

## Waste Not! Community Actions for Cleaner and Greener Environs

By  
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### Abstract

The generation of all forms of solid waste has grown exponentially with the combination of industrialization and population growth. As societies have industrialized since the 18<sup>th</sup> century, managing solid waste has been a major activity. This process has accelerated rapidly since the middle of the last century, when governments in less developed settings began sustained efforts to promote modern industrial development. By the third quarter of the 20<sup>th</sup> century, dire forecasts emerged that the world would soon bury itself in its own wastes. This led to a new social movement to Reduce, Reuse, and Recycle (3Rs) to save the world from this inundation.

National and international governments and NGOs everywhere now promote a wide variety of programs to manage solid waste in a more environmentally sound manner. Often these programs rely on local governments. This case shows how one village in the Philippines responded by extending the 3Rs and creating the Community-Based Solid Waste Management Program.

**Keywords:** Philippines, Barangay Holy Spirit, Recycle, Solid Waste. Local Governance

### The Setting

Barangay<sup>2</sup> Holy Spirit is one of the 142 *barangays* of the Philippines' highly urbanized Quezon City. The city is part of the Second District of the National Capital Region (NCR) or Metro Manila, located on the island of Luzon. It is bounded in the north-northeast by Barangay Fairview, in the east by Barangay Commonwealth, in the south by Barangay Batasan Hills, in the south-southwest by Barangay Old Balara and in the west by Barangays Culiati and Pasong Tamo. Holy Spirit has a land area of 322 hectares. The latest census of the National Statistics Office (NSO), in May 2010, shows a growing population of 101,385 within 22,992 households. It has classified the residents as being composed of 30 percent middle- to upper-class residents ("subdivision area") and 70 percent economically depressed or semi-depressed. Of the latter, 43 percent were on privately owned and/or occupied land while the remainder were awarded land by the National Housing Authority (NHA), land that was originally part of the National Government Center.

*Barangay* Captain Felicito A. Valmocina assumed leadership in 1992, with the *barangay* in very depressed socio-economic condition. Most streets, except major roads and those of the affluent subdivisions, were dilapidated. At that time, all secondary roads were unattended and in

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<sup>2</sup> *Barangay* is a Filipino term for a village. It is the smallest administrative division in the Philippines. Municipalities and cities are composed of *barangays*.

neglect and residents walked in ankle deep mud during the rainy season. Streets were unlighted and the crime rate was high. Households could hardly afford electricity. There was no source of potable water except deep wells, and rationing was necessary. Informal settlement families – squatters -- comprised 80 percent of the population in the depressed areas. Even the *barangay* government was in a difficult position.

## The Problem

In 2012 the Philippines reported solid waste generation amounting to 37,427 tons per day (tpd). Metro Manila was the highest generator at 8,602 tpd; the Southern Tagalog Region, with 4,146 tpd, ranked second. It was followed by Central Luzon at 3,632 tpd. (NSWMC 2014).

According to the Asian Development Bank (2004), Metro Manila from the 1980s was a metropolis in a garbage crisis. This was due to the forced closure in 1998 of two primary disposal facilities - the internationally infamous Smokey Mountain dumpsite in the City of Manila and the Carmona Disposal site. Furthermore, a tragic history of more than 30 years of garbage mismanagement was aggravated in July 2000 when a hill of garbage at the Payatas Dump facility in Quezon City collapsed on an informal settlement community resulting in the deaths of nearly 300 people. Hundreds of families were left homeless (Delos Reyes, et al. 2013). The Payatas Dump Facility was closed immediately after the incident and reopened by December 2001, due to the lack of an alternative disposal facility. This is where Quezon City now disposes its waste.

This tragic garbage slide triggered action by the Philippine Congress to enact Republic Act 0993 of 2000, the Ecological Solid Waste Management Act. It created the necessary institutional mechanisms and incentives, provided appropriate funds for solid waste management, and prohibited certain acts and imposed penalties for violations. According to the law, the local government units such as Quezon City would have primary responsibility for the implementation and enforcement of the Act within their respective jurisdictions, e.g., Barangay Holy Spirit (DENR 2001).

The dumpsite's liquid runoff, or leachate, was tested and found to have levels of contaminants far exceeding the maximum allowed in drinking water: Lead 22 times, Nitrogen 32 times, Biological Oxygen Demand (BOD) 98 times, and Arsenic 60 times. Moreover, fecal coliform averaged 7 million with high values measured at 30 million, indicating significant contamination (Asian Development Bank 2004). The environmental and social crisis continues as the growing solid waste overwhelms the National Capital Region (NCR), including Barangay Holy Spirit.

Holy Spirit's garbage issue emerged along with the need to revitalize the community and protect its citizens from illnesses and other health problems. In the 1980s the residents' lack of concern was evident in the prevailing unsanitary conditions in the *barangay*. The streets were littered with uncollected garbage and abuzz with flies, mosquitoes and other disease-bearing pests. The *barangay* generated a daily average of 66 tpd (330 cubic meters per day), a per capita generation of 0.65 kg/day per person.<sup>3</sup> This may not seem like a large amount, but when there is no garbage collection and management it can pose a serious health threat as it accumulates.

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<sup>3</sup> The population of the barangay was 101,385. There were 66 tons per day or 66,000 kilograms per day resulting in 0.66 kg/day per person. These figures came primarily during a March 23, 2015 visit and during key informant interviews.

The squatters, whenever possible, scratched out a small amount of food from gardens they planted. These gardens helped to address food security concerns, especially in the depressed areas of the *barangay*. The need for more compost to maintain the vegetable gardens that proliferated, especially in the squatter areas, has become an additional issue.

According to *Barangay* Captain Valmocina during an interview with the author, the grave threat posed to humans and the environment by garbage galvanized him into action. During his first term in office, in 1992, the problem was exacerbated by lack of knowledge. The majority of the residents either did not know or did not care about the waste problem. It was a trying experience for the officials of the *barangay* as many residents did not want to comply with the cleanup initiatives. Many residents who were following the ordinances for clean environments were still complaining to the *barangay* officials about the solid waste problem.

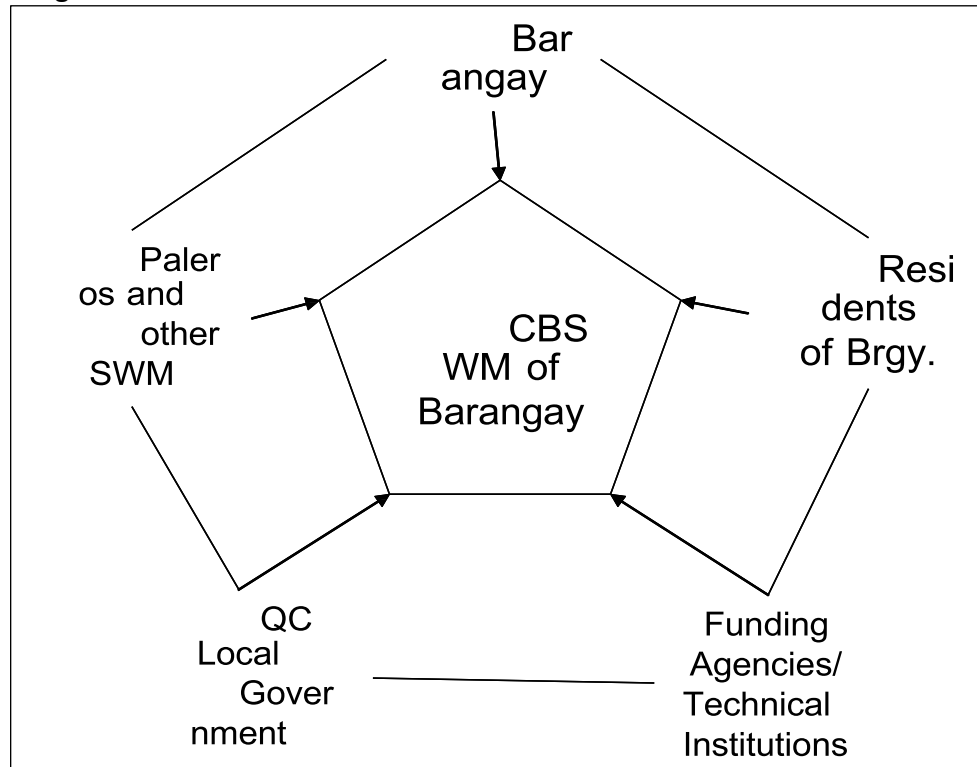
## **The Intervention**

Barangay Holy Spirit already was engaging in manual composting of biodegradable wastes as early as 1992. This came from the *barangay* officials' early recognition that there was a serious waste management problem. Quezon City enacted its own Clean and Green Program in 1995. In part, it was based upon then President Ramos' Executive Order calling on all communities to protect the environment through Green and Clean Programs. Building on these past developments, in 1997 Captain Valmocina created a new Community-Based Solid Waste Management Program (CBSWMP) for Holy Spirit. He and the members of the *barangay* council passed the required ordinances that established a Waste Management Office that was responsible for scheduling all waste collection in the *barangay*. The program's basic idea was the separation of household wastes into biodegradable and non-biodegradable.

A massive information and education campaign was the first step. It relied on *barangay* officials, staff, area leaders, NGOs, private organizations, and religious leaders to reach out to all the solid waste management program's constituents in the community. Flyers were distributed and a sound system was used in trucks that collected garbage. These provided detailed instructions on separation and waste collection. Ideas to promote zero waste always were included in the agenda in Holy Spirit meetings.

There were five primary actors with interdependent roles who made the new community-based solid waste management program a success. These were the local *barangay* officials; the Quezon City government; funding institutions and other resource providers from the National Government; the *paleros* (garbage collectors) and volunteers from the depressed communities of the *barangay*; and the residents (see Figure 1). Specific examples of efforts are discussed below.

Figure 1. Primary Actors in the Community-Based Solid Waste Management Program



Source: *Barangay. Holy Spirit, Quezon City Government*

Legend:

CBSWM – Community-based Solid Waste Management QC – Quezon City Government

ESWMD – Ecological Solid Waste Management Department

*Paleros* – Pilipino term for garbage collectors

The *barangay* officials started with simple ordinances requiring manual composting of household waste. They also were responsible for implementing national regulations, such as creating a local committee to oversee solid waste management. This local committee was composed of people from eleven different groups:

- Captain, as Chair;
- Councilor;
- Councilor to represent the youth;
- President of Homeowners Association;
- Public/private school principal or representative;
- Parent-Teacher Association president or representative;
- Religious organization representative;
- Business community representative;
- Environmental NGO representative;
- President of the Market Vendors Association; and
- Representative from the junkshop owners' association.

*Paleros* and CBSWM volunteers worked hand-in-hand with the Barangay Waste Management Office. They benefit directly from the implementation of the ordinances because they receive wages and tips from the collection and sale of products from the Materials Recovery and Composting Facility (MRCF – see details below).

The garbage collectors' wives also were given a chance to improve their own livelihood through the recyclable materials, which are remade and sold as new products. The products were even shown in an exhibit at some colleges in Metro Manila, together with the produce from the small farm benefiting from the MRCF's profits.

The Quezon City Government provided direction to its *barangays* in implementing its solid waste management programs and allocated funds necessary for the implementation of the environmental management program.

In addition, in 2002, the Asian Development Bank chose Holy Spirit as its model for the implementation of the MRCF. It gave the *barangay* a grant of 1.3 million pesos (USD 30,952) for equipment and facilities. This enabled the *barangay* to change from manual to mechanical composting, which increased both the speed of composting and its market value.

The national government, through the Department of Environment and Natural Resources, Department of Agriculture and Technology and the Livelihood Resource Center, provided technical assistance to the *barangay* officials, farm cooperative and MRCF representatives.

An effective solid waste management program requires that waste first be separated into biodegradable and non---biodegradable waste. This reduces the waste generated at the individual household. Separation is implemented to reduce, recycle, and reuse waste. To promote effective implementation, Holy Spirit adopted a “*No Separation, No Collection*” policy, denying collection to those who did not separate their household waste. The policy was enforced by the *barangay* environmental police, who were authorized to issue tickets to violators. The non--- biodegradable wastes include paper, bottles, metals and plastics, while the biodegradable wastes consist of leftover food and vegetable refuse or plant trimmings.

Garbage collection is accomplished by dividing the *barangay* into 3 zones, color-coded to facilitate the process. Zone I is green and has collection on Monday and Thursday, Zone II is red on Tuesday and Friday, and Zone III yellow on Wednesday and Saturday. Sunday is a special operation day. Main route roads, schools, and markets and other commercial areas, have daily garbage collection. The trucks are not required to collect on specific time schedules. They are, however, required to make their rounds throughout the day to ensure that all wastes are collected. The truck drivers and *paleros* are diligent in collecting the waste because a percentage of the earnings serve as their wages through the MRCF income. The more waste they collect, the higher their wages will be.

The *barangay*, aiming for Zero Waste Management, has 11 garbage trucks and a fleet of 30 pushcarts to serve in the interior areas of the community. Figure 2 shows the Barangay Holy Spirit system with the color-coded zone schedule.

Figure 2. Barangay Holy Spirit Color-coded Zone Schedule



Source: Barangay. Holy Spirit, Quezon City Government

Having its own trucks makes Holy Spirit independent of the Quezon City Government for garbage collection. The pushcart fleet also provides employment for slum dwellers, who earn income from their collections. A pushcart is a lightweight, shallow, open container with two or four wheels. It is used by street vendors for carrying loads. This allows the vendors to be more effective, thus helping to raise the overall welfare of the community.

The Materials Recovery and Composting Facility was specially designed and constructed for this program. Separated wastes from households are collected by the *paleros* and brought to the MRCF in dump trucks and pushcarts. The biodegradable wastes are sent on to the composting machines at the sorting area. The non- biodegradable wastes are further segregated into white and brown paper, metals and tin cans, plastics, and glass. Straw, old clothes, posters, cardboard and plastics are converted into useful objects, such as baskets, rags, and other handicrafts for decoration or containers, and rosaries. They then can be sold to traders or to visitors who tour the *barangay's* MRCF.

Composting is a major activity of the CBSWM program. Biodegradable wastes, once shredded and dried, are sifted in a screener and transferred to sacks. Fifty sacks of soil are

produced from one entire composting process. This soil is either brought to the Center's Vegetable and Flower Garden or to the small vegetable lot located near the *barangay* hall where the Barrio Social Development Officers get their free vegetables as incentives. The soil also is bought by garden enthusiasts or small vegetable farmers.

There is also a new *Bayanihan* (Volunteer) Waste Redemption Center to turn waste into usable products. It is the dropping off point for all recyclable materials. The Center periodically conducts seminars on Zero Waste Management down to the street level. It also provides skill training for home enterprises using discarded but usable waste materials. It is a self-reliant income-generating venture through collaborative efforts with *EntrePinay* and *Gulayan at Bulaklakan*. Typical items made from the recycled products are bags and mats from Tetra Pak material, lamp shades from plastic spoons, charcoal briquettes and various decorations.

The Center's Vegetable and Flower Garden project created a Research and Training Center. This was designed to transfer agricultural technology to urban farms using the compost produced by the MRCF. It employs a full-time agriculturalist and three assistants and has eleven greenhouses, a fishpond, a nursery area, and a compost area. The Center produces a wide range of high-yield organic vegetables and flowers, harvesting them every four months.

During the visit to the site, it was noted that the produce is of exceptionally high quality and has been compared with the finest from Baguio City, a high elevation agricultural area north of Manila. The Center also provides extra employment for local people and markets its produce locally.

Two other projects were specially created to help the poor increase their income. Thirty pushcarts were given to slum dwellers. In addition, a crafts livelihood project, *EntrePinay*, was initiated to provide an additional source of income for the wives of the garbage collectors. The organization was headed by the wife of the Holy Spirit *barangay* captain and has the support of the Technology and Livelihood Resource Center. Its products include soap, perfume, gel, shampoo, lotion, candles, pastry products, as well as indigenous items such as necklaces and home décor products. All are drawn from recyclable items from the Redemption Center.

## **The Outcomes**

The major objective outcomes are waste reduction, compost production and income from sales of redeemed goods. Table 1 shows that daily waste production has been reduced from 330 to 105 cubic meters or 66 to 21 tons per day.

Table 1. Daily Waste Generation and Trips of Garbage Trucks to Landfill Before and After Segregation

	Before Segregation	After Segregation
Daily Waste Generation (cubic meters per day)	330	105
Daily Waste Generation (tons per day)	66	21
Daily Trips of Garbage Trucks to Landfill	23.5	7.5

*Source: Barangay. Holy Spirit, Quezon City Government*

Compost production has increased with the adoption of the mechanical method. As of March 2015, the center produces 1,250 kg per day. Of this, 126 kg is used for the vegetable and flower gardens of the Center and 1,124 kg is sold to surrounding farmers and gardeners. Valued at 5 pesos per kg, this implies 6,300 pesos per day or 2,299,500 pesos (USD 15,330) per year. This is a significant financial gain.

The Bayanihan Redemption Center generates significant income by both buying and selling. It buys goods from local collectors, mostly garbage collectors and their wives, providing them with income. Those waste goods are then refurbished and the products sold, either to visitors or people from the *barangay*. These sales are income for the Center, and a significant financial gain for the *barangay*'s 100,000 inhabitants.

The project has been a success in other ways as well. It has won a number of awards for Holy Spirit. As early as 1997 it won the Clean and Green Program in competition with all the *barangays* in the country. It also received this award in several succeeding years. It won a 1.3 million pesos (USD 30,952) grant from the Asian Development Bank for its mechanical composting project. Its Zero Waste Management program won a Bronze Award in 2004 for the *Model Barangay in Eco Waste Management*, with a prize of 250,000 pesos (USD 5,952). This award allowed the Center to build a new facility that provides livelihood training for the wives of the garbage collectors. The Outstanding Farmer of the Philippines sponsored by the Chamber of Commerce and Universal Harvester is another award. It also was recognized by the central government as the cleanest *barangay* and Best Solid Waste Management Program in 2014.

The project has given the Holy Spirit a great deal of publicity through newspaper articles that recognize its accomplishments. As a result, it experiences many visitors. Records reviewed during a visit to the *barangay* showed that from 2004 to 2014, it received 146,789 visitors from nearby schools and from other Philippines local government units. It also had 525 that came from 86 countries.

Somewhat less tangible, but no less important, are changes in the community itself. By managing solid wastes Holy Spirit has learned to discipline itself. It has had the will to have its ordinances strictly enforced and obeyed. It has accepted the idea that all members are responsible for the cleanliness of their environment. The cleaner environment and the reduction of disease-carrying pests very likely has led to improved community health. Overall, it is reasonable to conclude that the community has gained considerable pride from being recognized by others, and by setting an example for what local government can do.



Finally, success in a solid waste management program such as this typically leads to other environmental programs. Barangay Captain Valmocina, other *barangay* officials, and some residents have started a new project called “*Oplan Sagip Batis*” or “The Operation to Save the Rivers and Creeks.” Its aim is to clean up nearby creeks and rivers from obstructive materials that can cause severe flooding during the rainy season. It also plans to use the stream banks as vegetable and flower gardens to increase the food supply for the community.

Barangay Holy Spirit’s Solid Waste Management Program, a community- based program, serves as evidence that implementing waste diversion such as the Reduce, Reuse, Recycling – the 3Rs -- is possible even at the *barangay* level. The practices used in this program, originating at the local with support from the national level, stemmed from the following guiding principles:

- Waste is a resource.
- Waste prevention is better than control by regulation.
- An integrated solid waste management system will best achieve the desired goals.
- All members of society are responsible for solid waste management.
- A solid waste management program must take into consideration the physical and socioeconomic conditions of the concerned communities and be designed according to their specific needs.

These successes showed the importance of many factors: proper planning in the identification of alternatives; strategies for specific plans of action; the necessity of a vigorous information and education campaign; the importance of enabling legislation (i.e., city and *barangay* ordinances) specifying the appropriate mechanism to operationalize and institutionalize the solid waste management plan; strong leadership and strong political will; monitoring and close supervision of the programs and the smooth operation of the facilities; active collaboration and cooperation among stakeholders; and the need for credit and proper management of funds and seed capital for the project. In addition, it was clear that foreign grants and contributions from the Quezon City Government were important in financing the project. The awards received provided both strong encouragement and financing.

The success of the Holy Spirit program did not happen overnight. Ten or more years of experience has brought everyone involved to where they are now. Its Solid Waste Management Program is a gold mine of “best practices” that may be pursued by other local government units.

The men and women of the Barangay Holy Spirit, led by its *barangay* chairman Mr. Valmocina, were responsible for the success and for sustaining the initiatives of the Community Based Solid Waste Management Program. Likewise, the national and local (Quezon City) governments, NGOs, POs, faith-based groups, international and local funding institutions and the constituents are the main movers of the program. This has substantially increased the wealth of the community and dramatically reduced solid waste generation and trips to the landfill. Barangay Holy Spirit has received awards and recognition, both nationally and internationally, for its successes.

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