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TAO Shelter

The Magazine for Sustainable Human Settlements



SOLID WASTE MANAGEMENT

GETTING RID OF OPEN DUMPS

COMMUNITY SUCCESS STORIES

WAYS TO PARTICIPATE IN RECYCLING

PRACTICES AROUND THE WORLD

Most of us think the problem of garbage is solved once we bring that trash bag out our door and the garbage truck picks it up. But the garbage truck is merely transferring it to another place we can't see or smell. If you live in Metro Manila, it will most likely end up in a place such as Pier 18, a reclaimed piece of land beside Manila Bay that was originally conceived as a garbage "transfer station."

Barges docking on the pier transfer the garbage to another dumpsite in Tanza, Navotas. But Pier 18 has ceased to be just a transfer station; it is now a full-fledged open dump occupying about 10 hectares. About a thousand families make their home beside the dump; they make a living from scavenging and making coal out of scrap wood. They've learned to live with the overwhelming smell of the dump – a sharp, sweet and sour, sticky smell that remains with you long after you've left the dumpsite. A visit to Pier 18, or any one of the open dumpsites in Metro Manila, will convince you that the problem hasn't been solved at all.

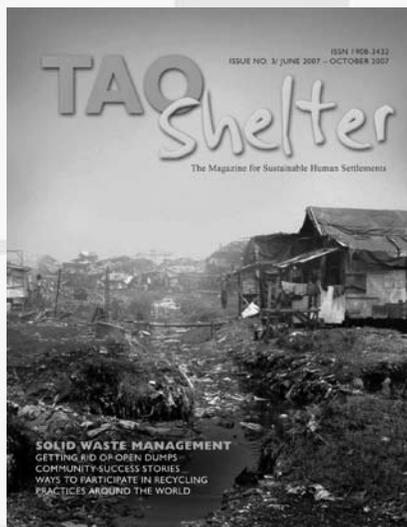
It will take a change in attitude in everyone, from government officials to the families in every household, to solve this problem. The Ecological Solid Waste Management Act ("RA 9003 in a Nutshell," p7) has laid down the steps. The simple act of segregating one's garbage according to what can be recycled ("5 Ways to Participate in Recycling," p16) will already make a difference. The Act also mandates that local governments should phase out open dumpsites and convert them into sanitary landfills. But local governments are protesting that the high cost of landfills makes it difficult to implement the law. On the contrary, Bangon Kalikasan argues ("Ditching the Dump," p8) that if a system of ecological waste management (which includes segregation, composting, recycling and processing residual garbage) is implemented, dumps, or even expensive sanitary landfills, need not be necessary.

We may not have the sophisticated systems of other countries ("Global Efforts in Urban Waste Management," p20), but it's possible to have a low-tech system that works, as Barangay Holy Spirit illustrates ("A Garbage Success Story," p12). Even urban poor communities ("Women in Waste Management," p10) have the capability to manage their waste. If they can do it, why can't the rest of us?

Amillah S. Rodil



PHOTO FROM WWW.JWODCATALOG.COM



ABOUT THE COVER

Pier 18 in the Port Area in Manila is threatening to become the next Smokey Mountain. PHOTO BY FAITH VARONA

THE PUBLISHER

TAO Pilipinas is a women-led, non-stock, non-profit, non-government organization of professionals in the field of architecture, planning, engineering, environmental science, economics and social development offering technical assistance in the planning and development of settlements to the urban and rural poor.

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Contact us at:

23-A Mapagbigay St., Brgy. Pinyahan, Diliman
1100 Quezon City
Telefax: (0632) 926-9504
Email: info@tao-pilipinas.org
Website: www.tao-pilipinas.org

ABOUT TAO SHELTER

TAO Shelter is a magazine that aims to promote the vision of sustainable human settlements that are inclusive, people-centered, environment-friendly and promotes equitable distribution of and access to resources. It is a venue to share technical knowledge, experiences, good practices and perspectives on issues confronting the planning and development of human settlements. It is published twice a year by TAO Pilipinas, Inc.

EDITORIAL STAFF

Editor in Chief
Amillah S. Rodil

Research and Publications Staff
Rosalyn-Frances O. Marcelo
Angelus Maria P. Sales

Contributing Writers
Michelle Galarion, Ana Papa,
Joey Papa, Patti Sales, Beryl Baybay, Gertrudes Samson,
Rosalyn-Frances Marcelo, Joel Ascan, Geraldine Matabang

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Benjamin D. Padero

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METRO MANILA'S SHAME

EACH PERSON IN METRO MANILA GENERATES AN AVERAGE OF HALF A KILOGRAM OF WASTE EVERYDAY

- The estimated total solid waste generated in Metro Manila daily is 6,700 tons (based on 2003 population estimates). This is equivalent to about 2,061 dump trucks.
- Only 720 tons (about 10.7 percent) of the 6,700 tons is recycled or composted.
- About 6,000 tons is either hauled to the city's dump sites, dumped illegally on private land, in rivers, creeks, Manila Bay, or openly burned.
- Given this average, 2.4 million tons of garbage will be generated every year.
- In the next 30 years, Metro Manila will generate over 70 million tons of solid waste.
- This is equivalent to over 230 million cubic meters of waste, an amount that equates to a knee deep layer of waste over the entire metropolis (over 630 square kilometers). Collection of this waste will require a line of waste trucks going three times round the earth and over halfway to the moon.
- Local governments in Metro Manila spend about P3.54B annually on waste collection and disposal.

SOURCE: THE GARBAGE BOOK: SOLID WASTE MANAGEMENT IN METRO MANILA PUBLISHED BY THE ASIAN DEVELOPMENT BANK IN 2004



OPEN DUMP IN PIER 18, MANILA

IN 1999, FORD MOTOR COMPANY USED MORE THAN 60 MILLION 2-LITER PLASTIC SODA BOTTLES (7.5 MILLION POUNDS) TO MAKE GRILLE REINFORCEMENTS, WINDOW FRAMES, ENGINE COVERS AND TRUNK CARPETS FOR ITS NEW VEHICLES

MESSAGE IN A BOTTLE



The next time you buy a beverage to drink, look twice at the bottle before throwing it away. If it's plastic, it will likely contain a symbol consisting of arrows cycling clockwise, forming a triangle, with a number in the middle. The number is the resin identification code - it indicates what kind of plastic the container is made of. If the number is 1, it indicates that the bottle is made of PET, or Polyethylene Terephthalate.

PET is a common plastic used for packaging a wide range of food products and other consumer goods, such as soft drinks, alcoholic beverages, detergents, cosmetics, pharmaceutical products, and edible oils.



PET is also fully recyclable. Used PET bottles are crushed, shredded into flakes, and then sold to manufacturers who use them as raw materials for clothing, pillows, carpets, polyester sheets, or non-food containers. Worldwide, approximately 1.5 million tons of PET bottles are collected for recycling.

Plastic recycling companies in the Philippines buy PET bottles for P15 a kilo. So the next time you drink mineral water, softdrinks, or flavored tea drinks, don't mix the empty bottle with the trash. Send it down the recycling path by keeping it in a separate container with other plastic bottles, and giving it to the Eco-Aide who collects the recyclables in your community.

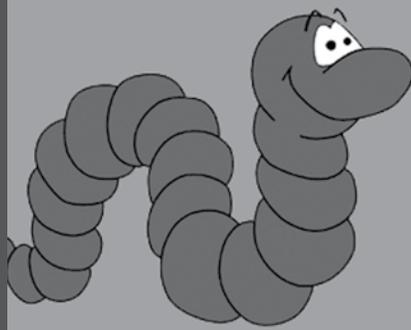
8 WAYS TO SHOP SMART

You can help reduce waste not just by recycling, but also by choosing well the products that you buy. Here are some tips from The Women's Environmental Network (<http://www.wen.org.uk>) to remember on your next trip to the grocery:

- 1 **Choose goods with the least packaging.** One layer is enough; layers and layers of plastic are not necessary.
- 2 **Buy non-perishables in bulk** such as household cleaning products. You'll only have one container to throw away and it's cheaper.
- 3 **Buy fruit and vegetables loose,** not pre-packed. This is cheaper and cuts down on packaging.



- 4 **Go for glass bottles** and jars or tins. Cartons and plastic can be difficult and expensive to recycle.
- 5 **Buy refills** for the products you buy regularly. Save on money and packaging—ideal for items such as washing detergents.
- 6 **Use reusable goods** which last longer than single use items. Examples: reusable dish cloths, dusters, razors and nappies.
- 7 **Take your own shopping bag** and avoid free plastic bags. If you say no to plastic bags, supermarkets might just get the message!
- 8 **Buy recycled goods.** This means that materials can be used for a second time, reducing our dependence on raw materials and finite resources.



LET WORMS EAT YOUR GARBAGE

Earthworms can help reduce your garbage by eating biodegradable waste

FOR MORE INFORMATION CONTACT:

VERMI ACTION CENTER
PHILIPPINE COUNCIL FOR AQUATIC
AND MARINE RESEARCH AND
DEVELOPMENT (DOST)
JAMBOREE ROAD, TIMUGAN,
LOS BAÑOS, LAGUNA
TEL/FAX: + 6349 5361582 OR 5365578
EMAIL: PCAMRD@LAGUNA.NET

MR. TONY DE CASTRO
VERMIPHIL FARM
SITIO BALOGO, BRGY. CONCEPCION,
TALISAY CITY, PHILIPPINES
+ 6334 4336880 / 4330362 / 7121100
EMAIL: PTHENARES@RIVERSIDE.EDU.PH



Tim Greenway/Kennebunk Post

This practice is known as vermicomposting, or the production of organic fertilizer through the action of earthworms. Worms can consume organic materials such as kitchen and garden waste and excrete it out as vermicompost, a high-quality organic fertilizer.

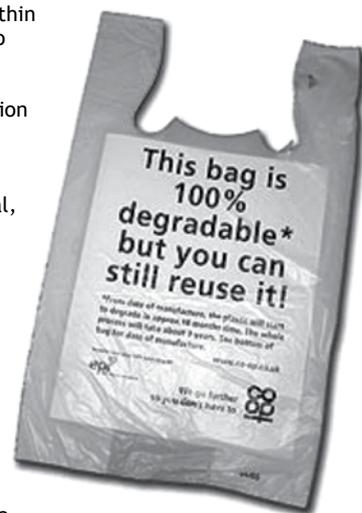
Vermiphil, a company based in Bacolod City, practices vermicomposting in the 18-hectare Buro-Buro Vermi Farm. The vermicompost is used to fertilize vegetables, which are sold in the local market. The earthworms (whose population can double within the composting time) are used to feed fishes, chickens, and other farm animals.

According to Vermiphil, the advantages of vermicomposting are many: it's environment friendly; it doesn't require imported inputs (they use the African night crawler, a type of earthworm introduced to the Philippines in the 80s); and the end-products are highly profitable when sold. Vermicompost is also more effective than ordinary compost.

According to cityfarmer.org, vermicomposting is also an ideal way for apartment dwellers with little or no space to dispose of their food scraps, as the composting can be done within a container, such as a wooden box, earthen pot, or plastic basin.

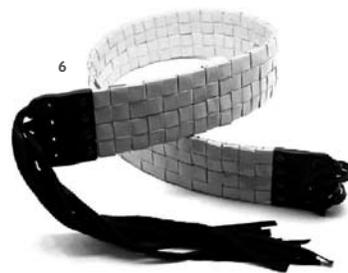
DEGRADABLE PLASTICS

- Can you imagine a plastic bag degrading into dust within six weeks? Normally it would take 100 to 400 years to degrade naturally. But with modern technology, it is now possible for plastic to degrade within a shorter period of time. According to the US Energy Information Administration (www.eia.doe.gov), Mc Donalds in Australia and Sweden have been using biodegradable plastic cutlery for three years. Biodegradable plastic contains a small percentage of non oil-based material, such as cornstarch, that enables it to break down more easily. It enables Mc Donalds to compost their catering waste without segregation. Six-ring carriers for packs of beer cans are also now being manufactured in a plastic which photo-degrades (breaks down when exposed to sunlight) in six weeks.
- But there are concerns that these plastics will not degrade if disposed of in inappropriate conditions. For example, if a photodegradable plastic is buried in a landfill it will not degrade because it is not exposed to light. Another concern is that the mixture of degradable and non-degradable plastics may complicate recycling systems. There are also fears that the use of these materials might encourage more people to use plastic, if they believe that it will simply disappear when discarded. But who knows, there might be a time when scientists will find a way to make plastics do just that.





1. DISCARDED BEER CANS MAKE COOL PENCIL HOLDERS. SEE MORE IN WWW.3RLIVING.COM. 2. PICTURE FRAME FROM COILED NEWSPRINT MADE BY THE WOMEN'S MULTIPURPOSE COOPERATIVE IN BAGUIO CITY, PHILIPPINES. SOLD IN WWW.TENTHOUSANDVILLAGES.COM. 3. PLACEMAT CROCHETED FROM COLORED PLASTIC BAGS BY QUI DIT MIEUX IN BENIN, WEST AFRICA. SOLD IN WWW.TENTHOUSANDVILLAGES.COM. 4. NOTEPAD MADE FROM 100 PERCENT RECYCLED KRAFT PAPER BY PAMELROTI IN THE PHILIPPINES. SEE MORE IN WWW.PAMELROTI.COM. 5. DRINKING GLASS MADE FROM A LIQUOR BOTTLE BY THE YELLOWKNIFE GLASS RECYCLERS COOPERATIVE IN YELLOWKNIFE, CANADA. RECOMMENDED BY WWW.GREATGREENGOODS.COM. 6. BRIGHTLY-COLORED BELT MADE FROM WOVEN CANDY WRAPPERS BY ECOIST. SEE MORE IN WWW.ECOIST.COM. 7. USED JUICE PACKS MADE INTO SLIPPERS BY THE KILUS MULTIPURPOSE ENVIRONMENTAL COOPERATIVE IN PASIG, PHILIPPINES. MORE FROM WWW.KILUS.ORG OR WWW.BAZURASHOP.COM.



Be inspired by these products made from recycled material from the Philippines and around the world

Compiled by Michelle Galarion

GREEN FINDS



8. DISCARDED PLASTIC SOFTDRINK (PET) BOTTLES MAKE UP THIS SHOULDER BAG FROM THE RECYCLED PLANET STORE. SEE MORE IN RECYCLEDPLANETSTORE.COM. 9. USED JUICE PACKS MADE INTO BAGS BY THE KILUS MULTIPURPOSE ENVIRONMENTAL COOPERATIVE IN PASIG, PHILIPPINES. MORE FROM WWW.KILUS.ORG OR WWW.BAZURASHOP.COM. 10. TRASH CAN MADE FROM 99 PERCENT RECLAIMED AUTOMOBILE TIRES AND RECYCLED PLASTIC. FROM VIVA TERRA. SEE MORE IN WWW.VIVATERRA.COM. 11. BASKET MADE FROM USED STRAWS WOVEN BY SANAGMANA, A PEOPLE'S ORGANIZATION BASED IN NAVOTAS, PHILIPPINES. CONTACT MARIANO DE VEYRA OR ERLINDA ARRANCHADO AT +632 2814716. 12. BOLD PATTERNS LIVEN UP THESE LAMP SHADES MADE FROM 100 PERCENT RECYCLED CARDBOARD FROM LOVE ECO. SEE MORE IN WWW.LOVE-ECO.CO.UK.

TRASH TALK

ESSENTIAL REFERENCES IN SOLID WASTE MANAGEMENT



**THE GARBAGE BOOK:
SOLID WASTE MANAGEMENT IN METRO MANILA**
PUBLISHED BY THE ASIAN DEVELOPMENT BANK IN 2004 (96 PAGES)
AVAILABLE IN THE ADB PUBLIC INFORMATION CENTER, 6 ADB AVENUE,
MANDALUYONG CITY 1550, PHILIPPINES. CONTACT THEM AT +632 6325894.

“FOR MOST, THE GARBAGE CRISIS IS LIMITED TO ITS COLLECTION. AS LONG AS THE MOUNDS OF GARBAGE ARE REMOVED, IT IS A PROBLEM OUT OF SIGHT AND OUT OF MIND”

This coffee-table book illustrates the gravity of the solid waste problem of Metro Manila through an eye-catching layout with compelling photos and imaginative collages. Statistics are presented in creative ways; for example the volume of waste that Metro Manila will generate over the next 30 years is shown as a “...line of waste trucks going three times round the earth and over halfway to the moon.” This book is a tool for understanding, as well as a reminder of the urgent need for change in the system of solid waste management in Metro Manila.



SOLID WASTE MANAGEMENT MADE EASY: A DO-IT-YOURSELF GUIDE TO A COMMUNITY-BASED ECOLOGICAL SOLID WASTE MANAGEMENT PROGRAMME

PUBLISHED BY THE NATIONAL SOLID WASTE MANAGEMENT COMMISSION-DEPARTMENT OF ENVIRONMENT AND NATURAL RESOURCES (56 PAGES). AVAILABLE FOR DOWNLOADING AT WWW.DENR.GOV.PH/NSWMC/CBESWMP

“MANAGING SOLID WASTE IS NO LONGER A MATTER OF CHOICE; RA 9003 MANDATES IT”

This handbook is a simple, easy-to-understand guide on starting a solid waste management program in your barangay or community. Case studies of successful programs in other communities serve as inspiration that a community-based program can indeed work. While it doesn't go into much analysis—such as what really makes community-based programs work and what doesn't—it is a good starting point for those who want to start their own community-based program.



SOLID WASTE MANAGEMENT MADE EASY: A FIELDBOOK ON IMPLEMENTING A COMMUNITY-BASED ECOLOGICAL SOLID WASTE MANAGEMENT PROGRAMME

PUBLISHED BY THE NATIONAL SOLID WASTE MANAGEMENT COMMISSION-DEPARTMENT OF ENVIRONMENT AND NATURAL RESOURCES (45 PAGES). AVAILABLE FOR DOWNLOADING AT WWW.DENR.GOV.PH/NSWMC/CBESWMP

“WE ARE ALL IN A POSITION TO MAKE A DIFFERENCE—STARTING IN OUR OWN HOUSEHOLDS, IN OUR BARANGAYS, IN OUR COMMUNITIES IN GENERAL”

This fieldbook is a companion volume for the Do-It-Yourself Guide. It contains training modules that can be used by NGOs or community organizations for initiating and implementing a solid waste management program. Each module presents the rationale, objectives, expected participants, and methodology. The simple way the modules are written make them easy to adapt, customize, or detail further for your community's training needs.



VITAL WASTE GRAPHICS II
PRODUCED BY UNITED NATIONS ENVIRONMENT PROGRAMME/GRID-ARENDAAL IN 2006 (45 PAGES). AVAILABLE FOR DOWNLOADING AT WWW.VITALWASTEGRAPHICS.NET/WASTE2/

“IN RICH COUNTRIES, FOR EVERY RUBBISH BAG PUT OUT BY HOUSEHOLDS 70 TIMES MORE WASTE IS PRODUCED IN MINING, LOGGING, FARMING, OIL AND GAS EXPLORATION, AND INDUSTRIAL PROCESSES USED TO CONVERT RAW MATERIALS INTO FINISHED PRODUCTS AND PACKAGING”

Vital Waste Graphics gives a global overview of the key issues and trends in waste. Each key issue is tackled within two pages (one spread), so you can absorb what you need to know in one glance. Statistics, concrete examples, and case studies are presented to create a clear picture of the issue. It's easy to understand because information is presented through simple and colorful graphics, maps and texts. There are also links to references on the web if you need to know or research more.



BASURA MONSTER
BY CHRISTINE BERSOLA-BABAO
PUBLISHED BY KATHA PUBLISHING IN 2007.
AVAILABLE IN GOODWILL BOOKSTORE

“THEN ONE DAY, THE BASURA MONSTER ROSE FROM THE RIVER AND WALKED ON LAND...”

Interested in stories that your kids will enjoy reading and at the same time learn values from? Basura Monster, a children's book written by Christine Bersola - Babao and illustrated by Cdric Ryan De Guzman tells the story of two children, Anne and Buboy, who always forget to throw their garbage in the right places. A monster starts to grow and thrive on the garbage, destroying forests, rivers, and houses. Anne and Buboy, as well as their whole community, learn their lesson by starting to segregate and recycle, and eventually destroying the Basura Monster. This story is a creative way to introduce children to the concept of solid waste management, and the consequences of mismanagement.

RA9003 IN A NUTSHELL



BASICS OF THE ECOLOGICAL SOLID WASTE MANAGEMENT ACT

REPRINTED FROM "SOLID WASTE MANAGEMENT
MADE EASY" A HANDBOOK BY THE UNDP/DENR/
NSWMC
PHOTO CREDIT: WWW.GREENVALLEYDISPOSAL.COM

WASTE REDUCTION AND PROPER SOLID WASTE SEGREGATION ARE NO LONGER CHOICES WE HAVE TO MAKE. AS LAW-ABIDING CITIZENS OF THIS COUNTRY, WE ARE REQUIRED TO FOLLOW A LAW ENACTED AS EARLY AS 2001.

Republic Act 9003, or the Ecological Solid Waste Management Act of 2000, was signed into law on January 26, 2001. It is considered a broad-based and comprehensive approach to solid waste management.

It involves segregation at source, segregated collection, storage, transfer, processing, treatment and disposal of solid waste.

The law promotes a way of thinking that waste is a resource that can be recovered. This can be achieved by following the 3 Rs: reduce, reuse, and recycle. The law mandates us to put these principles into practice. By doing so, the problem of solid waste management can be solved.

The law requires the following:

- Solid waste must be reduced at source.
- Recyclable materials must be recovered.
- The remaining waste, after recyclable and biodegradable materials have been separated and used, is to be disposed of properly.

Solid waste management begins inside the household. Starting in our homes, we must learn to conserve resources so we can reduce the amount of materials that we throw away.

Our local government units (LGUs) are responsible for enforcing the law. Government agencies on the national level are required to support LGUs in carrying out this responsibility. LGUs are thus required to draw up a solid waste management plan.

In terms of areas of responsibility, the barangay is tasked to ensure that households and establishments reduce waste, reuse materials, and recover recyclable items. The city or municipality provides a garbage collection system, and a proper waste treatment and disposal facility that protects the environment. ■

SOME PROVISIONS OF RA9003

Compiled by Beryl Baybay

- LGUs are mandated to divert 25 percent of the wastes thrown in disposal facilities to help reduce waste production within the first five years after the implementation of the act.
- All households, institutions, industrial and commercial establishments, and agricultural sources should segregate their wastes before collection. Wastes should be stored in separate containers and properly marked as "compostable," "non-recyclable," "recyclable," or "special waste." Designated areas and containers should be provided where residents can drop off the segregated wastes that later will be collected by the haulers. (Chapter 3 Article 2)
- There should be separate collection schedules and separate trucks that will collect specific types of wastes (Article 3)
- Some of the prohibited acts as outlined in Chapter 6 Section 48 and corresponding penalties based on Section 49 are the following:

Violations	Penalties
Littering, throwing, or dumping wastes in public places such as roads, sidewalks, canals, esteros or parks and establishments	A fine of not less than P300 but not more than P1,000, or rendering of community service for not less than one day to no more than 15 days to an LGU where such prohibited acts are committed, or both.
Open burning ("pagsisiga") of solid waste	A fine of not less than P300 but not more than P1,000 or imprisonment of not less than one day to no more than 15 days, or both.
Allowing or causing the collection of non-segregated or unsorted waste Squatting in open dumps and landfills Open dumping, burying of biodegradable or non-biodegradable materials in flood-prone areas Unauthorized removal of recyclable materials intended for the collection of authorized persons	A fine of not less than P1,000 but not more than P3,000 or imprisonment of not less than 15 days to no more than six months, or both.
Mixing source-separated recyclable material with other solid waste in any vehicle, box, container or receptacle used in solid waste collection and disposal	A fine of P500,000 plus an amount not less than 5 percent but not more than 10 percent of his net annual income during the previous year.
The construction of any establishment within two hundred (200) meters from open dumps or controlled dumps or sanitary landfills	A fine not less than P100,000 but not more than P1,000,000, or imprisonment not less than one year but not more than six years.

Any citizen may file an appropriate civil, criminal or administrative action in the proper courts/bodies against any person, government entities or official who violates or fails to comply with the provisions of the law. However, the law also protects those who implement it against suits intended to harass or pressure. You may download the full text of RA 9003 from www.emb.gov.ph. □

Landfills are not the answer to the garbage problem

DITCHING THE DUMP

by Ana and Joey Papa
Bangon Kalikasan Movement
www.bangonkalikasan.org

THE ECOLOGICAL WAY OF ADDRESSING THE GARBAGE PROBLEM IS NOT THROUGH A LANDFILL—THAT ONLY ENDS UP AS A “GLORIFIED” DUMPSITE—BUT THROUGH THE ECOLOGY CENTER SYSTEM OF RESPONSIBLE PRODUCERS, CLEAN PRODUCTION, AND PEOPLE IN HOUSEHOLDS AND THE COMMUNITY WHO PROMOTE AND PRACTICE WASTE PREVENTION AND REDUCTION, SORTING AND SEGREGATION AT SOURCE, REUSE, RECYCLING AND COMPOSTING.

The heart and soul of Republic Act 9003, or the Ecological Solid Waste Management Act, depends on the people—whom the local authorities should harness instead of the dump truck; and to whom they should give the land for habitation and livelihood.

Unfortunately, the authorities do not seem to understand ecological waste and resource management as they push instead for “sanitary” landfills (is there such a thing?). A draft paper which came out in January 2006 on behalf of the League of Cities and League of Municipalities of the Philippines entitled “Making RA 9003 Work,” recognizes the unreasonable expense and demanding requirements of RA 9003 for “sanitary” landfills, but it nevertheless focuses on the need for “final disposal facilities” and recommends, well, “modified” or “hybrid” landfills.

“Final disposal facilities” (read: landfills) are not the answer to the problem. The law states that every household and establishment in a community should protect the environment and promote public health through resource consciousness, waste prevention, waste sorting and segregation at source, recycling, composting, and use of special, environment-friendly technologies to process residual wastes including hazardous, infectious, and toxic wastes.

The law further mandates a nationwide information, education,

and communication effort led by the Department of Environment and Natural Resources with the active participation of other government agencies, non-government organizations, and other groups.

The success of such an effort—provided that information, education, and communication (IEC) programs and implementation are faithful to the full ecological framework that the essence of the law invokes—could in fact ease the burden on the need for “disposal” facilities.

On “sanitary” landfills, it is clear in the law that it is not the next alternative to a controlled dump as is now being asserted by certain vested interests—such as those who have succeeded in having this provision on “sanitary” landfills included in RA 9003—after all the efforts that had been taken to put in the ecological provisions.

The paper “Making RA 9003 Work,” asserts the following: Most Philippine LGUs are poor (4th to 6th class) and cannot support an effective solid waste management (SWM) system in the country; the cost of operating an effective SWM system is high; technical and financial support systems for the local implementing bodies are weak; “infirmities” and “realities” must be considered, such as “competition” between SWM and other development priorities; a need for “economies of scale” and “efficiency factors” for an effective SWM; “high-end and state-of-the-art SWM system in a low-end, low-tech local economy;” and conflicting and incomplete implementing guidelines.

There is no quarrel with the fact of the state of poverty in the country. It does not follow, however, that the “poor” LGUs cannot help in contributing significantly to an effective ecological resource management.

BARANGAY WITHOUT A DUMP

Barangay Tuktukan in Guiguinto, Bulacan, has two tricycles with sidecars for collecting biodegradable waste everyday from a population of about 10,000. The collection is composted in a shed. The product becomes soil enhancer for the community’s vegetable garden and for the collectors’ own plots; in another community, the compost is sold in bulk to a fishpond operator who finds the product more beneficial than the commercially produced feeds.

Most non-biodegradable wastes are sold as soon as the household segregates its waste, and these hardly see the collection day. Those not sold are being kept for the granulator or pulverizer that the municipal government has promised to buy which will turn the “residuals” into fillers for concrete products, or as raw material for livelihood crafts.

Also, there is no more dumpsite in Tuktukan. Before, all 14 municipalities of Guiguinto dumped their garbage in a one-and-a-half hectare property in the barangay, right along MacArthur Highway. Today, the area is overgrown with wild grass and a building has been constructed beside it.

More than the financial profit to be gained is the immeasurable “revenue” that an empowered community gains from the waste-turned-compost-turned-money; and from the preservation of the environment.

What is needed is adequate and timely information, education, and communication on environment and ecology. Too bad many authorities have often used that lame and condescending excuse, “ayaw matuto ang mga tao, ang titigas ng mga ulo” (the people do not want to learn; they are stubborn).

NEED FOR ECOLOGY CENTERS

With respect to the other points brought up in the paper, “Making RA 9003 Work:” The paper refers only to “SWM” not “ESWM.” Without the Ecological premise in “development”, no significant transformation can take place, much less be sustained.

“Economies of scale” is more akin to centralized, not barangay-based management.

“High-end” or “state-of-the-art” what? No man-made technology can beat composting with soil, cocodust, leaves, and the like; plus the heat of the sun; and the action of air, water, and microorganisms. Simple non-biodegradables can be recycled with simple know-how or simple equipment.

It is the hazardous, infectious and toxic (HIT) wastes that for now must be dealt with—but at the provincial or city level—with the use of special, environment-friendly technologies that could cost some amount, but only initially. Still, this is less than the cost of establishing and operating a landfill, even just a “hybrid” one. Besides, this portion of the waste is minimal compared to what can be composted and immediately recycled. It could be further reduced if the advocacy for extended producer responsibility and clean production technologies will succeed.

What we need are Ecology Centers (or Materials Recovery Facilities as referred to in the law, though we prefer the former because we are not only dealing with materials; we are dealing with values).

The recommendations in the paper are anchored on the conclusion that there is a need for disposal facilities because of waste volumes. Recommendations include the “upgrading” of requirements for controlled dumps, and coming out with a “hybrid” sanitary disposal facility much like an “engineered” landfill with less expensive features.

Landfills do not make for a waste-free environment. Waste volumes are synonymous with hauling, dumping, and tipping fees.

We need education for as many people in communities at the shortest time possible. There are no socio-economic boundaries in people’s capabilities to understand and do what is right, given an “even playing field” of opportunities for enlightenment and with the proper, not necessarily expensive, support. Thus, the people themselves will know how to prevent and reduce their wastes right in their own homes and in the Barangay Ecology Center. ■

ALL ABOUT LANDFILLS Compiled by Patti Sales

WHAT IS A SANITARY LANDFILL?

RA 9003 or the Ecological Solid Waste Management Act of 2000 mandates the closure of open dumpsites, and the use of a long term storage facility, or a sanitary landfill, for the residual (non-recyclable) waste after mixed waste has undergone sorting, segregation, composting, and recycling.

A sanitary landfill is an engineered way of storing and disposing of residual waste. In a sanitary landfill, wastes are spread in layers on a piece of property, usually on marginal or submarginal land. Each layer is covered with soil and compacted to minimize the volume of the waste and increase the rate of decomposition.

The engineered landfill systematically addresses the three forms of waste bi-products: residual solid waste after decomposition; gaseous waste evolving from the decomposition process; and the liquid leachate. Gaseous waste is addressed by a specially designed dome that collects or harvests gaseous waste bi-products, recycles it, and converts it into fuel that may be used to generate heat or other forms of energy.

The flooring of an engineered landfill is composed of a non-permeable material that prevents the seepage of leachate, liquid waste which is potentially 100 times more potent than raw sewage in polluting the soil and water table. A special chamber incorporated within the landfill collects the leachate and treats it with chemicals so that it can be safely disposed.

WHERE SHOULD IT BE LOCATED?

According to RA 9003, a site selected for a landfill must be:

- Consistent with the overall plan of the LGU
- Accessible to major roadways
- With adequate amount of earth needed for post closure
- Located in such a way that it will not affect environmentally sensitive resources such as the aquifer, groundwater reservoir or watershed areas
- Sufficient to accommodate the community’s waste for a period of 5 years

A landfill must also fulfill the following requirements for site design and operation:

- Full or partial hydrogeological isolation: Naturally, the sited landfill should have semi-permeable soil to secure against the seeping through of the leachate. As standard procedure, a soil or synthetic liner is installed to minimize contamination of groundwater. But even with the presence of a liner, there is still a need for the collection and treatment of the leachate.
- Formal engineering preparations: A systematic and engineered plan should be prepared with intensive and comprehensive research by professional geologists, architects and engineers.
- Permanent control: Knowledgeable and trained staff should always be at the site to regulate the preparation, construction and maintenance of the landfill, and the disposal of wastes as well.
- Planned waste placement and covering



WOMEN IN WASTE MANAGEMENT

Four women recount the challenges of starting a solid waste management program in their community
by Gertrudes C. Samson

Every other day from 7am to 11am, four women wearing white long-sleeved shirts and buri hats push a cart around a community in Tanza, Navotas, collecting segregated waste, sweeping litter, and reminding the people about the policies for solid waste management in the area.

They are Wenifreda “Nanay Weyne” C. Arabes, 60, Fedelina “Nanay Lyn” Pales, 57, Violeta “Ate Violy” O. Balse, 49, and Lanie “Jeng-Jeng” Eleoterio, 26. Together they compose the Solid Waste Management (SWM) Committee of the Samahan ng Nagkakaisang Maralita ng Navotas (SANAGMANA), a community-based organization in Tanza, Navotas. Nanay Weyne heads the SWM committee.

LIFE WITHOUT WASTE MANAGEMENT

Before transferring to the SANAGMANA community in Tanza, the four women lived in informal settlements in UE-Letre, Malabon, Metro Manila.

According to them, the situation in UE-Letre was really bad because majority of the people just dumped their mixed solid waste into a nearby creek. The garbage trucks then just occasionally dredged the waste in the creek. And because the

creek was polluted, the air smelled very bad, and there were lots of mosquitoes and flies. Nanay Lyn says that often, many people got sick especially the children and elderly.

Jeng-Jeng recalls, “*Ang babay namin noon malapit sa creek. Kapag umuulan bumababa hanggang sa sabig ng babay kasama ang mga basura. Ang hirap talaga*”. (Our former house there was near the creek. During rainy season, the water would rise up to the floor level of the houses, together with all the waste people dumped on the creek. It was really difficult).

Ate Violy adds, “*Walang nag-iikot doon para bumili ng recyclables at malayo din kami sa junkshop. Kaya kami na nagpapakolekta ng basura sa truck, balo-balo pa rin ang basura.*” (Nobody went around to buy recyclables and the junk shop was far. So the trash that the garbage truck picked up was still unsegregated).

According to Nanay Weyne, they didn’t have any program or orientation on solid waste management. She says, “*Nadinig ko lang sabi ng barangay kailangan daw maghiwalay ng basura, pero walang programa o oryentasyon. Wala ding tumitingin doon kung ginawa ba ng mga tao.*” (I just heard that the *barangay* (village) leaders said

we needed to segregate waste, but there was no program or orientation. Nobody checked if the people were doing it).

A CLEANER COMMUNITY

Compared with their former community in UE-Letre, their present condition now in SANAGMANA is a lot better. Nanay Weyne says that the environment is cleaner and the air is fresher compared to where they came from, and there are less mosquitoes and flies. Jeng-Jeng adds that they have not heard of anyone getting seriously sick, even the children.

Nanay Weyne attributes the better conditions to the solid waste management policies of the community. SANAGMANA has a comprehensive Deeds of Restriction which explicitly states that the members are required to follow RA 9003, or the Ecological Solid Waste Management Act, passed in 2001. RA 9003 requires households to segregate biodegradables from the non-biodegradables, and recover recyclable materials. If there are newcomers to the community, the SANAGMANA Council orients them on the policies of SWM.

SANAGMANA takes the challenge of solid waste management seriously because of the sensitive nature of the housing site—a reclaimed former fishpond surrounded by other fishponds. Waste management is a critical factor to prove the viability and of the project and sustainability of the environment. About 130 families are now living in the site, with more still coming.

WASTE COLLECTION

In January 2007, residents were required to sign up for committees to help in the management of the housing site. At first many people signed up for the SWM Committee. But when they learned that collecting waste was part of the responsibilities of the committee, the number dwindled, until only the four women were left.

The women started collecting segregated garbage around the community on February 2007. Aside from collecting the trash, the committee also imposes discipline on community members. If the garbage is mixed together, they do not collect it. They recount, "Isang beses may pasaway na residente, pinakolekta sa amin ang isang sakong basura niya. Sa ibabaw mga recyclables pero sa ilalim pala halo-balong basura pati nabubulok. Binalikan namin talaga siya, sabi namin buwag na niyang uulitin yon, kung bindi, hindi na talaga namin siya kokolektahan sa susunod." (One time, there was a stubborn resident who asked us to collect his sack of waste. At the top were the recyclable materials but below we discovered it was a mixture of wastes including biodegradables. So we went back to that person and told him not to do it again, otherwise we will not collect their waste anymore).

Through the committee's efforts, majority of the residents are already segregating their waste. Some bury their biodegradable waste in small pots, using the resulting compost as fertilizer for their plants. The people are now also cleaning their surroundings. Children also participate by segregating the recyclable waste at home to sell to the Materials Recovery Facility (MRF) of the community.

CHALLENGES

In the beginning reminding people about SWM policies was not easy. The women recall, "Noong simula pa lang, minsan yong tingin ng iba parang nagsabing, 'Anong karapatan nila para pagsabihan kami?'" Pero napansin namin, nang magkaroon na kami ng uniform parang nagkaroon na kami na awtoridad, kinikilala na nila kami. Ngayon kapag makita pa lang nila kaming padating na naka uniporme, naglilinis na ang mga tao ng paligid. Nilalabas na nila ang mga bukod-bukod na basura kabiti bindi pa kami nagsasalita." (When we were just starting, sometimes some people just stared at us as if thinking: 'What authority do they have to remind us?.' But we noticed, when we already had a uniform,

it gave us some sense of authority. People now recognize us. Nowadays when they see us coming in uniform, people start to clean up their surroundings. They bring out their segregated waste even if we don't tell them to).

Another challenge faced by the committee is balancing their time for the committee work and their livelihood or income generating activities which are also important for their family's survival. So in May 2007, the SWM Committee organized the community into blocks, with each block choosing a leader who will help the SWM Committee in the monitoring and implementation of SWM policies. The block leaders chosen were also all women. According to the SWM Committee, the work is also open to men, but most men are always busy earning a living for the family outside the community throughout the day.

FUTURE STEPS

The four women believe that 100 percent success in implementation of a solid waste management program is possible. They consider the challenges to its implementation as no longer obstacles but just temporary hurdles to overcome towards its full implementation.

First, they feel that they need to be persistent in reminding the community members on the gains of practicing SWM; and the corresponding penalties of violating the policies (for example, dumping of waste in water bodies is a criminal offense in RA 9003). For this, they are planning to maximize the use of the existing SANAGMANA paging system (a sound system with microphone and speaker which is heard in the whole community) to constantly remind people.

Second, they believe that parents should learn to discipline young children. Nanay Weyne says, "Yung mga magulang kailangan din talaga nilang pagsabihan ang kanilang mga anak na buwag magkalat sa paligid. Yung mga kalat kasi na winawalis namin, halos mga pinaglagaan ng kendi at sitsirya. Sino pa ba ang dapat magsabi sa mga anak kundi mga magulang?" (Parents need to tell their children not to litter, Majority of the waste we sweep around the community are candy wrappers and junk food packaging. Who else should tell the children but the parents?).



WEYNE ARABES AND VIOLY BALSE COLLECT BIO-DEGRADABLE WASTE



THE AUTHOR (FAR RIGHT) WITH THE SWM COMMITTEE

When the four of them were asked why they decided to volunteer in the SWM committee, they said, "Naniniwala kasi kami na mahalaga ito. Para sa kabutihan din naming labat ito. Gusto kasi namin ng malinis na paligid, dahil mas mabuti ito. At siyempre kung gusto mo ng malinis na paligid tumulong ka dapat na pangasiwaan ito." (We believe it is important. This is also for our own good. We want a clean environment because it is better. And of course, if you want a clean environment you must help in managing it). ■

“SEVERAL COMMUNITY REPRESENTATIVES IN ALMOST ALL PARTS OF THE COUNTRY HAVE VISITED OUR BARANGAY AND WANTED TO REPLICATE THE PROJECT. HOWEVER, WHEN THEY ASK ABOUT THE CAPITAL, THEIR ENTHUSIASM BEGINS TO FALTER. MY ADVICE IS THAT THEY SHOULD REALIZE HOW BARANGAY HOLY SPIRIT STARTED. START SMALL. IN OUR CASE WE STARTED WITH MANUAL COMPOSTING AND SIMPLE WASTE SEGREGATION. THE KEY, REALLY, IS INITIATIVE.”
- JOVITA SANTOS, OIC, BARANGAY HOLY SPIRIT MRF

The garbage success story of Barangay Holy Spirit (BHS) in Quezon City emerged from the recognized need to revitalize the community and protect its citizens from illnesses and health problems. In the past, the lack of concern of the residents was evident in the prevailing unsanitary conditions in the barangay. The streets were littered with uncollected garbage, along with flies, mosquitoes and other disease-bearing pests. After more than a decade of hard work and despite an average of 66,000 kilos of waste generated daily, Barangay Holy Spirit has maintained its overall cleanliness and environmental sanitation through a successful Community-Based Solid Waste Management (CBSWM) program.

COLLECTION STRATEGY

Barangay Holy Spirit's CBSWM consists of segregation, recycling and mechanical composting. Households segregate their waste to “di-nabubulok” (non-biodegradable) and “nabubulok” (biodegradable). The ‘No Segregation, No Collection’ policy is practiced in the community. Every dump truck is accompanied by an officer from the Barangay Security and Development Office (BSDO) to facilitate implementation of this policy.

Eight garbage trucks, owned by the barangay, collect the solid wastes from the three zones of the area. Zone One's collection schedule is on Mondays and Thursdays, Zone Two is on Tuesdays and Fridays, Zone Three is on Wednesdays and Saturdays while all of the commercial areas' solid wastes are collected daily. These trucks are obliged to make their

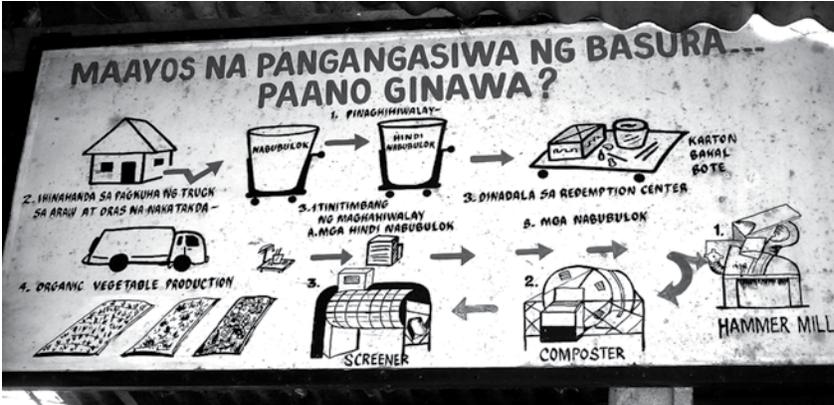
A GARBAGE SUCCESS STORY

by Rosalyn-Frances Marcelo



How Barangay Holy Spirit in Quezon City became a model for community-based solid waste management

SORTING AREA OF THE MATERIALS RECOVERY FACILITY



FROM TOP, CLOCKWISE: PROCESS OF SOLID WASTE MANAGEMENT; COMMUNITY VEGETABLE GARDEN; REVOLVING COMPOSTER DRUM; SHREDDER FOR BIODEGRADABLE WASTE.



rounds the whole day to make sure that all wastes are collected. The truck drivers and “paleros” (garbage collectors) are diligent in waste collection because their earnings also depend on the quantity of their collection. The more waste they collect, the higher the income they receive.

MATERIALS RECOVERY

The main facilities of Barangay Holy Spirit’s CBSWM are the Materials Recovery Facility (MRF), also called the Bayanihan Waste Redemption Center, and the “Bulaklakan at Gulayan” (Flower and Vegetable Garden).

For non-biodegradable materials, the MRF has a space for sorting and storage, a small office, and a handicrafts making area. At the sorting area, the non-biodegradable wastes are further segregated into paper (white and brown), metals and tin cans, plastics and bottles. Straws, old cloths, posters, cardboards and other plastics are converted into handicrafts or useful objects such as baskets, rags, and containers. These products are sold and serve as source of income for the wives of the paleros and SWM volunteers.

COMPOSTING

Biodegradable wastes that are not composted at the household level are brought to the MRF. The biodegradable wastes area is partitioned into: the mixing and shredding area (with mixing bins and one shredder); composting area with six composting drums; air-drying shed; sifting or screening area

(with one screener); and compost storage shed. After sorting and weighing, the wastes are transferred into drums/tumblers and mixed with coconut husks, saw dust (which absorbs the leach of kitchen waste) and lactobacilli—a bacterium used to remove any foul odor from wastes. They are stored inside the bins until the foul odor is removed. After composting they are grinded inside a shredder/hammer mill, and placed inside the six revolving composting drums. At the end of five composting days, they will be collected in the compost bin. To remove the methane from the compost, the mixture is dried in the covered air-drying shed for three to four weeks. Then it is sifted through the screener and transferred to sacks. This soil is either brought to the “Bulaklakan at Gulayan” or to the small vegetable garden located near the Barangay Hall where the BSDOs get their free vegetables as incentives.

IMPACT OF THE PROGRAM WASTE REDUCTION

Based on a study conducted by the Asian Development Bank, the daily waste generation of 330 cubic meters was reduced to 105 cubic meters with the segregation project of the barangay. And with almost 70 percent reduction in waste, garbage trucks make only 7.5 trips per day compared to 23.5 (the estimated number of trips for 120,000 residents and 0.55 kilo daily waste generation per person).

HOW TO IMPLEMENT A COMMUNITY-BASED SOLID WASTE MANAGEMENT PROGRAM

The following are the key implementation steps based on the experience of Barangay Holy Spirit:

- 1 Make a thorough assessment of the current state of the waste management and garbage collection system in the barangay.
- 2 Estimate the logistical requirements in terms of manpower, number of dump trucks needed, etc.
- 3 Acquire dump trucks and other equipment necessary for the implementation of the garbage collection program.
- 4 Create an Eco-Waste Management Group to supervise and monitor implementation of the project.
- 5 Establish a Garbage Redemption Center. This is the waste segregation and recycling area and the dropping point of all compostable and recyclable materials. Later this can be expanded into a full-fledged Materials Recovery and Composting Facility (MRCF).
- 6 Mobilize community participation by establishing a sense of project ownership. This includes holding regular meetings with purok (community) leaders to gain and sustain the cooperation of citizens in the garbage collection effort and to maintain the general cleanliness in their respective residences and their immediate vicinity.
- 7 Establish a systematic and regular garbage collection system by dividing the barangay into zones to make the collection of garbage more orderly and systematic.
- 8 Establish a garbage collection monitoring and evaluation system and have regular meetings to identify specific areas for improvement.
- 9 Implement the segregation of waste into biodegradable and non-biodegradable materials.
- 10 Recover recyclable materials from the non-biodegradable garbage and transform the biodegradable waste to useful organic fertilizer for the benefit of the community.

IN 2004, QC
GOVERNMENT
PASSED
ORDINANCE NO.
1191, PROVIDING
INCENTIVES TO
ALL BARANGAYS
UTILIZING THEIR
OWN TRUCKS
FOR SOLID WASTE
COLLECTION IN
THEIR RESPECTIVE
BARANGAYS.



CARDBOARD
FOR SELLING

EMPLOYMENT AND INCOME OPPORTUNITIES

Apart from the job items for the personnel and monitoring aides of the Waste Management Office that provide employment to the barangay's constituents, this project has also generated several other opportunities for income generation. The Kariton Pangkabuhayan provides karitons (pushcarts) to out-of-school youths and aged individuals who want to be productive. With 30 units of karitons, it also supports the collection of garbage in the interior areas of the barangay. The Bayanihan Redemption Center conducts skills training for livelihood ventures using discarded but usable waste materials. Through the Entrepinay program, the wives of the paleros sell products such as soap, perfume, gel, shampoo, lotion, candles, pastry products, as well as accessories and home décor made from recyclable materials. The Bulaklakan at Gulayan provides jobs to poor families by employing them to plant vegetables. It also helps them avail of high quality vegetable products for lower prices.

IMPROVEMENT OF HEALTH AND SANITATION

Residents of the subdivisions, depressed areas, commercial and business sectors now enjoy the benefits of the cleaner environment. Less garbage mean less breeding ground for insects and pests and fewer risks on health and sanitation.

REDUCED BURDEN FOR THE CITY GOVERNMENT

Since they use and operate their own garbage trucks, the community is now independent as far as garbage collection is concerned.

PROMOTION OF DISCIPLINE AND SENSE OF RESPONSIBILITY

The residents, garbage collectors, and barangay officials all played their role according to the directions set by the barangay, which led to the success of the program. With equal distribution of tasks for each sector involved in the project, the barangay was awarded annually for its efforts. Now, the people are more vigilant in the exercise of their responsibility in protecting the environment.

KNOWLEDGE SHARING

The barangay is constantly being visited by students, entrepreneurs and government employees from all parts of the globe. The barangay shares its experiences and lessons learned through the Lakbay-Aral program of the National Government. Visitors from Ilocos Sur, Visayas, Pangasinan, Sorsogon, Catanduanes, Laguna and even Japan were able to observe and appreciate the practice of Barangay Holy Spirit.

ADVERSE REACTIONS

The first period of the implementation suffered adverse reactions from the residents of the depressed areas. As expected, they were resistant to change. The program sought the help of the BSDO who served as mediators and enforcers of the "No Segregation, No Collection" policy. Coupled with the persistent and consistent efforts of the barangay officers who imparted and explained comprehensively to its detractors the expected advantages of the project (the information and education campaign took about five to six months), the project eventually achieved the cooperation and support of the majority. Now, the people are more vigilant in the fulfillment of their responsibility in environmental protection. ■

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Elements of a Successful Solid Waste Management Program

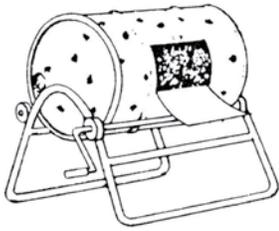
As BHS has successfully demonstrated, the participation of the community in the SWM Project is the most critical factor in the attainment of its goals. To replicate the program, the following elements also need to be in place:

- Strong leadership, political will and commitment of the Punong Barangay (head of the administrative unit) and other local officials in starting and sustaining the project.
- Massive information campaign to engage the community in the cleanup of streets, alleyways and backyards of individual homes for a clean and green environment.
- Sufficient funds and/or initial seed capital from the local government unit for the purchase of dump trucks and other necessary garbage collection equipment and other day-to-day requirements.
- Constant supervision and monitoring to ensure the regular and efficient collection of garbage and other waste materials.
- Enactment of a local ordinance to institutionalize the program.

SMART GUIDE TO HOUSEHOLD COMPOSTING

How to turn your biodegradable waste into organic fertilizer

by Rosalyn-Frances Marcelo



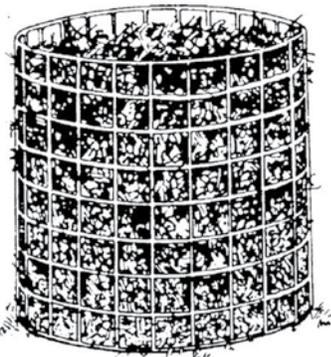
ROTATING BARREL COMPOSTER

Why use compost?

A healthy soil needs adequate nutrients, helpful bacteria, animal and plant organisms as well as a good structure to allow it to breathe and absorb moisture. To produce

vegetables at a bigger size and a quicker rate, gardeners normally make use of synthetic fertilizers. However, these types of fertilizers have several disadvantages. They sacrifice the long-term texture and flavor of vegetables. They are derived from deteriorating petroleum resources, and consume excessive energy during production. Excess chemicals also leach out of the soil, pollute waters, and drive away or destroy helpful soil organisms.

The most effective yet simple way to boost your soil is by composting. Compost is nothing more than decayed organic matter. Advantages of composting include: contribution to proper waste disposal; conversion of organic wastes into rich fertilizer; reduced dependence on inorganic fertilizers; feeding of microorganisms that aid plants in growing; and improvement of the structure of soil and its ability to retain nutrients. Composting is also based on renewable and locally available raw materials. It can generate employment opportunities and lessen environmental pollution. Best of all, it's easy. Once the compost bin itself is built, it is just as quick to take your food scraps out to the compost pile as to your garbage can. ■



WIRE-FENCING HOLDING UNIT

THE ORGANIC GARDENER'S RECIPE FOR QUICK COMPOST

1. The ideal composting site is shaded, well drained and near a source of water. But an open area can be used. Build the compost pile in the spot of your garden where collection of raw materials is easiest.
2. Build a compost bin out of easily available materials such as scrap lumber, chicken wire, bricks, or concrete blocks. Or just build free-standing piles, and cover them with tarps to protect them against the wind.
3. Make sure the bin has enough openings to allow air to penetrate the pile so that the bacteria and fungi that do the composting can get enough oxygen.

4. Compost works best with a mixture of coarse and fine materials, layered together in 6- to 8-inch layers. Lay down a bottom layer of twigs, cornstalks, wood chips, or other coarse material (such as shredded corn cobs or sawdust). Follow with a layer of high-nitrogen material such as manure or grass clippings. Be careful not to layer wet grass clippings in the pile as they tend to mat, and matted wet clippings become sticky masses of slime through anaerobic decomposition, restricting air and water movement in the pile. You can add a layer of garden soil, then more rough materials, more clippings, and so on. Sprinkle the materials with water as you build the pile. Repeat the sequence until the pile is 4 or 5 feet high, and keep everything covered until the pile is built up.

5. As you build the pile, make sure it's at least 3 feet square and 3 feet high. The pile should be large enough to hold the heat that it generates, yet small enough to allow air movement into the center of the pile. But don't let the pile get over 5 feet high. The mass may pack down, squeeze out air and slow down decomposition. It will also be difficult to turn.

6. Turn the pile every 3 or 4 days to move the fully composted material out of the hot center of the pile, and replace it with partially composted material on the sides. Turning the compost also helps prevent strong smells from building up. Remoisten the material as you turn it. The finished compost pile should be half the size of the original pile.

7. Compost may be ready as early as 12 days after you begin the process, though most well-managed piles will produce usable compost in four to eight weeks. Generally, the more compost is turned the faster it decomposes. The time required to develop finished compost also depends on the size of the pile and time of year or air temperature.

TROUBLESHOOTING COMPOSTING PROBLEMS	
SYMPTOM/ PROBLEM	SOLUTION
Rotten egg smell Insufficient air; excess moisture	Turn pile and incorporate coarse organic matter (sawdust, leaves)
Ammonia smell Organic material too high in nitrogen	Add coarse organic material (sawdust, leaves)
Pile does not heat up Pile too small	Add more organic matter
Insufficient moisture	Turn pile and add water
Lack of nitrogen	Incorporate manure, fertilizer or low C:N (carbon-nitrogen) ratio plant material (lawn clippings)
Poor aeration Cold weather	Turn pile Increase pile size or insulate with straw

MAINTAINING A COMPOST PILE

The compost pile may fail to heat up and decompose properly for a number of reasons. The table above by George Dickerson shows some common symptoms, problems and solutions.

DRAWBACKS OF COMPOSTING

If odors are successfully controlled, contamination of compost, making it undesirable or unsafe for use, may also be a problem. This can result from: a) incomplete separation of organic from inorganic wastes; as well as b) composting grass clippings from chemically treated lawns. Nevertheless, these problems are manageable, and do not outweigh the benefits of composting in general. ■

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5 WAYS TO PARTICIPATE IN RECYCLING

Give your garbage a new lease on life

RECYCLING IS THE RECOVERY OF DISCARDED MATERIALS TO BE USED AS RAW MATERIAL AGAIN

Most of us would probably say that we are willing to recycle. But still we end up throwing out recyclable materials because we don't know what to do with them. Here are five ways to help you get on the path to recycling:

1 Start by segregating recyclables at home. Separate metal, paper, glass and plastics into their own containers. Segregated waste is easier to collect for recycling. These also sell higher than when they are recovered from the dumpsite by scavengers because these are "cleaner" and not yet stained by garbage. For example, at the Rodriguez landfill in Montalban, Rizal, scavenged tin cans sell for P4 per kilo compared with P5.50 to P6 per kilo outside. Hazardous wastes such as used car batteries, ink cartridges, and used electronic appliances also need to be separated from the trash.

2 Give or sell recyclables to a barangay collector, a materials recovery facility (MRF), or a neighborhood junkshop. Barangay collectors, traditionally known as the "bote - dyaryo" (glass bottle - newspaper) collectors, gather recyclable materials from house to house. Now they have a more contemporary term: Eco-Aides. They usually push a cart or drive a bike with a sidecar. If you can't find the collectors in your neighborhood, you can deliver recyclable materials directly to a Materials Recovery Facility (MRF), a site or building where collected materials are stored until they are sold or processed. Ask your barangay officials if you have an MRF. If your barangay has no MRF you can bring recyclable materials directly to a junkshop. But not all wastes should be delivered to junkshops. Those containing hazardous materials should be delivered to recycling companies who can process them safely. (See directory in page 22 for a list of junkshops and recycling companies within or near Metro Manila)

3 Bring your recyclables to a collection event or waste market. The Philippine



ECO-AIDES COLLECT PLASTIC BOTTLES FOR RECYCLING

Business for the Environment (PBE) organizes **Recyclables Collections Event (RCE)** and Waste Markets. The annual Recyclables Collection Event (RCE) is a one-day collection event for recyclable materials usually held around "Earth Day" week in residential subdivisions or open parking lots. Here recyclables are redeemed for cash on the spot. **Waste Markets** are regular collection events for recyclable materials held on a monthly/weekly basis in malls or commercial shopping areas. It offers individuals and institutional waste generators a convenient and accessible place for the following activities:

- **Waste trading** - scrap papers can be traded for new paper or tissue paper while empty inks and toners can be traded for remanufactured inks and toners
- **Waste buying** - non-traditional recyclable materials such as used lead acid batteries, used electronic/electrical equipment, empty inks and toners, tin or aluminum cans, PET bottles and used papers and cartons can be redeemed for cash
- **Drop-off area** - used mobile phones, mobile phone batteries and polystyrene (styrofoam) can be collected here for recycling by legitimate recyclers
- **Used oil registration** - generators of used industrial and engine oil can inquire or register directly with the treater/transporter of hazardous waste

The PBE in coordination with the Department of Environment and Natural Resources and SM Supermalls are holding Waste Markets in SM Shopping Malls around the country from April to October. For inquiries on the Waste Market

Why recycle?

- You can reduce the waste that goes to dumps or landfills. About 45 percent of the total solid waste generated by households in Metro Manila can be re-used or recycled, according to a Waste Analysis and Characterization Survey done by the Asian Development Bank in 2003.
- You can help save the government money. Local governments in Metro Manila spend P3.8 billion annually for garbage collection. If recyclables and biodegradables are segregated at the source and do not end up in dumpsites, P3.61 billion will be saved. This amount can be diverted for other projects, such as schools and roads.
- You can protect other people's health. Electronic waste such as old personal computers can contain 1.5kg to 2kg of lead compounds and small amounts of mercury and arsenic. These can pollute the environment and cause serious health problems, such as increased blood pressure, fertility problems, nerve disorders, and muscle and joint pains. Bringing hazardous wastes to the proper recycling facilities will ensure that people aren't exposed to these toxic substances.
- You can earn extra income. Recycling companies buy waste that they can process and sell as raw materials to manufacturers. For example, a kilo of aluminum cans can sell for up to P55, while used laser toners can sell for up to P250 each.
- It is required by the law. The recovery of recyclable materials is part of the provisions of RA 9003, or the Ecological Solid Waste Management Act, enacted in 2001.

SOURCE: "SOLID WASTE MANAGEMENT MADE EASY: A DO-IT-YOURSELF GUIDE TO A COMMUNITY-BASED SOLID WASTE MANAGEMENT PROGRAMME" PUBLISHED BY UNDP/DENR/NSWMC

schedules, call Nancy Pilien of the PBE at +632 635-2650 or 635-2531.

4 Go through a waste exchange. This process encourages the exchange of waste of one industry with another industry for re-use or recycling. It aims to reduce the environmental impacts of industrial waste disposal and generate economic returns through the promotion of resource recovery from industrial waste. It is also an opportunity for companies, trade associations, and chambers of commerce to demonstrate environmental responsibility and accountability.

An example of this is the **Industry Waste Exchange Program (IWEP)** managed by the Philippine Business for the Environment since 1994. IWEP maintains a database of waste generators and waste buyers/recyclers that can be potentially matched. Examples of successful waste exchanges are glass cullets used for remanufacture of glass; used engine oil converted into two-stroke engine (2T) oil; and used solvents processed and used as degreaser.

Those who can benefit from the waste exchange are: companies or groups who want to reduce raw material costs or have surplus products/ off-spec or obsolete manufactured products; companies or groups who want to test the marketability of by-products; local governments and recycling networks looking for better market outlets and uses for potentially useful waste; and businesses, entrepreneurs, and investors who want to explore new markets. For inquiries on IWEP, call Nancy Pilien of the PBE at +632 6352650 or 6352531.

5 Start your own recycling business. Recycled products can become a source of income. A good example is the KILUS Multipurpose Environmental Cooperative, an all-women cooperative in Barangay Ugong, Pasig City, Metro Manila which turns discarded juice doypacks into bags, home furnishings, footwear, and accessories. What started as a small livelihood project for the cooperative's members has now grown into a successful export business, with the products being sold in countries such as Japan, USA, Canada, Belgium, Germany and Australia. They not only keep the juice packs away from the landfills, they also produce functional, stylish products that create a strong environmentally-friendly fashion statement. You can visit the KILUS Cooperative at 36 C. Santos St., Ugong, Pasig City, Metro Manila or contact them at +632 6712834, or at www.kilus.org. ■

GUIDE TO RECYCLABLE MATERIALS

*prices (except for glass) are based on the Philippine Business for the Environment's Waste Market on April 2007



PAPER

About 12 percent of Metro Manila's solid waste is paper. Unlike metal or glass, paper can only be recycled five to seven times before the wood fibers become too short and brittle to be made into new paper. Some types are harder to recycle than others. Papers that are waxed, pasted, gummed, or coated with plastic or aluminum foil are usually not recycled because the process is too expensive.

How much it sells for:

White paper (used bond paper, computer paper, used notebooks) - P8/kg
Newsprint (newspapers and magazines) - P5.50/kg
Cardboard boxes - P2.50 - 3.50/kg
Mixed paper - P1/kg

How to prepare for recycling:

Sort the paper according to type: white paper (bond paper), newspapers, cardboard, and mixed or colored paper. Keep it dry and free from contaminants such as food, plastic, metal and other trash, as contaminated paper cannot be recycled.

How it is recycled:

The used paper is repulped, or broken down into smaller pieces and mixed with water. The pulp is then passed through a screen and cleaned to remove contaminants. It is then deinked, refined, bleached and color stripped. After this it is mixed with virgin pulp to make new paper.

Products:

Most recovered paper is recycled back into paper and paperboard products. Recovered paper is generally recycled into a grade similar to, or of lower quality than, the grade of the original

product. For example, old corrugated boxes are used to make new recycled corrugated boxes. Recovered printing and writing paper can be used to make new recycled copy paper.

Recycled pulp can be used in a variety of other products, such as egg cartons, fruit trays, ceiling and wall insulation, paint filler, and roofing.

What is saved:

Producing recycled paper consumes between 28 to 70 percent less energy and uses less water than producing virgin paper. A ton of paper made from recycled fibers instead of virgin fibers conserves: 7,000 gallons of water, 17 to 31 trees, and 4,000 KWh of electricity.

GLASS

Glass constitutes 3 percent of the solid waste produced in Metro Manila. Unlike paper, glass jars and bottles can be recycled over and over again. The glass doesn't wear out.

How much it sells for:

Softdrink bottles - P45-P60/case
Assorted bottles - P0.75-P2/pc

How to prepare for recycling:

Remove the lids or caps of glass jars and bottles and rinse them with water. Segregate them by color. Not all glass products are recyclable. Don't mix light bulbs, ceramics, glass mirrors, windowpanes, and dishes with glass jars and bottles as they are not made of the same materials.

How it is recycled:

Used glass is melted, formed and annealed to make new glass.

Products:

Used glass is made into new glass jars and bottles or into other glass products such as fiberglass insulation.

What is saved:

Recycled glass uses 40 percent less energy than making products from all new materials. It saves energy because crushed glass, called cullet, melts at a lower temperature than the raw materials (sand, soda ash, and limestone) used to make new glass.



PLASTICS

Plastics account for 25 percent of Metro Manila's solid waste. It is the most visible type of solid waste and takes several hundred years before it breaks down at the landfill. But most plastics can be recycled, with Polyethylene Terephthalate (PET) and High Density Polyethylene (HDPE) being the most commonly recycled.

How much it sells for:

PET bottles - P15/kg
Disposable cups - P10/kg
Plastic gallons - P8/kg
Assorted plastics - P5/kg

How to prepare for recycling:

Wash plastic containers and squash if possible. Sort the plastics according to type, by checking the resin identification code (arrows forming a triangular shape with a number in the middle) to learn what kind of plastic it is. The following is the complete list of codes:



PET Polyethylene Terephthalate
Mineral water and beverage bottles, mouthwash bottles



HDPE High Density Polyethylene
Milk jugs, trash bags, detergent bottles.



PVC Polyvinyl Chloride
Cooking oil bottles, food trays, cling film



LDPE Low Density Polyethylene
Grocery bags, produce bags, food wrap, bread bags



PP Polypropylene
Yogurt containers, shampoo bottles, straws, margarine tubs, diapers, microwaveable meal trays



PS Polystyrene
Hot beverage cups, take-home boxes, egg cartons, meat trays, CD cases, protective packaging for electronic goods and toys



OTHER
All other types of plastics or packaging made from more than one type of plastic (example: melamine)

How it is recycled:

Plastics are washed, chopped into flakes, and fed into an extruder, where heat and pressure melt the plastic. The molten plastic is then formed into strands, which are then chopped into uniform pellets. These plastic pellets are then sold to manufacturing companies who can use these as raw material for new products.

Products:

The wide range of products made from recycled plastic include: polyethylene bin liners and plastic bags; PVC sewer pipes, flooring and window frames; building insulation boards; video and compact disc cassette cases; fencing and garden furniture; fleeces; fibre filling for sleeping bags and duvets; and a variety of office accessories.

What is saved:

Recycling plastic conserves non-renewable fossil fuels (plastic production uses eight percent of the world's oil production); reduces consumption of energy; reduces amounts of solid waste going to landfill; and reduces emissions of carbon-dioxide (CO₂), nitrogen-oxide (NO) and sulphur-dioxide (SO₂).



METALS

Metals constitute five percent of waste in Metro Manila. All metals can be recycled, with aluminum and steel being the most common. Metals can be recycled indefinitely without losing any of their properties. Other metals such as copper, gold, silver and brass are rarely thrown into the trash because of their value.

How much it sells for:

Aluminum cans - P55/kg
Tin (steel) cans* - P3/kg

How to prepare for recycling:

Sort scrap metal into ferrous and nonferrous metals. Ferrous scrap is made of iron and steel. This can come from cars, household appliances, steel beams, railroad tracks, ships, or food packaging and other containers. Nonferrous scrap include aluminium (including foil and cans), copper, lead, zinc, nickel, titanium, cobalt, chromium, and precious metals. Although there is less nonferrous scrap than ferrous scrap, it is often worth more financially.

How it is recycled:

Steel and aluminum scrap are usually melted in a furnace and then formed into sheets. These are then used as raw materials for various products.

Products:

Aluminum cans are usually recycled into new aluminum cans. Recycled steel cans can be made into new cars, girders for buildings, or new food cans.

What is saved:

Steel and aluminum recycling is much more energy efficient and cost effective than primary production of these metals. Every ton of recycled steel packaging saves 1.5 tons of iron ore; 0.5 tons of coal; and 40 percent of the water and 75 percent of the energy needed to make steel from virgin material. Recycling aluminum, meanwhile, requires only 5 percent of the energy and produces only 5 percent of the CO₂ emissions of primary production.



DON'T THROW THESE IN YOUR TRASH CAN!

Harmful wastes need to be disposed of properly
by Joel Ascan and Michelle Galarion

In our day to day life, we use different kinds of products and generate different types of waste. But we may not know that that some of them may be hazardous to our health and the environment.

Hazardous wastes can cause death, illness, or injury to people or destruction of the environment if improperly treated, stored, transported, or discarded. Hazardous wastes may be ignitable (capable of burning or causing a fire), corrosive (able to corrode steel or harm organisms because of extreme acidic or basic properties), reactive (able to explode or produce toxic cyanide or sulfide gas), or toxic (containing substances that are poisonous).

In the Philippines, R.A. 6969 or the Toxic Substances and Hazardous and Nuclear Waste Control Act mandates control and management of import, manufacture, process, distribution, use, transport, treatment, and disposal of toxic substances and hazardous and nuclear wastes in the country. The Act seeks to protect public health and the environment from unreasonable risks posed by these substances in the Philippines.

Here are some common hazardous wastes generated by households and how to handle them:

1. Household cleaners (all-purpose cleaners)

These contain chemicals such as chlorine, ammonia, organic solvents, and strong fragrances that are very harmful or fatal if swallowed. Some are flammable, and some can cause skin or eye burns. These should not be mixed with other products because these might undergo chemical reactions and cause accidents.

How to dispose properly: Use up according to label directions or offer to others who can use them. Dispose of small amounts by pouring down the drain with lots of water.

2. Paints

Oil-based paint is hazardous because of its vapor that harms human health and its flammability.

How to dispose properly: Never pour paint down drains or allow it to drain into gutters where it can pollute waterways and harm wildlife. Set aside any unused paint for future touch-ups by storing it in an air-tight container in a cool, dry place. If you don't need it anymore, give it to neighbors, friends or family who may find a use for it. If you have to dispose of latex or water-based paint, fill a paper bag with sawdust or sand and pour the remaining latex paint into the bag. Wait for the paint to be absorbed and dispose of the paper bag with your household trash. Do not use this method for oil-based paints, however.

3. Used motor oil

Used oil from one oil change can contaminate one million gallons of fresh water—a year's supply for 50 people. It is insoluble, persistent and can contain toxic chemicals and heavy metals. Furthermore, oil is slow to degrade and can stick to everything from beach sand to bird feathers.

How to dispose properly: Put your used motor oil in a clean plastic container with a tight lid. Never store used oil in a container that once held chemicals, food, or beverages. Also do not mix the oil with anything else, such as antifreeze, solvent, or paint. Take used motor oil to a service station or a company that collects used motor oil for recycling.

4. Fluorescent Lamps

A fluorescent light contains small amounts of mercury, and an incandescent light contains lead. In addition, incandescent light requires the generation of 75 percent extra electricity, which can



COMPUTER MONITORS CAN CONTAIN CARCINOGENS SUCH AS LEAD.
PHOTO BY GREENPEACE / NATALIE BEHRING

increase air pollution from carbon dioxide, combustion gasses, particulates and mercury.

How to dispose properly: Store used fluorescent lights in a safe place until you can find a recycling company or a hazardous wastes company who can take it.

5. Car Batteries (Lead acid batteries)

The two main components of lead acid batteries are highly corrosive sulfuric acid (H₂SO₄) and lead, which has been linked to central nervous system damage in humans and animals.

How to dispose properly: Deliver these to a retailer or wholesaler of new lead acid batteries, or a collection center that will deliver the batteries to a facility that recycles these.

6. Ink Cartridges And Toners

Ink is toxic and can affect kidneys. Ink cartridges and toners can be recycled instead of being dumped at landfills where they can become health hazards.

How to dispose properly: Ink cartridges can be refilled or remanufactured (a process of dismantling, draining, cleaning and pressurizing of cartridges so they can be used again). Have the ink cartridge refilled or bring it to a company who can remanufacture it.

7. Electronic Waste

These are obsolete, defective, end-of-life unwanted electronic appliances such as personal computers, monitors, TVs, printers, audio-visual equipment, mobile phones, and telephones. TVs and computers have cathode ray tube (CRT) monitors that contain carcinogens such as lead, barium, phosphor and other heavy metals.

How to dispose properly: Drop off electronic wastes at recycling companies authorized to handle them. About 70 to 90 percent of materials (by weight) in scrap computer equipment is potentially recyclable/reusable, saving around 70 to 95 percent of energy required in recovering. ■

See the Directory in p22 for a list of recycling centers that can take hazardous wastes. Visit www.emb.gov.ph for a list of registered transporters, treaters, and recyclers of hazardous wastes.

Global Efforts in Urban Waste Management

From simple recycling bins to high-tech pneumatic tubes, cities around the world are employing a variety of strategies to manage their garbage
by Geraldine Matabang

FROM PINOYS ABROAD

Filipinos working or studying abroad share urban waste management strategies they have encountered in other countries. Their experiences and insights on waste management especially in developed countries highlight the difference with local practice but also give an assortment of ways on how we could more successfully manage our wastes.



INCINERATION AND USE OF RECYCLED SHOPPING BAGS IN SINGAPORE

by Kenneth Barrientos, architect now working in Singapore

Final waste disposal in Singapore is usually via landfill and incineration. Their incineration system is quite effective and non-polluting. We live near the Ulu Pandan Incineration Plant and I rarely notice any dark smoke coming out from the high chimneys.

Garbage segregation facilities are in place and recycling is still by old-fashioned way of *bote-dyaryo* (glass-newspaper collection) similar to the Philippines, but using vans instead of *kariton* (carts). Sometimes schools will organize collection drives where they will leave a garbage bag with a note outside your door stating the collection date of used paper and plastics.

In some grocery stores, they encourage shoppers to use woven or recycled bags to minimize the use of plastic bags. Unfortunately, this is not as effective as most cashiers themselves will hand out extra plastic bags upon request. Ikea has an Earth Day program where they tell the customers to bring their own shopping bags because they won't be issuing any plastic bags for packaging even for the smallest item. The store is very strict with this policy despite initial complaints from shoppers. Maybe it also helps that shoppers have no choice because the store is still the best place to get home furnishing

HOUSEHOLD HAZARDOUS WASTE SEGREGATION IN GUAM, USA

by Jerry Estrella, mechanical engineer now working in Guam

Guam has a landfill but all recyclable items are sent to China for recycling

Waste management is hardly a 21st century phenomenon, as records show the earliest landfill was created way back in 3000 BC. In the beginning of the twentieth century, proper disposal of waste was mainly an issue of public health and sanitation. Today, with the advent of globalization, electronic communication and disposable consumer items, waste has become a complex problem and is now more prominently taken as a matter of environmental sustainability. The quantities and composition of wastes people generate on a global scale presents a major ecological concern as more waste mean greater pressure on the environment's capacity to cope with the damaging impacts of waste disposal.

Modern production and consumption trends have also led to new categories of waste stream that now includes hazardous wastes, e-wastes, and hyperbulk wastes. But what ends up in our trash bins and how we eliminate waste differs from place to place, depending on one's economic status and lifestyle. Rich countries consume more and therefore they accumulate

because the island is too small. Even used cooking oil should not be thrown into the sink because there is someone who collects it for recycling. Restaurants are required to have external grease traps.

Household hazardous wastes such as batteries, paint cans, refrigerators, household chemicals, tires, etc. should not be thrown into regular trash cans because ordinary wastes are brought to the landfill. It's not like the Philippines where you can throw anything you like into the trash. You have to bring these items to the Household Hazardous Waste Facility so they can ship it to China.

PNEUMATIC WASTE COLLECTION IN BILBAO, SPAIN

by Dominic Villanueva, architect who finished his graduate studies in Spain

The practice of pneumatic waste collection really amazes me. I saw it in operation in Bilbao, Spain. Barcelona is also moving towards a more comprehensive citywide network. The system works like this: 1) you segregate your trash; 2) go to your street's corner where there would be different tubes, one for each type of garbage—organics, plastics, and bottles; 3) open the appropriate chute, put the trash in and pull the lever; and 4) your trash will be sucked directly at high speed into a "trash factory" which could be miles away! This minimizes energy wasted in garbage collection, as well as noise pollution, air pollution, etc.

One thing I don't really approve of in the Philippines is the house-to-house collection of trash; it is very cumbersome. I think there should be a neighborhood trash center which will not only minimize collection routes but also make people more aware that their trash is also their problem and not only the *basurero's* (garbage collector).

RECYCLING AND BOTTLE DEPOTS IN VANCOUVER, CANADA

by Ogie Punzal, architect now working in Canada

You have to apply to the Vancouver city government if you want your recyclable items to be collected. They will give you the right containers for the recyclable items. These are colored blue, approximately 2ft. x 2ft. x 4ft. with two wheels. The collection trucks here have a lifting arm to pick up

more waste. Global trends also show that as countries get richer, the share of organic waste decreases and the paper and plastic wastes increase. This consumption pattern represents an unsustainable practice for waste management because non-biodegradables require more landfill space for disposal. It is said that one plastic bag takes one second to manufacture, 20 minutes to use, and 100 to 400 years to degrade naturally.

Strategies that seek to curb over-consumption (and lessen the amount of waste generated) include promotion of the three Rs (reduce, reuse and recycle) in the production and manufacture of goods, and integrating a polluter pays principle in the pricing of goods wherein people, as consumers of waste-generating goods, are forced to pay more for the management of waste. The lifecycle approach to waste management (reducing waste output at every stage of a product's life from its production, distribution, use, until its final disposal) also helps conserve resources and minimize the environmental impacts of waste.

these standard-sized containers. Only two people operate these trucks—one driver and another person who picks up the containers. They pick up the segregated newspapers, miscellaneous papers, glass, and plastics once a week. A different team of garbage collectors picks up the solid waste and recycled waste.

You have to pay an additional deposit (approximately 5 cents per bottle or tetra pack) for all drink containers. To get the deposit back, you have to return the bottle to the bottle depot. The milk container is an exception; they don't pay you when you return these, and I don't know why. I had a funny experience during my first time to return bottles to the depot. I brought in catsup and patis (fish sauce) bottles and was informed that only drink bottles were accepted. I miss our *bote-dyaryo* (glass-newspaper collection) guys who go around the neighborhood because they pay for my catsup and patis bottles as well as my old newspapers.

SECOND-HAND SHOPS AND WASTE SEGREGATION IN LEUVEN, BELGIUM

by Arlene Lusterio, architect-planner who finished her graduate studies in Belgium

For a student from a developing country, a €1 drinking glass or set of spoon and fork is quite expensive. But for those who are practical, there is a second hand shop called SPIT—a center for reusable items such as kitchen utensils, clothing, wood planks, study lamp, sofa, bed, books, turntable discs, bicycles, you name it. It operates all over Flanders, Belgium.

Garbage collection is scheduled for specific waste types which are packed in color-coded garbage bags. Recyclable plastics and metals are packed in the transparent blue bag. Paper and cardboard are kept dry and uncrumpled, and placed in a cardboard box. Unsegregated wastes are placed in the brown bag. All garbage bags carry the logo of the Town of Leuven and are sold in any grocery store. Under the polluter pays principle, the most expensive bag is for unsegregated wastes. The green bag costs €0.30 for a roll of about 20 large bags while the brown bag costs €20.00 for a roll of 10 medium-sized bags! Glass is not collected; instead it is deposited in a glass collection bin. Two glass bins are provided, one for clear and another for brown glass. Supermarkets also accept returned glass bottles and pay back €0.25 to €0.50/piece depending on size. Wrongly segregated trash is not collected and instead is stamped with a sticker informing the owner that he has to remove

Developed countries such as Germany, Belgium and Japan are already leaders in advanced waste management strategies that require high levels of technology and significant budget, such as non-polluting, energy-recovering landfills and incineration plants. With the need to wisely use limited natural resources, integrated waste management strategies such as segregation, recycling and other waste reduction programs are also in place and their industries and citizens have already adapted well to strict waste policies. The Philippines still has a long way to go in developing these kinds of sophisticated waste management schemes. Successful waste reduction programs are not expected to happen overnight as can be learned from their experiences. Important lifestyle changes are needed to move towards a more disciplined and recycling-conscious society and perhaps the transformation can happen with continuous awareness-building, incentive-driven programs and enforcement of regulations for sound waste management.

contents that are not supposed to go with the bunch such as a foil-lined cardboard in a blue bag.

Bulky wastes such as study tables, mattresses, sofas, wooden planks, book shelves, and kitchen shelves are collected in a truck trailer strategically parked in the university parking lot at the end of semester when international students start to leave home after finishing their course and when such wastes are expected to be generated. These items are brought to SPIT for repair, cleaning, and selection, and are sold as "second hand" to the next wave of university students at drop dead prices. You can buy a leather high-backed couch for €0.50! But there is no delivery service. This is easily solved by student ingenuity: two supermarket flatbed carts from a nearby supermarket and some friends. Really good finds are normally bidded out to the best buyer. Bidding is scheduled and goods are displayed early on to give a chance to prospective bidders to pick their choice and compare prevailing prices.

How about packaging? SPIT patrons come with old newspapers and sando bags from supermarkets and deposit them at the cashier's counter. So even packaging is also recycled.

SEGREGATION AND WASTE WATER TREATMENT IN VIRGINIA, USA

by Gerard Matabang, medical technologist working at a hospital and at Starbucks in Virginia, USA

Here in Loudoun County, Virginia, we have separate trash bins for recyclables and common waste. The waste is collected twice a week while the recyclables are collected once a week. It's the same thing at Starbucks; there are separate bins for recyclables but these are picked up everyday because commercial trash accumulates faster. Almost all trash is sent to a landfill. While driving around the countryside, I saw the landfill. Ang linis! (It looked so clean) It was so unlike our dumpsites in the Philippines.

We pay for sewer management. I think all liquid waste goes into a centralized sewage piping system, then into a treatment facility where they are filtered and released into the environment (usually open water areas). The county sanitation website (www.lcsa.org) explains the technology used for waste water treatment. ■



BIKE LANES IN LEUVEN, BELGIUM



THE GUGGENHEIM IN BILBAO, SPAIN

JUNKSHOPS & RECYCLING CENTERS

•Lucky Tableware Factory, Inc. Guadalupe, Cebu City Engr. Edmundo Solon +6332 2541341

LAGUNA

•Asia Brewery Inc Km 43 National Highway, Bo. Sala, Cabuyao, Laguna Mr. William Tam +6349 8102701 to 10 (Laguna) +632 8163421 to 25 or 8165116 (Manila)

MAKATI CITY

•Arcya Glass Corp. 22nd Floor Herrera Tower, 98 Herrera St. cor. Valero St., Salcedo Village, Makati Mr. Lee Ning Lee +632 8450813 to 16 or 8450824

MANDAUE CITY

•San Miguel Mandaue Glass Plant SMC Mandaue Complex, Highway, Mandaue City Mr. Jesus S. Teruel +6332 3457000 or 3460125

BATTERIES

MAKATI CITY

•Shell "Bantay Baterya Project" Pasong Tamo, Makati City +632 8136500 or 8177315

•Shell Magallanes "Bantay Baterya Project" South Super, Magallanes +632 8527903

MANDALUYONG

•Caltex Julia Vargas "Bantay Baterya Project" Ortigas Center +632 6343812

QUEZON CITY

•Philippine Recyclers, Inc. Ramcar Center, Rocas Ave., Diliman, Quezon City Mr. Irving Guerrero / Mr. Steve Ofilanda +632 3701000

SAN JUAN

•Caltex Greenhills "Bantay Baterya Project" Mc Kinley Road cor. Ortigas Ave. (Near Club Filipino) San Juan +632 7213152 or 7215795

COMPUTERS

MANDALUYONG

•HMR Super Surplus Bodega Pioneer cor. Reliance St, Mandaluyong +632 6340526 *electronics, base metals, computer/appliance recycling, telephone systems, racking & shelving, precision testing, spare parts

LAGUNA

•HMR Group of Companies DaysStar Industrial Park, Pulong Sta. Cruz, Sta. Rosa, Laguna +632 5208618 to 19 (Manila), +6349 8370577 www.hmrgroup.com

GLASS

(the following accept container glass, unless indicated)

CEBU CITY

329 J. Theodoro St. cor. 9th Ave., Caloocan City Gilbert Dylanco +632 3611173 or 3611173 (fax)

•MH Del Pilar Junk Shop 120 MH del Pilar (bet. 7th and 8th Ave.), Caloocan City +632 3624409 or 3301899 (fax)

•New Asia Foundry and Manufacturing Company, Inc. 8272 Rizal Avenue, Extension, Caloocan City Danny Sy +632 3658784 or 3658783 (fax)

MAKATI CITY

•Bacnotan Steel Corp. 166 Salcedo St. Legaspi Vill., Makati Mike Andrada +632 8152779

•Milwaukee Industries 2155 Pasong Tamo St., Makati Alex Ngui +632 8103536

MANDALUYONG

•A. Metal Recycling Corp. 380 Barangka Drive cor. Hinahon St., Mandaluyong City Aquino Dy +632 5334719 or 5334717 (fax)

MANILA

•WG & A Philippines G/F Harbour Centre II 23rd St. cor. Railroad South Harbour Port Area, Manila hopeintheacan@wgasuperferry.com +632 5274605 loc. 4161, 5276460 or 5272027

PASAY CITY

•Kapalaran Metal Scrap & Junk Shop 3001 P. Santos, Pasay City +632 8337123 *copper, aluminum sheets

PASIG

•Cathay Pacific Steel Corp 25 F Galeria Corp Center EDSA Cor Ortigas Ave, Pasig Benjamin Chua +632 6338033 or 6338048 (fax)

QUEZON CITY

•Cathay Pacific Steel Plant Pablo dela Cruz Rd., Bgy San Bartolome, Novaliches, QC Antonio Arrobio +632 9362669 or 9360721

•Metalline Enterprises 18 Diamond Ave. Greenheights Subd. San Bartolome, Novaliches +632 4173358

•Topline Metals #78 9th Avenue, Murphy, QC Mr. Billy Naguit +632 4214841, 4214505 or 4214505

TAGUIG

•MIRDC-DOST Bicutan, Taguig Engineer R. Villoria +632 8370430 (fax) or 8387878 (fax)

•Reynolds Phils. Corporation 2/F FENICS Bldg., 5 Avocado Road, FTI Complex, Taguig Jime Gonzales / Atty. George Molina

+632 8389071, 8388383 local 12

VALENZUELA

•Hilton Mfg. Corp. 648 T. Santiago St., Linunan, Valenzuela Robert Yu +632 2928134

MIXED MATERIALS

MANILA

•Auro's Junk Shop Sampaloc, Manila Duncan Aurora +632 7151935 or 7147523 (fax)

MAKATI CITY

•Myrna's Junk Shop 2206 Marconi St. Makati Myrna or Rudy Manalo +632 8440118

QUEZON CITY

•Ang Tok Junk Shop 2211 Rizal Ave., QC +632 2542289 *bottles, scrap metal

•Everlasting Junk Shop 13 Cabalata St., QC +632 7320688 (fax) * bottles, scrap metal

•Linis Ganda MM Fed. of Envt. Multi-Purpose Coop Inc. 123-B N Domingo St. Cubao, QC Winnie Larez/ Bong Teves/ Mrs. Gilmore +632 7271219, 09179239742, 09189030532

•Quezon City Parks Dev't Foundation, Inc. Quezon Memorial Circle Admin. Office Elliptical Road, QC Gemma / Susan / Chay +632 9243395 or 9243412

•Rolando Barrientos 60 Sct. Oheda, QC +632 3732333 *white paper, metal, bottles, paper (min. amount - 500 kilos)

VALENZUELA

•Marulas Indt'l Corp 141 McArthur Highway, Marulas, Valenzuela Wilson Fung/ Michael Mancilla +632 2918105 to 07 *all types of waste except ABS PVC

PAPER

BULACAN

•Paper City Corporation of the Philippines Mariano St., Blvd. Bagbaguin, Valenzuela, Bulacan Michael Sy +6344 2410489

MAKATI CITY

•Bataan 2020 Rm 201 Narra Bldg., 2276 Pasong Tamo Extension, Makati City Mr. Kirby Ong +632 8135913 to 14 or 8135902 (fax)

•Trust International Paper Corporation (TIPCO) Rosa St., Legazpi Village, Makati City Roland Peña +632 8929781 to 89 local 342 or

8159460 (fax) www.tipco.com.ph

•United Pulp and Paper 5/F Phinma Plaza 39 Plaza Drive, Makati +632 8700100 or 8700316 local 231

MALABON

•Global Paper Mills 1000 Gov. E. Pascual Ave., Potrero, Malabon City Mr. Oliver Yu +632 3612516 to 18 or 3615096

•Liberty Corrugated Boxes Mfg Corp 40 Gov. Pascual Ave., Malabon City Josie Olivares +632 3612541 or 3619394 (fax)

MARIKINA CITY

•Noah's Paper Mills, Inc. Southeast Marcos Bridge, Marcos Highway, Calumpang, Marikina Mr. David Hwang +632 6455684, 645-5678 or 6455684 (fax)

MUNTINLUPA CITY

•Worldwide Paper Mills Meralco Road, Bo. Sucat, Muntinlupa Rogelio Sarmiento +632 8371039

PAMPANGA

•Trust Int'l Paper Corp. TIPCO Compound, Bo. Bundagul, Mabalacat, Pampanga Rolando D. Pena +6345 8930403 (Pampanga) +632 8929781 to 89 local 342 (Manila) www.tipco.com.ph

PARAÑAQUE

•San Miguel Rengo Packaging Corp. Dr. A. Santos Ave., Sucat, Paranaque Ferdinand T. Fernandez +632 8265541 to 45 or 8264113

PASIG CITY

•Hansson Paper Corp. RFM Compound, Barrio Manggahan, Pasig City Sonny So +632 6462160,646-2164, 646-2105

•Trans-National Paper Co. Rm 301-302 Jollibee Center Building, San Miguel Avenue, Pasig City Stephen Cheng +632 6334213, 6334218, 6339492

QUEZON CITY

•Container Corporation of the Philippines 60 Old Samson Road, QC Victor Pascual +632 3619801 or 3620370 (fax)

•Holland Pacific Paper Corporation 226 Quirino Highway, QC Renato Domingo +632 3620370 (fax)

•Paperland Industrial Corp. Leiland Drive, Balintawak, QC Mr. Johanne Tan +632 3618531 to 33 or 3623607

VALENZUELA

•Liberty Paper 751 Paso de Blas, Valenzuela

Anthony Tsionsgon +632 3620370 (fax)

•National Paper Products and Printing Corp. 34 Narciso St., Canumang, Valenzuela City +632 9838000 or 4444987

•Sunrise Paper Mills 3549 M. delos Reyes St., Gen. T. de Leon, Valenzuela Robert Yu +632 2933002 or 2915117

•Vanson Paper Industrial 150 R. Delfin, Marulas, Valenzuela Eddy Sy +632 2916818 (fax)

PLASTICS

BULACAN

•Plastech Industrial Corporation Meycauayan Industrial Subdivision William Ong +632 2417301 to 05 or 2444952 (fax)

CALOOCAN CITY

•Asia-Plas Industries Corp. 12-E 8th Ave., cor. 6th Street, Caloocan City Beth Ong / Joselyn Ng +632 3638832

CEBU

•Avenue Industrial Development Corporation 87-89 MC Briones St., Maguikay, Mandaue City, Cebu Edgardo Monsanto / Ernesto Damasco +6332 3450106

•DDL Industries Paknaan, Mandaue City, Cebu Gabriel B. Babon +6332 3461589

MAKATI CITY

•DOW Chemical Pacific, Ltd. 23/F, 6750 Ayala Avenue, Makati City Bobby Batungbakal +632 8191986 or 8172933

MALABON

•Manila Plastic Products 36 Gov. Pascual Ave., Malabon Leonardo Andaya +632 3612691

MANDALUYONG CITY

•San Miguel Packaging Specialists, Inc. 10F SMPFC, St. Francis St., Mandaluyong City Melanie Bularan / Argeline Doliente +632 7024321, 6349022, 6376297

MANILA

•Philippine Polystyrene Recycling Corp. RM 900-1 Victoria Bldg., 429 UN Avenue, Ermita, Manila Tony Chiong +632 5220860, 5260889, 5224354

•San Miguel Manila Plastics Plant 631 Tomas Claudio St., Pandacan, Manila Myra Leabres +632 5638541, 5633123

MUNTINLUPA CITY

•Now Trading Concepts No. 32 RMT Industrial Complex,

Tunasan, Muntinlupa City Chingbee Lim +632 8623390, 8621258

PARAÑAQUE CITY

•Seacom Waste Management and Recycling Corp. 11 Seacom Compound, Sucat Road, Paranaque City Mr. Danilo Sotto +632 8208146

•Synber Manufacturing Meliton St., cor. Sucat Road, Parañaque City Val Co +6346 4302133, 8267827, 8255356 (fax)

LAGUNA

•Polytrader Plastic Products South Point Subd., Bgy. Pulo, Cabuyao, Laguna +6349 5413062, 09213763230 or 09797630797 ecopoly_05@yahoo.com

QUEZON CITY

•Chemrez, Inc. 65 Calle Industries, Bagumbayan, QC Romeo Tan +632 6350680 or 6350703

•FI PET, Inc. 60 West Ave. QC Carmencita Abelardo +632 3739797 or 3719781

•Metal Wealth Enterprises Co. (old 37) New 41, Gen. Luis St., Sitio Kapre, Brgy. Nagkaisang Nayon, Area IX, District II, QC Walter Sy +632 9369774, 9369766, 9369769

•PEMA Plastic Mfg. Corp. 80 Mendez Rd., Baesa, QC Emma Sy +632 3612844, 4557610

VALENZUELA

•Adventure Manufacturing Corp. 77-D Pablo St., Karuhatan, Valenzuela Genaro Chua +632 2920550

•Asiano Industries 16 Isidro Francisco St, Maysan, Valenzuela City James Jim +632 2928111, 2928113, 4436828 (fax)

•E-Friend Trading Corp. 26 San Diego St., Canumay, Valenzuela City Tony Chua +632 2933168, 2933161, 2911230 (fax)

•Hi-Top Pelletize Products 3-S Cabral Near, 67 Maysan Road, Valenzuela City Ting Hok +632 2929003 (fax)

•Interpolymer Corporation 016 Cantillon St., Maysan Village, Valenzuela Alex Go +632 2924878, 2927726

•Marulas Industrial Corporation 141 MacArthur Highway, Marulas, Valenzuela City Wilson Fung +632 2918105 to 07 or 2916030 (fax)

•MCS Plastic 13 IRC Compound, Paso De Blas, Valenzuela City Milan Chua +632 445-0178 or 432-3011 (fax)

•Moonstar Plastic 8 Escabiall, Maysan, Valenzuela Jason Ang +632 2774927, 2772446

•National Plastic 100 Sn. Francisco St., Karuhatan, Valenzuela City Jose Tan +632 2931449, 2914459, 2931450

•New Ace Master 1430 North Diversion Service Road, Bo. Parada, Valenzuela City Mr. James Limquenco +632 4452282 or 4452280

•Pacific Plastic Industry 7 T. Santiago Canumay Valenzuela City Elaine Reyes, Elsie David +632 2927831 to 34, 2921185, or 2927840

•Plastic City 7 T. Santiago, Canumay, Valenzuela City Antonina Crisostomo +632 292 7831,33 or 34

•Playland Manufacturers Bo. Balubaran, Valenzuela City Romy Ang +632 2927906

•Pro-Earth Plastic 73 Maysan Road, Valenzuela City Choi Siukam +632 2925024 or 2920895

•R.A. Plastic Corp. 238 Elopo Miranda St., Paso De Blas, Valenzuela City Antonio Tan +632 2945367 to 68 or 4451090

•Top Fine Plastic Mfg. Corp. 184 G. Int. MacArthur Highway, Karuhatan, Valenzuela City Benson Tang +632 2915388, 2931421, 4447777

RUBBER

BULACAN

•Accorn Reclaim Rubber Corp. Sta. Maria, Bulacan Richard Chan / Ramon Chan +6344 2996345 +632 2920811, 2920779, 2920775 (Valenzuela) *tires

MARIKINA CITY

•Metro Recapping Inc. 99 Gen. Ordenez, St. Marikina City Mr. Rey Sabariaga +632 9415339, 9415339 *tires

PASIG CITY

•Metro Manila Retreaders Inc. KM 19 Amang Rodriguez, Manggahan, Pasig City Mr. Robert Tan +632 9000061, 6462185 *tires

TETRAPACK

TAGUIG

•Tetrapak Phils. 7th Flr., Net One Center, 26th Street, Fort Bonifacio, Global City, Taguig Ms. Tess Raymundo +632 8181306, 8844402, 8181072 *Tetrapack

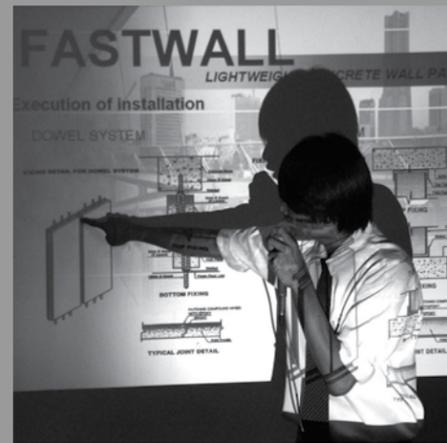
SUMMER INTERNSHIPS

Seven interns were selected to work on various TAO projects during the summer months of April and May 2007. The student internships are part of the Young Professionals Orientation and Training Program organized by TAO-Pilipinas and supported by SELAVIP (Latin American, African and Asian Social Housing Service). The focus of the internship is community-based technical assistance and fieldwork in TAO-assisted urban poor communities in Metro Manila. The YP interns were exposed to alternative approaches in



TAO INTERNS (FROM TOP LEFT TO RIGHT) AARON CHING, MARK LOPEZ, NICO NOBLE, MICHELLE GALARION, ANNE EVANGELISTA, OWNERY DIALA, AND JASMINE SORIANO.

RESEARCH ON ALTERNATIVE BUILDING MATERIALS



A PUP STUDENT REPORTS ABOUT LIGHTWEIGHT CONCRETE WALL PANELS.

TAO-Pilipinas recently collaborated with the Polytechnic University of the Philippines - College of Architecture and Fine Arts (PUP-CAFA) in undertaking research for the Sourcebook of Alternative Building Materials and Technologies for Socialized Housing (SABMAT), a research project conceptualized by TAO-Pilipinas. During the second semester of the school year 2006-2007, fourth year architecture students enrolled in the Research Methods subject under Dean Ted Inocencio looked for alternative building materials and technologies that were appropriate, affordable, and locally available for social housing projects or for communities doing self-help building projects. The sourcebook is primarily intended for the use of poor communities as a reference in constructing sustainable houses.

Students identified several alternative building materials such as compressed earth blocks, concrete interlocking blocks, lightweight concrete panels,

composite building panels, micro-concrete roof tiles, and fiber cement-bonded boards. The results of the first stage of the research activity was compiled into a database.

Following the submission of the students' first draft outputs, a short program was held on March 8, 2007 so the class could present their research to a panel composed of representatives from TAO-assisted communities and partner NGOs such as: Dike-Side Organization of Punta (DSOP), Samahan ng Nagkakaisang Maralita ng Navotas (SANAGMANA), Community Organizers of the Philippines Enterprise (COPE), Community Organizers Multi-versity (COM), and Foundation for the Development of the Urban Poor (FDUP). Fr. Jorge Anzorena and Illac Diaz, two distinguished personalities in issues of social housing and social entrepreneurship, also gave lectures during the SABMAT Project presentations.

Fr. Jorge Anzorena, TAO Advisory Board member and Ramon Magsaysay Awardee for International Understanding in 1994, presented a global perspective of social housing by relating the experiences of Latin American countries in the struggle for security of tenure and shelter rights of poor people. He commended the efforts of PUP-CAFA students as a good way of starting architects to work with the poor. Fr. Jorge also advised the students that in their research for alternative building materials, those that local people themselves could produce or manufacture should be prioritized.

Mr. Illac Diaz, a recipient of the Ten Outstanding Young Men Award for Social Entrepreneurship, presented the initiatives of his organization, My Shelter Foundation.

housing poor communities through community workshop facilitation, research, and development of training tools in land research, participatory planning, solid waste management and disaster-resistant housing.

This summer's intern pool included four BS Architecture students from Polytechnic University of the Philippines and Mapua Institute of Technology: Rose Anne A. Evangelista, Paulo Nico S. Noble, Jasmine M. Soriano, and Ownery Rose DC. Diala; a BS Civil Engineering student from University of Sto. Tomas: Michelle G. Galarion; and two BS Geodetic Engineering students from University of the Philippines: Mark Anthony I. Lopez and Aaron Andro V. Ching. Their internship also forms part of the on the job training (OJT) requirements in their respective universities

YP REGIONAL CAMP IN SAN CARLOS CITY, NEGROS OCCIDENTAL

JF Ledesma Foundation, Inc., TAO-Pilipinas' Young Professionals (YP) network partner, organized the 2007 YP Regional Camp in San Carlos City, Negros Occidental on April 27-29, 2007. The YP Regional Camp is held annually as a venue for young professionals to explore their role in issues of poverty, homelessness and sustainable development.

Representatives from twelve universities and colleges in the Visayas and Mindanao participated in the camp. A professor-student tandem represented the architecture or engineering departments of the following institutions: Xavier University - Ateneo de Cagayan; Mindanao Polytechnic State College; Silliman University; University of Cebu; Lyceo de Cagayan; MSU-Iligan Institute of Technology (MSU-IIT); Central Philippines University; Colegio de San Agustin; Ateneo de Davao University; Southwestern University; Holy Name University; and University of Bohol.

The highlights of the YP Camp included a series of lectures on the theme, "Network Strengthening and Disaster Risk Management in Social Housing: A YP Challenge for 2007 and Beyond," and an immersion on the Interlocking Compressed Earth Block (ICEB) technology. Geoffrey Wheeler, Executive Director of the Center for Vocational Building Technology in Thailand, and Prof. Daniel Mostrales of MSU-IIT facilitated the immersion. The facilitators oriented YP camp participants in the actual production process and quality control of ICE Blocks, an innovative building material for low-cost housing projects. Examples

LECTURE SERIES ON SOCIAL HOUSING AT MAPUA

The School of Architecture, Industrial Design and the Built Environment of Mapua Institute of Technology (MIT) co-sponsored TAO's YP Lecture Series on May 8, 2007 at the MIT, Intramuros, Manila. The YP Lecture Series is organized by TAO to provide more opportunities for the discussion of issues in social housing, shelter security and sustainable development especially for students in the fields of architecture and engineering.

The major topics presented in the YP lecture included the experiences of SELAVIP (Latin American, African and Asian Social Housing Service) in sheltering the poor, and the implementation of Decentralized Wastewater Treatment Systems (DEWATS) in urban poor communities.

Architect Joan Mac Donald, current president of SELAVIP and former Vice Minister of Housing and Urban Development in Chile introduced the efforts of their foundation in providing poor people with modest shelters especially during the period when security of tenure is still being processed. She also recounted how the poor in Latin American countries such as Chile and Argentina have mobilized themselves to gain shelter security and the various ways they have coped with housing policies that prevented them from attaining land ownership. Arch. Mac Donald urged the students to be more socially-committed in their professional practice and to advocate pro-poor housing policies.

Engineer Jonas Maronilla of Basic Needs Services Philippines, Inc. presented the initiatives of their organization in providing affordable wastewater treatment systems through pilot



SPEAKERS LINA OLOFSSON, SOPHIA TRUONG, ARCHITECT JOAN MACDONALD, AND ENGINEER JONAS MARONILLA POSE WITH TAO EXECUTIVE DIRECTOR ARLENE LUSTERIO AND DEAN GLORIA TEODORO OF MAPUA.

projects in local government units. Engr. Maronilla explained the various treatment methods, such as anaerobic baffles and filters, planted gravel filters and indicator ponds, which can also be implemented in urban poor communities.

Lina Olofsson and Sophia Truong, students from the Lund University, Sweden who visited TAO-assisted poor communities in Navotas as part of their thesis on "Sustainable Housing in the Philippines," also presented the findings of their research in the YP Lecture. Their study highlighted the self-help initiatives of the people's organization SANAGMANA, their struggle for shelter security and the construction of disaster-resilient houses.

COMMUNITY TRAINING ON MCR (MICRO-CONCRETE ROOF) TILE PRODUCTION

The Foundation for the Development of the Urban Poor (FDUP) recently trained members of the Technical Committee of the Samahan ng Nagkakaisang Maralita ng Navotas (SANAGMANA) in Micro-Concrete Roof (MCR) Tile production. The training was done in March 2007 through the coordination of TAO-Pilipinas.

The training included hands-on production, quality control and maintenance of the machine and production facility. After the required curing cycle, actual tile laying was done on one of the houses now serving as a model roof installation for MCR tiles in the community.

MCR tiles are an inexpensive and durable alternative to conventional galvanized iron (GI) sheet roofing. MCR tiles are made of sand, cement and water and are produced using special equipment (a screeding machine and moulds). Its main advantages are the following: the tiles can be produced locally where cement is available; can easily be installed with good training of even unskilled workers; and unlike



YP CAMP PARTICIPANTS LEARN ABOUT INTERLOCKING COMPRESSED EARTH BLOCKS.

of its use in the post-tsunami reconstruction efforts in southern Thailand were also presented.

Several resource speakers also presented on diverse topics, such as urban design and development, disaster risk management in flooding-affected areas, and communication advocacy tools. Social housing policies and the Community Mortgage Program were also extensively discussed, particularly the functions of institutions such as the Philippine Undertaking for Social Housing (PUSH) and the Social Housing Finance Corporation (SHFC).



ARCHITECT CESAR ARIS OF FDUP DEMONSTRATES HOW TO MAKE MCR TILES.

galvanized sheets, are rust and fire resistant. The technology has been applied in several low-cost housing projects of Pagtambayayong Foundation in Cebu City and FDUP in Metro Manila.

For the self-build housing project of the SANAGMANA resettlement community in the reclaimed fishponds of Tanza, Navotas, MCR provides a viable roofing alternative for their houses and a livelihood opportunity for the community.



SMOKY AIR.
INFORMAL SETTLERS LIVING BESIDE THE OPEN GARBAGE DUMP IN
PIER 18, MANILA TURN SCRAP WOOD INTO CHARCOAL FOR A LIVING.
PHOTO BY FAITH VARONA

From:

TAO PILIPINAS, INC.

23-A Mapagbigay St., Brgy. Pinyahan,
1100 Diliman, Quezon City, Philippines

To: _____

Address: _____
