeast coast of Cebu Island and is one of the 4 municipalities that constitute the Camotes group of Islands. San Francisco is a 3rd class municipality in Cebu Province with a total annual income of P55,862,028.19. Its main economic activities include agriculture and fishing, with tourism as a growing industry. San Francisco has a population of 45,125 (NSO 2010) spread over a total land area of 10,957 ha. that is divided into 15 barangays, 12 of which are classified as coastal. Around 7,948.53 hectares are considered arable land and about 143 hectares are classified as forest/reservation/timberland. Lake Danao, the largest natural lake found in the Province of Cebu, is a distinct part of San Francisco's physical landscape. It is both marketed as a tourist attraction and a site of tree-planting activities as well.

In 2011, San Francisco won the prestigious United Nations Sasakawa Award, given yearly to an individual or institution that has undertaken outstanding disaster risk reduction management (DRRM) programs in their communities. San Francisco bested 14 cities, 4 individuals and 7 institutions from around the world. The cities of Santa Fe (Argentina) and Northern Vancouver (Canada) came in second and third respectively to San Francisco.

How the Purok Works

The secret of San Francisco's success is its purok system. Under the Municipal DRRM Council and its implementing DRRM Office, all barangays in San Francisco have a purok structure that practices the bottom-up approach in identification, planning and implementation of all DRRM programs. Each purok has a



United Nations
Sasakawa Award
for Disaster Reduction

Recognizing excellence in reducing disaster risk



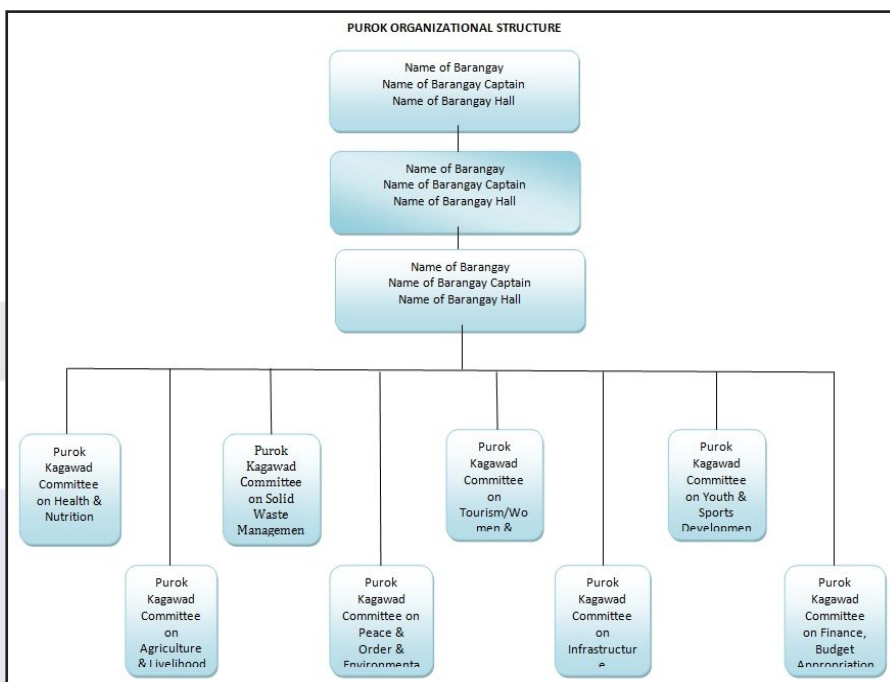
president that oversees several committees. The puroks coordinate with the barangay officials through a designated barangay councilor (A2D Project, 2011).

The Purok System plays a critical role in implementing the municipal DRRM programs. It enhances the community’s participation in responding to disaster risks effectively, while partnering with government, civil society, and NGOs in improving the overall situation of each barangay.

San Francisco’s Integrated SWM Program promotes an environmentally sensitive and climate-smart development. It is considered as a best practice in the municipality.

Under RA 9003 and supported by Municipal Ordinance 2009-061 (Modified Ordinance of Integrated and Ecological Solid Waste Management of San Francisco, Cebu), the town was able to develop a SWM strategy that addressed the problem of pollution and indiscriminate dumping of garbage. It created an SWM office, located in the municipal government complex, and allocated resources and logistics to implement SWM programs.

The municipality’s SWM program directly minimizes the risk of disaster caused by flooding by ensuring proper segregation of wastes and regular cleaning and unclogging of gutters, drainage systems and creeks.



EDUCATE

The SWM office works with purok leaders to conduct information campaigns at the purok level. The Department of Education (DepEd) and Cebu Technological University San Francisco campus also integrates the SWM program into its curriculum for elementary, high school, and college students.

IMPLEMENT

Purok leaders implement SWM programs by activating its SWM committees. These undertake regular cleaning of barangay environs and maintain the barangay MRFs.

ENFORCE

“No segregation, no collection” and “No burning of garbage” policies are strictly enforced.

SUSTAIN

Barangay MRFs provide livelihood opportunities and additional income by marketing recycled and processed materials.

Mandaue City: Training Future Leaders for SWM Sustainability

Best Practices

Mandaue City is one of only two highly urbanized cities in the Central Visayas region. Before the second half of the last century, the then-town of Mandaue had relied heavily on agriculture to boost its economy. In the 1960s, the city started its sustained growth and development when it adopted policies for industrialization. Within ten years, it developed into a major job opportunity center and residential area and a minor port of trade and navigation.

As of 2001, the city has 391 export and import private manufacturing firms and has more than 8,000 major business establishments engaged in local and domestic trade, wholesale and retail, merchandising and services. Today Mandaue is Cebu's new economic driver with more than 10,000 business establishments. About 40 percent of Cebu's export companies are found in Mandaue. The city has also contributed a lot to furniture production in the country with 75 percent of the total export coming from Mandaue.

Due to the rapid urbanization mentioned, Mandaue City faced several SWM issues, such as low public awareness on waste generation and characterization, few waste reduction activities and lack of a final disposal facility. Aside from that, there is still no system of garbage fees and waste taxes. These served as the baseline for the city's 2010-2019 solid waste management framework plan.

As an initial response to the solid waste problem, Mandaue City enacted several ordinances and resolutions which were later amended into the Ordinance Number 10-2006-372 also known as the "Ecological and Solid Waste Management Ordinance of Mandaue City" as prescribed in R.A. 9003. Its main objective is to monitor, coordinate, facilitate and provide assistance in the development and implementation of an improved solid waste management program in the city. Furthermore, its goal is to adopt the 3R principles, encourage the use of compost rather than chemical fertilizer and raise awareness among public through various



Do you know that...

Mandaue received the "Gawad Pangulo sa Kapaligiran Award" for two consecutive years (2000-2001) for being the "cleanest and greenest" in the highly urbanized city category.

training and interactive program. It focuses on four major interventions: 1) source segregation; (2) waste minimization; (3) reuse, recycling & utilization; and (4) final disposal.

Currently, Mandaue City is employing an approach towards sustainability of its the solid waste management program. Mandaue City SWM Officer Engr. Ricardo Mendoza is pushing for integrating composting training in the science curricula of private and public secondary educational institutions located in the city.

By training the youth in household composting (specifically using the Takakura method), waste reduction at the source will be practiced. Aside from promoting composting at home, educational institutions are encouraged to initiate the same to manage biodegradable wastes inside their premises. Both projects shall be periodically monitored and evaluated by the Mandaue City Solid Waste Management Office (Cebu Daily News, September 2012).

"If our current generation of leaders do not respond to the problem, future leaders would find it very agonizing and it would be close to impossible for them to confront the solid waste problem."

- Engr. Ricardo Mendoza, Mandaue City SWM Officer

Sunpride Foods Inc.: Commitment to Reduce Waste at the Source



Sunpride Foods Incorporated is a food processing company. It has its main plant in Barangay Paknaan, Mandaue City, and manufactures canned processed meats, frozen meats, and other meat products. It services markets all over the country.

In February 2011, two representatives from Sunpride were sent to a Composting Training conducted by the Department of Science and Technology (DOST). Four months later, in June 2011, the company decided to implement the Takakura method of composting. Fat, oil, and grease (FOG) from its processed meat products formed the bulk of the mother compost that was initially harvested. Since then, Sunpride has already composted 6 tons or 432 drums of FOG.

Every week, 10 to 15 drums of FOG (weighing 210 liters each) are added to the mother compost. Kitchen wastes, mainly from Big Blue Logistics (a sister company), are added and mixed to the compost heaps on a daily basis. Assigned workers turn each compost heap daily.

The microorganism ingredients are mixed ahead and stored in drums prior to mixing. Final compost product is usually harvested after 4 months.

What composes the Mother Compost?

- 500 kilos of rice bran
- 500 kilos of rice husk
- Mixed micro-organisms (yogurt, mushrooms, molds, and yeast)



Since 2011, the harvested organic fertilizer has gone straight to the company garden or or has been donated to its host barangay, Paknaan, of Mandaue City. Just this October 2012, Sunpride prepared to sell their fertilizer on the local market.

Aside from its reduction of biodegradable waste, Sunpride also maintains an MRF and sells plastics and tin cans for recycling.

Sharing its success

Last October 29, 2012, Sunpride hosted an information drive with officials from nearby barangays in Mandaue. Partners from King’s, another food processing company, also attended to learn the technology that can help them reduce their wastes at the source.

According to Ms. Pareja, despite the hard work and perseverance required in Takakura composting, she has not doubted that it is sustainable. Thus, private companies stand to benefit a lot if they adopt it.

Since implementing Takakura composting, we have saved on funds that were previously used to haul FOG for treatment. Instead of spending 650 pesos weekly for treatment and disposal, we have already saved almost 125,000 pesos!

-Lyndel J. Pareja, Sunpride Pollution Control Officer



St. Theresa's College: Promoting Responsibility for the Environment through Composting

St. Theresa's College (STC) is a Catholic learning institution located at the Don Ramon Aboitiz Street, Cebu City. It has a current school population of 2,281, serving the preschool, basic, intermediate, secondary, and tertiary educational levels.

STC has long been an advocate for the environment. It is affiliated with the Redemptorist Center for Social and Environmental Concerns, Kaabag sa Sugbu Environment Committee, Natural Farming Technology and Education Center (NAFTEC), and the Coastal Conservation Education Foundation (CCEF).

In partnership with the Cebu City government under its Community Involvement Program (CIP), STC implemented in 2010 the LMK program, short for Lihok alang sa Malungtarong Kalikupan, which in English means Action for a Sustainable Environment. All STC stakeholders, including maintenance personnel, canteen concessionaires, teaching faculty, partner communities, and the parents' council, were oriented about the program and subsequent adoption of Takakura composting.

A pilot test was conducted by 3 NSTP (National Service Training Program) classes with 60 students each. Each student was given 1 Takakura basket as a project to finish by the end of the semester. The results were positive, with a 90 percent of the students successfully harvesting compost.



The following semester, on that same year, the program was implemented as an institution-wide campaign. The main goal was to minimize waste and introduce household composting to the students.

After 3 years of implementation, there are now 2 Takakura composting centers of STC. The first one is located near the grade school canteen and fed by organic waste generated by the canteen concessionaires. The second one is located near the Sentro sa Katilingban and is fed by the garden waste from the trees and other waste sources around the campus. Both sites have already harvested dozens of sacks of organic fertilizer, now selling at 20 pesos per kilo.

STC shared its knowledge on composting with other educational institutions, particularly the University of San Carlos, University of Southern Philippines Foundation, Southwestern University, Cebu Doctors University, University of the Philippines Cebu Campus, and the University of San Jose Recoletos. It has also partnered with nearby Barangay Camputhaw. The latter lends them their shredder bi-monthly while STC students conduct their community outreach programs in the barangay.

Best Practices**Talisay City and Lapulapu City:
Initiating Change for SWM Sustainability**

Talisay City and Lapulapu City are two highly urbanized cities that are part of Metro Cebu. Talisay is located immediately to the south of Cebu City while Lapulapu lies across the Mactan channel, connected via bridges to Mandaue City.

Talisay and Lapulapu currently have a population of 200, 772 and 350,467 respectively. Both are home to commercial establishments and industries. Lapulapu is home to the metro's biggest industrial site, the Mactan Export Processing Zone. In the past several years, many workers and their families have chosen to live in these two emerging cities.

Because of urbanization and population growth, solid waste management is a pressing concern in both cities. Talisay city established the CSWMP, with Edwin L. Nierves currently serving as OIC to oversee the operations of the city's landfill and daily garbage collection. Meanwhile Lapulapu established its central material recovery facility.



People should learn the importance of their role and that is to reduce their wastes at the household level. Without the people's participation, the SWM framework will not work.

-Edwin L. Nierves OIC, CSWMP

In Talisay, the sanitary landfill has been in existence for 7 years. It was estimated to have a lifespan of 15-20 years but recent assessment shows that it might not last that long due to dumping of unsegregated waste and lack of compactors.

In response, Talisay trained several barangays in waste segregation and moved to strictly implement the same. In barangay Mohon, Takakura composting has been introduced along with segregation and recycling activities. Three pilot barangays have been designated for community-based composting, namely Poblacion, Pook, and Lawaan.

In Lapulapu on the other hand, a new central MRF has been established after the closure of its open dumpsite. Aside from employing a crew of former dumpsite waste pickers to segregate recyclable plastics and paper, the city has initiated vermicomposting. The plastics are recycled, often mixed with concrete to produce hollow blocks and plant boxes. The fertilizer products from composting are used in the city-owned garden plots and green houses. The mayor has expressed openness to try alternative methods such as Takakura composting.

Both cities have a commitment to further improve their SWM programs. It is hoped that eventually the whole Metro Cebu will be able to fully implement the 3 Rs.

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