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International POPs Elimination Project

*Fostering Active and Efficient Civil Society Participation in
Preparation for Implementation of the Stockholm Convention*

Policy Brief on Zero Waste: A Proposal for a POPs-Free Alternative to Managing Municipal Discards in Indonesia, Malaysia and the Philippines

Balifokus, Indonesia

Consumers' Association of Penang, Malaysia

Ecological Waste Coalition, Philippines

Global Alliance for Incinerator Alternatives, Philippines

**Indonesia, Malaysia, Philippines
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About the International POPs Elimination Project

On May 1, 2004, the International POPs Elimination Network (IPEN <http://www.ipen.org>) began a global NGO project called the International POPs Elimination Project (IPEP) in partnership with the United Nations Industrial Development Organization (UNIDO) and the United Nations Environment Program (UNEP). The Global Environment Facility (GEF) provided core funding for the project.

IPEP has three principal objectives:

- Encourage and enable NGOs in 40 developing and transitional countries to engage in activities that provide concrete and immediate contributions to country efforts in preparing for the implementation of the Stockholm Convention;
- Enhance the skills and knowledge of NGOs to help build their capacity as effective stakeholders in the Convention implementation process;
- Help establish regional and national NGO coordination and capacity in all regions of the world in support of longer term efforts to achieve chemical safety.

IPEP will support preparation of reports on country situation, hotspots, policy briefs, and regional activities. Three principal types of activities will be supported by IPEP: participation in the National Implementation Plan, training and awareness workshops, and public information and awareness campaigns.

For more information, please see <http://www.ipen.org>

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Policy Brief on Zero Waste: A Proposal for POPs-Free Alternative to Managing Municipal Discards in Indonesia, Malaysia and the Philippines

I. Introduction

Southeast Asia, particularly the industrializing countries of Indonesia, Malaysia and the Philippines, faces mounting waste and pollution problems brought about by expanding population, dirty industrial processes, and the globalization of Western consumption patterns marked by throw-away consumer culture. Waste-impacted countries, in their rush to mitigate the effects of wasteful production and consumption, are being lured to build waste burners, regardless of the many studies implicating waste incineration as major source of by-product POPs such as dioxins and furans.

Policy makers in Indonesia and Malaysia are mulling over incinerator proposals of various types and sizes. In the Philippines, technology vendors are tenaciously promoting incinerators in disguise notwithstanding the national ban on waste incineration.

In line with the spirit of the Stockholm Convention of promoting non-POPs alternatives, four NGOs from Indonesia, Malaysia and the Philippines have carried out a coordinated policy research on Zero Waste as a healthy and sustainable option for managing discarded materials in these waste-impacted countries.

The participations NGOs are:

- Yayasan BaliFokus (BaliFokus Foundation) - an Indonesian NGO based in Bali that works on environmental management, cleaner production, pollution control and prevention, urban, tourism and other sustainable development issues. Established in June 2000, BaliFokus works with other groups on waste issues through JALA Sampah or the Garbage Network. BaliFokus works in tsunami-impacted areas in Aceh in developing community-oriented system for managing discards.
- Consumers' Association of Penang (CAP) is a grassroots non-profit, non-governmental organization linking consumer issues with environment and development issues. Founded in 1969, CAP promotes critical awareness and action among consumers in order to uphold their inherent rights and interests. CAP facilitates information sharing on POPs and alternatives in Bahasa Melayu, Mandarin and Tamil languages in Malaysia and neighboring countries.

- Ecological Waste Coalition of the Philippines, Inc. (or the Ecowaste Coalition) is a network of public interest groups and movements formed in 2000 to promote Zero Waste by 2020 by advancing the ecological management of discards, clean production and other strategies aimed at conserving and protecting the earth's finite resources, and building a toxics-free society. The Coalition successfully carried out waste reduction projects at the 4th World Meeting of Families in 2003 and the 23rd Southeast Asian Games in 2005.
- GAIA is an expanding international alliance of organizations and individuals working to end the incineration of all forms of waste and to promote Zero Waste, sustainable waste prevention and discard management practices. GAIA serves as co-hub for Southeast Asia of the International POPs Elimination Project (IPEP) and participates in the Expert Group on Best Available Techniques/Best Environmental Practices of the Stockholm Convention on POPs.

This policy brief on Zero Waste will explain why authorities and citizens should reject incineration and alternatively pursue a holistic, non-burn approach to managing discards that are anchored on waste prevention, reduction, separation at source, recycling and composting. Zero Waste alternatives to incineration exist, which, if genuinely implemented, will minimize POPs releases, conserve diminishing resources, generate jobs and stimulate community self-reliance and development.

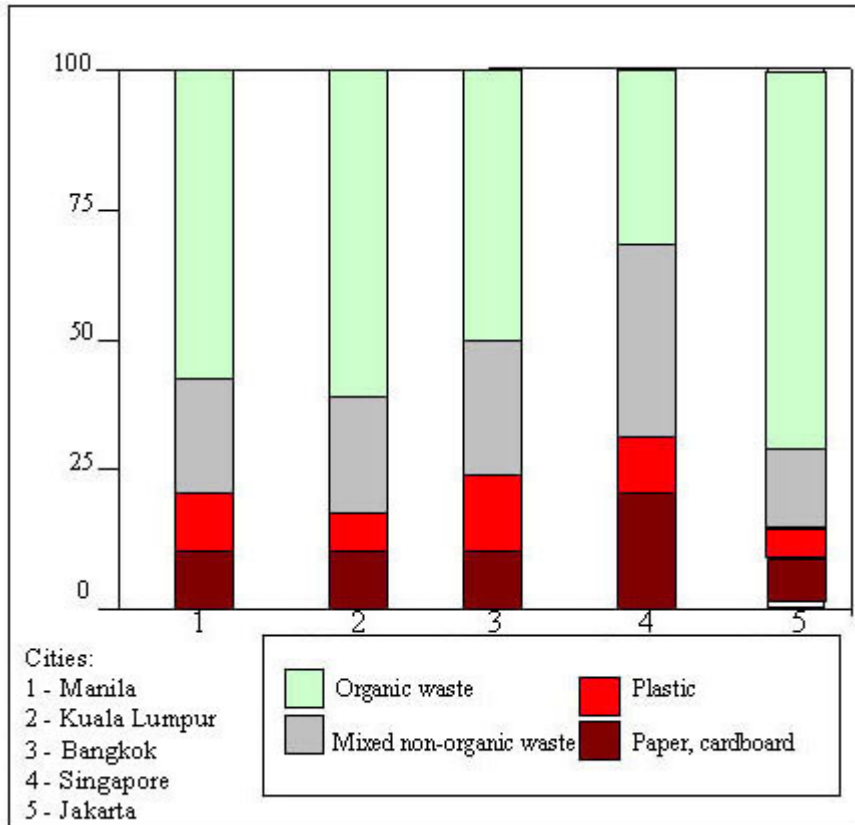
This policy brief is a “work in progress” and does not claim to represent all the experiences and perspectives of the participating NGOs and their network partners. BaliFokus, CAP, Ecowaste Coalition and GAIA intends to expand and enrich this initial report as we continue to reach out and learn from Zero Waste communities and advocates and as we try out techniques and steps to achieve Zero Waste or darn near in our respective work.

This policy brief is divided into seven parts:

- I. Introduction
- II. State of Wasting and Recycling in Indonesia, Malaysia and the Philippines
- III. Prevailing Policies and Practices for Managing Municipal Discards in Indonesia, Malaysia and the Philippines
- IV. Issues and Concerns against Waste Incineration
- V. Zero Waste Alternative to Waste Incineration
- VI. Pieces of Zero Waste in Indonesia, Malaysia and the Philippines
- VII. Conclusion

A note on currencies used: one US Dollar is equivalent to 9,132 Indonesian Rupiah (IDR), 3.6 Malaysian Ringgit (RM), and 52 Philippine Peso (PHP).

II. State of Wasting and Recycling in Indonesia, Malaysia and the Philippines



Source: United Nations 1995, World Bank 1995 and 1998, UNEP/SPREP 1997

Figure 1: Approximate Composition of Municipal Solid Waste in Selected Cities of ASEAN Member Countries 2001. The highly urbanized cities are shown to generate a high percentage of organic and mixed inorganic waste – between 70 to 80 percent, with about 10 to 24 percent made up of paper and cardboard waste. (“State of Waste Management in South East Asia,” UNEP, 2004)

INDONESIA

Indonesia, the fourth largest country in the world with a population of over 216 million (2004), is facing serious problems with solid waste. The vast country spanning 890,000 sq. km. is predicted to increase its solid waste volume by as much as 2 – 4% per year, which will require appropriate infrastructure, system and resource allocation.

Based on the infrastructure book of Indonesia (Bappenas, 2003), the total waste generated in the country in 1995 was approximately 22.5 million tonnes, and this is projected to increase to 53.7 million tonnes in the year 2020. In large cities the production of garbage per capita is about 0.6 – 0.85 kg per day.

As an illustration, Jakarta City produces 6.2 thousand tonnes per year, Bandung 2.1 thousand tonnes per year, Surabaya 1.7 thousand tonnes per year and Makassar 0.8

thousand tonnes per year (Damanhuri, 2002). Only about 4.2% are collected and transported to final dumpsites, the rest are burned (37.6%), dumped into the rivers/streams (4.9%) or remain uncollected (53.3%).¹

NO	NAME OF RIVERS	VOLUME	PROCESSED
1.	Kamal	2,007.50	1,505.63
2.	Sentiong	3,741.25	2,805.94
3.	Angke	2,828.75	2,121.56
4.	Cideng	4,653.75	3,490.31
5.	Grogol	4,657	3,490.31
6.	Duri	3,102.50	2,326.86
7.	Ciliwung	2,098.75	1,574.06
8.	Ancol	8,557.5	6,433.13
9.	Banglio	7,026.25	5,269.69
10.	Papanggo	5,556.25	4,174.69
11.	Sunter	5,657.50	4,243.13
12.	Cakung	2,510	1,882.50
	TOTAL	52,427.75	39,317.82

Figure 2: Solid Waste in 12 Rivers in Jakarta, Indonesia Waste Situation Report by WALHI. Presented at the Waste Not Asia Meeting, 2001.

Jakarta, the capital city, generated approximately 25.700 cubic meters per day of waste in 2000. If we compare it with the famous Borobudur temple, that much of waste will be equivalent to 14 Borobudur temples per month or about 170 Borobudur temples per year. [Bapedalda DKI, 2000]

Recycling is practiced informally in most of the cities, mainly by the informal private sector, e.g. waste pickers and garbage truck helpers. Recycling occurs at three stages: the household level, curbside collection, and at the dumpsites. In the face of a relatively large market for used products made from recycled plastics, glass bottles, scrap paper, and scrap metals, Indonesia recycles only a small portion of its municipal discards.

Data in 1996 from the Indonesian Scavengers Association revealed that there are more than 150 facilities in Jakarta involving more than 400,000 waste retrievers who collect recyclable materials for the different industries. The recyclables, mostly paper, glass, metal and plastics are sold to distributors, where they are cleaned, sorted and packaged, and go through preliminary processing before reselling. Most of these activities are run informally, and are not recognized as a formal component in the city's solid waste management system. Through informal recycling, approximately 40% of waste generated daily in Jakarta City is sorted and recycled. The business scale could reach up to IDR 18 billion per month.²

¹ Infrastruktur Indonesia Sebelum, Selama dan Pasca Krisis, Deputy Bidang Sarana dan Prasarana, Bappenas, October 2002

² Sinar Harapan daily newspaper, February 12, 2004

A 1997 research study conducted in three big cities of Bandung, Semarang and Surabaya revealed that the recycling activities involving waste pickers could save monthly operational waste management costs up to Rupiah 34.83 million per month or approximately US\$ 3,554 monthly. By volume, recycling activity by waste pickers reduces the waste volume by as much as 31%.

City	SWM Operating Costs (Rp billion/year)	Monthly inorganic SW Generation (m3)	Reduction of SW by Waste Pickers (m3)	Monthly Savings (Rp million)
Bandung	3,630	55,060	10,610 (19%)	29,17
Semarang	2,940	30,729	500 (2%)	1,37
Surabaya	11,200	41,458	12,665 (31%)	34,83

Figure 3: Operational Costs Savings in Solid Waste Management Due to Waste Picking (DKI, Bandung, Semarang, Surabaya or Listyawan, B., "Prospects of Recycling Systems in Indonesia," Recycling in Asia: Partnership for Responsive Solid Waste Management. UN Center for Regional Development, Nagoya, Japan, 1997).

MALAYSIA

Malaysia covers an area of about 330,257 sq. km. consisting of Peninsular Malaysia and the states of Sabah and Sarawak in the Borneo Island. It has a population of about 26.5 million.

Rapid population growth, consumption patterns, industrialization and urbanization experienced in Malaysia have resulted in the generation of massive amounts of solid waste. With increasing wealth, the composition of waste changed from primarily biodegradable organic materials to plastics and other synthetic materials.

The average amount of municipal solid waste (MSW) generated in Malaysia is 0.5–0.8 kg/person/day and has increased to 1.7 kg/person/day in major cities. (Kathirvale, et.al, Energy Potential from Municipal Solid Waste in Malaysia in Renewable Energy, 2003).

In 2005, about 7.34 million tonnes of solid wastes were generated in Malaysia. On average, daily generation of solid wastes is about 18,000 tonnes. Statistics show that only 3 to 5 % of the solid waste is being recycled ("Waste Reduction: No Longer an Option but a Necessity," Bernama, 9 February 2006). The volume of waste generated in Malaysia is expected to increase 2% per annum.

The biggest component of solid waste that is generated is organics, which is potentially suitable for conversion to compost. More than 30% of material in the waste stream such as paper, plastic, metal, glass and textile can be recycled. Lack of regulations and guidelines are among the problems that hinder the success of recycling programs.

A study conducted in Kuala Lumpur has revealed that the amount of organic wastes for residential area range from 62 to 72%. Disposal of solid waste is done almost solely

through landfill method. There are about 177 disposal sites in Peninsular Malaysia. In most cases, open dumping is being practiced and takes place at about 50% of the total landfills. In the Seventh Malaysia Plan (1995-2000), the Federal government had spent RM 20.9 million to build 9 sanitary landfills and upgrade 27 existing landfills in 34 local authorities.

Table 2
Average composition weight percentage of components in MSW generated by various sources in Kuala Lumpur

Sources	Residential high income (%)	Residential medium income (%)	Residential low income (%)	Commercial (%)	Institutional (%)
Food/organic	30.84	38.42	54.04	41.48	22.36
Mix paper	9.75	7.22	6.37	8.92	11.27
News print	6.05	7.76	3.72	7.13	4.31
High grade paper	–	1.02	–	0.35	–
Corrugated paper	1.37	1.75	1.53	2.19	1.12
Plastic (rigid)	3.85	3.57	1.90	3.56	3.56
Plastic (film)	21.62	14.75	8.91	12.79	11.82
Plastic (foam)	0.74	1.72	0.85	0.83	4.12
Pampers	6.49	7.58	5.83	3.80	1.69
Textile	1.43	3.55	5.47	1.91	4.65
Rubber/leather	0.48	1.78	1.46	0.80	2.07
Wood	5.83	1.39	0.86	0.96	9.84
Yard	6.12	1.12	2.03	5.75	0.87
Glass (clear)	1.58	2.07	1.21	2.90	0.28
Glass (colored)	1.17	2.02	0.09	1.82	0.24
Ferrous	1.93	3.05	2.25	2.47	3.75
Non-ferrous	0.17	0.00	0.18	0.55	1.55
Aluminum	0.34	0.08	0.39	0.25	0.04
Batteries/hazards	0.22	0.18	–	0.29	0.06
Fine	–	0.71	2.66	0.00	0.39
Other organic	0.02	0.00	–	1.26	1.00
Other inorganic	–	0.27	0.25	–	8.05
Others	–	–	–	–	6.97
Total	100.00	100.00	100.00	100.00	100.00

Figure 3: Municipal solid waste generation from residential, commercial and institutional sources in Kuala Lumpur, Malaysia (Kathirvale, et.al, Energy Potential from Municipal Solid Waste in Malaysia in Renewable Energy, 2003).

PHILIPPINES

The Philippines is home to over 85 million people. The country has a total land area of 300,000 sq. km., comprised of 7,107 islands and some 41,975 barangays (the country's basic political unit).

Waste generation in the Philippines is estimated at about 36,172.50 tons per year, i.e. 0.50 kg/capita/day (in urban areas) and 0.30 kg/capita/day (in rural areas). Metro Manila,

which is comprised of 14 cities and 3 municipalities with total population of over 10 million, produces 6,700 tons of waste daily.

In Metro Manila, for instance, 27% of the more than two million tons of garbage created yearly are thrown illegally into dumps and water bodies or openly burned, exacerbating the air, water and soil conditions of the bustling metropolis. In three decades, Metro Manila, which is comprised of 17 cities and towns, is expected to yield over 70 million tons of waste.

The ecological management of discards remains to be a major challenge for the Filipino nation. The ever increasing volume and toxicity of wastes generated from factories, households, institutions and other sources is threatening human health as well as endangering the environment, food safety and security.

According to the National Solid Waste Management Commission, recycling rates in Metro Manila has improved from 6% in 1997, 13% in 2000 to 25% in 2003. A report by the Federation of Multipurpose Cooperatives in Metro Manila, which is comprised of junk dealers, shows that during this timeframe trade in recyclables rose from 69,400 metric tons to 209,770 metric tons, valued at PHP 268 million (“Implementation of 3Rs in the Philippines,” National Solid Waste Management Commission, 2005).

Despite increasing recycling rates, the country has yet to significantly reduce the volume and toxicity of residual waste being disposed in the country’s 734 open dumps and 262 controlled dumps.

III. Prevailing Policies and Practices for Managing Municipal Discards in Indonesia, Malaysia and the Philippines

Country	Disposal Methods (%)				
	Composting	Open dumping	Landfilling	Incineration	Others
Indonesia	15	60	10	2	13
Malaysia	10	50	30	5	5
Myanmar	5	80	10	-	5
Philippines	10	75	10	-	5
Singapore	-	-	30 *(10 in 2002)	70 *(90 in 2002)	-
Thailand	10 **(0 in 2001)	65 **(67 in 2001)	5 **(32 in 2001)	5 **(1 in 2001)	15 **(0 in 2001)
Vietnam	10	70	-	-	20

Source: ENV 1997

*Communication with National Environment Agency officials

**Draft Annual Report, The State of Pollution, Thailand B. E.2544 (2001), Pollution Control Department 2002

Figure 4: Disposal Methods for Municipal Solid Waste in Selected ASEAN Countries (“State of Waste Management in South East Asia,” UNEP, 2004)

INDONESIA

Applicable laws and regulations:

- Environment Management Act Number 23, 1997
- Government Regulation Number 82, 2001 (Water Quality Management and Wastewater Control)
- Local Government Regulation
- Government Regulation Number 18 and 85, 1999 (Hazardous Waste Management)
- Presidential Decree Number 61, 1993 (ratification of the Basel Convention on the Control of Trans-Boundary Movement of Hazardous Waste and their Disposal)
- Number Kep-01 to Kep-05/BAPEDAL/09/1995 (procedures and requirements for hazardous and toxic wastes)
- Number Kep-68/BAPEDAL/05/1994 (procedures on licensing for hazardous waste storage, collection, operations of treatment equipment, treatment and final disposal)

In Indonesia, open final dumpsites can be found in most of the regencies or municipalities. It remains to be the predominant disposal option in the country. As cities grow and produce more discards, the public health and environmental impacts of open dumps becomes increasingly unbearable.



The operational record of most of Indonesia dumpsites is expectedly poor due to lack of properly trained and skilled staff to manage the site, lack of financial resources, and lack

of political support from the local government for necessary mitigation measures.

In February 2005, a huge landslide occurred in a regional dumpsite, Leuwigajah, final dumpsite of Bandung City, Cimahi City and Cimahi Regency. The mountainous garbage descended, killing about 143 people who lived downstream. The economic losses due to this mismanaged dumpsite calculated by community amounted to about 41 billion Rupiah or approximately US\$ 4 million.

Indonesia's dumpsites provide dangerous livelihood for hundreds of waste pickers who must register with the responsible authority to work at and/or adjacent to the dumps.



Burning of waste is another common practice in both urban and rural areas to reduce the volume of waste. Fires, either spontaneous or accidental, are common occurrences at dumpsites due to ignition of methane gas produced from decomposing organic matter. Waste pickers at dumpsites also burn materials to separate the

recyclable, i.e., metal.

Some local governments, related institutions and private sector groups are advocating for centralized incineration facilities as a potential solution to Indonesia's growing waste problem. However, incinerators are proven to an ineffective option in Indonesia due to high moisture and organic content and low calorific value of discards, the lack of constant and consistent quality of waste stream, high construction and operating costs, varying operating conditions and temperatures, and weak regulatory enforcement and monitoring.

The Surabaya incinerator in East Java, developed through public-private partnership in 1989-1990, illustrates the failure of waste incineration as a disposal option for Indonesia's waste. The 200-tons-per-day incineration facility became operational in 1991 and costs approximately US\$ 150,000. The low calorific value of the wastes in Indonesia especially of Surabaya (between 900-1,200 kcal/kg) caused start-up problems, and fuel had to be added constantly to maintain combustion, even during the dry season and after 5 days of air-drying in a shed. Because of the spatial requirements for the air drying system, the plant incinerates only 170 tons per day. In addition, the plant does not use particulate or gas control systems, and their installation could increase the overall costs of the facility by at least 50 percent.³

The environmental group WALHI reports incinerators that operate in Jakarta can handle 201 cubic meter of solid waste per day and requires 600 liters of kerosene as fuel. The incinerators are located in Rawasari, Central Jakarta. In the city budget for the 2000-2001, the government has allocated funds to build incinerators in every sub-district of Jakarta: 8 sub-districts in Central Jakarta, 10 in East Jakarta, 10 in South Jakarta, 7 in North Jakarta and 8 in West Jakarta. If Jakarta will implement this plan, it could worsen the air pollution in Jakarta and surrounding areas and increase smog and poison gases.

PVC is the major contributor of chlorine to four combustion sources—municipal solid waste incinerators, backyard burn barrels, medical waste incinerators and secondary copper smelters—that account for a significant portion of dioxin air emissions.⁴ Dioxin

³ Indonesia Environment Monitor Report, World Bank, 2003.

⁴ PVC Bad News Comes in The Poison Plastic, Health Hazards and the Looming Waste Crisis, Center For Health, Environment and Justice & Environmental Health Strategy Center, US, December 2004

formation is the key factor of PVC toxicity. Burning PVC plastic, which contains 57% chlorine when pure, forms dioxins, a highly toxic group of chemicals that build up in the food chain and are slated for reduction and elimination under the Stockholm Convention.

MALAYSIA

Applicable laws and regulations:

- Environmental Quality Act 1974
- Local Government Act 1976
- Street, Drainage and Building Act 1974
- Drainage Works Ordinance 1954 (Revised 1988)
- Urban Storm water Management Manual for Malaysia 2000

Malaysia law has empowered the local authority to manage solid waste in their areas of operation. The Local Government Act 1976 which is used as legal provision for solid waste management is generic in nature and unable to fully address many issues and elements that arise in the ever expanding scope and nature of the waste sector. (Engku Azman Tuan Mat, 2001, Partnership Between Government, Waste Management Companies, Recyclers and the Consumers in the Context of 3R - paper presented in Waste Management 2001 Conference, Kuala Lumpur)

In Malaysia, waste management services such as collection and disposal forms an integral part of the local authority administration. For providing these services, households are charged through their house assessment payments. (Noor Zalina Mahmood, 2000, Solid Waste Management in Malaysia: A Comparison Study - paper presented in 26th WEDC Conference, Dhaka, and Bangladesh).

In certain areas, municipal waste collection, treatment and disposal services have been privatized but with Government supervision. Currently, the main waste management approach being employed is landfilling. Wastes collected by private companies are deposited in government-owned landfills, some of which are managed by private consortia. The majority of the local authorities in the country dump solid wastes in controlled dumps.

Due to rapid development and lack of space for new landfills, big cities in Malaysia are planning to switch to incineration. At present there are many proposals to install solid waste incinerators, waste-to-energy plants, and refuse-derived fuel plants. These proposals are at various stages, from preliminary proposals submitted to State Governments, Environmental Impact Assessments (EIAs) submitted to the Department of Environment for review, EIA's being approved, proposals being rejected etc. Up till now no big incinerator plants have been set up.

Malaysia plans to build its largest thermal treatment facility for municipal solid waste with a capacity of 1,500 ton/day in Beroga, Selangor. A 700-ton Resource Recovery Centre (a refuse-derived facility) plant is likewise being planned at Mukim Ulu Semenyih, Selangor. Plans are also afoot to build thermal treatment plants in Kuala Lumpur, Penang, Cameron Highlands, Kuantan, Johor, Melaka, among others.

In the Seventh Malaysia Plan (1995-2000), the government spent RM17million to purchase seven mini-incinerators with a capacity of 5 to 20 ton/day to burn discards in the resort islands of Langkawi, Labuan, Tioman and Pangkor.

The Malaysian government is introducing a new law on solid waste management but the Bill has yet to be tabled in Parliament. The principal processes options available and being recognized as hierarchy for integrated waste management is: waste minimization, reuse, material recycling, energy recovery and landfill. Waste transfer stations, thermal treatment plants and waste-to-energy (WTE) are being considered are being considered too as future options.

PHILIPPINES

Applicable laws and regulations:

- Ecological Solid Waste Management Action of 2000
- Clean Water Act of 2004
- Clean Air Act of 1999
- Toxic Substances and Hazardous Waste and Nuclear Waste Control Act of 1990.

In January 2001, the Ecological Solid Waste Management Act of 2000 (Republic Act 9003 or R.A. 9003) was signed into law with the aim of adopting a systematic, comprehensive and ecological solid waste management. This groundbreaking legislation seeks to advance an ecological approach for managing discards primarily through waste prevention, reduction, segregation at source, reuse, recycling and composting, “which do not harm the environment.”

R.A. 9003 calls for the adoption of best practices in discards management excluding incineration. The law further makes waste separation at source compulsory, and requires the establishment and operation of Materials Recovery Facilities (MRF) in every barangay or cluster of barangays to facilitate community-based recycling of discards.

The country’s waste problems persist due to the slow-moving implementation of the fundamental elements of R.A. 9003. Critiques from the civil society and from within the government quarters cite the lack of political will to execute the law, the lack of impetus and incentive to prevent and reduce waste, the lack of public awareness and education on the need to use and waste less, the lack of combined strategies so that community-based schemes can benefit from networking and economies of scale, the lack of producer responsibility as some of the reasons for the limited success of R.A. 9003.

Due to the ineffective implementation of R.A. 9003, dumping remains as the prevalent mode for disposing discards. To date, some 734 open dumps and 262 “controlled” dumps sited in various communities remain operational, steadily contaminating surface and ground water with leachate and posing grave risks to local communities, their environs and livelihood. By law, open dumps should have been converted into “controlled” dumps in February 2004, and “controlled” dumps closed in February 2006.

Unlike Indonesia and Malaysia, waste incineration is explicitly prohibited in the Philippines, particularly in Section 20 of the Clean Air Act of 1999, which says:

“Incineration, hereby defined as the burning of municipal, bio-medical and hazardous wastes, which process emits poisonous and toxic fumes, is hereby prohibited. Provided, however, that the prohibition shall not apply to traditional small-scale method of community/neighborhood sanitation “siga,” traditional, agricultural, cultural, health and food preparation, and crematoria. Provided, further, that existing incinerators dealing with bio-medical wastes shall be phased out within three (3) years after the effectivity of this Act. Provided, finally, that in the interim, such units shall be limited to the burning of pathological and infectious wastes, and subject to close monitoring by the Department.”

Local government units are hereby mandated to promote, encourage and implement in their respective jurisdiction a comprehensive ecological waste management that includes waste segregation, recycling and composting.

With due concern on the effects of climate change, the Department shall promote the use of state-of-the-art, environmentally-sound and safe non-burn technologies for the handling, treatment, thermal destruction, utilization, and disposal of sorted, unrecycled, uncomposted municipal, bio-medical and hazardous wastes.”

R.A. 9003 reiterates the ban of incineration through the following provision:

“Ensure the proper segregation, collection, transport, storage, treatment and disposal of solid waste through the formulation and adoption of the best environmental practice in ecological waste management excluding incineration.”

Notwithstanding the ban, foreign and local incinerator peddlers continue to target the Philippines, marketing their products as “state-of-the-art, non-burn” technologies, including gasification, pyrolysis, thermal oxidation, plasma arc, “waste-to-energy” etc. Also, open burning of discards in both urban and rural areas continues despite being a prohibited act that is punishable by law.

IV: PROBLEMS WITH WASTE INCINERATION

Waste incinerators present a long list of problems and concerns for host communities and governments. The most conspicuous of which are the contamination of our bodies, food supply and environment with POPs and other injurious substances, the production of toxic ash, the destruction of resources that could have been reused or recycled, the huge

financial, economic and employment costs, waste of energy, and incompatibility with sustainable approaches to managing discards.

The Asian Development Bank recognized that “Incineration has had very limited use for municipal solid waste and has not had much success in the cities of Asian developing countries where it has been installed, because most of these cities have encountered many problems with imported incinerators, either due to design problems or high operating and maintenance costs.” (“Asian Cities in the 21st Century: Contemporary Approaches to Municipal Management Vol. 4 Partnerships for Better Municipal Management, ADB, 2000)

Some of these “many problems” associated with waste incineration in developing countries, include:

- Lack of robustness of technology to function well in a Southern environment.
- Lack of ability to regularly monitor stack emissions or ash toxicity.
- Lack of technical ability to conduct tests for dioxins and other toxic releases.
- Lack of secure landfills for the highly hazardous ash.
- Lack of trained personnel with required skills for effective monitoring.
- Budget uncertainties that can affect regular maintenance and replacement of equipment.
- Differing physical conditions and waste streams.
- Threat of corruption.

TOXIC RELEASES AND HEALTH COSTS

Rather than solve a waste problem, incineration produces multiple residue streams which are often more hazardous in nature than the waste being burned. The Stockholm Convention has identified waste incineration as a source with “...the potential for comparatively high formation and release...” of unintentionally produced POPs.

Incinerators produce large quantities of gaseous, solid and sometimes liquid residues. Large volumes of gases are created during combustion of the wastes and are sometimes subject to treatment before release into the air. The solid residues consist largely of bottom ash or slag, which collects at the bottom of the furnace. A second solid residue, fly ash, consists of particulate matter that is removed from the combustion gases by the air pollution control equipment. Some forms of air pollution control also generate liquid residues, such as scrubber water.

The composition of these gaseous, solid and liquid incinerator residues depends on many factors, including the composition of the waste burned, the incinerator design, and the condition and maintenance of the incinerator. However, generally, all of these incinerator residues are contaminated with toxic substances, such as heavy metals, dioxins, furans and other persistent organic pollutants.

Dioxins are the most notorious pollutants associated with incinerators. They are a class of chemicals formally known as polychlorinated dibenzo-p-dioxins. The term usually

includes a related class of chemicals, the polychlorinated dibenzofurans. Dioxins cause a wide range of health problems including cancer, immune system damage, reproductive and developmental problems.⁵

Dioxins bioaccumulate by selectively building up in the fatty tissues of living organisms and biomagnify as they are passed up the food chain from prey to predator. They concentrate in fish, meat, eggs and dairy products, and ultimately in humans. Dioxins are of particular concern because they are ubiquitous in the environment; and they are found in human populations at levels that have been shown to cause health problems, implying that entire populations are now suffering their ill-effects.⁶ Incinerators release 69% of dioxins worldwide.⁷

Dioxins, furans and ten other chemicals or groups of chemicals are subject to the restrictions of the Stockholm Convention on POPs.⁸ POPs are chemicals that bioaccumulate, biomagnify, resist decomposition and are capable of long-distance transport, meaning that populations may be exposed to POPs that originate thousands of kilometers away. For dioxins and other by-product POPs, the Stockholm Convention requires that each Party “shall, at a minimum reduce the total releases derived from anthropogenic sources of each of the chemicals ... with the goal of their continuing minimization and, where feasible, ultimate elimination.”

FINANCIAL AND ECONOMIC COSTS

The GAIA report “Resources Up in Flames: The Economic Pitfalls of Incineration versus a Zero Waste Approach in the Global South” identifies 20 reasons why incineration is a losing financial proposition for host communities:

1. Incineration is the most costly discard management option, requiring huge capital investments and operating costs.
2. Incinerators contribute to countries' indebtedness since they require foreign financing not only for the construction, but even facility repairs and upkeep.
3. Incinerators are capital-intensive rather than labor-intensive, creating far few jobs compared to recycling.
4. Wet organic materials, common in southern countries, may reduce the capacity of or shut down incinerators.
5. Incineration will adversely impact the informal sector and the informal sector will diversely impact incineration.
6. Energy revenues from incinerators are often over-estimated.
7. Incinerators may require transfer stations, another cost.

⁵ Allsopp, Michelle; Costner, Pat; Johnston, Paul, “Incineration and Human Health -State of Knowledge of the Impacts of Waste Incinerators on Human Health,” Greenpeace Research Laboratories, University of Exeter, UK, March 2001.

⁶ DeVito, M.J., Birnbaum, L.S. et al, “Comparisons of Estimated Human Body Burdens of Dioxinlike Chemical and TCDD Body Burdens in Experimentally Exposed Animals”, *Environmental Health Perspectives*, Vol. 103, No. 9, pp. 820-831, Sept. 1995.

⁷ UNEP Chemicals, *Dioxin and Furan Inventories: National and Regional Emissions of PCDD/PCDF*, Geneva, Switzerland, May 1999.

⁸ The Stockholm Convention on Persistent Organic Pollutants (POPs) can be found online at www.chem.unep.ch/sc/

8. Pollution control equipment and pollution regulation and enforcement are expensive and increase costs.
9. Incinerators produce a toxic ash that requires disposal in engineered landfills, significantly adding to costs.
10. Incinerators often receive far less tonnage than they were designed to process, leading to financial problems.
11. Lack of infrastructure in lesser-industrialized countries may doom incinerators to financial failure.
12. Citizens and taxpayers pay for incinerators' financial problems.
13. Incinerators hamper least-cost options such as waste prevention and recycling.
14. Incinerators not only put the livelihoods of waste pickers at risk, but they also reduce overall employment and business opportunities from reuse and recycling.
15. Incineration consultants and can add millions to the costs.
16. Incineration's high investment increases potential for corruption.
17. Incineration has high public health costs.
18. Incineration wastes resources and energy and associated investment.
19. Incinerators lower property values.
20. Incineration encourages continued generation, diverts attention clean production and zero waste solutions, and reinforces the unwanted discards are a local responsibility and cost.

INCINERATOR MYTHS

Incinerator proponents buy into a number of myths when trying to sell projects. Here are some common myths surrounding municipal solid waste incineration:

Myth: Incinerators provide a solution to the problem of rapidly increasing waste.

Reality: Incinerators do not make municipal solid waste magically disappear. Indeed, they encourage waste generation and current patterns of production and consumption, which are at the root of solid waste problems. Incinerators are the most costly of all solid waste management options; result in air and water pollution, and still need to be supplemented by landfills as they produce an ash that is far more toxic than ordinary domestic trash.

Myth: Incinerators maximize the use of scarce landfill space.

Reality: Communities with incinerators still need landfills for ash disposal and by-pass wastes. Ash can comprise about 25% by weight of an incinerator's throughput and must be landfilled. Thus, incineration means incineration plus landfill. There are two kinds of by-pass waste: bulky materials that do not fit into the incinerator (such as mattresses), and collected waste that cannot be burned when the incinerator is down for regularly scheduled or unscheduled maintenance. These materials typically require landfilling in communities that have built incinerators. On the other hand, embracing zero waste as a planning tool and a vision for the future will extend landfill life and help build a sustainable system to avoid waste and recover materials.

Myth: Incineration is less expensive than other options, including recycling and "sanitary" landfills and incineration yields electricity, a useful by-product.

Reality: Incineration is the most costly of all waste management options. Costs cannot be offset with energy revenues. Consider Rhode Island's (U.S.) 1992 law that banned municipal solid waste incineration in the state: "...incineration of solid waste is the most costly method of waste disposal with known and unknown escalating costs which would place substantial and unreasonable burdens on both state and municipal budgets to the point of jeopardizing the public's interest." In general, incineration costs 5 to 10 times more per ton than sanitary landfills, even after discounting energy revenues. If incineration is cost-competitive with landfilling, recycling, or other options, residents of the global South should be concerned that such "cheap" incinerators do not have the pollution control equipment that their counterparts in countries with more stringent regulations might have. With regard to energy, considerably more energy can be saved through alternative strategies such as waste prevention, reuse,

recycling, and composting than can be generated by burning. Three to five times more energy can be saved by recycling than by burning materials.

Myth: Local communities prefer incinerators to landfills.

Reality: Incinerators, like landfills, are highly unpopular among local communities. Knowledgeable community activists the world over have fought to prevent construction of incinerators. Hundreds of projects have been cancelled or put on hold as a result of citizen opposition. In the U.S., Philadelphia, Seattle, Portland, Austin, San Diego, Boston and other cities have cancelled proposed municipal waste incinerators. In the Netherlands, citizens organized to defeat a US\$700-million incinerator proposed for a suburb of The Hague, then organized a national network against all proposed and operating incinerators in the country. In Germany, some 500 grassroots groups oppose incineration. As public opposition to the construction of new incinerators in the west continues to grow, western incineration industries are pushing their unwanted technology east.

Myth: Incinerators are safe and more environmentally benign than landfills.

Reality: Incinerators increase risk of environmental and health threats as compared to other waste management alternatives. In addition to the threat to groundwater from ash disposal, incineration creates large amounts of air pollution. Incinerators are major – and in many areas the largest – sources of pollutants such as dioxin, lead, and other heavy metals released into the environment. They also release carbon monoxide, oxides of sulfur and nitrogen, hydrocarbons, and particulates into the air.

Source: Institute for Local Self-Reliance, Washington, D.C., U.S., 2004.

V. The Zero Waste Alternative to Waste Incineration

Article 5 of the Stockholm Convention on POPs directs parties to implement measures to reduce with the goal of eliminating releases from unintentional production of chemicals listed under Annex C (polychlorinated dibenzo-p-dioxins and dibenzofurans, hexachlorobenzene and polychlorinated biphenyls). The Convention further calls for promotion and even requiring the use of “...substitute or modified materials, products and processes to prevent the formation and release of the chemicals listed in Annex C...”

Following the above, BaliFokus, CAP, Ecowaste Coalition and GAIA invites the governments and citizens of Indonesia, Malaysia and the Philippines to consider Zero Waste Resource Management as an alternative to the POPs-producing processes of dumping and burning discards.

As Anne Leonard, GAIA co-chair has stated, “Zero Waste provides an alternative to the wanton destruction of our environment, communities and social systems. Zero Waste reduces both the volume and toxicity of materials we use through reducing consumption, improving production efficiency, eliminating toxics, and safely recovering discarded materials. In implementing these changes, Zero Waste requires an informed and involved citizenry. Thus a Zero Waste approach builds community, while sustaining the economy, the environment and public health. Zero Waste points us towards real solutions.”

Zero Waste is a 'holistic system' approach to resource management that promotes ecological consumption, maximizes recycling, minimizes waste, and ensures that products are made to be reused, repaired or recycled back into nature or the marketplace, thereby generating income and livelihood for the people, conserving the Earth's finite resources, and protecting community health and the environment. Zero Waste is more

than recycling as it seeks to reduce not only the quantities of materials used, but also their toxicities.

Zero Waste entails:

- Redesigning the one-way industrial system into a closed-loop circular system.
- Clean production, including designing for the environment, toxics use reduction, materials substitution.
- Enforcing extended producer responsibility (EPR) and stimulating take back programs.
- Waste prevention, reduction, reuse, recycling and composting and, providing incentives for communities and companies to join the loop.
- Setting ambitious waste reduction or diversion targets.
- Eco-enterprise development towards local self-sufficiency.
- Provision of humane, safe and sustainable jobs for waste pickers and other waste workers.
- Reducing spending on waste disposal and investing more on public information and education for Zero Waste.
- Banning recyclables, compostables and hazardous materials in landfills.
- Placing levies on materials that are landfilled.
- Developing and sustaining market for recycled materials and products.

A Zero Waste movement is gaining more adherents in many communities. In Asia, citizens' groups have come together to form Waste Not Asia (WNA), which aspires for a decentralized community-based reuse, recycling and composting programs that promote materials recovery rather than materials destruction. WNA is opposed to landfills, incinerators and other end-of-pipe interventions, and promotes clean production, extended producer responsibility, and the elimination of POPs towards a toxic-free Zero Waste society.

Zero Waste benefits include:

- Creation of sustainable recycling jobs and enterprises.
- Reduced disposal costs, and increased savings for other basic social services.
- Saving energy by reducing energy consumption associated with extracting, processing and transporting 'virgin' raw materials
- Increasing carbon uptake by forests (recycled paper, for example, leaves more trees standing so they can breathe in our carbon dioxide).
- Reducing and eventually eliminating the need for incinerators and landfills, including eradicating the burden of landfill decontamination and rehabilitation.
- Eliminating pollution from POPs, heavy metals, greenhouse gases and other chemicals of concern.

As an emerging social movement aimed at confronting dirty production processes and throw-away consumer culture, Zero Waste solutions come in many diverse and creative

expressions, but share a set of common characteristics of being community-driven, life-sustaining, job generating and low cost.

AIMING FOR ZERO WASTE: TEN STEPS TO GET STARTED

Every community is different. There is no one way to prevent, reduce, reuse, recycle, or compost discarded materials. For instance, manual sorting of recyclables may be appropriate in one community and not in another. The ten steps listed below are applicable to most if not all communities interested in pursuing a zero waste future. A community group or local government can take any step to get started. These steps are not mutually exclusive. Integrating community participation in decision-making will enhance the success of any discard management program. This plan can be adopted at the community, municipal, or national level, depending on which approach will yield the best results in each situation. Also, one can work with many communities to adopt local zero waste goals, and the momentum generated can lead towards an eventual citywide or even national goal.

1. Adopt a non-incineration discard management plan. Better yet call it a resource management plan and embrace zero waste as a vision for the future. Make waste prevention, reuse, repair, recycling, and composting the heart of the plan. Adopt waste elimination goals as well as recycling goals. Provide leadership, dialogue, and information on how to move toward a zero waste economy. Decide against privatizing and centralizing waste systems. Seek public input to build broad public support for waste reduction programs and build a network of stakeholders to be involved in the design and implementation of the programs. Make community participation meaningful.

2. Decentralize waste management by building on local community initiatives using local resources and accommodating the informal sector. Community projects do not need to be relegated to local small efforts. Replicate and expand successful community initiatives. Provide them with an institutional structure that will allow them to thrive and become mainstream (for example, earmark land for composting activities). Allow for decentralized functioning and community efforts rather than an emphasis on one central initiative to solve all waste problems.

3. Target a wide range of materials for reuse, recycling, and composting (especially several grades of paper and all types of organics) and **keep these materials segregated** at the source from mixed trash to maintain quality and enhance diversion levels.

4. Compost. Composting is key to achieving 50% and higher diversion levels and doing so cost-effectively. Keeping organics and putrescibles out of landfills will make landfills less of a nuisance and source of pollution. Emphasize backyard or at-home composting followed by community composting; target many types of clean organic materials and offer year-round, frequent, and convenient collection.

5. Make program participation convenient and meaningful. The more households and businesses participating, the more materials diverted from disposal. More people will reduce, reuse, recycle, and compost if programs are convenient, easy, and simple. Some ways to make programs convenient include: providing curbside or door-to-door collection of recyclables with the same frequency curbside collection of trash is provided; providing seasonal and frequent collection of yard trimmings; offering service to all households including multi-family dwellings; utilizing set-out and collection methods that encourage resident participation as well as yield high quality, readily marketable materials (such as using large bins for commingled food and beverage containers, and separate set-outs for paper grades); providing adequate containers for storage and set-out of recyclables; and establishing drop-off sites to augment door-to-door collection (such as at disposal facilities if residents or businesses self-haul trash and at decentralized locations around the community).

6. Institute economic incentives that reward waste reduction and recovery over disposal, such as reduced tipping fees for delivering recyclable and compostable materials to drop-off sites, tax incentives to encourage businesses and haulers to recycle, and pay-as-you-throw fees for trash collection. Eliminate any subsidies for waste burning.

7. Enact or push for policies and regulations to improve the environment for recycling and recycling-based businesses. These might include:

Banning waste incineration. Incinerators compete for the same materials and financial resources as waste reduction strategies and encourage wasting.

Banning products that cannot be reused, repaired, recycled, or composted; requiring residents and businesses participate in recycling and composting programs. Local ordinances can either require residents and businesses to source-separate or ban them from setting out designated recyclable or compostable materials with their trash. Retain authority over the collection and handling of municipal discards so that haulers undertake, encourage, and invest in recycling

Banning recyclable and reusable materials and products from landfills and incinerators.

Banning single-use disposable products from public events and festivals and as many other places as possible. Instituting or expanding existing beverage container deposit systems. Amend laws to require refillable containers.

Establishing recycling market development zones with incentives to create industrial parks for reuse, recycling, and composting firms.

Instituting building policies that require reuse and recovery of building materials in new construction and in building deconstruction projects. Establishing a municipal, regional, or national disposal surcharge (funds could be used to establish a Solid Waste Reduction, Recycling, Composting Authority that awards grants and loans to industry and nonprofit recycling operations).

Supporting state and national mandates and goals, which can be very effective in increasing recycling levels. In the United States, state waste reduction goals, requirements, and policies encourage governments at the local level to implement waste reduction programs. State beverage container deposit laws and landfill bans on recyclables materials have, for instance, provided recycling-based businesses with needed materials.

Supporting state and national policies that will help ensure the prices we pay for our goods and services reflect the true cost of providing them. Policies ending subsidies for virgin material extraction and taxing polluting industries are examples.

Enacting a Toxics Use Reduction Act to encourage industries to reduce the use of toxic materials in their processes and products.

8. Develop markets for materials with an eye toward closing the loop locally (that is, within the local economy), producing high-value end products, and linking recycling-based economic development with a larger vision of sustainable community development. Minimum recycled-content policies, grant and loan programs, and recycling market development zones have encouraged the development of recycling-based manufacturing.

Acquire public property for reuse, recycling, and composting in order to provide a stable land base for ecoindustrial parks and reuse and recycling facilities. Support local nonprofit or for-profit mission-driven recyclers and reuse operations and the informal recycling sector. Community-based recyclers are in business for the good of the community and often provide services that the market undervalues. The informal sector likewise provides undervalued services and often does so free of charge to waste generators and local government.

Implement or expand procurement of recycled-content products. If you're not buying recycled, you're not recycling.

9. Work to hold manufacturers responsible for their products throughout their life-cycle. Local government can press for extended producer responsibility (EPR) at the state and national levels. In particular press for state and national efforts to work with manufacturers to voluntarily reduce packaging and meet minimum recycled-content standards for products and packaging. If goals are not met, push for institution of a regulatory framework. Local government can pass producer responsibility resolutions calling on producers to share the responsibility for their products and on state and national legislatures to shift the burden of managing discarded products and packaging from local governments to the producers of those products. Local government can also pass local ordinances banning use and/or sale of certain types of products and packaging that cannot be reused, repaired, recycled, or composted.

10. Educate, educate, educate. Education and outreach is critical. Educational and technical assistance programs provide residents and businesses with information about "how" and "why" to reduce, reuse, recycle, and compost. Launch a public information campaign that will allow consumers to make smart choices when making purchases. Public education campaigns can also highlight the environmental and economic benefits of preventing, reusing, and recycling discards and connect the role these activities play in moving toward a sustainable economy.

Source: Brenda Platt, Institute for Local Self-Reliance, Washington, D.C., U.S., 2004.

V. PIECES OF ZERO WASTE IN INDONESIA, MALAYSIA AND THE PHILIPPINES

Zero Waste solutions come in many diverse and creative expressions, but share a set of common characteristics of being community-driven, life-sustaining, non-polluting, job generating, low cost, and creative. The following “pieces of Zero Waste” will demonstrate the beauty, viability and sustainability of Zero Waste at different settings in Indonesia, Malaysia, the Philippines and other neighboring countries.

INDONESIA



The implementation of Zero Waste concept in some densely populated settlements in Banjarsari Jakarta, Tigaraksa settlement in Tangerang and Monang-maning settlement in Denpasar showed that waste reduction up to 30% could be reached at the community level. People have set up a '*Komite Lingkungan*' or '*Kelompok Keluarga Sadar Lingkungan*' as environmental committee that provides education and training on environmental awareness, paper recycling, and composting. In Banjarsari,

youths are trained to make recycled paper and carry out composting. The committee in Denpasar also provides household composting program for the nearby neighborhood.

Dry materials collected by waste collectors and/or waste pickers are collected further by the recycler's middlemen. The organic wastes, including food scrap and garden clippings, are being composted at the household level. The organic fertilizers produced are then utilized to grow medicinal herbs. Some of the organic compost produced by the communities are used by homeowners or sold to the public.

In Jimbaran, southern Bali, since 1998, a waste separation facility owned by local entrepreneur who handled wastes from tourism industry and airport catering service, employed about 40 permanent workers, successfully processing about 60 metric tons of wastes per day and recycling almost 65% of inorganic and organic wastes. Food scraps are used to feed the pigs and garden wastes are turned into organic compost that is then used by the hotels in their own garden. Some 35% of the residual waste is sent to final dumpsites.



In Temesi village of Gianyar regency in Bali, the community works together with the local government and a charity organization in processing about 80 cubic meter of waste per day for recycling and composting. Recyclables are separated and sold out to middlemen. By applying this activity, wastes dumped are reduced up to 40%. Furthermore, job opportunities are created for 45 people from the 3 villages surrounding the dumpsite.



MALAYSIA

Taman Bukit Indah in Bukit Mertajam, state of Penang, has been recycling since 1996 through the leadership of recycling couple Don Theseira and Mylene Ooi. To date, the residential community has recycled 221.70 tonnes of materials, diverting 270 one-tonne lorry loads of resources away from the landfill. The recycling project has so far earned RM 43,727, which has been donated to various charities. The recycling duo travel across Malaysia providing recycling information and training to various organizations, corporations and residents' associations.

PHILIPPINES

Many communities, institutions and groups in the Philippines are actively undertaking people-driven projects that are significantly diverting waste resources away from dumps and landfills. In partnership with communities, local authorities and other stakeholders, many “pieces of Zero Waste” are being implemented, testing and confirming the viability of Zero Waste strategies and systems for eliminating and reducing trash.

The following examples demonstrate the efficacy of non-incineration approach to managing discards in an urban and rural setting:

Urban Community Model: Barangay Holy Spirit in Quezon City, with a population of about 120,000, generates 66 tons of waste daily. In 1995, the barangay re-launched its discards management program anchored on waste separation at source, organizing residents into homeowners' associations and educating their leaders through seminars and workshops on the proper management of discards. The Redemption Center for recyclable materials and the composting facility were soon put in place, yielding economic and environmental benefits. Three years later, in 1998, the barangay became self-reliant in waste disposal, a feat that saved the City Government eight million pesos

(or about US\$143,000) in waste collection fees. Dump trucks have to cut their trips from 23.5 to 7.5 daily due to increased recycling. Today, Barangay Holy Spirit has achieved a waste reduction rate of about 60%.

Rural Community Model: Barangay Linomot in the municipality of Jones, province of Isabela in northern Philippines provides another model for ecological waste management in an agricultural setting. This barangay, with a population of about 2,000, draws the participation of about 90% of residents. Prior to the implementation of discards management program, 99.5% of residents threw away or burned their garbage, .025% composted and .025% dumped their trash into the river. With ecological solid waste management, almost nothing now is wasted, burned or dumped into the river. The income generated from recycling activities has been used to construct fishponds that promise to provide the community with additional income as well as food. Intensive composting is gradually lessening farmers' dependence on pesticides and inorganic farm inputs. Also, the sustained implementation of ecological waste management has resulted to improved health and sanitation, steadily eradicating diseases, which used to afflict residents, especially infants and children.

OTHER PIECES OF ZERO WASTE IN THE REGION:

Cambodia: Community Waste Collection in Partnership with Waste Pickers

The Community Sanitation and Recycling Organization (CSARO) organizes waste pickers into Self Help Groups that collect municipal discards from partner communities. In 2003, the SHGs provided waste collection services to 30,000 people, collecting an average of 18-20 tons of trash daily. The recyclable and compostable materials from the collected waste provide waste pickers with supplementary income. CSARO's program involving separation of materials for composting and recycling has resulted in decreased deposit of waste in landfills - ultimately benefiting the community and the environment.

India: Empowering Rag Pickers

The Chintan Environmental Research and Action Group works with one of the most marginalized sections of the urban poor in India – the rag pickers. Chintan is helping those who keep New Delhi clean by campaigning to get them officially recognized for their valuable role in managing the city's waste. Chintan organizes trainings to build their confidence and skills and access basic social services. The group has likewise initiated steps to curb police harassment, including an ID system for waste pickers. Chintan has even partnered with a local bank to enable the rag pickers, who have no place to keep their small savings, to open accounts.

India: From “Must See” to “Must Avoid” to “Must See Again” Tourist Spot

Thanal runs a Zero Waste project to address the mounting tourism waste problem of Kovalam, which used to be a “must see” destination in Southern India for domestic and foreign tourists, especially for its pristine beaches. However, the mismanagement of tourism discards earned for it a “must avoid” label. In 2001, Thanal, in partnership with the tourism authorities, hoteliers, community members and environmental groups like

GAIA and Greenpeace, launched a model waste reduction program for tourism waste. Apart from receiving the “Most Innovative Project in Tourism” award in January 2004, the Zero Waste Kovalam project has created two small-scale industries, providing decent livelihood and income to over a 100 people; provided alternative biogas energy sources for cooking and electricity; achieved 100% diversion of biodegradable waste and 90% of recyclable waste. The dramatic waste reduction has encouraged tourists to spend time in Kovalam instead of avoiding it.

Japan: Kamikatsu Town Challenges “Burn Policy” with Zero Waste

In September 2003, Kamikatsu became the very first town in Japan to proclaim Zero Waste by 2020 as policy goal, challenging the dominant incineration policy of Japan. In order to be able to pass on to the children of future generations an earth bountiful in clean air, pristine water and a healthy natural environment, Kamikatsu-cho hereby issues the Kamikatsu-cho Zero Waste Declaration which spells out its program to reduce the waste generated to zero 2020.

- Kamikatsu-cho will strive to foster individuals who will not pollute our environment!
- Kamikatsu-cho shall promote waste recycling and resource reuse to the best of its ability to eliminate waste incineration and landfill by 2020!
- Residents of Kamikatsu-cho shall join hands with people around the world in order to improve the earth's environment!

South Korea: Volume-Based Waste Collection Fee System and EPR

South Korea has been implementing a Volume-Based Waste Collection System since 1995, following two simple principles: 1) collection fees are charged according to the amount of waste disposed, and 2) recyclable materials are collected at no cost by the local government. From 1995-2000 the amount of landfilled and incinerated waste dropped to 29,720,000 tons, while recycling increased to 9,720, 000 tons. Comparing these with 1994 data, waste decreased by 42.6% and recycling rose to 94.8%. In 2003, South Korea started implementing their Extended Producer Responsibility (EPR) law, initially targeting certain packaging materials (glass, cans, PET and other plastics), electrical products and appliances (TV, refrigerator, washing machine, air conditioner, computer, cellular phones) and other materials (tire, lubricant oil, bulbs and batteries).

New Zealand: Embracing Zero Waste as National Goal

The Ministry for the Environment released in March 2002 the National Waste Strategy, “Towards Zero Waste and a Sustainable New Zealand,” making New Zealand the first country in the world to have formally adopted Zero Waste.

These are just some of the living testimonies of people’s resolve to manage their discards without causing injury to public health and the environment. They inspire other communities to move away from the outdated “burn or bury” approach and adhere to real solutions to managing discards. As Nature is our model in Zero Waste and as creativity is

an essential element of any Zero Waste initiative, it will not be surprising to find countless possibilities for preventing and reducing waste to Zero or darn close.

VII. CONCLUSION

By adopting the Zero Waste approach, Indonesia, Malaysia and the Philippines will have the opportunity to:

- Prevent the discharge of toxic releases from incinerators, including cancer-causing dioxins and furans, which could only exacerbate environmental pollution and threaten public health and food security.
- Prevent our countries from becoming a dumping ground for polluting and destructive technologies from abroad, and imposing grave health, environmental and financial difficulties for our nations.
- Prevent huge amount of money from being squandered to pay for a costly, imported and unnecessary technology, and saved funds for recycling and other sustainable approaches to managing discards.
- Prevent vast quantity of materials from being destroyed and turned into toxic ash.
- Prevent recyclables from being wasted to feed incinerators, undermining recycling efforts, and jeopardizing the economic livelihood of waste pickers and their families.

Zero Waste inspires creative thinking and action for a clean and vibrant society free of waste.

“The key to healthy communities is to redirect the millions of dollars in investments slated for incineration systems into waste prevention and reduction and zero waste systems that maximize both return on investments and economic development opportunities.” (Brenda Platt, "Resources up in Flames: The Economic Pitfalls of Incineration versus a Zero Waste Approach in the Global South," published by GAIA, 2004)