

SUNSHINE

AFTER THE STORM

A Typhoon-Ravaged City Rises
to Become Zero Waste



ZERO WASTE CITIES ASIA SERIES

Tacloban City, Philippines

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Nearly flattened in 2013 after becoming ground zero of Typhoon Haiyan—the strongest typhoon ever in recorded history to landfall—Tacloban City, a highly urbanized area in central Philippines, is well on its way to becoming a Zero Waste model city.

But getting on the road to Zero Waste was tough. Already burdened with waste problem due to lack of efficient waste management system, the city suddenly found itself having to deal with massive wastes from the wreckage wrought by the typhoon. Having to clear the city of the debris from uprooted trees and broken buildings and houses, among many others, the city immediately filled up its dumpsite which should have long-ago been closed to begin with.

In 2016 or three years after the devastation, the local government received a complaint from the Department of Environment and Natural Resources (DENR), the Philippines' environmental ministry. The city's dumpsite in Barangay Santo Niño was swollen with debris from the typhoon and the waste of the city's inhabitants

being added daily. Continued use of the site violated the country's solid waste management law, RA 9003 or the Ecological Solid Waste Management Act, because cities are required to end the use of dumpsites.

At the time, the city was providing collection services for only 30% of the households with an annual budget of 80 million pesos [USD 1.5 million], most of which went to private hauling companies, leaving most residents with no reliable waste collection services. Residents in those sections of the city not covered by the collection services sometimes resorted to open dumping and open burning, a further cause for DENR scrutiny. The risk of fines for noncompliance combined with growing concerns about waste and plastic pollution served as a wake-up call for Tacloban City officials.

Tacloban City sought affordable and feasible options to expand waste collection services to the remaining 70% households. Incineration was too costly and hazardous, and

the planned sanitary landfill would eventually fill up with mixed waste amid the city's growing population. What would happen when they finally ran out of space? It was clear that the city needed a more promising and sustainable option.

The Mayor of Tacloban City, Cristina Gonzalez-Romualdez, had heard of Mother Earth Foundation's impressive track record in supporting cities with Zero Waste programs that meet legal requirements for waste collection and separation. Thus, in October 2016, Mayor Gonzalez-Romualdez and MEF launched phase 1 of the Ecological Solid Waste Management Program (ESWM) for Tacloban City.

Two years later, the city was providing waste collection services city-wide. Decentralized and source separated collection of food scraps, recyclables, and residual waste is rolled out across half of the city, accompanied by community composting sites. Even though the full

source separation program is still being rolled out to the rest of the city, the new system is already saving money: waste to the landfill is down by 31%, leaving the city with savings of 21.6 million [USD 413,000] in the annual budget.



PAVING THE WAY FOR SWM

Phase 1: October – December 2016

Prior to the implementation of an ESWM program, the city worked on establishing baseline data to give them a better understanding of the present situation. MEF conducted a survey on the residents' awareness, practices, and perceptions concerning solid waste in all 138 barangays. MEF also trained 128 LGU officials to undertake a Waste Analysis and Characterization Study (WACS), which entails examining the composition of waste using a representative sample, in this case 10% of households. These allowed the city to draw conclusions about waste-related behaviors and practices of households, including the amount of waste and the different waste streams that the households produced.

The study revealed that on average, each resident generated 0.37 kg of waste each day. Urban residents behaved differently than their rural and upland counterparts: they not only tended to throw away more things, but also produced relatively less organic or food waste. Their organic waste makes up only 20.5% of their total waste stream. In contrast, for coastal, rural, and upland barangays, organic waste constitutes 41.5%, 66.1%, and 59.8%, respectively.

Sorting waste into at least four categories makes it easier to manage waste: by composting organic waste; selling recyclable materials to junk shops; treating hazardous waste; and transporting residuals—a fraction of total household waste—to the city landfill. Recyclable waste makes up 15% to 32.5% of the city's total waste volume.



Mother Earth Foundation staff and volunteers conduct waste assessment and brand audit. ©MOTHER EARTH FOUNDATION

One of the most important findings was that the sampled population had a lack of awareness of proper waste management. Their understanding on segregation, for example, was mostly limited to separating high-value recyclables from other kinds of waste, which are left mixed. Compliance on segregation was low, even though most indicated they knew about the adverse impacts of improper waste disposal. One in ten respondents admitted they burned their waste and threw garbage in water bodies like creeks and rivers. Only 26% of survey respondents were aware that the primary responsibility of waste segregation falls on residents.

The preliminary study also exposed weaknesses at the barangay level. Barangay officials' level of awareness of their roles and responsibilities on ESWM was found to be low. Barangay ESWM committees (BESWMCs) were either non-existent or inactive. Materials recovery facilities (MRFs) did not exist.

Generally, officials had misconstrued ESWM as impracticable and costly—a burden, in short. Their perception on waste management was reduced as a "clean and green" campaign, only focused on removing litter. They saw their role starting with household waste collection and ending with dumping.

Based on the city government's data, the city's total municipal waste amounted to 175 tons per day in 2017. Waste collection was centralized and outsourced to private haulers, who are paid depending on the number of trips they make from the households to the landfill. Given that hauling costs around PHP1,100 [USD ~21] per ton, collecting the unsegregated waste for the entire city would be expensive. If residents were to practice proper waste segregation and divert organic and recyclable wastes, which comprise 62% of the city's total waste volume, the savings from reduced collection trips would increase significantly.

Table 1. Waste Generation in Tacloban City by Area Cluster (in kg)

Waste Generation	Urban	Coastal	Rural	Upland	Average Waste Generation
Per Household/Day	2.14	1.7	1.36	1.65	1.88
Per Household/Week	14.9	11.9	9.5	11.56	13.15
Per Person/Day	0.42	0.34	0.27	0.33	0.37
Per Person/Week	2.9	2.38	1.9	2.31	2.58
Population Per Area Cluster (in %)	59.50%	21.4%	9.7%	9.5%	

Calculated based on MEF's Tacloban City project data

Table 2. Household Waste Classification in Tacloban City by Area Clusters

Material Class	Urban	Coastal	Rural	Upland	Average
Compostable	20.5%	41.48%	66.1%	59.8%	33.2%
Recyclable	32.5%	24.89%	15%	25.4%	28.5%
Residuals	23.8%	15.84%	10.5%	4.9%	19.0%
Residual – Special	18.9%	15.33%	6.7%	7.6%	15.9%
Hazardous	4.3%	2.46%	1.7%	2.4%	3.5%
% of population	59.5%	21.4%	9.7%	9.5%	

Source: MEF Q3 Progress Report

ESWM TAKES OFF

Phase 2 – January 2017 – September 2018

The City Environment and Natural Resources Office (CENRO) oversees ESWM for Tacloban City. Seeing the need for a body that would actively involve various stakeholders and guide the implementation of the project, the CENRO created the City SWM Board. Since the success of Phase 2 of the project hinged on the participation of the community, the Board needed to start at the barangay level. Together with MEF, they targeted the barangays left out of the regular collection services. They took on a multi-pronged approach, using policy instruments; information, education, and communication (IEC) campaign, and enforcement mechanisms.

POLICIES

RA 9003 places the responsibility of managing waste on barangays. It states that each barangay should have an MRF, where segregated waste is stored and processed accordingly: organic waste, residuals, hazardous, and other recoverable materials that have value in the resale market (like PET plastic bottles, which are commonly recycled/downcycled and fetch a relatively high price). At least half of all waste should be diverted. Collection of mixed waste is prohibited.

Policy instruments at the local level give flesh to RA 9003 and provide a real opportunity for change. In 2017, the City of Tacloban passed an ordinance on Integrated Ecological Solid Waste Management, requiring residents to segregate at source,

meaning segregating their waste in their own households.

A few barangays had ESWM ordinances, but these were generic and needed to be adapted to the local context. MEF provided officials with technical support to revise or draft local ordinances on ESWM and establish BESWMCs or Barangay Ecological Solid Waste Management Committees. The ordinances set out barangay-specific mechanics of garbage collection, segregation, and MRFs, and authorize barangays to levy user fees to cover the costs of collection and MRF operation. The committees prepared their respective action plans.

SPREADING THE WORD

Once these ordinances were enacted, the next step was to spread the word. The government was clear: No segregation, no collection. Over the years, the CENRO had organized workshops and forums for barangay officials to heighten their awareness on ESWM and get them on board. The MEF staff with the cooperation of the BESWM committees ratcheted up the CENRO's efforts through an intensive IEC campaign. Each barangay devised its own IEC strategy. Some used the public address system, broadcasting daily reminders, while others took to displaying visible signages with clear messaging. Others distributed flyers and leaflets with clear instructions on how to segregate (Figures 1 and 2).

The key element, however, was the household visits. By the end of the second phase, MEF and CENRO had reached 36,615 households. It was crucial to dispel the notion that segregation



Waste collectors collect segregated wastes from a household.

is inconvenient or difficult. A typical monitoring visit for the MEF Tacloban team's 11 community coordinators would consist of rummaging through a household's bin and identifying materials disposed in the wrong bin. The staff would also ensure that households avoid



Figure 1. Poster explaining the different waste streams and how they should be handled, as well as the fines imposed for each offense.



Figure 2. Poster displayed by haulers indicating which articles are classified as residual waste that they can collect.



Waste collection in Barangay 77. © MOTHER EARTH FOUNDATION

using plastic bags as secondary liners for kitchen waste. These visits served as a significant one-on-one learning experience for residents, which also allowed them to ask questions directly from the MEF staff. Engr. Jonathan Hijada, City ENR Officer, lauds this initiative: "Their system was more effective because they went door-to-door."

IMPLEMENTATION AND ENFORCEMENT

After the IEC campaign, MEF and the BESWM committees implemented a door-to-door collection system. For the first time, residents in areas with narrow roads that are inaccessible to large dump trucks experienced the convenience of at-source waste collection. The city government distributed 52 pedicabs (bicycles with a sidecar attached) and plastic drums,

as well as PhP15,000 [USD ~288] cash assistance to barangays to help with the initial set-up and construction of their MRFs.

The committees monitored whether households were sorting their waste properly. Newly-trained environmental police, meanwhile, enforced the ESWM ordinances. Barangay tanods (village officials) vigilantly patrolled their areas of jurisdiction. They also had the power to fine residents who refused to sort their waste, starting at PhP300 [~USD 6] or one day community service for the first offense, up to PhP3,000 [USD ~58] or three days of community service for the third offense.

These enforcement mechanisms aside, the project had an inspirational component. They selected Barangay 74 (Lower Nula-Tula) located in the town

center as a showcase for ESWM. It had a history of clogged drains and flooding as a result of unmanaged waste, but thanks to ESWM, Barangay 74 was transformed into a model barangay due to its cleanliness and efficient waste management systems and facilities. Visitors would see the barangay's MRF and hear Chairman Nelia Malate narrate their Zero Waste journey through the sharing of knowledge and best practices during barangay assemblies and small group meetings. MEF arranged these study visits in hopes that by witnessing the benefits of Zero Waste, other barangay captains would commit their own barangays to the cause.

Rap Villavicencio, MEF Project Officer, believes that such model-building not only raises awareness on SWM, but also gives people a glimpse of what is possible in their own areas.



Waste collectors temporarily store residual wastes in an eco-shed in a materials recovery facility in Barangay Sto. Nino. © ROMMEL CABRERA/GAIA

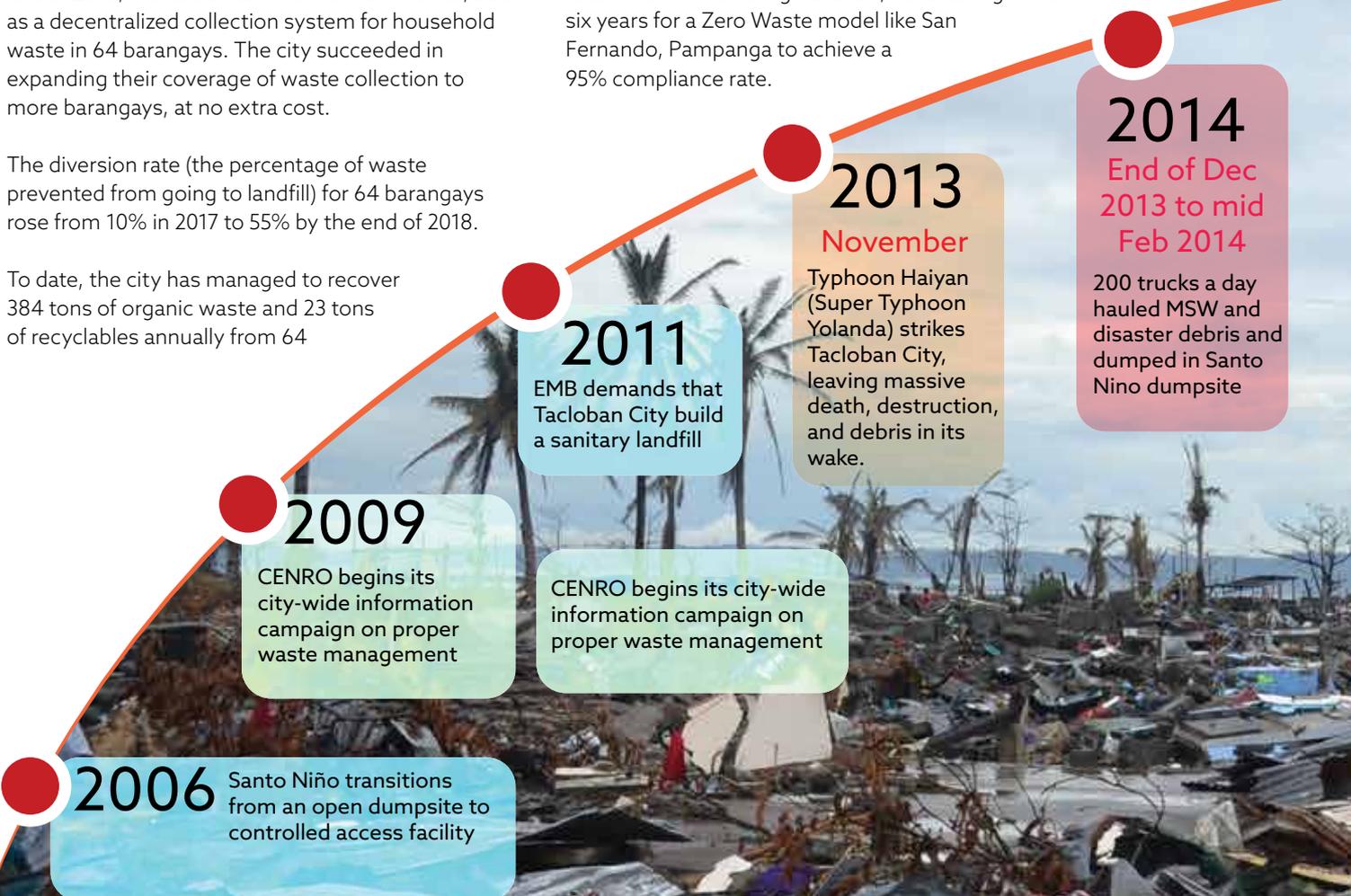
RESULTS

When Phase 2 of the project was terminated at the end of 2018, it could boast of concrete victories, such as a decentralized collection system for household waste in 64 barangays. The city succeeded in expanding their coverage of waste collection to more barangays, at no extra cost.

The diversion rate (the percentage of waste prevented from going to landfill) for 64 barangays rose from 10% in 2017 to 55% by the end of 2018.

To date, the city has managed to recover 384 tons of organic waste and 23 tons of recyclables annually from 64

barangays implementing decentralized collection, or a total 1.1 tons per day of recovered materials. Moreover, the compliance rate of waste segregation by households in participating barangays had risen to 63%. This is a great start, considering it took six years for a Zero Waste model like San Fernando, Pampanga to achieve a 95% compliance rate.



The rest of the city, meanwhile, has yet to adopt a decentralized collection and still relies on private contractors to haul household waste. Nonetheless, it managed to reduce landfill-bound waste from 175 to 121 tons per day—a drop of 31%. Moreover, Tacloban City has committed to introducing Zero Waste programs in these areas in the next two years.

Engr. Hijada observes the increase in the number of legitimate junk shop operators, from a little over a dozen to at least 21. He attributes this to a greater number of households participating in segregation at source. Pedicabs regularly roam barangays to collect organic and recyclable waste from households. By closing time of business establishments, light trucks called multicabs visit stores downtown to collect recyclables such as cardboard boxes.

Beyond the numbers, there is a high degree of satisfaction and empowerment in the city and the communities due to what they have accomplished. One barangay chairman cites the cleanliness of their barangay as a direct result of the ESWM. Another mentions that the collection trucks are no longer full because some of the discards are either composted or recycled in their MRF. For Villavicencio, the people's openness to give Zero Waste a chance has made all the difference.

THE WAY FORWARD

Buoyed by its successes in the first and second phases of the project, the city plans a third phase to expand the Zero Waste program to other barangays, as well as engage local businesses, schools, and universities more meaningfully.

To improve waste compliance, Tacloban City is committed to continuing its IEC campaign. It also plans to be stricter in terms of its enforcement. While compliance has been high among participating barangays, it will take more time and effort to include the more commercialized areas in the city center. The current manpower needed to collect waste and monitor implementation will have to be increased to accommodate the dense and still growing urban population. But above all, the main challenge has been shifting mindsets and compelling people to action with regard to proper waste management practices.

Tacloban City aspires to elevate its waste diversion rate to 95%. City officials and MEF staff are hopeful that Tacloban City, the only highly urbanized city in Eastern Visayas, will serve as a Zero Waste model for the region. Hijada envisions a highly disciplined citizenry, where every household segregates and composts their wastes at source. At any rate, the wheels have been set in motion. The City SWM Board, for one, has strengthened its capacity to ensure ESWM's sustainability. Finally, as younger generations get older, they can continue the program's legacy.

2016

Tacloban receives a DENR notice ordering the closure of the Santo Niño dumpsite

Oct. 2016

MEF invited by city government

Oct to Dec 2016

Phase 1

2017

Jan 2017 - Sept 2018

Phase 2 - Full implementation of ESWM Program

Tacloban City government passes Integrated ESWM Ordinance requiring segregation at source

2018

Aug. 2018

Pedicabs and plastic drums are distributed by the city government to barangays for MRFs

2019

Feb 8, 2019

Sanitary landfill opens in Barangay San Roque

Feb 12, 2019

Partial closure of dumpsite in Barangay Santo Niño

COSTS BEFORE ZERO WASTE PROGRAM STARTED

Hauling cost: Php 1,100 [USD ~21] per ton

Waste generation (LGU): 175 tons

Waste generation (HHs, MEF-WACS): 82 tons

MEF data were taken from a sample of 55 households;

LGU meanwhile collected its data from intercepted samples (collected waste inside trucks)

ESTIMATED COST (YEARLY)

175 tons: Php 70.2 million [USD ~1.34 million]

82 tons: Php 32.92 million [USD ~628,180]

ESTIMATED COST SAVINGS THROUGH THE ZERO WASTE PROGRAM

72% waste diversion (organics + recyclables)

175 tons: Php 19.67 million [USD ~375,343]

82 tons: Php 9.2 million [USD ~175,555]



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