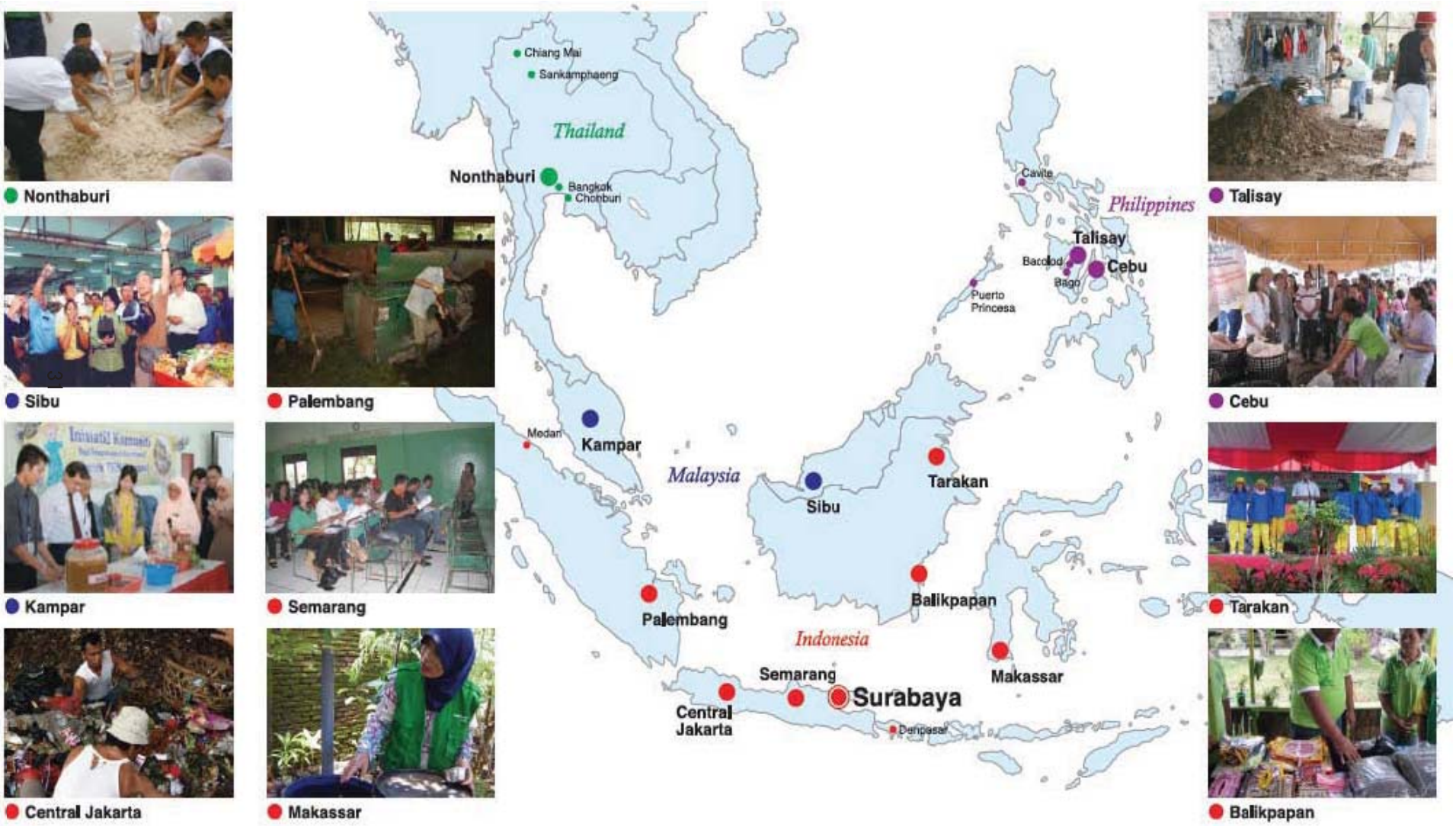
# *Map of Cities*

# Map of Cities




Source: Kitakyushu City, 2011

# *Concept Note*

# A Networking Seminar on KitaQ System Composting in Asia

## Concept Note

**1. Background:**

Composting of organic waste is considered as one of the effective measures for waste reduction and environmental awareness building among communities, especially in developing countries, where organic waste accounts for more than half of the total amount of waste. The Japan International Cooperation Agency, JICA, also applies the technique in various projects to promote 3R (reduce, reuse, recycle) around the world.

KitaQ system, a composting method invented by JPec Co., Ltd has successfully reduced the amount of waste in Surabaya City in Indonesia by 30% since 2004 through an organic waste composting project implemented by Kitakyushu City, involving more than 20,000 households in the project. Utilizing its international environmental city network, Kitakyushu City, Kitakyushu International Techno-Cooperative Association (KITA) and the Institute for Global Environmental Strategies (IGES) has worked together in introducing KitaQ system to cities in Asian countries. Now the city owns various experience and knowhow to promote composting of organic waste and community participation in waste management.

JICA Kyushu also has introduced KitaQ system in its projects for training of overseas participants and Japan Overseas Cooperation Volunteers (JOCVs).

In this networking seminar, related cities and organizations are invited to share their successful experiences and challenges, thus to enforce their relationships, and discuss about further cooperation.

**2. Objectives:**

(1) Assessing good practices and challenges in waste management by cities from Indonesia, the Philippines, Malaysia and Thailand to make good use of the experiences in related projects.
(2) Developing network among related cities and organizations which are promoting composting of organic waste for further cooperation in the future.
(3) Assessing needs to develop an educational material of KitaQ system.

**3. Date:**

June 28 – July 2, 2011 (Main program: June 29 – July 1, 2011)

**4. Venue:**

JICA, Kyushu International Centre (KIC), Kitakyushu City, Japan

**5. Participants:**

The participants include local government representatives from the following cities:

- Indonesia (Balikpapan, Makassar, Palembang, Semarang, Surabaya, Tarakan)
- Philippines (Cebu, Talisay)
- Malaysia (Sibu, Kampar)
- Thailand (Nonthaburi)

**6. Programme Outline:**

Sponsor: JICA Kyushu

Cosponsor: Kitakyushu City, KITA, IGES

| | |
|---|---|
| **Day 1 – 28 June** | |
| | ***Arrival in Japan*** |
| 15:00 – 15:30<br>15:30 – 16:00 | • A courtesy visit to Kitakyushu city office<br>• Visit to Environmental Museum in Yahata |
| **Day 2 – 29 June** | |
| ***09:00 – 10:15*** | ***Opening Session*** |
| 09:00 - 09:15 | • Welcoming Remarks<br>➢ Mr. Keiichi Muraoka, Director general, JICA, KIC<br>➢ Mr. Hiroshi Imanaga, Director general, Environmental Bureau, Kitakyushu City |
| 09:15 – 09:30 | • Introduction to seminar and JICA Training Activities in KIC,<br>Mr. Akihiko Kodama, Training Programme Division, JICA, KIC |
| 09:30 – 12:30 | • Lessons learned: solid waste management and composting in participant cities<br>Presentations by the participant cities (20 minutes for each presentation) |
| ***12:30 – 13:30*** | ***Lunch Break*** |
| 13:30 – 14:30 | • Lessons learned: solid waste management and composting in participant cities<br>Presentations by the participant cities (20 minutes for each presentation) |
| ***14:30 – 15:00*** | ***Moving to Jpec, Wakamatsu*** |
| 15:00 – 16:10 | • Demonstration and discussions on how to make a Takakura Composting and how to solve the practical problems in using compost.<br>➢ Mr. Koji Takakura, Deputy Director, Wakamatsu Environment Research Institute<br>➢ Ms. Sayaka Yaoya, Wakamatsu Environment Research Institute |
| 16:10 – 16:50 | • Successful practice of composting in municipal solid waste management in Surabaya City<br>➢ Presentation by the representatives from Surabaya City (30 minutes)<br>➢ Q&A (10 minutes) |
| ***16:50 – 17:10*** | ***Moving to Yoshihara Farm*** |
| 17:10 – 18:10 | • Observation on community composting and organic farming<br>Guide by Ms. Sanae Yoshihara, Yoshihara farm |
| **Day 3 – 30 June** | |
| ***09:00 – 10:15*** | ***Experience's in Promoting Sustainable Material-Cycle Society in Kitakyushu City*** |
| 09:00 – 10:00 | • International Environmental Cooperation Strategies and Municipal Solid Waste Management in Kitakyushu City<br>Ms. Seiko Kubo, Deputy Director, Office for International Environmental Strategies, Kitakyushu City |
| 10:00 – 10:20 | • Kitakyushu Initiative and replication of Surabaya composting model in other Asian cities<br>Mr. Toshizo Maeda, Act. Director, IGES-KUC |
| ***10:20 – 10:30*** | ***Tea Break*** |
| 10:30 – 12:00 | ➢ Capacity development for Municipal Solid Waste Management and Composting in Asia<br>Dr. Mitsuo Yoshida, Senior Advisor (Environment), JICA |

| | |
|---|---|
| ***12:00 – 13:00*** | ***Lunch Break*** |
| ***13:00 – 13:30*** | ***Moving to Ano Community Center*** |
| 13:30 – 14:00 | • Introduction of citizen participation in promoting 3R activities<br>Ms. Nobuko Uchiyama, Manager, Ano Community Center |
| 14:00 – 16:00 | • Observation of community composting programme in Ano Community Center. |
| ***16:00 – 16:30*** | ***Moving toJICA, KIC*** |
| 16:30 – 18:00 | • Discussions on successful factors, constraints, and challenges in promoting composting in municipal solid waste management in participant cities<br>Facilitator: Dr. Mitsuo Yoshida, Senior Advisor (Environment), JICA<br>Assistant: Dr. D.G.J.Premakumara, IGES-KUC |
| ***18:00 – 20:00*** | ***Reception at JICA, KIC*** |
| **Day 4 – 01 July** | |
| ***08:00 – 10:30***<br>***10:30 – 12:00*** | ***Site Visit:*** bin/can recycling center<br>***Group Discussions***<br>Facilitator: Prof. Mitsuo Yoshida, Senior Advisor (Environment), JICA<br>Assistant: Dr. D.G.J.Premakumara, IGES-KUC |
| | • Preparation on follow-up action plans and implementation strategies for composting model cities programme. |
| ***12:00 – 13:00*** | ***Lunch Break*** |
| 13:00 – 16:45 | • Discussions on identifying effective mechanisms for follow-up and networking among participants. |
| ***16:45 – 17:00*** | ***Wrap-up and Closing Remarks***<br>➢ Mr. Keiichi Muraoka, Director general, JICA, KIC |
| ***17:30 – 19:00*** | ***Farewell Party*** |

# *Participant List*

# List of Participants

| Name | Institution/Position |
|---|---|
| ***Balikpapan City, Indonesia*** | |
| Arie Soetjiadi | Expert staff<br>Conservation of Natural Resources<br>Environmental Agency of Balikpapan (BLH) |
| Panti Suhartono | Head of Natural Resources Conservation Division<br>Environmental Agency of Balikpapan (BLH) |
| Amiruddin Abdul Malik | Head of Community Supervsion Division<br>Environmental Cleanliness, Parks and Cemetery Service of Balikpapan (DKPP) |
| Sudirman Djaya Leksana | Head of Park and Cemetery Service Division<br>Environmental Cleanliness, Parks and Cemetery Service of Balikpapan (DKPP) |
| Hairul Ilmi | Head of Sanitary Landfill Manggar<br>Environmental Cleanliness, Parks and Cemetery Service of Balikpapan (DKPP) |
| Astani Abdul Manap | Head Secretary<br>Environmental Cleanliness, Parks and Cemetery Service of Balikpapan (DKPP) |
| Fahrianoor Rullah Hakim | Head of Environmental Law Enforcement Sub-division<br>Environmental Agency of Balikpapan (BLH) |
| Murni Supeno Wijanarko | Head of Natural Resources and Environmental Management Subdivision<br>Regional Development Planning Board of Balikpapan (BAPPEDA) |
| Rosmarini | Head of Environmental information and regulation Division<br>Environmental Agency of Balikpapan (BLH) |
| Elvin Junaidi Malik Saleh | Head of Cleanliness Division<br>Environmental Cleanliness, Parks and Cemetery Service of Balikpapan (DKPP) |
| Antos Padmawidjaja | Director<br>Environmental NGO YAYASAN PEDULI |
| ***Makassar City, Indonesia*** | |
| Andi Murtan | Chief of Urban Cleaning Management Division<br>City Goverment Makassar South Sulawesi |
| ***Palembang City, Indonesia*** | |
| Nyimas Ida Apriani | Head of Environmental Degradation Controll Division<br>Environmental Agency-Palembang City |
| ***Semarang City, Indonesia*** | |
| Berkah Wahyudi | Environmental Board, Semarang Municipality |

| Name | Institution/Position |
|---|---|
| ***Surabaya City, Indonesia*** | |
| Ema Agustina | Public Works and Spatial Planning Department, Surabaya City |
| ***Tarakan City, Indonesia*** | |
| Sonya Wijayanti | Cleansing Department, Tarakan City |
| ***Cebu City, Philippines*** | |
| Pacres, Jose Rey | Officer-in-Charge<br>Environment and Natural Resources Office, Cebu City |
| ***Kampar City, Malaysia*** | |
| Goh Seng Chee | Assistant Env. Health officer<br>Kampar district council, Perak.Malaysia |
| ***Sibu City, Malaysia*** | |
| Yong Ing Chu | Assistant Secretary, Sibu Municipal Council |
| ***Nonthaburi City, Thailand*** | |
| Pornsri Kictham | Municipal Secretary, Nonthaburi City |

| Name | Institution/Position |
|---|---|
| ***Kitakyushu City*** | |
| Imanaga Hiroshi | Chief Executive, Environment Bureau |
| Naito Hideo | Executive Director, Office for International Environmental Strategies<br>Environment Bureau |
| Hitsumoto Reiji | Director, International Environmental Strategies Division<br>Environment Bureau |
| Shigeoka Akinori | Director, Kitakyushu Asian Center for Low Carbon Society<br>International Environmental Strategies Division<br>Environment Bureau |
| Ogata Shinichi | Director, Kitakyushu Asian Center for Low Carbon Society<br>International Environmental Strategies Division<br>Environment Bureau |
| Kubo Seiko | Deputy Director, International Environmental Strategies Division<br>Environment Bureau |

| Name | Institution/Position |
|---|---|
| Motoshima Naoki | Deputy Director, International Environmental Strategies Division<br>Environment Bureau |
| Takeuchi Shinsuke | Manager, Kitakyushu Asian Center for Low Carbon Society<br>International Environmental Strategies Division<br>Environment Bureau |
| Iizuka Makoto | Manager, Kitakyushu Asian Center for Low Carbon Society<br>International Environmental Strategies Division<br>Environment Bureau |
| Morimoto Misuzu | Deputy Director, Kitakyushu Asian Center for Low Carbon Society<br>International Environmental Strategies Division<br>Environment Bureau |
| Masuda Ryouji | Kitakyushu Asian Center for Low Carbon Society<br>International Environmental Strategies Division<br>Environment Bureau |
| Mitoma Yousuke | International Environmental Strategies Division<br>Environment Bureau |
| Yamashita Shingo | International Environmental Strategies Division<br>Environment Bureau |
| ***KITA (Kitakyushu International Techno-cooperative Association)*** | |
| Nakazono Satoshi | Chief Executive, KITA Environmental Cooperation Center<br>Kitakyushu International Techno-cooperative Association |
| Nagaishi Masaya | Director, KITA Environmental Cooperation Center<br>Kitakyushu International Techno-cooperative Association |
| ***JPEC (J-POWER Group JPec Co.,Ltd)*** | |
| Suetake Shinji | Director, J-POWER Group JPec Co.,Ltd<br>Wakamatsu Environment Research Institute |
| Takakura Kouji | Deputy Director, J-POWER Group JPec Co.,Ltd<br>Wakamatsu Environment Research Institute |
| Yaoya Sayaka | J-POWER Group JPec Co.,Ltd<br>Wakamatsu Environment Research Institute |
| ***JICA (Japan International Cooperation Agency)*** | |
| Muraoka Keiichi | Director General, Japan International Cooperation Agency<br>Kyushu International Center |
| Yoshida Mitsuo | Senior Advisor, Japan International Cooperation Agency |
| Yao Kazuya | Associate Expert, Global Environment Department<br>Japan International Cooperation Agency |

| Name | Institution/Position |
|---|---|
| Tamura Eriko | Director, Trainning Program Division,<br>Japan International Cooperation Agency Kyushu International Center |
| Nishida Shiuko | Program Officer, Trainning Program Division,<br>Japan International Cooperation Agency Kyushu International Center |
| Kodama Akihiko | Program Officer, Trainning Program Division,<br>Japan International Cooperation Agency Kyushu International Center |
| ***JICE (Japan International Cooperation Center)*** | |
| Suzuki Makiko | Translator, Japan International Cooperation Center |
| ***IGES (Institute for Global Environmental Strategies)*** | |
| Murakami Emiko | Director, Kitakyushu Urban Centre<br>Institute for Global Environmental Strategies |
| Maeda Toshizo | Acting Director, Kitakyushu Urban Centre<br>Institute for Global Environmental Strategies |
| Premakumara Jagath<br>Dickella Gamaralalage | Researcher, Kitakyushu Urban Centre<br>Institute for Global Environmental Strategies |
| Mekaru Hiroshi | Visiting Researcher, Kitakyushu Urban Centre<br>Institute for Global Environmental Strategies |
| Huang Jian | Associate Researcher, Kitakyushu Urban Centre<br>Institute for Global Environmental Strategies |
| Hirohata Kazuyoshi | Research Assistant, Kitakyushu Urban Centre<br>Institute for Global Environmental Strategies |
| Aoi Mutsumi | Intern, Kitakyushu Urban Centre<br>Institute for Global Environmental Strategies |
| Sakai Risako | Intern, Kitakyushu Urban Centre<br>Institute for Global Environmental Strategies |

# *Presentations*

Introduction to

# Networking Seminar on KitaQ System Composting in Asia and JICA KIC Training Activities

Akihiko Kodama
Training Program Division, Kyushu International Center
Japan International Cooperation Agency

## Outline

1. Introduction to JICA KIC
   (1) What is KIC?
   (2) What does KIC do?
2. Introduction to the Networking Seminar
   (1) Background
   (2) Purpose
   (3) Contents

1. Introduction to JICA KIC

## What is KIC? - location

JICA branches in Japan

1. Introduction to JICA KIC

## What does KIC do? (1)

Citizen participation programs
- Japan Overseas Cooperation Volunteers (JOCV)
- JICA Partnership Programs

Community-based Solid Waste Management System Development Project in Sibu Municipality



1. Introduction to JICA KIC

## What does KIC do? (2)

Training programs
- Seeing is believing!
- Focus on Environmental management and energy & resources

Waste Management Technique and Environmental Education



1. Introduction to JICA KIC

## What does KIC do? (3)

Facts of training programs in KIC (as of 2010)

22… Years old
97… Countries
146… Training Programs
823… Participants

For environmental management and energy & resources…

39… Training Programs
333… Participants

1. Introduction to JICA KIC

## What does KIC do? (4)

JICA's strategy on waste management

1. Building a sound material-cycle society
2. Developing capacity of governmental organizations
3. Improvement in collection, transportation and disposal
4. Promoting activities to address climate change

Table 1 Achievements in waste management sector (FY 2000 to FY 2009)
* Japanese fiscal year (FY): April-March

| Assistance type | Technical cooperation: Technical cooperation project | Technical cooperation: Technical cooperation for development planning | Technical cooperation: JICA Partnership Program | Technical cooperation: Individual experts | Trainees | JOCV (Junior Volunteers) | SV (Senior Volunteers) | OOF | Grant aid project |
|---|---|---|---|---|---|---|---|---|---|
| No. of projects | 29 | 22 | 22 | 139 (pers) | 1710 (pers) | 91 (pers) | 65 (pers) | 4 | 10 |
| Total amount of projects (yen) | 3,583,000 | 1,574,900 | 146,824 | 747,771 | 2,370,554 | 200,954 | 387,223 | 28,427,000 | 2,465,160 |

Total amount of cooperation in the field of waste management for FY 2000 - FY 2009 period: 39,903,114 (thousand yen)



2. Introduction to the Networking Seminar

## Background

JICA's works

Kitakyushu's works

KitaQ System Composting



2. Introduction to the Networking Seminar

## Contents

1. Presentations
   - By cities
   - By related organizations
   - By experts
2. Site visits and observations
   - To a farm utilizing compost
   - To a workshop for community
   - To a waste treatment facility
3. Discussions among participants



2. Introduction to the Networking Seminar

## Purpose

1. Sharing good practices and challenges
   - Feedback to related projects
   - Development of educational materials
2. Enforcement of partnerships
   - Assessment of needs & seeds
   - Development of strategies in the future



## Thank you very much for your attention!

# Solid Waste Management of Balikpapan

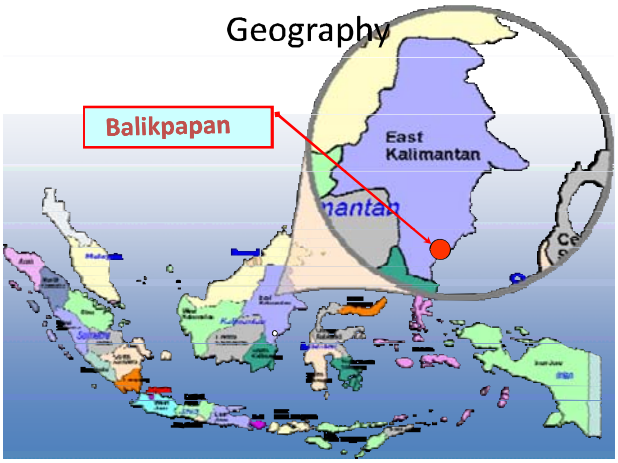
By City Government of Balikpapan

## Presentation Outline

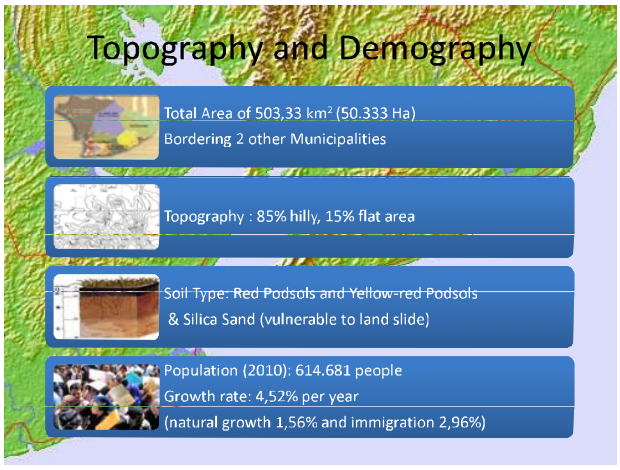
1. Introduction to Balikpapan
2. Solid Waste Management Portrait
3. Recent and Future Strategy
4. Composting in Balikpapan
5. Lessons Learned
6. Summary

## Introduction to Balikpapan

## Geography




## Topography and Demography



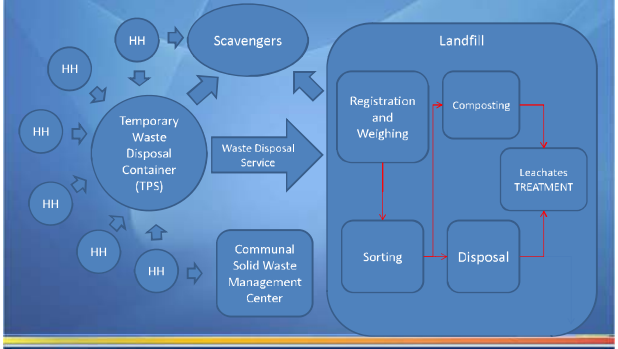

## Solid Waste Management Portrait

## General Overview

- Waste disposal site with Sanitary Landfill system to minimize environmental impacts
- International cooperation project (PFSAMAS) to reduce the amount of produced solid waste by 10% within 3 years
- Improvement of legal aspects and law enforcement against littering
- Raising environmental awareness through education and public campaign
- Adjusting waste management principle to local characteristics to improve the effectiveness ("Trash Bank")

PEMERINTAH KOTA BALIKPAPAN

## Waste Disposal Mechanism

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## Baseline Information (1)


In 2010
Through Composting : 525 tons/month (app.. 3,98%)
Through Recycling : 564 tons/month (app.. 4,28%)
Through other uses : 86 tons/month (app.. 0,66%)

8,92%

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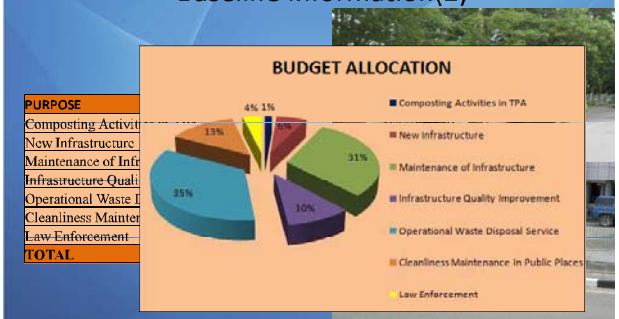
## Baseline Information(2)

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## Waste Characteristics


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## Recent and Future Strategy (1)

VSION : Balikpapan as a clean, beautiful, and comfortable city

MISSIONS Up to 2015:

1. To improve the health quality of the sanitation worker and community in general
2. To improve community awareness and involvement on solid waste management and extend the capacity building in environmental management
3. To improve city cleanliness via integrated solid waste management until 2015 (CGH, 3R, communal composting program)
4. To cover the required infrastructure for solid waste management until 2015

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## Recent and Future Strategy (2)

Our PESAMAS = Pengelolaan Sampah Berbasis Masyarakat (Community-based Solid Waste Management)

Initial PESAMAS by JICA = Pengkomposan Berbasis Masyarakat (Community-based Composting Project)

Biodiversity Conservation

Environmental-sound Regulation

Balikpapan towards Environmentally Sustainable City

Sanitation

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## Recent and Future Strategy (3)

Progress, results or targets are achieved already

- Landfill gas utilization in progress
- Some behavior change have been observed to be more aware to the regulation regarding littering
- Law enforcement operation from once a year to 4 times a year.
- Total solid waste Reduction by 8,92% in 2010
- Construction of new composting center, especially in the coastal residential area.

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## Recent and Future Strategy (4)

FUTURE PLANS

- To expand and promote composting center to be citywide
- To promote community solid waste management via "trash bank"
- To promote environmental education (for sustainable development)
- To improve the human resources via capacity building for the relevant stakeholders
- To increase public involvement on solid waste management.
- To promote environmental sustainability via various mass media.
- To improve law enforcement
- To implement reward and punishment mechanism.

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## Recent and Future Strategy (5)

Through Formal Education

- Based on the concept of Education for Sustainable Development
- Nationwide program with emphasizing environmental issues at the global to local level ("Mangrove High school" and "Rainforest High school")
- To the recent date, 11 Schools in Balikpapan are officially appointed as "Adiwiyata School"

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## Recent and Future Strategy (5)

Through Non-Formal Education

- Public counseling emphasizes on 3R concepts and practices, legal aspects
- Manggar Landfill as an environmental education center emphasizes on solid waste issues
- KWPLH as an environmental education centre with a special facility for malayan sun bear, also promotes composting
- Well-run Composting Centers as learning places

# Composting In Balikpapan

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## Composting in Balikpapan (1)

| Name of Program/Project/Activity | Scale | Initiator | Since | Annual Budget (IDR) | Composting Method |
|---|---|---|---|---|---|
| Community composting project at Talaga sari | Neighbourhood | NGO | 2003 | 50.000.000,00 IDR | Takakura and aerob composter |
| Composting activity at Sanitary Landfill Manggar | Citywide | City Government | 2005 | 463.386.640,00 IDR | Wind row |
| Community composting program at Prapatan-Telagasari | Subdistrict | Multistakeholders | 2006 | 125.000.000,00 IDR | Stapled Takakura |
| Community composting program Renggansi | Neighbourhood | Provincial Government | 2009 | no data | Wind row |
| Household and Community composting project | Citywide | City Government | 2000 | 1.000.000.000,00 IDR | Takakura |
| Community composting project in 3 traditional markets | Citywide | City Government | 2009 | 956.000.000,00 IDR | Wind row |
| Household composting project for residential area in Sepinggan | Household | Provincial Government | 2008 | no data | Takakura |
| Household composting project for residential area in Gunung Samarinda | Household | NGO and Private Sector | 2008 | 100.000.000,00 IDR | Takakura |

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## Composting in Balikpapan (2)

| Partners | Role |
|---|---|
| Chevron | Donor via CSR |
| Total | Donor via CSR |
| PERTAMINA | Donor via CSR |
| YAYASAN PEDULI | Motivator |
| PT BES | SWM Business company |
| BP MIGAS | CSR Coordinator |
| Adiwiyata schools | Practicioner |
| Kaltim post group | Campaign and Dissemination |
| PERKUMPULAN STABIL | Motivator |
| Consortium of Environmental Organization in Balikpapan | Motivator and Coordinator |

**Mobilization via Governmental Instances (BAPPEDA, BLH and DKPP)**

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## Composting in Balikpapan (3)

- Compost products produced by governmental facilities are for local consumption only
- Compost products produced by local community will be purchased by the city government but in small scale only
- Green/Food Waste as Fish pellets

# Lessons Learned

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## Success Factors

- Incentive via Adipura awards
- Enforcement of Environmental regulation
  UU no. 18 Tahun 2008 and PERDA No. 10 Tahun 2004
- CGH Programs

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## Barriers and Challenges

- Contrast diversity in Education level requires different approaches
- Lack of Awareness
- Regulation to be actually enforced
- Mediocre coverage for garbage disposal service due to hilly topography and poor spatial planning

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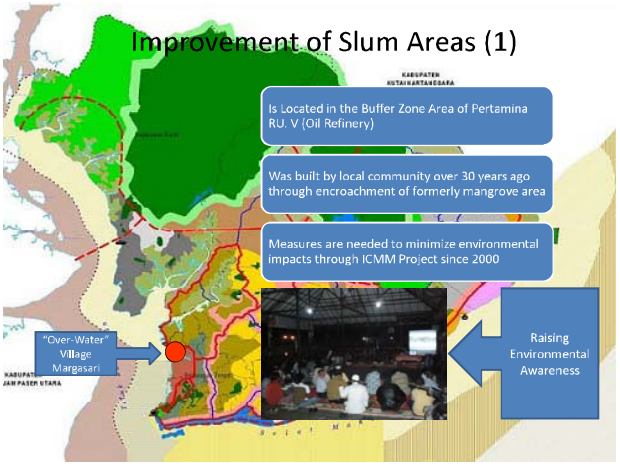
## Required Assistance in

- Improving urban planning
- Approach Strategy Planning to alert the people the importance of proper waste management
- Policy Advocacy to produce realistic regulation concerning waste management to be implemented
- Capacity Building for relevant stakeholders in managing and utilizing garbage
- Extending Possibilities to market compost products

## Improvement of Slum Areas (1)

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## Improvement of Slum Areas (2)



## SUMMARY

- The City Government of Balikpapan is striving to improve solid waste management, water resources management, ad air quality with solid planning and MRV principles
- PESAMAS has been integrated to the mid-term urban development master plan to reduce solid waste generation, primarily but not exclusively through composting
- The City Government of Balikpapan set a priority on environmental education as a main tool to raise environmental awareness in general
- The City Government of Balikpapan is engaged in national to international cooperation activities to improve environmental quality of urban area

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## Economic & social conditions affect garbage problem

**Parameter :**

- Population growth
- Economic growth
- Consumption patterns of society
- Packaging and behavioral patterns of the population
- Activities of city functions
- Populasion density and building
- The complexity of urban problems

**Waste Problem :**

- Number → Much more
- Composition → Increasingly diverse
- Management → Traditional / Conventional
- Condition → MIX & DIRTY
- Cost management → NOT ADEQUATE

### WASTE DEFINITION

The rest of the day-to-day activities of human and or from natural processes that form solid

### WASTE MANAGEMENT OBJECTIVES

- Reduce waste generation
- Handle garbage (sorting, collecting, transporting, and processing the final in where the final processing)
- So as to create a good environment, clean, and healthy

### MAKASSAR CITY POPULATION IN THE LAST TEN YEARS

| Nu | Year | NUMBER OF MALES (Soul) | NUMBER OF WOMEN (Soul) | NUMBER OF POPULATION (Soul) |
|---|---|---|---|---|
| 1 | 2000 | 547,687 | 565,001 | 1,112,688 |
| 2 | 2001 | 557,050 | 573,334 | 1,130,384 |
| 3 | 2002 | 565,882 | 582,430 | 1,148,312 |
| 4 | 2003 | 572,686 | 587,325 | 1,160,011 |
| 5 | 2004 | 582,382 | 596,641 | 1,179,023 |
| 6 | 2005 | 582,572 | 610,862 | 1,193,434 |
| 7 | 2006 | 611,049 | 612,491 | 1,223,540 |
| 8 | 2007 | 618,233 | 617,006 | 1,235,239 |
| 9 | 2008 | 601,304 | 652,352 | 1,253,656 |
| 10 | 2009 | 610,270 | 662,079 | 1,272,349 |
| 11 | 2010 | 642,098 | 697,276 | 1,339,374 |

### TABLE WASTE AND ARE HANDLED PER DAY IN THE CITY OF MAKASSAR

| LOCATION | GENERATION ( M3/Day ) | TO THE TOTAL GENERATION ( % ) | UNTREATED WASTE ( M3/Day ) | DIFFERENCE IN THE GENERATIO AND UNTREATE ( M3/Day ) |
|---|---|---|---|---|
| | | | | |
| l / Household | | | | |
| rious | 226.46 | 6.15 | 216.81 | 9.65 |
| ediate | 318.42 | 8.65 | 282.18 | 36.24 |
| | 1325.61 | 36.02 | 1155.67 | 169.94 |
| NUMBER | **1,870.49** | **50.82** | **1,654.66** | **215.83** |
| kota : | | | | |
| t | 588.36 | 15.99 | 522.99 | 65.37 |
| es Area | 134.41 | 3.65 | 120.47 | 13.94 |
| area | 112.95 | 3.07 | 108.82 | 4.13 |
| ion Area | 74.68 | 2.03 | 67.45 | 7.23 |
| | 94.26 | 2.56 | 84.32 | 9.94 |

### *COMPARISON LIST OF WASTE HANDLING THE CITY OF MAKASSAR IN (M3/ DAY) FROM 1997/1998 TO DECEMBER 2010*

| NU | YEARS OF SERVICE | WASTE GENERATION | UNHANDLED | % OF THE GENERATION |
|---|---|---|---|---|
| 1 | 1997/1998 | 2.913,40 M3/DAY | 2.753,79 M3/DAY | 94,52% |
| 2 | 1998/1999 | 3.311,60 M3/DAY | 2.987,40 M3/DAY | 90,21% |
| 3 | 1999/2000 | 3.535,20 M3/DAY | 2.996,67 M3/DAY | 84,77% |
| 4 | 2000 | 3.816,00 M3/DAY | 3.064,00 M3/DAY | 80,29% |
| 5 | 2001 | 3.918,00 M3/DAY | 2.675,30 M3/DAY | 68,28% |
| 6 | 2002 | 3.560,00 M3/DAY | 2.871,84 M3/DAY | 80,67% |
| 7 | 2003 | 3.748,00 M3/DAY | 3.251,74 M3/DAY | 86,76% |
| 8 | 2004 | 3.580,15 M3/DAY | 3.121,55 M3/DAY | 87,19% |
| 9 | 2005 | 3.546,21 M3/DAY | 3.109,56 M3/DAY | 87,69% |
| 10 | 2006 | 3.582,01 M3/DAY | 3.151,27 M3/DAY | 87,97% |
| 11 | 2007 | 3.661,81 M3/DAY | 3.245,29 M3/DAY | 88,63% |
| 12 | 2008 | 3.812,69 M3/DAY | 3.315,20 M3/DAY | 86,95% |
| 13 | 2009 | 3.680,03 M3/DAY | 3.278,12 M3/DAY | 89,08% |

## GARDENING BUDGET ALLOCATION AND CLEANLINESS FISCAL YEAR 2011

| | Capping FUND | REALIZATION | PHYSICAL | REST C |
|---|---|---|---|---|
| | | | | |
| | | | | |
| | | | | |
| e Cemetery | Rp. 2.197.070.000 | Rp. 458.777.500 | | Rp. |
| | | | | |
| | | | | |
| | Rp. 31.787.000 | Rp. 600.000 | | Rp. |
| Water Resources and Electricity | Rp. 109.800.000 | Rp. 27.450.000 | | Rp. |
| icle Licensing Office / Operations | Rp. 101.380.000 | Rp. 22.500.000 | | Rp. |
| | Rp. 5.454.100 | Rp. - | | Rp. |
| ponents / Lighting Office Buildings | Rp. 2.975.000 | Rp. - | | Rp. |
| plies | Rp. 73.750.000 | Rp. 17.500.000 | | Rp. |
| gislation | Rp. 6.720.000 | Rp. 1.680.000 | | Rp. |

## WASTE MANAGEMENT OF OPERATING COSTS LAST SEVEN YEARS

| YEARS | COST OF OPERATIONS & MAINTENANCE | COST ADMINISTRATION | CAPITAL EXPENDITURES | TOTAL COST SERVICES |
|---|---|---|---|---|
| | | | | |
| 2005 | Rp 5,984,467,958 | Rp. 3,340,375,000 | Rp. 205,000,000 | Rp. 9,529,842,958 |
| 2006 | Rp 9,068,802,500 | Rp. 1,958,757,725 | Rp. 526,000,000 | Rp. 11,553,560,225 |
| 2007 | Rp 9,094,289,890 | Rp. 4,529,584,195 | Rp. 331,226,900 | Rp. 13,955,100,985 |
| 2008 | Rp 10,297,627,335 | Rp. 3,985,964,400 | Rp. 14,518,825,800 | Rp. 28,802,417,535 |
| 2009 | Rp 9,087,857,703 | Rp. 3,776,397,720 | Rp. 2,877,504,774 | Rp. 15,741,760,197 |

## PROBLEMS

- Still limited facilities and infrastructure management
- The difficulty of placing land container
- Increase in waste generation in line with population growth and urban activities
- Collection process is less hygienic (Unlimited)
- Schedule has not fulfilled the collection and transporting waste
- Traffic density on the operating line
- The difficulty of access roads at the of processing

## OLD PARADIGM (CURRENT) WASTE MANAGEMENT

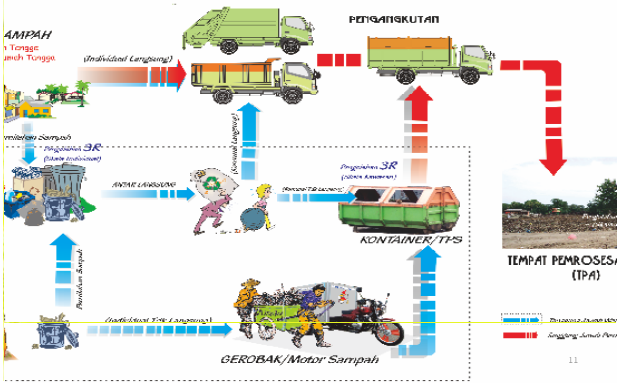
TOGETHERS ➡ TRANSPORT ➡ THROW

HOW TO CAUSE THIS ISSUE :

1. LANDFILL BURDEN IS VERY HIGH, LIMITED LAND AREA
2. *OPERATIONAL COST HIGH*
3. POSE AN INCREASINGLY SEVERE ENVIRONMETAL IMPACTS :
   - AIR POLLUTION
   - WATER POLLUTION
   - SOIL CONTAMINITION
4. WASTEFUL OF RESOURCES
5. LESS ROOM FOR THE ROLE OF COMMUNITY & BUSINESSES

10

## KEBIJAKSANAAN UMUM TEKNIS PENGANGKUTAN SAMPAH KOTA MAKASSAR




11

## CURRENT PARADIGM MANAGING WASTE

WASTE MANAGEMENT OF A NEW PARADIGM

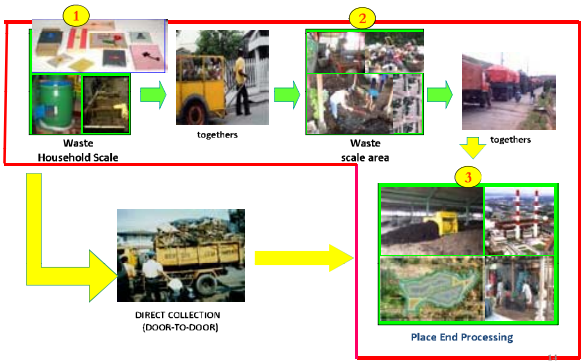
PRINCIPLES OF WASTE AS A RESOURCE prioritize
Prioritize PRINCIPLE POLLUTION CONTROL

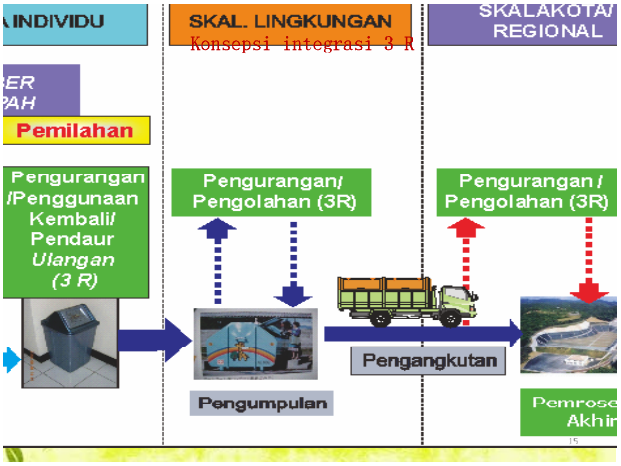
IMPLEMENTATION OF PRINCIPLES TSB ACTIVITIES PERFORMED :
1. 3R (*REDUCE, REUSE, RECYCLE*).
2. EXTENDED PRODUCER'S RESPONSIBILITY (EPR).
*3. WASTE TO ENERGY.*
4. END MANAGEMENT That *ENVIRONMENTAL FRIENDLY (SANITARY LANDFILL).*

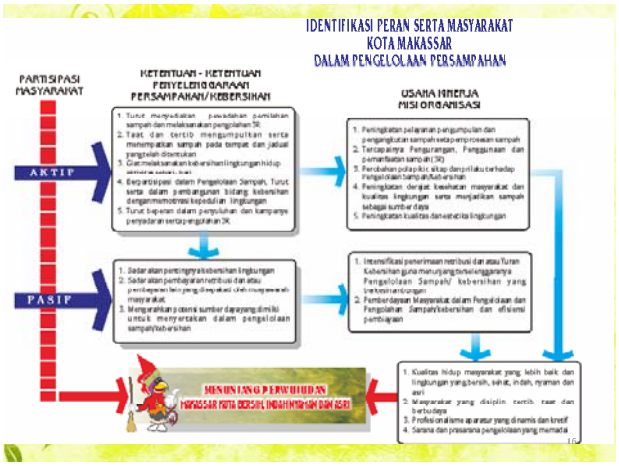
KEUNTUNGAN CARA INI:
1. SAVES RESOURCES.
2. EXPENSES pollutants reduced.
3. ECONOMIC VALUE & OPEN EMPLOYMENT.
4. LOW OPERATIONAL COST.
5. EXPENSES landfill is reduced.

13

## NEW PARADIGM MANAGING WASTE



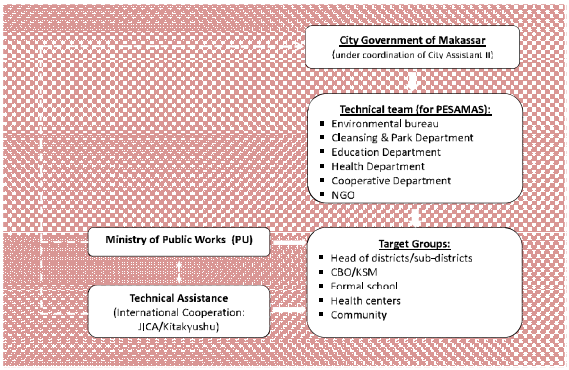

## ACTION PLAN FOR WASTE REDUCTION PROGRAM THROUGH COMPOSTING (PESAMAS) IN MAKASSAR CITY (2011-1013)


ANDI MURTAN
Chief of Urban Cleaning Management Division
Cleansing & Park Department
City Government of Makassar
INDONESIA


## COMMITMENT OF CITY GOVERNMNET FOR COMPOSTING & 3R

- Promoting a community based composting (PESAMAS) is a model of waste reduction program up to 5-10% within next 3 years by optimizing waste separation through composting (household and communal level), under technical assistance of Kitakyushu City/JICA
- Conducted grass-root project for composting (2009) under technical assistance of Kitakyushu City/JICA & physical supports from Ministry of Public Works (PU)

## ORGANIZATIONAL STRUCTURE




## Action 1: PROMOTE COMPOSTING PRACTICES

| No. | Activity | Indicator of Activity | | | Stakeholder | Financial Sources | Expected Support from JICA |
|---|---|---|---|---|---|---|---|
| | | 2011 | 2012 | 2013 | | | |
| 1.1 | Communal composting for residential area | Operated: 3 composting centers at Rusunawa Mariso, DTP Tamalanrea, & Sambung Jawa | | Established 2 composting centers at 2 residential area | Makassar City,NGOs, Public Works (PU) | Makassar, City PU | Technical assistance for composting & improving management of composting centers |
| 1.2 | Household composting (THM) | Distributed 500 THM units | Distributed 1,500 THM units | Distributed 3,000 THM units | Makassar City, community, NGOs | Makassar City | Technical assistance for composting & awareness campaign modules |
| 1.3 | Composting for school level<br>- Elementary school<br>- Junior High School<br>-Senior High School | 35 school: 350 ~THM units<br>10 school: 150 ~HM & 40 aerobic-composter<br>8 school: 80 THM & 24 aerobic-composter | 45 school: 450 THM units<br>25 school: 250 THM & 100 aerobic-composter<br>15 school: 130 THM & 45 aerobic-composter | 90 school: 900 THM units<br>30 school: 450 ~HM & 180 aerobic-composter<br>25 school: 345 THM & 115 aerobic-composter | Makassar City, school, PU | Makassar City, PU | Technical assistance for composting and environmental education module for school |
| 1.4 | Composting at health centers: | 60 centers: 67 THM | 112 centers: 126 ~THM | 136 centers: 150 THM | Makassar City, Health centers | Makassar City | - |
| 1.5 | Composting for park | 7 parks: 21 aerobic composter units | Established 1 composting center at nursery park | - | Makassar City | Makassar City | Technical assistance for composting & modules |
| 1.6 | Composting at public facilities (bus station) | Distributed 30 THM & 8 aerobic composter units | Distributed 25 THM & 8 aerobic composter units | Distributed 25 THM & 8 aerobic composter units | Makassar City | Makassar City | - |
| 1.7 | Composting for traditional market | - | - | Established 1 composting center at 1 market | Makassar City, PU | Makassar city, PU | Technical assistance for composting & modules |
| 1.8 | Operational support for composting center | OM for 3 composting centers<br>Procurement of composting equipments for 1 composting center (Sambung Jawa) | OM support for 3 composting centers<br>Procurement of composting equipments for 1 composting center | OM support for 3-5 composting centers (including compost centers for market) | Makassar City, PU | Makassar city,PU | - |
| 1.9 | Procurement transportation for disposing residue to landfill | - | 1 unit transportation<br>2 units container for residue collection | 1 unit transportation<br>2 units container for residue collection | Makassar City, PU | Makassar City, PU | - |

## Action 2: ENVIRONMENTAL AWARENESS CAMPAIGN

| No. | Activity | Indicator of Activity | | | Stakeholder | Financial Sources | Expected Support from JICA |
|---|---|---|---|---|---|---|---|
| | | 2011 | 2012 | 2013 | | | |
| 2.1 | Makassar Green & Clean (MGC) | 50 Districts | 75 Districts | 100 Districts | Makassar City, NGOs, private sectors, communities MGC, media | Makassar City,private sector media | - |
| 2.2 | Selecting motivator & facilitators for environmental cadre | Motivator team (10 person), facilitator team (50 person) and cadre team (1,500 person) available | Motivator team (10 person), facilitator team (75 person) and cadre team (2,250 person) available | Motivator team (10 person), facilitator team (100 person) and cadre team (3,000 person) available | Makassar City, NGOs, private sectors communities MGC, media | Makassar City private sector media | - |
| 2.3 | Developing manual guideline for solid waste management at source level | Draft manual guideline of waste separation at source level | Draft manual guideline of waste collection and transportation | Dissemination manual of waste management | Makassar City. | Makassar City | Technical assistance for developing Standard Operational Procedure (SOP) for solid waste management at sources level |

## Action 3: CAPACITY BUILDING

| No. | Activity | Indicator of Activity | | | Stakeholder | Financial Sources | Expected Support from JICA |
|---|---|---|---|---|---|---|---|
| | | 2011 | 2012 | 2013 | | | |
| 3.1 | Short-course on waste management policy to Japan for the decision makers level | - | Conducted short-course policy on waste management to Japan for the decision makers level | - | Makassar City | Makassar City, JICA | Training package (program, local transport) |
| 3.2 | International training/short-course for improving technical capacity on 3R implementation in Kitakyushu City/other cities in Japan | - | Assign at least 1 person of technical staff to international training | Assign at least 1 person of technical staff to international training | Makassar City | Makassar City | Training package (program, accomodation & local transport) |
| 3.3 | Study tour of waste management (local/national level) | Conducted at least 1 time study tour on waste management (local/national level) | Conducted at least 1 time study tour on waste management (local/national level) | Conducted at least 1 time study tour on waste management (local/national level) | Makassar City, NGOs, community, PU | Makassar City, PU, JICA | Training program & local transport |

## Action 4: PROMOTING RECYCLING PRODUCT

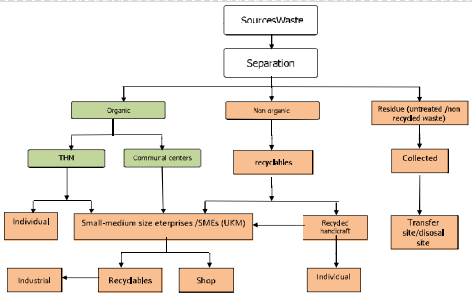
| No. | Activity | Indicator of Activity | | | Stakeholder | Financial Sources | Expected Support from JICA |
|---|---|---|---|---|---|---|---|
| | | 2011 | 2012 | 2013 | | | |
| 4.1 | Promoting of compost utilization | Research & Development for compost quality and composition | Identify mechanism of compost marketing | - | Makassar City, Community. | Makassar City | Technical assistance for promoting organic farming/urban farming & introducing an environmental business system on recycling product for local government (LG) |
| | | Identify compost demand/supply in Makassar City & South Sulawesi Province | Established piloting project for organic farming | Established piloting project for organic farming | | | |
| | | Promoting urban farming concept at household/residential area (traditional herb plan, organic vegetables, etc) | Promoting urban farming concept at household/residential area (traditional herb plan, organic vegetables, etc) | Promoting urban farming concept at household/residential area (traditional herb plan, organic vegetables, etc) | | | |
| 4.2 | Marketing for recycling handycraft products | Identification the demand & capacity of recycling crafts production production in Makassar City | Identify mechanism of recycling crafts marketing | - | Makassar City | Makassar City | |

## Action 5: MONITORING FOR PROJECT IMPLEMENTATION

| No. | Activity | Indicator of Activity | | | Stakeholder | Financial Sources | Expected Support from JICA |
|---|---|---|---|---|---|---|---|
| | | 2011 | 2012 | 2013 | | | |
| 5.1 | Establish PESAMAS team | Established PESAMAS team by Mayor decree (SK Walikota) | - | - | Makassar city, NGO | Makassar City | - |
| 5.2 | Monitoring & evaluation | Identify mechanism for project monitoring & evaluation | Conducting monitoring & evaluation activity | Conducting monitoring & evaluation activity | Makassar City, PESAMAS team. | Makassar City | Technical assistance for monitoring & evaluation scheme (including the monitoring & evaluation tools/software, etc) |
| | | Conducting monitoring & evaluation activity | Identify lesson learnt & input for project improvement | Identify lesson learnt & input for project improvement | | | |
| | | Identify lesson learnt & input for project improvement | | | | | |

CITY OF MAKASSAR

## Schematic Model for PESAMAS Implementation in Makassar City




Examples :

-Takakura Home Method (THM) and Aerobic- Composter volume 110 ltr

Thank You


## Gambaran Umum Kota Palembang

- ✓ Area : Luas wilayah 400,61 km²
- ✓ Administrative : Divided into 16 Distric and 103 sub distric
- ✓ Population : Total ± 1,665,681.1 person (Source: Data Dinas Capil 2009)
- ✓ Population Growth : 1,80 % per year
- ✓ Economic Growth : 6,7 %(dengan migas); 8,24 %
- ✓ Pendapatan per kapita : Rp. 14.712.175,- (dengan migas)
- ✓ Economic Structure : Domination by Trade and Services sector

Basic Information of Solid Waste:

| NO | Waste | VOLUME ($m^3$)/Month | % (from total waste generation) |
|---|---|---|---|
| a. | Transfer to FDS. | 75.000 | 66.0 |
| b. | Waste Management : | 8.650 | 8.33 |
| | (1). Composting. | 3.300 | - |
| | (2). Recycle | 1.350 | - |
| | (3). Others | 4.000 | - |
| c. | Not Transport to FDS | 28.850 | 25.64 |

## Waste Characteristic

- Waste generation amount/ratio by source:
  - Residential : 79,20 %
  - Market : 8,51%
  - Industry : 6,86%
  - Commercial : 2,64%
  - Other : 2,79%
- Waste Composition:
  - Organic : 47,4 %
  - Plastic : 14,5 %
  - Paper : 15 %
  - Metal : 2,5%
  - Other : 20,6 %

4

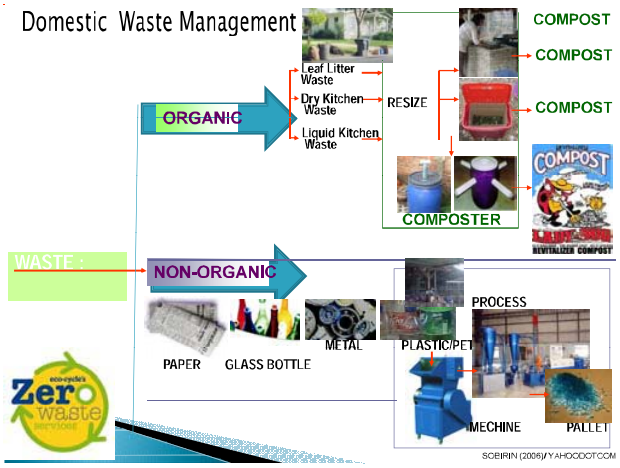
## Waste Management in Palembang City-Indonesia

×PREVIOUS PARADIGM

COLLECT TRANSPORT DISPOSAL

## NEW PARADIGM

SORTED WASTE FROM THE SOURCE




## Solid Waste Management Strategy of Palembang City

Vision : Palembang Ecocity

Mision: Environmental Management of Palembang City to Clean, Green and Blue.

Programs:

1. Eco Friendly Village
2. Eco Friendly Office
3. Eco Friendly School
4. Eco Friendly Market

## 1. Eco Friendly Village

Is : Eco friendly Village base on Community Development

Goal: To reduce waste generation in Final disposal site


CRITERIA OF ECO FRIENDLY VILLAGE :

- COMMUNITY ORGANIZATION THAT RESPONSIBILITY TO ENVIRONMENTAL MANAGEMENT
- SORTED WASTE
- COMPOSTING
- CLEAN WATER
- SANITATION
- GREENING
- TEMPORARY DISPOSAL SITE AND GARBAGE PLACE
- CLEAN WASTE
- DECORATIVE PLAT ARRANGEMENT
- HERB
- RENEWABLE ENERGY
- BIOPORI INFILTRATION HOLE / WELLS

## 2. Eco Friendly School

Goal :

- Environmental Education of school ages
- Waste Management 3R System
- Involving the participation of student in Environmental Management
- To reduce waste generation from school


**PRAKTEK PEMILAHAN DAN PENGOLAHAN SAMPAH ATAU 3R KE SEKOLAH DALAM RANGKA PROGRAM SEKOLAH RAMAH LINGKUNGAN**

### 3. Eco Friendly Office

Goal :
- Waste management 3R system at the office
- To reduce waste generation to final disposal fron office.


Pemilahan Sampah dan Pengomposan di kantor Pemerintah

### 4. Eco Friendly Market

Goal :
- Waste management 3R system at the market
- To reduce waste generation to final disposal from market

### COMPOSTING OF INDUSTRY SCALE

**COOPERATION BETWEEN PALEMBANG CITY GOVERNMENT AND PT. PUSRI (PRIVATE SECTOR) ON URBAN WASTE MANAGEMENT**

**SOURCE OF ORGANIC WASTE:**

1.Organic waste from Residencial in around of PT.PUSRI

2.Organic Waste from Traditional market in Palembang City

### PENGOMPOSAN SKALA INDUSTRI LOKASI PT. PUSRI

Sampah Pasar yang dikelolah Pupuk Oranik PT. Pusri

PENGOMPOSAN SKALA INDUSTRI LOKASI PT. PUSRI

Sampah Organik perumahan

**Pelibatan Partisipasi Stakeholder dalam Pengelolaan Lingkungan**

1. PRODUKSI PUPUK CAIR PENGOLAHAN KOTORAN KAMBING LOKASI SUKAWINATAN KECAMATAN SUKARAMI

2. PENGOMPOSAN DI TPA OLEH KOPERASI PEMULUNG LOKASI SUKAWINATAN KECAMATAN SUKARAMI

## 3. PELATIHAN KADER LINGKUNGAN



## Program Kebersihan Lingkungan Perkotaan

| Alat Angkut | Jumlah | Kapasitas per unit ($m^3$) |
|---|---|---|
| Gerobak sampah | 390 | 1-1.5 M3 |
| Dump truck besar | 70 | 6 M3 |
| Dump truck kecil | 26 | 6 M3 |
| Trailer container | 163 | 6 M3 |
| Motor sampah | 12 | 1 M3 |

| Pelayanan | Tingkat Pelayanan | |
|---|---|---|
| | 2009 | 2010 |
| Luas daerah pelayanan | 400,61 (ha) | 400,61(ha) |
| Jumlah penduduk terlayani | 1.150.000 jiwa | 1.150.000 jiwa |
| Jumlah penduduk terlayani terhadap jumlah penduduk perkotaan | 71.85 % | 71.85 % |

| Fasilitas Pengolahan Sampah | Luas |
|---|---|
| TPA I | 25 Ha |
| TPA II | 40 Ha |


Pasukan kuning sedang membersihkan salah satu jalan Protokol

## UPAYA PENGEMBANGAN PENGELOLAAN PERSAMPAHAN

1. Penyusunan kebijakan managemen pengelolaan persampahan
2. Penyediaan prasarana dan sarana pengelolaan persampahan
3. Peningkatan Operasional dan Pemeliharaan prasarana dan sarana Persampahan
4. Pengembangan teknologi pengelolaan persampahan
5. Peningkatan kemampuan aparat pengelola persampahan
6. Sosialisasi Kebijakan Pengelolaan Persampahan
7. Peningkatan Peran Serta Masyarakat dalam pengelolaan Persampahan

## ENVIRONMENTAL PROBLEMS

- Haven't yet a system of integrated waste management .
- Increasing of Waste Production
- There are still many companies that have not been carrying out social responsibilities for environment
- There are some people still think cleanliness is responsibility of city government

## continue

- Limited budged for integrated environmental management
- Facilities and infrastructure are limited
- Still determining how the management of the right to the applied in various types of waste
- Amount of Human resources for environmental management are limited.
- Human Resources have limited knowledge about environmental technology on waste management

## Solid Waste Management And Composting Practices in Semarang

- Jumlah Penduduk Kota Semarang Tahun 2010 1.555.984 jiwa (BPS, 2010)
- Volume timbulan sampah di Kota Semarang sebesar 6500 m3/hari
  - sampah organik : 62 %
  - sampah anorganik dapat dimanfaatkan : 29 %
  - sampah anorganik tidak dpt. dimanfaatkan : 9 %
- Total sampah yang ada di TPA : 700 ton

## Kondisi TPA Di Kota Semarang

## ALUR PELAYANAN SAMPAH Di Kota Semarang

a. Rumah Tangga

RUMAH TANGGA → BECAK SAMPAH → CONTAINER SAMPAH → TRUCK SAMPAH → TPA SAMPAH

b. Niaga/Tempat Usaha

NIAGA/ TEMPAT USAHA → TRUCK SAMPAH → TPA SAMPAH

c. Fasilitas Sosial

FASILITAS SOSIAL → TRUCK SAMPAH → TPA SAMPAH


## Beberapa Upaya Pengelolaan Sampah Yang Dilakukan di Kota Semarang

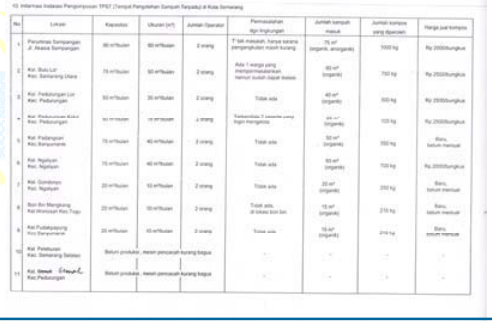
1. Pembatasan/pengurangan timbulan sampah (*Reduce*)
   - Dengan menggunakan Takakura

2. Pemanfaatan kembali sampah (*Reuse*)

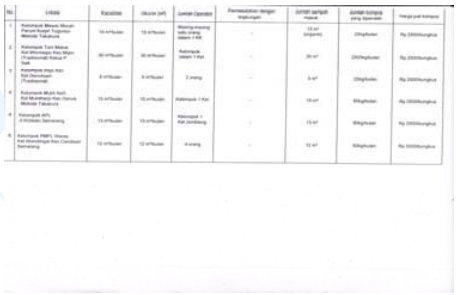
## Rumah Pilah Di Kota Semarang Bantuan Jepang

## Beberapa Contoh Rumah Pilah & Rumah Kompos Di Semarang

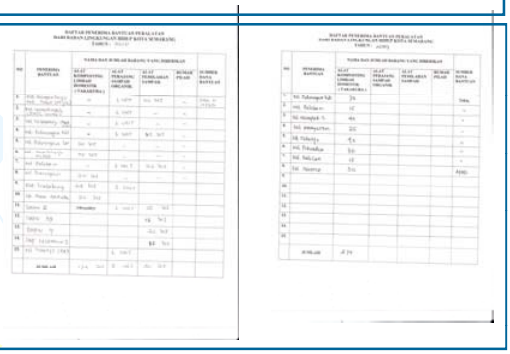
## LokasiTempat Pengolahan Sampah Terpadu Di Kota Semarang

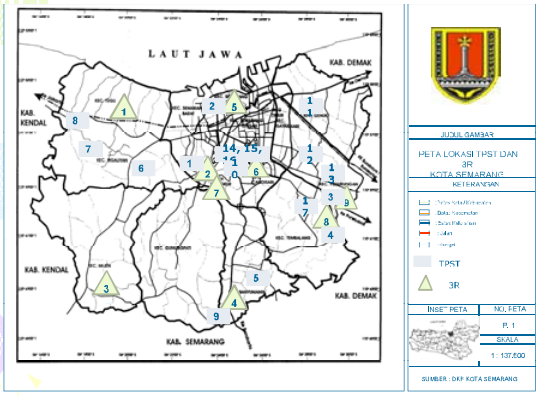


## Kelompok Pengolah Sampah Terpadu Di Kota Semarang



## Daftar Penerima Keranjang Takakura Di Kota Semarang







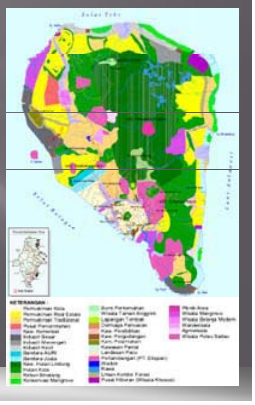
Terima Kasih

# CLEANSING DEPARTMENT OF TARAKAN CITY LOCAL GOVERNMENT

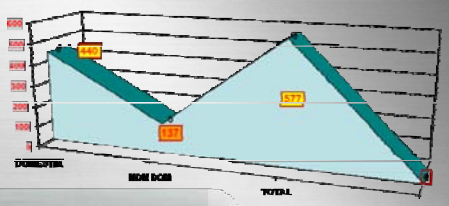
Sonya Wijayanti

## TARAKAN ISLAND


1. Area (km²) = 657,33
2. Total Population (people) = 230.093



## Total waste generation




2,75 LITER/PEOPLE/ DAY
TOTAL 577 M³
TRANSPORTED WASTE 504 M³
87.33 %
UNTRANSPORTED WASTE
12.67 %

## Waste Handling Systems

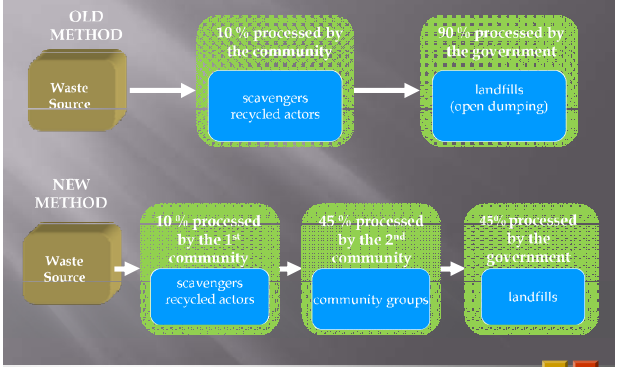
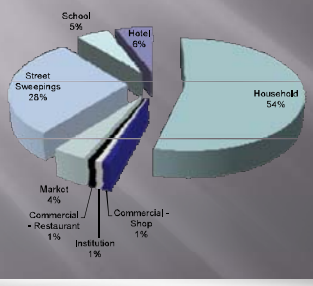



Figure 1. Tarakan City Waste Source

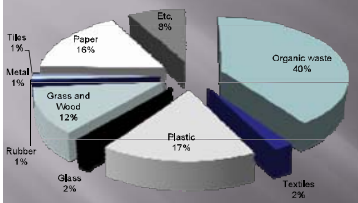



| Sources of municipal waste tarakan | |
|---|---|
| Household | 54% |
| Commercial Shop | 1% |
| Institution | 1% |
| Commercial Restaurant | 1% |
| Market | 4% |
| Street sweepings | 29% |
| School | 5% |
| Hotel | 6% |

Sumber: DKKP, 2010

Tarakan City-Indonesia

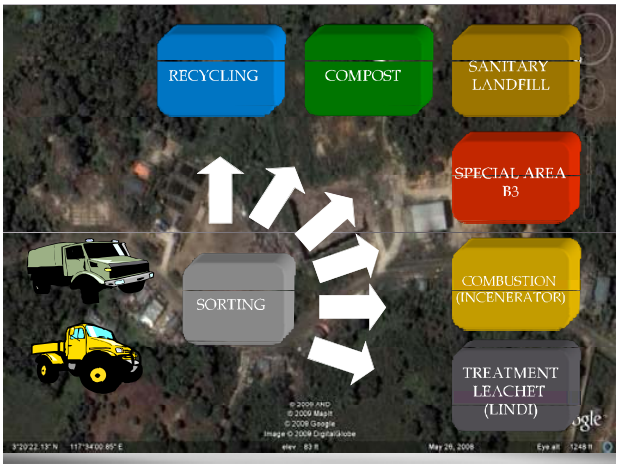
Figure 2. Household Waste Composition




| Type of waste | Percentage (%) |
|---|---|
| Organic Waste | 40% |
| Textiles | 2% |
| Plastic | 17% |
| Glass | 1% |
| Grass and Wood | 12% |
| Rubber | 1% |
| Metal | 1% |
| Tiles | 1% |
| Paper | 16% |
| Etc. | 8% |

| Type of Waste | Percentage (%) |
|---|---|
| Organic Waste | 52 |
| Non-Organic Waste | 48 |

DKPP 2010



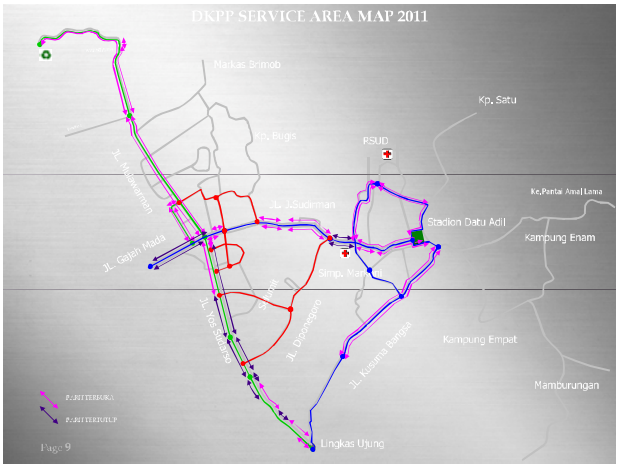

## CLEANSING DEPARTMENT OF TARAKAN CITY

**VISION :**

"AS THE BEST SANITATION DEPARTMENT AND THE CEMETERY GARDEN IN KALIMANTAN YEAR 2014 AND THE BEST LEVEL OF CITIES IN INDONESIA 2020"

**MISSION :**

1. The increased quantity and quality Hygiene Services, Garden and Cemetery;
2. Increas Community Participation;
3. Building Coordination of partnership between government, business and society;
4. Doing Guidance;
5. Doing Supervision.




## FLAGSHIP

- WASTE MANAGEMENT WITH S3R SYSTEM
- WASTE MANAGEMENT WITH HOUSEHOLD SCALE
- WASTE TREATMENT IN LANDFILLS
- SPECIAL AREA INTEGRATED
- APPLICATIONS SOLID WASTE BANK
- OUTSOURCING WORK
- AREA ADIPURA
- FOREIGN COOPERATION

## TARGET

- Awake Hygiene in Areas of Operations
- Reduced Number of Waste
- Waste further towards zero waste
- Active participation of all elements of society
- Changing the mindset about waste (a problem - a blessing)
- CULTURAL CHANGE

- Replikasi bank sampah
- Pembuatan jadwal pembuangan dan pengangkutan sampah
- Green and Clean Competition
- Active participation of all elements of society
- Mengaktifkan program CSR perusahaan swasta

## CHALLENGES, CONSTRAINTS AND OPPORTUNITIES

**CHALLENGES**
- COMMUNITY PARTICIPATION.
- OPTIMIZATION AND EFFICIENCY.
- IMPROVEMENT & DEVELOPMENT OF EXISTING SYSTEMS.
- HEALTHY ENVIRONMENT IS AFFORDABLE.

**CONSTRAINTS**
- OPERATION AND MAINTENANCE.
- COMMUNITY AWARENESS THAT WILL CLEAN AND HEALTHY ENVIRONMENT IS STILL LOW.
- INSTITUTIONAL MANAGERS.

**OPPORTUNITIES**
- DEVELOPMENT OF EXISTING.
- REDUCING COST OF SERVICES.
- USE OF LOCAL PRODUCTS.
- DECENTRALIZATION / LOCAL AUTONOMY.

## Composting in Municipal Solid Waste Management

- Composting in Tarakan starting in 2007 until now
- Composting program in Tarakan using the system:
  a. Household Scale
  b. Community-based composting
  c. Composting center in the market
- Types of composting technology :
  a. Takakura Method
  b. Open Windrow
  c. Barrel Composter

## Composting in Municipal Solid Waste Management

- Stakeholders involved in the composting
  a. Local government
  b. Community Groups
  c. Media Organization
  d. School
  e. Private Company
- Handling End compost
  a. For sale to the public
  b. In order to reforestation
  c. Purchased by private companies
  d. Used for garden city

- Success factors at composting program
  a. Local government
  b. Community Groups
  c. Media Organization
  d. School
  e. Private Company
- Barriers and challenges at composting program
  a. For sale to the public
  b. In order to reforestation
  c. Purchased by private companies
  d. Used for garden city

# CEBU CITY PRESENTATION

Networking Seminar on KitaQ Composting System in Asia
June 28-July 1 2011, Kitakyushu City, Japan

## Part 1: Solid Waste Management in Cebu City

Basic Information

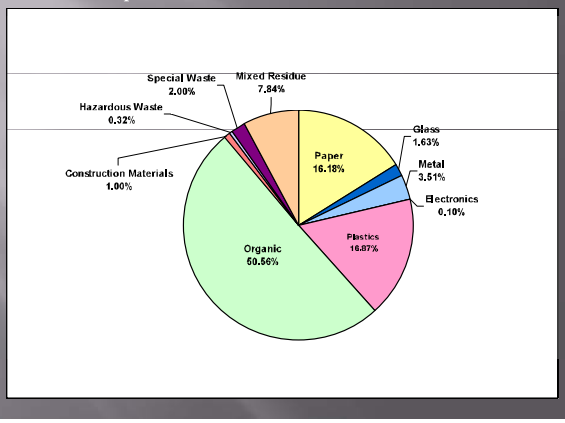
- Population: 799,079


- Total Waste Generation: 411 tpd
- Total Waste Collection: 285 tpd est.
- Total Recycling: 21.044 tpd, worth Php 234,000.00/ day
- SWM Budget Allocation: Php 85M, 2008

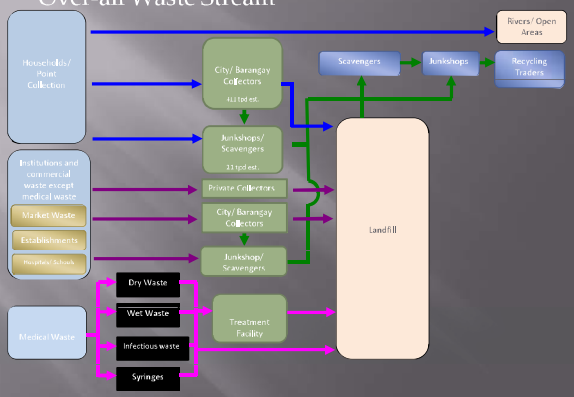
## Waste Characteristics

- Waste Generation
  - Households
  - Institutions (schools, businesses establishments, offices, etc.)
  - Markets
  - Hospitals
  - Sweepings

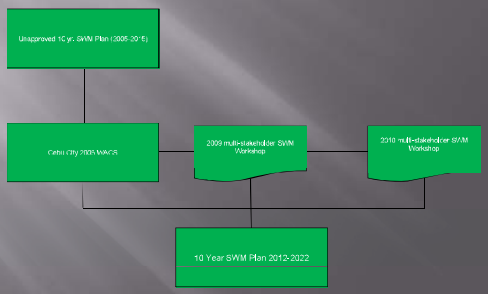
## Waste Composition




## Over-all Waste Stream




## Solid Waste Management Strategy Year of Preparation



## Vision and mission

"Cebu City with empowered stewards and stakeholders that nurture the environment through integrated solid waste management."

## Targets for waste reduction

Divert wastes by 50% from the Inayawan Sanitary Landfill within the next 3 years

Reduce wastes by 25% in the next 3 years.

Complete enforcement of the SWM laws and ordinances

Cebu City Landfill

## New initiatives, actions or policy support taken to implement the strategy in partnership with other stakeholders

- Partnership with the academe through the City Academe Network (CAN) in the dissemination of information about SWM
- Partnership with the business and industry sector Cebu Chamber of Commerce and Industry (CCCI) for the financial support of SWM programs
- Partnership with the religious sector through the Archdiocese of Cebu and Interfaith sector for the participation of communities in SWM
- Partnership with international organizations such as IGES, KITA, UNEP, AusAid, etc. for technical and financial assistance for SWM programs

## Progress, results or targets are achieved already

- Distributed around 1,500 bags of Takakura Mother compost which reduces around 750 kgs. of biodegradable waste per day
- Constructed a compost center with the assistance of KITA which can produced 4.5 tons of Takakura mother compost
- Partnered with schools and universities to put up their own Takakura distribution center

Takakura basket

Preparing the bags

Distribution

## Issues, challenges, constraints

- Still a lot to be done in SWM
  - Many factors are still unknown, such as collection rate, collection efficiency, time efficiency, future waste generation, etc.
  - Weak participation level in waste segregation, reduction
  - Limited final disposal options
- Weak CCENRO
  - Inadequate number of personnel
  - Inadequate financial resources
  - Few equipment
- SWM components still lodged in other departments/ offices, like garbage collection and disposal
- Few SWM practitioners in the locality that would support SWM policies and implementation

## Future actions

- Increase resources for CCENRO by convincing political decision-makers that a stronger environment office is an advantageous political step
- Intensify SWM IEC through use of mass media and community dialogues
- Increase individual and community participation in segregation and reduction by providing viable incentives such as purchase of compost, financial assistance, food for work, etc.

In households

In schools

In businesses

In churches

## Part II: Existing composting programs in Cebu city

Composting programs began with implementation R.A. 9003 in 2004. The City Agriculture Department initiated vermi-composting in the agricultural areas in Cebu City. Hon. Nestor Archival also championed composting for the reduction of biodegradable wastes. Most of the programs were showcase projects in the applicability of the technology, which was successful for a time but was not scaled up for wider practice.

In 2007, Takakura Home Method of composting was introduced to the Cebu City Government through the City Planning and Development Office and Office of Hon. Edwin Jagmoc, then a city councilor. With Pagtambayayong Foundation, Inc., the City Government actively pursued a wider dissemination of the method. Unfortunately, there was a very limited response in the community and/or weak distribution mechanism.

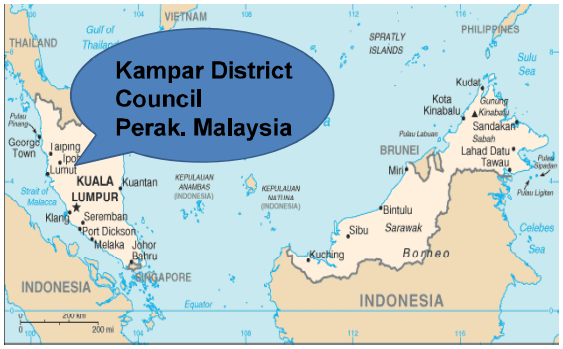
Through a wider network of the urban poor, academe, parishes and businesses, we aim to distribute to about 50% of the city's households, or around 75,000 Takakura mother compost bags within the next 3 years. There would be distribution in the communities, parishes, schools and businesses. Aside from household composting, other waste generators such as markets and institutions will be strongly encouraged to do composting in their own premises.

Compost product will be purchased by the City Government for its greening program and support for farmers in upland agriculture. The city has allocated Php 2.5M for the purchase of compost. However, the mechanics for the purchase has yet to be decided.

## Sharing lessons learned

- Identify success factors in promoting sustainable composting programs based on your own experience
  - Political support from political leaders
  - Strong public support and receptive public for environment programs
  - Reliable technical skills of personnel in Takakura composting method
- Identify barriers and challenges in promoting sustainable composting programs based on your own experience
  - Currently a weak institution that promote composting programs
  - Technical information resources is limited to trained personnel

- Identify what kind of external assistance you may need to improve your composting programs.
  - Technical support
    - Training of personnel, additional compost advisers
    - Acquisition of facilities, such as resource center, composting center, etc. and equipment, such as shredder, skidsteer
  - Financial support
    - Support for purchase of supplies
    - Personnel salaries

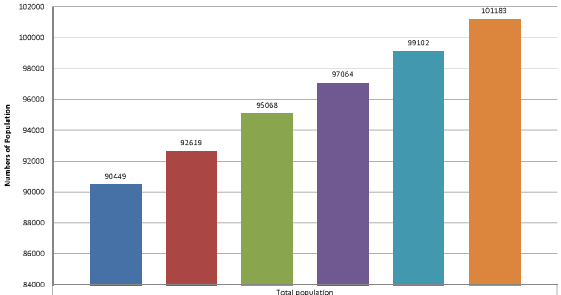




***Kampar District Council, Perak, Malaysia***

## Operation area

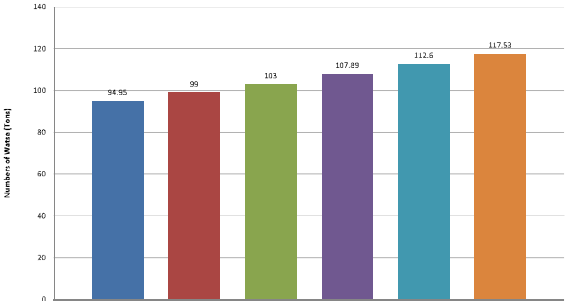

1) KAMPAR
2) *MAMBANG DIAWAN*
3) *TRONOH MINES*
4) *GOPENG*
5) *KOPISAN*
6) *LAWAN KUDA*
7) *KOTA BHARU*
8) *JERAM*
9) *KUALA DIPANG*
10) *MALIM NAWAR*
11) *SUNGAI SIPUT (S)*

**Total Population year 2005 - year 2010**



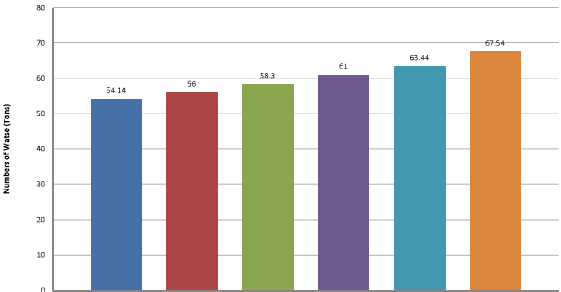

| | Total population |
|---|---|
| Year 2005 | 90449 |
| Year 2006 | 92619 |
| Year 2007 | 95068 |
| Year 2008 | 97064 |
| Year 2009 | 99102 |
| Year 2010 | 101183 |

**Estimated Total Waste Generation /Day**



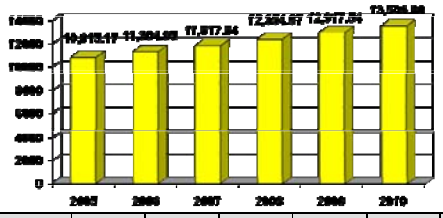

| | Estimated total waste generation /days |
|---|---|
| Year 2005 | 94.95 |
| Year 2006 | 99 |
| Year 2007 | 103 |
| Year 2008 | 107.89 |
| Year 2009 | 112.6 |
| Year 2010 | 117.53 |

**Total Waste Collection/ Day**




| | Total waste collection /days |
|---|---|
| Year 2005 | 54.14 |
| Year 2006 | 56 |
| Year 2007 | 58.3 |
| Year 2008 | 61 |
| Year 2009 | 63.44 |
| Year 2010 | 67.54 |

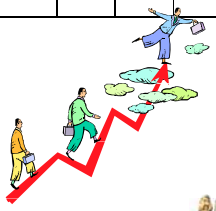
## 5. Total Recyclables (2005-2010)



| No | Materials | 2005 | 2006 | 2007 | 2008 | 2009 | 2010 |
|---|---|---|---|---|---|---|---|
| | | (Tones/year) | | | | | |
| 1 | Papers | 5,973.41 | 6,247.92 | 6,535.58 | 6,837.06 | 7,153.05 | 7,484.27 |
| 2 | Plastics | 2,810.57 | 2,931.91 | 3,058.68 | 3,191.11 | 3,329.47 | 3,474.04 |
| 3 | Glass | 1,336.38 | 1,398.34 | 1,463.30 | 1,531.41 | 1,602.82 | 1,677.71 |
| 4 | Ferrous Metals | 553.68 | 579.00 | 605.52 | 633.32 | 662.44 | 692.96 |
| 5 | Aluminium | 141.13 | 147.78 | 154.76 | 162.08 | 169.76 | 177.82 |
| Total | | 10,815.17 | 11,304.95 | 11,817.84 | 12,354.97 | 12,917.54 | 13,506.80 |

## MDKpr recycling Rate…

| Recycling Rate (%) | | | | |
|---|---|---|---|---|
| 2006 | 2007 | 2008 | 2009 | 2010 |
| 5% | 7% | 9% | 11% | 13% |



## Total Municipal budget and its allocation for SWM

| 2006 | 2007 | 2008 | 2009 | 2010 |
|---|---|---|---|---|
| RM8mil | 8 mil | 9 mil | 10mil | 12mil |
| RM 2.7 mil | 3.4 mil | 4.0 mil | 4.3 mil | 4.7 mil |

## Waste characteristic

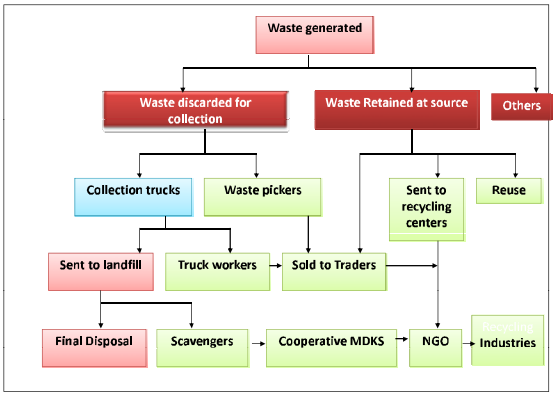
Based on the landfill data, the recorded average total waste as disposed to be around **67.54 tones/day**

| No | Generation Sources | Waste as collected (tones/day) | Percentage |
|---|---|---|---|
| 1 | Household | 40.71 | 60.27% |
| 2 | Commercial | 12.43 | 18.40% |
| 3 | Market | 11.40 | 16.88% |
| 4 | Industrial | 1.2 | 1.78% |
| 5 | Public Parks /Garden | 1.8 | 2.67% |
| Total | | 67.54 | 100.0% |

## 3. Waste Composition

- Food waste : 39.6%
- Paper : 31.2%
- Plastic : 8.1%
- Glass : 3.5%
- Scrap metal : 1.7%
- Aluminums : 0.7%
- Others : 15.2%


## Waste Flow in MDKpr



## SWM Strategy of Kampar

**Year prepare : 2005**

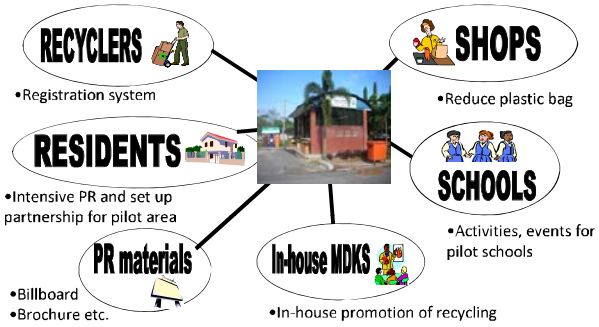
***Vision :***

***Reduce waste disposal to landfill by 22 % recycling rate by year 2020***

**Mission : To promote waste awareness minimization by increasing public and building effective recycling system**

## Action Plan

- Overall project plan for each targets.




## Progress, results achieved already

- Achieve 13% recycling rate
- 13 model schools
- 2 community initiatives
- 20 trainers
- Recycle network unit in district office
- Information Network with recyclers

## Issues

- **Issues - privatization of SWM ( federal level)**
- **Challenges : continuous and sustaining program**
- **Constraints : staff and finance**
- **Future action :**

**→continue as LA 21 program**

**→ Compost centre at landfill site**

## Let's join 3R @ Golden Dragon Garden Community

**How it get Started ?**


JOCV

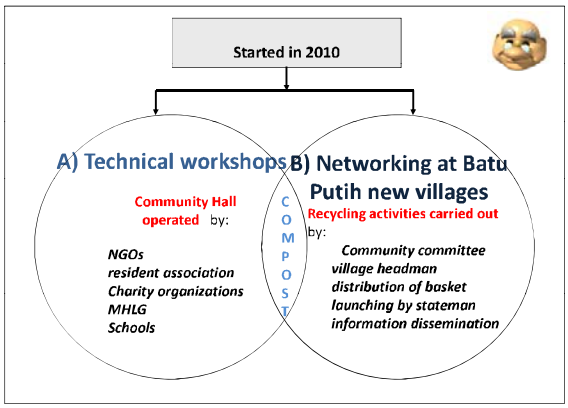
**to achieve ZERO WASTE society**
**用正确的方式进行再循环,**
**以达致“零垃圾”的社会**

## Let's try! COMPOST

- 2 Cardboard Boxes
- Soil
- ***Charcoal***
- **Kitchen waste** (Vegetable, fruits peels etc.)
- Mixing tool (shovel, turner, or lubber glove etc.)

***Optional***
Rice bran

## Existing Composting Program




## THM – household program (Pilot Project)

Takakura home method – 2 basket per household

## Stakeholders involved, role and responsibilities

1. *NGOS – information dissemination*
2. *Schools – information, workshop, role model*
3. *Academic institutions – lead role model*
4. *Private sectors – financial support*
5. *District council – main committee ( every month reporting progress )*

## Mobilize external resources

- *Community participation – workshop with resident group.*
- *Launching by the statesman.*
- *NGO participation – handicap association e.g. Kampar beautiful Gates*
- *University students hands on project ( community service society)*
- *International cooperation – JOCV*

## Budget Allocation For Compost

- *Municipal budget ( part of Local Agenda 21 program ) → RM 30 K a year*
- *Federal government - RM 45 K*

## Final product of compost

- *Promotion of backyard gardening*
- *Sell back to landscape department for own public places & garden use*

## Lesson Learned

### Success factor

- *Segregation at source*
- *Pure organic waste ( homogenous) such as food and beverages industries is easier*
- *Bigger quantity and more sustainable*
- *Market value for compost is also crucial*

## Barriers

- Lack of knowledge, attitude ( do not segregate waste) and skills
- need continuous strengthening of project
- Market for compost is small
- Price is low
- Characteristic of compost content sensitive ( Halal or haram perspective from religious point of view)

## External assistance

- *Demand market with reasonable price*
- *Budget to implement compost needed*
- *If market is available → feasible doing compost)*
- *E.g. sell it back to landscape department of own office usage for public landscaping works*

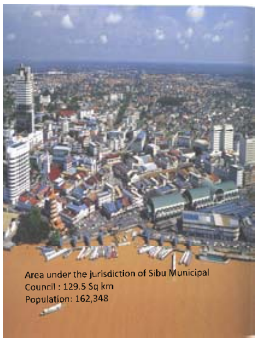
# Solid Waste Management and Composting in Sibu

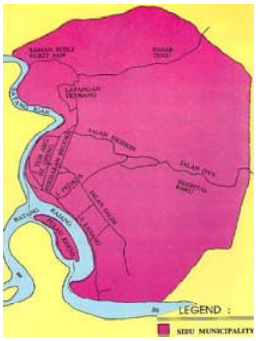
**SIBU MUNICIPAL COUNCIL,**
**SIBU, SARAWAK, MALAYSIA**

JICA
Kyushu International Centre
29 June 2011

Sibu – Gateway and Regional Centre of Central Sarawak, Malaysian Borneo


## Present Sibu Town




## Overview of SWM

Revenue collected by Sibu Municipal Council for waste collection for year 2010:- RM3.5 million
- Based on the 4% ARV (Assessment Rate/year)

Expenditure for solid waste management for year 2010:- RM5 million, which included RM310,020.00 for leachate treatment plant, RM948,112.00 for sanitary landfill and the rest Payment for refuse collection (4 contractors)

## Waste Management

- Divided into 4 zones, therefore 4 contractors
- Collect on domestic and commercial waste
- Collection schedule:-
  - Residential areas:- 3 times a week
  - CBD areas & markets:- twice a day
  - Other commercial areas: once a day
- Disposed at Kemunyang Sanitary Landfill

## SANITARY LANDFILL AT KEMUNYANG

Locality- Approximately 26 km from Sibu town and is accessible via Jalan Kemunyang.

Cost of the Project- 8 Millions (RM) (operational in 2001)

Land Coverage Area- Approximately 13 Acres

## Capacity

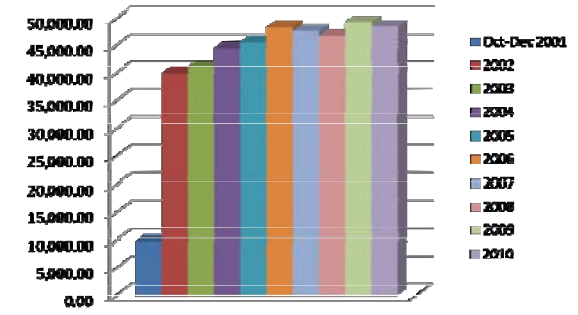
| | | |
|---|---|---|
| Cell 1 | = | 60,000 cu m |
| Cell 2 | = | 37,000 cu m |
| Cell 3 | = | 28,000 cu m |
| Layer 2 (14 m - 19 m) | = | 81,000 cu m |
| Layer 3 (19 m - 24 m) | = | 39,000 cu m |
| Layer 4 (24 m - 29 m) | = | 11,000 cu m |
| Total : | = | 256,000 cu m |
| Life Span | = | 10 Years |

| YEAR / MONTH | 2001 | 2002 | 2003 | 2004 | 2005 | 2006 | 2007 | 2008 | 2009 | 2010 |
|---|---|---|---|---|---|---|---|---|---|---|
| January | | 4,502.52 | 4,091.96 | 3,727.22 | 4,720.34 | 5,727.24 | 5,418.89 | 4,388.70 | 4,535.37 | 5,254.52 |
| February | | 3,229.13 | 2,834.32 | 3,174.31 | 4,132.09 | 4,196.90 | 4,583.21 | 3,978.00 | 3,628.73 | 4,362.78 |
| March | | 2,943.16 | 3,073.84 | 3,451.61 | 3,735.10 | 3,847.16 | 3,824.10 | 3,701.97 | 3,861.28 | 4,034.58 |
| April | | 2,982.61 | 3,170.12 | 3,391.28 | 3,400.13 | 3,604.95 | 3,595.16 | 3,595.23 | 3,789.14 | 3,844.79 |
| May | | 3,073.41 | 3,250.52 | 3,679.77 | 3,613.33 | 3,939.74 | 3,699.87 | 3,534.43 | 3,989.60 | 3,928.66 |
| Jun | | 2,854.83 | 3,199.92 | 3,363.06 | 3,381.20 | 3,524.21 | 3,342.34 | 3,352.16 | 3,727.81 | 3,795.59 |
| July | | 2,962.32 | 3,228.38 | 3,644.45 | 3,617.83 | 3,717.97 | 3,736.35 | 3,534.49 | 3,863.52 | 3,911.33 |
| August | | 2,929.57 | 3,218.91 | 3,682.21 | 3,520.13 | 3,768.53 | 3,617.31 | 3,530.12 | 3,930.05 | 3,919.83 |
| September | | 2,909.49 | 3,288.43 | 3,379.51 | 3,614.24 | 3,674.10 | 3,527.44 | 3,723.68 | 3,982.40 | 3,605.66 |
| October | 1,581.07 | 3,232.09 | 3,662.26 | 3,465.46 | 3,936.78 | 3,816.58 | 3,819.12 | 4,614.67 | 4,393.17 | 3,608.67 |
| November | 3,332.28 | 3,480.21 | 4,179.93 | 4,127.41 | 3,818.72 | 3,715.37 | 3,542.77 | 4,496.42 | 4,636.08 | 3,936.22 |
| December | 4,846.14 | 4,777.24 | 3,957.24 | 5,385.85 | 4,013.92 | 4,791.88 | 4,755.45 | 4,264.87 | 4,828.36 | 4,143.30 |
| SUB-TOTAL | 9,759.49 | 39,876.52 | 41,055.83 | 44,372.14 | 45,508.81 | 48,225.73 | 47,532.01 | 48,714.64 | 49,165.51 | 48,344.93 |

TOTAL TONNAGE UP TO DATE = 420,550.61

8

**Monthly waste disposed at Kemunyang Sanitary Landfill, Sibu from 2001 up to date**




| Years | Oct-Dec 2001 | 2002 | 2003 | 2004 | 2005 | 2006 | 2007 | 2008 | 2009 | 2010 |
|---|---|---|---|---|---|---|---|---|---|---|
| Tonnage | 9,759.49 | 39,876.52 | 41,055.83 | 44,372.14 | 45,508.81 | 48,225.73 | 47,532.01 | 48,714.64 | 49,165.51 | 48,344.93 |

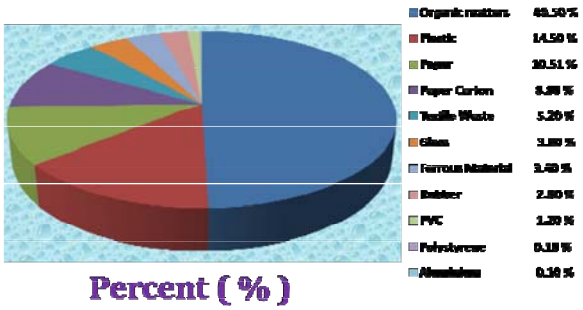
Total tonnage up to date = 420,550.61
Population Served = 162,348

## Sanitary Landfill at Kemunyang.
## Refuse Composition [ By Weight ]

| Item | Material | Percent [%] |
|---|---|---|
| 1 | Organic matters | 49.50 |
| 2 | Plastic | 14.50 |
| 3 | Paper | 10.51 |
| 4 | Paper Carton | 8.80 |
| 5 | Textile Waste | 5.20 |
| 6 | Glass | 3.80 |
| 7 | Ferrous Material | 3.40 |
| 8 | Rubber | 2.80 |
| 9 | PVC | 1.20 |
| 10 | Polystyrene | 0.10 |
| 11 | Aluminium | 0.10 |

10

## Waste Characterization




Percent ( % )

## National Recycling Program

- Launched in SMC on **23 June 2011**
- 66 sets of three coloured recycling bins were distributed to schools, commercial centres, petrol stations and put at public places.
  - Brown for glass
  - Blue for paper
  - Orange for plastic & aluminium

## Recycling – Aluminium Cans

| Year | Total Amount Collected (kg) |
|---|---|
| 2008 | 756 |
| 2009 | 1932 |
| 2010 | 1100 |
| Jan – April 2011 | 161 |

## Recycling – Old Newspaper (ONP) and Mixed Paper

| Year | Total Amount Collected (kg) | |
|---|---|---|
| | ONP | Mixed Paper |
| 2008 | 150,312 | 3,823 |
| 2009 | 132,279 | 2,092 |
| 2010 | 113,952 | 1,537.5 |
| Jan – April 2011 | 33,502 | 13,993 |

## Journey to Community Composting

- Started in 2008 (conventional method)
- Pilot projects in 2 residential neighborhoods and 2 secondary schools
- Activities
  - Briefing, demonstration, free compost bins, follow up inspection
  - Communal composting centre (Market hawkers and schools)
  - JICA ,under JICA Partnership Program (JPP) "Community-based Solid Waste Management System Development Project in Sibu Municipality assisted SMC in promoting THMC.

- Under JPP, experts from Japan were dispatched to Sibu:-
  - December 2009 – Regional Workshop
  - July 2010 – Follow up visit
  - November 2010 – Seminar and follow up visit to composting centre/households
  - February 2011 – Technical Workshop/Seminar

- Budget allocation (under Local Agenda 21):-
  - Municipal
  - Federal government
  - No cost/benefit analysis done at the moment.

**December 2009**

**July 2010**

**November 2010**

**February 2011**

**Small Composting Centre at Seng Ling Road, Sibu**

Small Composting Centre at Seng Ling Road

- 20-50 kg of green waste (vegetables, fruits, etc) collected daily from Sibu Central Market, Rejang Park Market
- Usage of compost:- door gift, exchange, used as seed compost
- Challenges:- segregation of waste, shredder, cooperation from the hawkers/contractors, manpower

# Environmental Management

Nonthaburi municipality, Thailand

PORNSRI KICTHAM – Municipal Clerk

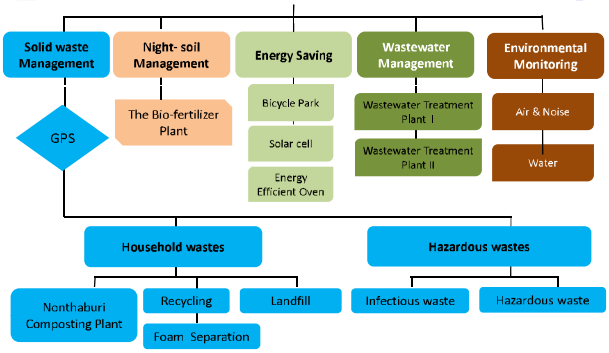
## Nonthaburi municipality

Area 38.9 sq.km.

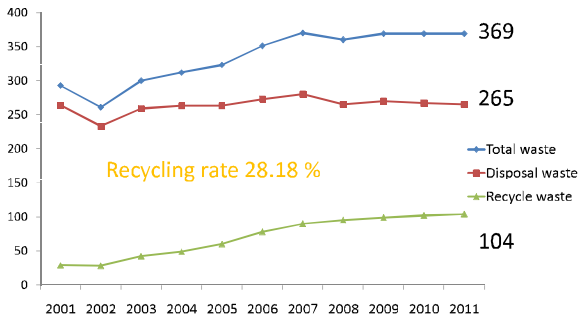
Population 263,553

106,074 households

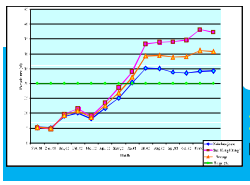
## Urban Environment Management




## Total waste generation, Total Waste collection and Recycling rate in Municipality , 2001-2011 (t/d)




## 2001 : First Meeting of the Kitakyushu Initiative Network, Japan



Recycling rate 37.2 % and 24.3 %

2002 : Pilot Project Maximizes Recycling & Minimizes Waste in communities

## 2002 : Nonthaburi Composting Plant

Organic fertilizer 5 tons/month

2004 : Infectious Waste Management

405,510 kg/year

98 hospitals & health clinics

2005 : GPS Vehicle Monitoring System

2006 : Night soil Management

12,000 Visitors,
70 tons ,
6,000 US$ /year

2007 : Hazardous Waste Management

11,300 Kgs./year , 101,700 bulbs

2009 : Wastewater Treatment Plant at Municipal office

**75 m³/day , BOD < 10 mg/L**

2010 : PSP & EPS Foam Separation

Start July 2010

1,200 kg/month

2011 : Solar cell

Start Jan 2011

150 kilowatt/day

## Promotion of Composting in Nonthaburi

## Nonthaburi Composting Plant ( started 2002)

**Composting technology** : Fixed-bed technology

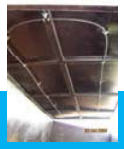
**Kind of composting** : Organic waste

**Capacity** : 5 tons/day

**Budget supporting** : Asia Urbs Program

**Partner :** Nonthaburi , Thailand & Reggio Emilia , Italy & Barcelona , Spain

Mixing room



Bio-cells

Bio-Filter

Curing room

Filter room

Process

Composting Promotion : Takakura method

## Key success factors

- ☆ Policy
- ☆ Small scale
- ☆ Simple technique
- ☆ Teamwork
- ☆ Motivation







Environmental Learning Center

## Future Plan

1. Zero waste
2. 2022 Beautiful Canal and Clean River in Nonthaburi


3. Waste from Electrical and Electronic Equipment : e-waste

## - Thank you -

## Workshop of KITA-Q
## (Takakura Composting) Method

29.June. 2011
J-POWER Group JPec Co., Ltd
Wakamatsu Environment
Research Institute
Koji Takakura, Sayaka Yaoya

## Important item of composting

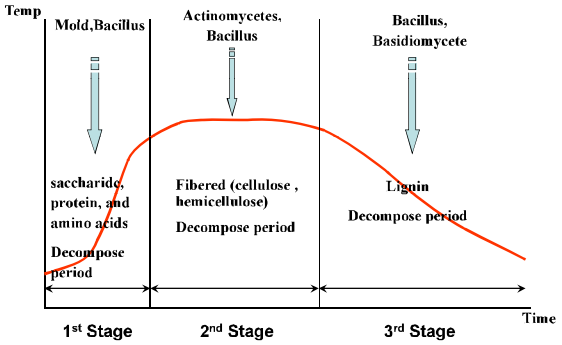
- Microorganisms
- Moisture control
- Aerobic($O_2$:Oxygen)

## Various Microorganisms reiate to the composting

- The composting cannot be finished by only one kind of Microorganism .
- The priority kind of Microorganism changes according to the stage of the composting.
- Bacillus, Mold, Actinomycete , and Basidiomycete are necessary.
- Also in the category of the same kind of Microorganism, it's better a lot of kinds. (Diversity)

You do not expect the bacterium to proliferate naturally.
You adjust the bacterium with a purpose.

## Transition of composting and microorganisms
(It is advanced at the same time in the compost container.)




## Composting the 1st Stage

◎An important thing

Easily decomposable organic matters are quickly decomposed with a useful bacterium.

Both good and bad Microorganisms can use the easily decomposable organic matter.

For example,

Mold and E. coli bacteria proliferate on the condition. And, food poisoning and the allergy might be caused.

Countermeasure

## Composting the 1st Stage

Increasing a large amount of harmless Molds and Bacillus in the compost.

"Fermented food such as Aspergillus oryzae and lactic acid bacteria" is added with a purpose.

→ It comes to prevent rot.

## Composting the 2nd Stage

◎The majority of a botanical organism such as the vegetables is fibered.

cellulose , hemi cellulose, Lignin

↓ Countermeasure

Actinomycetes is suitable for the decomposition of cellulose and the hemi cellulose.
(Actinomycetes lives in the hums.)

The hums can be made though a long time is needed.

## Composting the 3rd Stage

◎The decomposition of the lignin contained in the plant such as the vegetables is slow.

↓ Countermeasure

The basidiomycete is suitable for the resolution of lignin.

The basidiomycete is Mushroom

## The fermentation microorganisms are gathered in the region.

- The microorganisms that relate to the fermented food is effective.
- When the fermented food is unavailable, "Decomposed fallen leaves (hums) " are very effective.

→

- Moreover, the bacillus, the type, Actinomycetes, and Basidiomycota can be collected at the same time.

## The fermentation bacterium is gathered in the region.

- In addition, effective Microorganisms for the composting are on the surface of the vegetable and the fruit.

→

- They are collected by applying Japanese pickles [asazuke] by using salt water.
- The increasing of miscellaneous germs is controlled with the salt. And, aimed lactic acid Bacillus and yeast fungus are collected.

## Anticipated efficacies in the fermentation Microorganisms

It is not only effective for the composting.

- Microorganisms collected in the local area are good matching the soil in that area.
- We expect fermentation Microorganisms can produce the substance like hormone and the material like vitamin and the effect of promoting the plant growth .
- A certain kind of Actinomycetes makes the antibiotic.

## As for the composting, aerobic decomposition is good.

- **Aerobic decomposition**

$$C_6H_{12}O_6 + O_2 + H_2O \rightarrow 6CO_2 + 12H_2O + 38ATP$$

- **Anaerobic decomposition** (alcoholic fermentation)

$$C_6H_{12}O_6 \rightarrow 2C_2H_5OH + 2CO_2 + 2ATP$$

↓

ATP (Adenosine triphosphoric acid): Energy source of all lives

Aerobic decomposition is fast

## The moisture control

The good condition is 40～60%.

- The activity of the microorganisms become slow when moisture is a little.
- When moisture is much, it becomes the oxygen-deficiency.

→ anaerobic and rot.

When moisture control is to 40-50% , the failure is few.

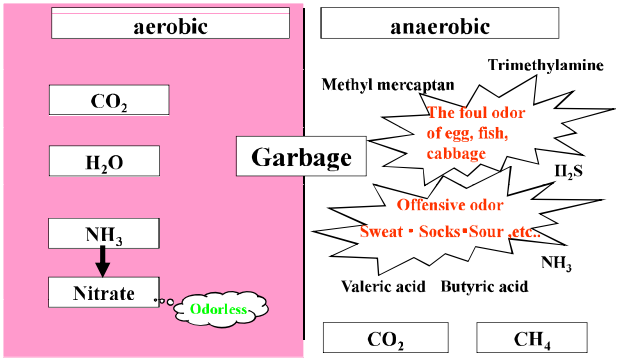
When moisture control is to 50-60% , decomposition is fast

## moisture and oxygen are related.

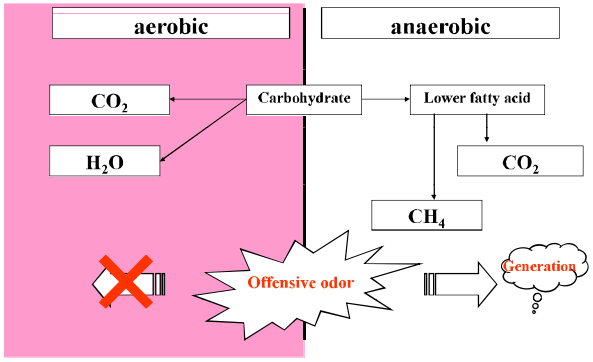
- Oxygen in air is 21%.
- Oxygen in water is 0.0008%(8ppm)
- When it is high moisture, much water enters the space and it changes to anaerobic.

When it is high moisture, it is perishable.

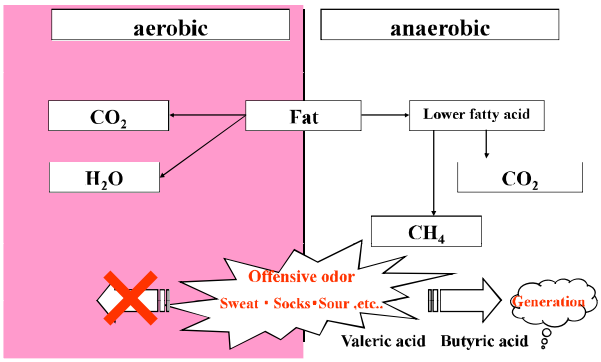
## Difference between aerobic and anaerobic -1



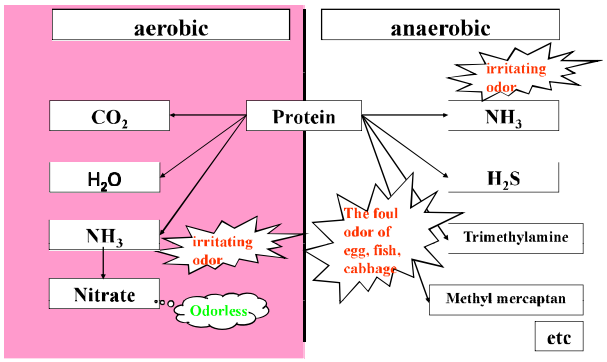

## Difference between aerobic and anaerobic -2




## Difference between aerobic and anaerobic -3




## Difference between aerobic and anaerobic -4



## Composting and C/N ratio (ratio of carbon/nitrogen)-1

- The best C/N ratio of the composting is 20.
- When the C/N ratio is high, decomposition is slow. (It needs long time)

- We need to adjust the C/N ratio for the garbage composting?

→No necessary, because the C/N ratio of garbage is 20 or less.

## Composting and C/N ratio (ratio of carbon/nitrogen)-2

- What material is high C/N ratio?

→Hard plants are high.

Fallen leaves：50～100、Straw：110～150、

Rice straw and Rice husk：70、

Sawdust：300～1300 (The conifer is high.)

## Composting and C/N ratio (ratio of carbon/nitrogen)-3

- Then, when material of the fermentation is made by sawdust, adjustments are necessity?

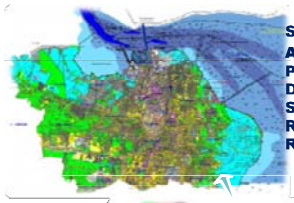
→Sawdust is not made compost. It only uses as a base material.

When garbage is decomposed, the entire C/N ratio falls. At the end, It becomes C/N ratio that can be used as compost.

## Community - Based Solid Waste Management as Best Practice in Surabaya City

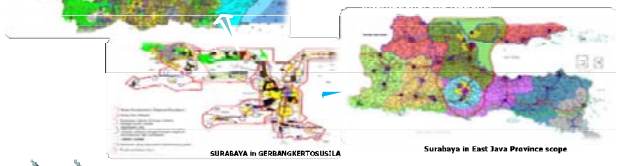
EMA AGUSTINA, ST
Dinas Cipta Karya dan Tata Ruang


•The Second Biggest City in Indonesia after Jakarta;



**SURABAYA CITY IMAGE**

| | |
|---|---|
| Area | : ± 33.048 Ha |
| Population | : ± 2.934.174 |
| Districts | : 31 |
| Sub Districts | : 160 |
| RW | : 1389 |
| RT | : 9124 |

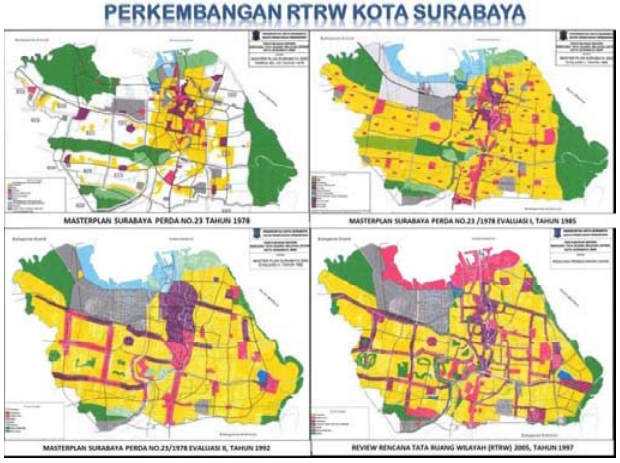



In national scale, Surabaya is the center of development in East Indonesia.

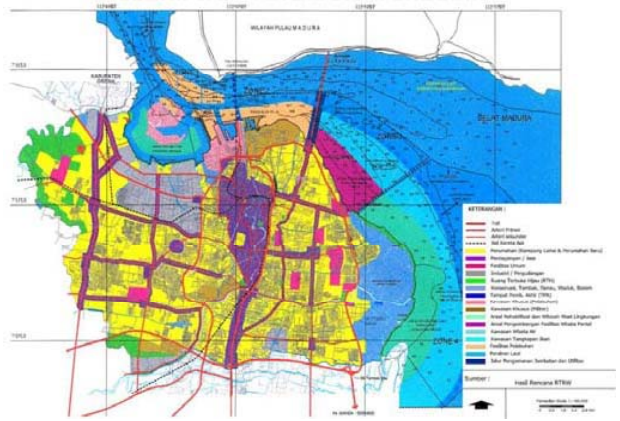
Regionally, Surabaya is the capital city and center of service and culture in East Java.

Surabaya City

## PERKEMBANGAN RTRW KOTA SURABAYA

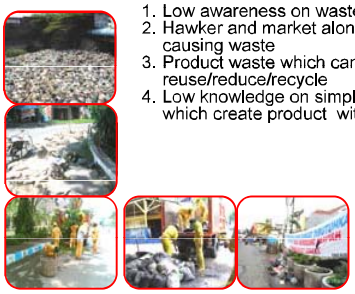



## PERDA 3/2007 RTRW KOTA SURABAYA



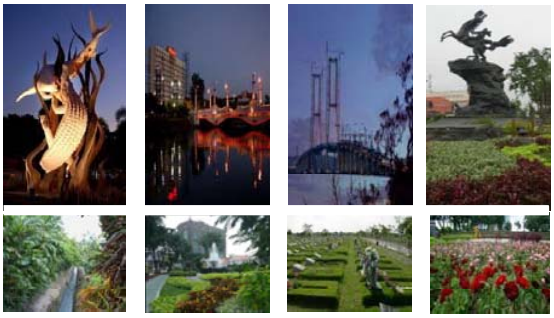
## BACKGROUND

## PROBLEMS



1. Low awareness on waste dumping
2. Hawker and market along the pedestrian causing waste
3. Product waste which cannot be reuse/reduce/recycle
4. Low knowledge on simple waste technology, which create product with economic value

## SHOWING SHORT MOVIE ON BENOWO LANDFILL



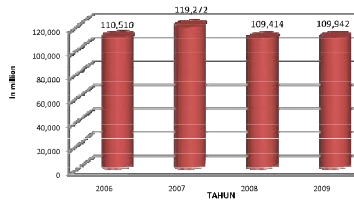
## WASTE MANAGEMENT

*"Waste management activities in the city of Surabaya is focused on reducing waste at its source, and processing waste in the landfill by using environmentally friendly technologies."*

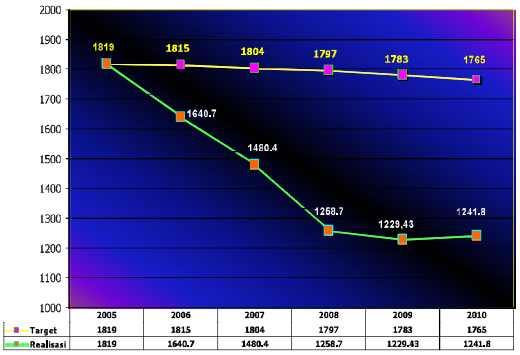
## LOCAL BUDGET FOR ENVIRONMENT

| NO | BUDGET | BUDGET | | | | NOTES |
|---|---|---|---|---|---|---|
| | | 2009 | % | 2010 | % | |
| 1. | Total budget | 4.364.366.780.398 | 100% | 4.383.712.427.048 | 100% | |
| 2. | Environmental budget | | | | | |
| | Sea, Fishery and Farming Development Program | 35.334.139.497 | 0,8% | 23.405.280.994 | 0,5% | Farming Dept. |
| | Environment Control and Conservation Program | 11.430.786.532 | 0,3% | 13.918.825.429 | 0,3% | Bappeko, Farming, Transportation, Environment |
| | Green Open Space and City Park Program | 40.652.921.024 | 0,9% | 58.200.507.958 | 1,3% | Farming, Spatial and Cleaning Dept. |
| | City Cleanliness Management Program | 118.486.923.877 | 2,7% | 105.705.809.320 | 2,4% | 31 district, Cleaning Dept |
| | TOTAL | | 4,7% | | 4,6% | |

## CLEANING AND LANDSCAPING DEPARTMENT OPERATIONAL BUDGET




## Waste Dumped in Benowo Landfill




| | 2005 | 2006 | 2007 | 2008 | 2009 | 2010 |
|---|---|---|---|---|---|---|
| Target | 1819 | 1815 | 1804 | 1797 | 1783 | 1765 |
| Realisasi | 1819 | 1640.7 | 1480.4 | 1258.7 | 1229.43 | 1241.8 |

## Waste Management Facility

### A. Temporary Depot (TD)

| No. | TYPE | NUMBER |
|---|---|---|
| 1. | TD | 163 |
| 2. | Waste treatment facility | 16 compost center |

PART 2


**3R IMPLEMENTATION IN SURABAYA**

1. COMMUNITY - BASED SOLID WASTE MANAGEMENT
2. COMPOSTING PROGRAMME

**BEST PRACTICE IN SURABAYA CITY**

**I. Community - Based Solid Waste Management**

Community based waste management with community involvement in its management through 3R implementation

A. BASIC CONCEPT

a. Reducing waste from its source: Reducing environment waste and reducing waste dumped into Landfill
b. Waste sorting: between organic and inorganic waste
c. Waste Treatment:
   - Organic waste processed into compost
   - Inorganic waste sold to scavenger or made into recycled products ingredients
   - Compost centre development


## 3R IMPLEMENTATION IN SURABAYA

COMMUNITY BASED WASTE MANAGEMENT

B. ACTIVITIES

**Main activities for Community - Based Solid Waste Management Program :**

1. Socialization to the community (City of Surabaya in cooperation with NGO helps the community such as : Bangun Pertiwi, Pusdakota, Sahabat Lingkungan etc)
2. Recruitment and training of cadres
3. Distribution of cleaning tools (composter bin, takakura basket,cart, and build compost centre)
4. invoiving community :
   a. Process organic waste into compost
   b. Inorganic waste sold to scavenger or as recycle material
   c. Compost center development and improvement


## IMPLEMENTATION OF 3R IN SURABAYA CITY

a. Socialization to the community

- Socialization aims to spread the understanding of the importance of 3R starting from community level
- Socializations are conducted in schools, communities (districts & sub-districts), markets and office buildings
- Socialization targets: students, communities, businessmen and workers

Counseling activities


Environmental campaign

Socialization in school


## PUBLIC CAMPAIGN

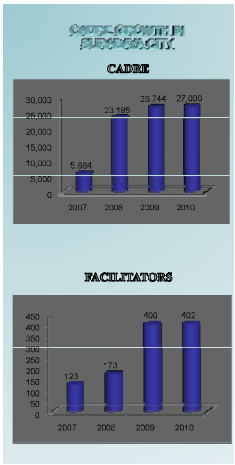
➔ To improve awareness and changing people habits

➔ Finding the most effective way in waste management by understanding people characteristics

## IMPLEMENTATION OF 3R IN SURABAYA CITY

b. Recruitment and training of Cadre

- Environmental cadre has the responsibilities to guide their communities to conserve their own environment, especially in 3R issues.
- The environmental cadres has the responsibilities to share information and techniques of waste treatment to those who are in need.
- Facilitators are environmental cadres in sub-district level that coordinates environmental cadres.


## IMPLEMENTATION OF 3R IN SURABAYA CITY

c. Distribution of Cleaning Tools

City Government of Surabaya distribute cleaning tools to help community in managing their own waste, tools given such as:

- Trash cart
  to carry waste from the source into Transfer Station
- Waste shredder
  to shred waste before processing in compost center
- Composter (Takakura basket, Composter bin, etc)
  given for free to communities who wants to separate and process their waste
- City Government also build compost center using Government Budget. The proposals to build compost center can either come from City Government or communities with open site themselves

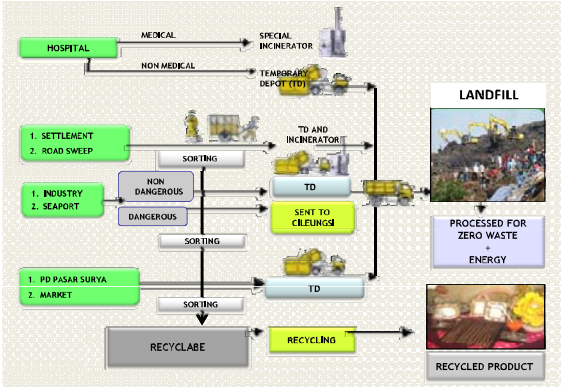

Trash cart


Composter and its modifications


shredder


Composter and its modifications

## WASTE TREATMENT AND COLLECTION SCHEME




## COMMUNITY WASTE SORTING


## Recycled Product village


Gundih Sub-Dist, Bubutan Dist

PART 3

## BEST PRACTICE IN SURABAYA CITY

### II. Composting program

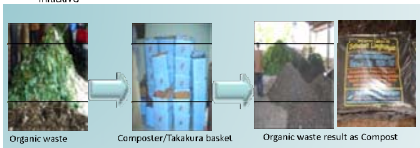
Follow up program from 3R implementation where separated organic waste processed into compost

**A.BASIC CONCEPT**

a. Organic waste sorted and processed into compost
b. Composting conducted in household and city scale
c. In household scale composting using household scale composter
d. In city scale composting using compost center. Surabaya has 16 compost centers

**B. ACTIVITIES**

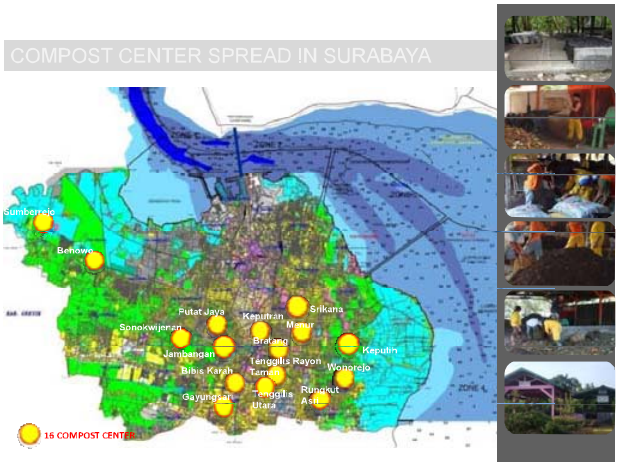
a. Distribute household scale composter for free to socialized community
b. Constructing compost center through community proposal or city government initiative




**Distribution (till 2010)**

- Takakura Basket reached 17,033 units
- Composter bin reached 1.314 units

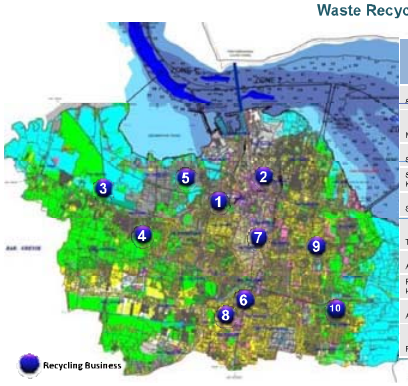

## COMPOST CENTER SPREAD IN SURABAYA






## IMPLEMENTATION OF 3R IN SURABAYA

### Waste Recycling Business Distribution




| NAMA | ADDRESS | AREA |
|---|---|---|
| Rinadi | JL. Demak Timur II No. 26 | Central Surabaya |
| Mien Suryadi | JL. Kedung Mangu Selatan VI No. 23 | Northern Surabaya |
| Sri Mulkah | Pondok Benowo Indah Blk. MN - 12 | Western Surabaya |
| Sri Kesuderyanthie | JL Wonkan Rejo Di Nk H-I - 11 | |
| Sri Gecung M | JL. Tambak Pring Barat No. 24 | |
| Tantin Yasmini | JL. Prilo Wonokromo No. 144 | Southern Surabaya |
| Anggraini | JL Kupang Krajan Lor II No. 58 | |
| Risnani Pudji Rahayu | JL Jambangan II-A No. 2 | |
| Asri Nardini | JL. Jojoran Baru III No. 30 | Eastern Surabaya |
| Fatikah | JL Ringkut Lor VII Gg Masjid No. 2A | |

## COMPOST CENTER TRADITIONAL MARKET : KEPUTRAN

## COMPOST CENTER SETTLEMENT : TENGGILIS UTARA

## COMPOST CENTER BENOWO LANDFILL

## COMPOST CENTER CLEANING AND LANDSCAPING DEPARTMENT OFFICE (MENUR)



## COMPOST CENTER SEED GARDEN : WONOREJO




## COMPOST VOLUME in SURABAYA COMPOST CENTER

| No. | Location | January 2011 | | February 2011 | |
|---|---|---|---|---|---|
| | | Input (M3) | Output (M3) | Input (M3) | Output (M3) |
| 1. | Bratang | 347.00 | 173.50 | 300.50 | 150.30 |
| 2. | Menur | 359.50 | 179.80 | 314.00 | 157.00 |
| 3. | Keputran | 111.50 | 55.75 | 99.00 | 49.50 |
| 4. | Putat Jaya | 385.80 | 192.90 | 347.90 | 173.95 |
| 5. | Rungkut Asri | 252.00 | 126.00 | 220.00 | 110.00 |
| 6. | Sitkana | 122.50 | 61.26 | 107.50 | 53.75 |
| 7. | Benowo | 226.50 | 113.25 | 203.50 | 101.75 |
| 8. | Bibis Karah | 131.00 | 113.25 | 122.00 | 61.00 |
| 9. | Sono Kwijenan | 364.00 | 182.00 | 321.50 | 161.00 |
| 10. | Tenggilis Utara | 133.00 | 86.50 | 154.50 | 77.30 |
| 11. | Wonorejo | 305.00 | 152.50 | 275.00 | 137.50 |
| 12. | Gunungsari | 107.50 | 53.75 | 97.50 | 48.75 |
| 13. | Tenggilis Rayon Taman | 173.00 | 86.50 | 156.00 | 78.00 |
| 14. | Jambangan | 127.00 | 63.50 | 98.00 | 49.00 |
| 15. | Sumberejo | | | | |
| 16. | Keputih (liponsos) | | | | |

*Catatan : RK Sumber Rejo dan RK Liponsos baru diresmikan Maret 2011*

*Dinas Kebersihan dan Pertamanan, 2011*

## SEVERAL TAKAKURA AND COMPOSTER IN OFFICES

Auto 2000
Jl. HR. Muhammad

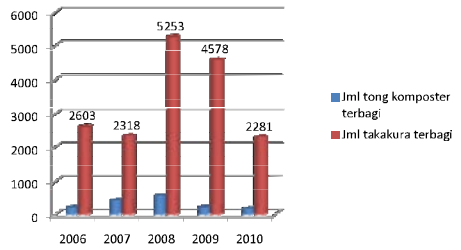
Bappeko Surabaya

Dukuh Pakis
District Office

Jagir Community
Healthcare

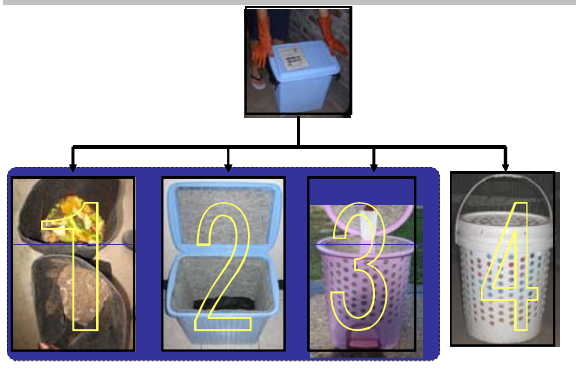
## COMPOSTING PROGRAM (HOUSEHOLD SCALE)

**Takakura and composter bin distribution (2009) :**
-Takakura up to13.669 unit / tahun
-Composter up to 795 unit / tahun




REUSE
REDUCE
RECYCLE

## TAKAKURA HOME METHOD



## WASTE MANAGEMENT BASE ON COMMUNITY


User of TAKAKURA Home Method in RUNGKUT LOR Kampong: 130 user

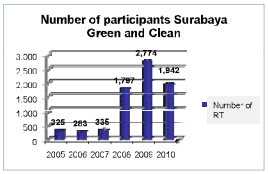
## SEVERAL AREA SUCCEEDED IN REDUCING WASTE

| NO | AREA | HOUSEHOLD | WASTE VOLUME (M3/ BLN) | |
|---|---|---|---|---|
| | | | BEFORE | AFTER |
| 1 | Rungkut Lor RW IV | 1,165 | 65 | 16 |
| 2 | Mojo RW XII | 1,156 | 262 | 139 |
| 3 | Kebunsari RW II | 638 | 63,16 | 21,76 |
| 4 | Wonokromo RW V | 523 | 46,32 | 0 |
| 5 | Komplek Kenjeran RW I | 260 | 90 | 0 |
| 6 | Pakis RW III | 1,056 | 202,8 | 147,33 |
| 7 | Karah RW V | 500 | 58 | 13,34 |
| 8 | Margodadi RW VII | 691 | 178 | 60,25 |
| 9 | Jambangan RW II | 510 | 68 | 26 |
| 10 | Kedung Baruk RW V | 350 | 14,4 | 4,32 |
| 11 | Tenggilis Mejoyo RW IV | 791 | 420 | 90 |
| 12 | Ketintang RW III | 720 | 618 | 210,4 |
| 13 | Margorukun RW X | 617 | 186,04 | 65,05 |

## IMPLEMENTATION OF 3R IN SURABAYA

!!!. Reward and Punishment
- Reward given to community willing to process waste is given through Green and Clean event
- Reward to environmental cadre is given through national day awarding
- Law Enforcement through Judicial Operations

**Community participation through Surabaya Green and Clean**








## Surabaya Green and Clean 2005-2010













## Creative recycling

## SEVERAL AREA SUCCEEDED IN REDUCING WASTE
(TOP 50 SURABAYA GREEN AND CLEAN 2010)

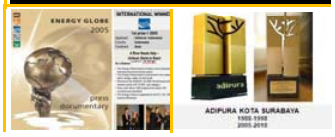
| No. | District | Sub-District | RW |
|---|---|---|---|
| 1. | Wonokromo | Gundih | 1 |
| 2. | Bubutan | Gundih | 8 |
| 3. | Bubutan | Gundih | 9 |
| 4. | Bubutan | Gundih | 6 |
| 5. | Bubutan | Jepara | 4 |
| 6. | Bubutan | Gundih | 7 |
| 7. | Jambangan | Jambangan | 1 |
| 8. | Jambangan | Jambangan | 2 |
| 9. | Jambangan | Jambangan | 5 |
| 10. | Jambangan | Pagesangan | 1 |
| 11. | Jambangan | Kebonsari | 1 |
| 12. | Jambangan | Karah | 5 |
| 13. | Jambangan | Jambangan | 2 |
| 14. | Tambak Sari | Gading | 13 |
| 15. | Tambak Sari | Tambak Sari | 6 |
| 16. | Semampir | Pegirian | 6 |
| 17. | Semampir | Pegirian | 10 |
| 18. | Wonocolo | Margorejo | 1 |
| 19. | Wonocolo | Margorejo | 5 |
| 20. | Wonocolo | Margorejo | 4 |
| 21. | Dukuh Pakis | Gunung Sari | 4 |
| 22. | Dukuh Pakis | Dukuh Kupang | 7 |
| 23. | Sawahan | Pakis | 5 |
| 24. | Sawahan | Pakis | 10 |
| 25. | Sawahan | Banyu Urip | 4 |

## SEVERAL AREA SUCCEEDED IN REDUCING WASTE
### (TOP 50 SURABAYA GREEN AND CLEAN 2010)

| No. | District | Sub-District | RW |
|---|---|---|---|
| 26. | Sawahan | Banyu Uro | 8 |
| 27. | Benowo | Babat Jerawat | 8 |
| 28. | Gubeng | Gubeng | 2 |
| 29. | Gubeng | Barata Jaya | 8 |
| 30. | Gubeng | Mojo | 12 |
| 31. | Gubeng | Kertajaya | 12 |
| 32. | Gubeng | Gubeng | 1 |
| 33. | Rungkut | Rungkut Kidul | 9 |
| 34. | Rungkut | Kedung Baruk | 3 |
| 35. | Genyhgan | Kalirungi | 3 |
| 36. | Wonocolo | Margorejo | 6 |
| 37. | Kenjeran | Kejawan | 13 |
| 38. | Sukomanunggal | Tanjungsari | 2 |
| 39. | Tegal Sari | Kedungdoro | 2 |
| 40. | Krembangan | Dupak | 3 |
| 41. | Krembangan | Perak Barat | 4 |
| 42. | Lakarsantri | Lidah Kulon | 4 |
| 43. | Pabean Cantikan | Perak Timur | 2 |
| 44 | Asemrowo | Asemrowo | 1 |
| 45. | Kenjeran | Krukah Kenteng | 7 |
| 46. | Wonokromo | Ngagel Rejo | 10 |
| 47. | Wonokromo | Ngagel Rejo | 5 |
| 48. | Genteng | Peneleh | 5 |
| 49. | Bulak | Kamal, Kenjeran | 2 |
| 50. | Gunung Anyar | Rungkut Tengah | 6 |

## SURABAYA ACHIEVEMENT IN ENVIRONMENT

1. *ASEAN Environment Suistanable City Award 2011*
2. *Asian cities of the future* 2009/2010
3. *"Dubai International Award For Best Practices to Improves The Living Environment 2008" for Green and Cleos Initiative Indonesia*
4. *"The Green Apple Award* 2007" for Environmental Best Practice
5. *Energy globe* 2005
6. Adipura 1988-1998 dan 2005-2010
7. Adiwiyata
8. Wahana Tata Nugraha
9. *Green Building* di Kota Surabaya: *ASEAN Center for Energy Award* (2002: Graha Pangeran, 2006: Graha Wonokoyo)


# *Introduction to the municipal waste administration*

International Environmental Strategies Division
Environment Bureau
City of Kitakyushu

1. What is waste?
2. History of Japan's waste administration
3. Waste administration of Kitakyushu City
   - (1) Kitakyushu City's view on the waste treatment
   - (2) Waste treated by Kitakyushu City
   - (3) Handling of waste other than the waste collected by the administration
   - (4) Toward further reduction of the household-related waste
   - (5) The latest situation and the challenges of Kitakyushu City

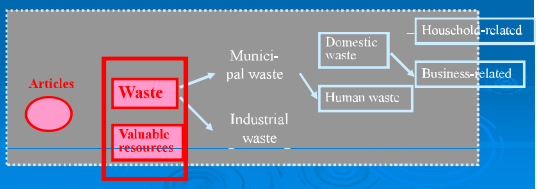
## 1. What is waste?

### *Definitions of waste*

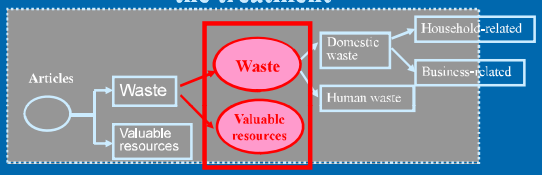
- *Definitions*

"Waste" refers to refuse, bulky refuse, ashes, sludge, excreta, waste oil, waste acid and alkali, carcasses and other filthy and unnecessary matter, which are in solid or liquid state.

("Waste Disposal and Public Cleansing Law")




### Kinds of waste and the parties responsible for the treatment




**Municipal waste**
Waste other than industrial waste
→ **Treated by the local government**

**Industrial waste**
Ashes, sludge, waste oil, waste acid and alkali, waste plastics and others stipulated by the government ordinances (total 21 items) among all the wastes left as a result of business activity
→ **Treated by the discharging businesses**

### Examples of the Industrial Waste

Sludge | Waste oil | Waste plastics

Slag | Rubble | Soot and dusts

Source: "Industrial Waste in Japan, 2005" of the Ministry of the Environment

## The system of law for establishing the recycling-based society

**Basic Law for Establishing the Recycling-Based Society (Enforcement in January, 2001)**

A basic framework law for realization of the recycling-based society

**[Promotion of recycling]**

**Law for the Promotion of Effective Utilization of Resources**
Enforcement in April, 2001

**[Promotion of proper treatment of waste]**

Waste Disposal and Public Cleansing Law

**Enactment of various recycling-related laws: Regulation to meet the characteristics of respective articles**

Container and Packaging Recycling Law, Home Appliance Recycling Law, Food Recycling Law, Construction Material Recycling Law, End-of-Life Vehicle Recycling Law

Law on Promoting Green Purchasing

## The role assignment between parties

- **The role of the municipality**
  - ㋑ To promote citizens' voluntary activities with regard to the reduction of waste within the jurisdiction
  - ② To take necessary measures for proper treatment of waste
  - ③ To make efforts toward efficient operation in the implementation of waste management such as development of employees' capacity, maintenance of the facilities and improvement of the work method
- **The role of the citizens**
  - ① To restrain generation of waste ② To sort and discharge waste
  - ③ To promote reuse of waste by making use of reusable matters
  - ④ To cooperate with the municipality for the reduction of waste and its proper treatment
- **The role of the businesses**
  - ① Discharger's responsibility
    To treat properly on the discharger's own responsibility
  - ② Extended producer responsibility
    To improve the design of products, containers, etc. and to take back and use them and so on
- **The role of the national government**
  - ① To collect, arrange and use information so that waste be properly managed
  - ② To promote technical development with regard to treatment of waste and to give technical and financial assistance to the municipalities etc.

## Responsibility of the businesses
### ~ Extended producer responsibility (EPR) ~

**A policy aiming at the control of generation of waste by "holding the producers responsible not only for the production and delivery of the products but also for the disposal of the products after use"**

Manufacturing enterprises are held responsible to a certain degree to reduce throwaway products and increase durable products, easy-to-recycle products or products less apt to become waste so that reuse and recycle of products perform a function in the market economy.

## 2. Waste administration of Kitakyushu City

(1) Kitakyushu City's view on the waste treatment
(2) Waste treated by Kitakyushu City
(3) Handling of waste other than the waste collected by the administration
(4) Toward further reduction of the household-related waste
(5) The latest situation and the challenges of Kitakyushu City

## (1) Kitakyushu City's view on the waste treatment

- **Transition of the view**

**Disposal-oriented process (Before1993)** Prompt and safe disposal of the discarded waste → One-way structure where the citizens discard the waste and the city disposes it

(Advancement in the amenity of everyday life)
→ Increase in the waste volume
→ Diversification of waste materials (e.g. plastics)
→ Increase in the throwaway products

**Recycling-oriented process (From 1993)** Introduction of the point of view of recycling materials → Initiation of the sorted collection of cans and bottles (1993)
→ Initiation of the sorted collection of PET bottles, initiation of the spot collection of cartons and white foam trays, and so on

**Environmentally-sound process (From 2000)**
Reducing, reusing and recycling waste and green purchasing (Purchasing and using recycled products)

## Basic plan of the municipal waste treatment in Kitakyushu City

- **Formulation in February, 2001**
- **Basic philosophy: From the "disposal-oriented process" to the "environmentally-sound process"**
- **Increase in the recycling rate : From 13% to 25%**
  **→ Development of comprehensive policies based on reducing, reusing and recycling waste including the purchase and use of recycled products (Green Purchasing)**
- **Planned implementation term: 10 years up to and including 2010**

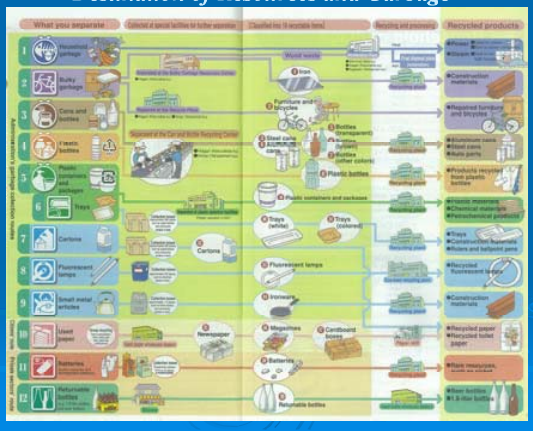
## Basic view on the sorting and recycling of waste

1. **Understandability for the citizens**
   → To refrain from classifying too precisely to sort
2. **Establishment of the recycling technology, demand for the recycled products**
   → Materials would not be recycled without a recycling mechanism.
3. **Efficiency including the cost performance**
   To make maximum use of the private and citizens' collection routes
   → The cost for collection would increase along with the increase in the kinds to be sorted.

## (2) Waste collected by Kitakyushu City

- Household-related waste (twice a week) (50-yen charge/45 liter bag)
  → Garbage, waste paper, plastic products, etc.
- Bulky waste (once a month) (300-yen to 1000-yen charge)
  → Furniture, bedclothes, etc.
- Plastic containers and packaging (once a week) (12-yen charge/25 liter bag)
- Cans, bottles and PET bottles (once a week) (12-yen charge/25 liter bag)
- Cartons, food trays, small metallic articles, fluorescent tubes (from time to time)
  (Into the collection boxes placed in the supermarkets etc. in the city)
- Brought-in waste (100-yen charge/10kg)
  → Waste brought into the facilities of the city by enterprises or collection and transportation businesses (700-yen charge/100kg before October, 2004)

## *Destination of Resources and Garbage*



## ① Flow of the household-related waste treatment

**From the collection and transportation to the incineration and final disposal**

## Designated bags of household-related waste


## Waste-collection point (Gomi station)

## A scene of collection of the household-related waste

Refuse truck

## Final disposal of waste

## ② Sorted Collection of Recyclable Materials 1

→ **Waste collection in the paid designated bag – once a week**

(Materials brought by the citizens in the designated bag to the recycling material station will be collected)

1. Cans and bottles
2. PET bottles
3. Plastic containers/packaging

## Designated bags of recyclable waste


## Plastic Containers/Packaging

This symbol is the marker.

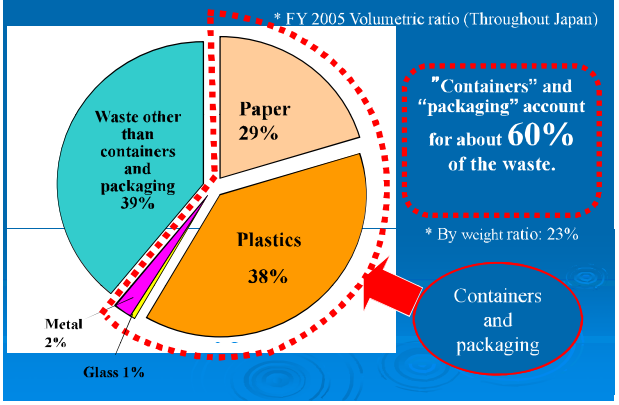
Those are the plastic containers and packaging that become waste when the contents in them are used up.


* Those not the ~~object of sorting as "plastic containers and packaging"~~

- Plastic goods other than containers or packaging

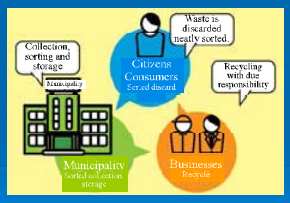
Examples: Plastic goods such as video tape, toy, washbowl, etc.

## The rate of containers and packaging accounting for the household-related waste



## Containers and Packaging Recycle Law (Enforcement in 1995)

To establish a recycle system by which the amount of containers and packaging is reduced as far as possible and the discarded containers and packaging are recycled.




Citizens
→ Correct sorting

Municipality
→ Collection, storage

Businesses manufacturing or using containers and packaging
→ Recycling with due responsibility

## Collection spots of the recyclable waste (Cans, bottles, PET bottles and plastic containers and packaging)

## A scene of separation of the recyclable waste

Cans and bottles recycling center

Plastics recycling center

## ③ Sorted Collection of Recyclable Materials 2

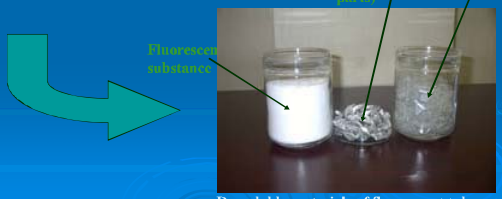
→Things collected in special collection boxes placed at different locations such as certain supermarkets in the city.

1. Cartons and trays
2. Fluorescent tubes
3. Metal objects (pots, kettles, etc)

## Collection box of food tray at supermarket



## Recycling of fluorescent tubes




Recyclable materials of fluorescent tubes

## A collection box of small metallic articles

## (3) Local Efforts for Recycling Domestic Garbage

①Waste paper
(Subsidizing 7yen/kg for the collection by the local volunteer organizations (depending on collection methods). The organizations also collect waste cloth and reused bottles.)

②Composting of food waste
(Composting domestic food waste and utilize manure at schools or parks to grow flowers, etc.)

③Pruned branches/mowed grass
(Partially collected by the neighborhood associations to be composted after being used in factories as spread under the livestock)

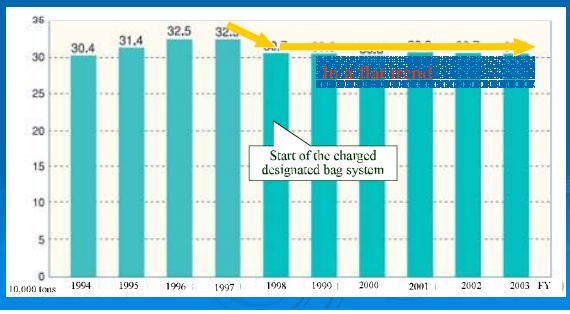
④Waste food oil
(Partially collected by the neighborhood associations and used as fuel for the waste collection vehicles after refinement.)

## (4) Toward further reduction of the household-related waste

~ Revision of the household-related waste collection system ~
(Coming into practice in July, 2006)

## Transition of the amount of waste until the revision of the system

Reduction of 6% was achieved by introducing the system of designated bags for household-related waste in FY 1998. After that, however, the amount of waste has been in a flat trend.




## Basic concept of the revision

1. Further promotion of recycling and reduction of waste
2. Securement of fairness of the cost sharing
3. Sharing of a certain degree of responsibility by the citizens as the dischargers
4. A large amount of cost related to waste treatment and recycling

Enrichment of the recycling and separation system

Improvement of the awareness toward reduction by the revision of the charge

Putting the two schemes together

To aim at the reduction of waste by 20%

## The early-morning manner improvement campaign

A scene of the starting day of the sorting system of plastic containers and packaging

- About 13,200 persons attended the early-morning guidance throughout the city.
  (About 11,700 citizens, 1,550 city employees)
- The total number of attendants during the 10 days from 6:30 to 8:30 am counted to about 100,000 persons.
  (There is no similar example in other cities of the same size.)

## The reduction effect immediately after the revision of the collection system of household-related waste

(The total amount of waste collected from July to December, 2006)

| From July to December, 2006 | (For comparison) From July to December, 2003 |
|---|---|
| 93,484 tons | 126,815 tons |

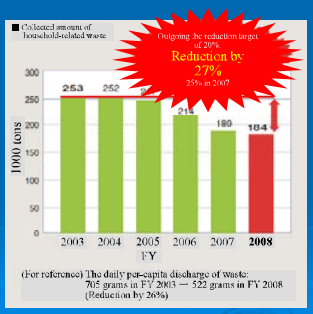
→ **Reduction of about 33,300 tons, with the reduction rate of 26%**

Right before the revision



Immediately after the revision

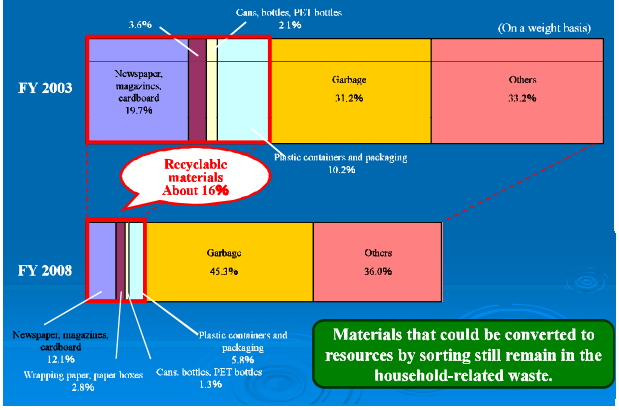
## Recent record of the collected amount of household-related waste




| 2003 | 2008 |
|---|---|
| 258,306 tons | 187,707 tons |

**70,599 tons**
(Reduction by 27%)

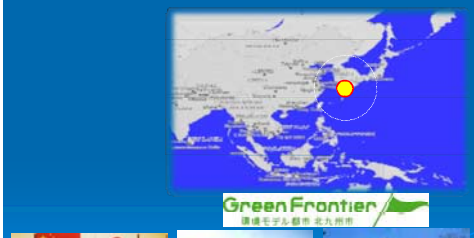
## Composition of the waste in the designated bags for household-related waste

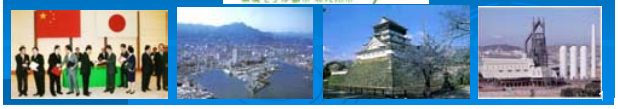



**Materials that could be converted to resources by sorting still remain in the household-related waste.**

## Kitakyushu Green Growth Strategies

**International Environmental Strategies Division**
**Environment Bureau, City of Kitakyushu**



## Kitakyushu Green Frontier Plan

Strategy for Low Carbon Economy

**Sustainable Society with Accumulated Prosperity by Generations**

☑To Reduce $CO_2$ to Protect the Environment
☑To achieve Happiness and Health & Comfortable and Convenient Life
☑To simultaneously Achieve Sustainable Economic Development
*~Not Compression but promotion of Economy~*

**$CO_2$ Reduction Target with 40% of Economic Growth in 2050**
☑ City Area : **50%**
☑ Asian Region: equivalent to **150%** the Kitakyushu's Emission

5 Strateries for sustainable development

Urban Development | Industrial Development | Human Development | Social Development | Sustainable Development in Asia

## Japan's New Growth Strategy

~Scenario for revitalizing Japan~ Approved by the Cabinet in June 2010

Toward Becoming the World's No.1 Environmental Energy Power

One of the seven strategic fields
**Green Innovation**
[Target by 2020]
New market of over 50 trillion yen
New jobs for 1.4 million workers

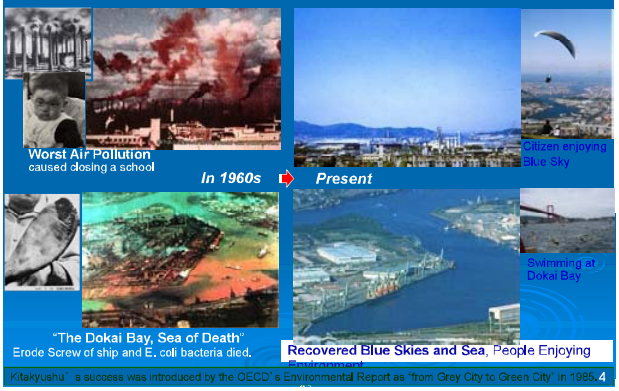
One of the 21 national strategic projects
Deployment in Asia
Integrated infrastructure deployment overseas
[Target by 2020]
New market of 19.7 trillion yen

Kitakyushu City's 2020 target (in GDP equivalent)
**New market of 350 billion yen, new jobs for 10,000 workers**

3

Kitakyushu's Resources & Capabilities for Low Carbon Economy

## Overcoming Severe Environmental Pollution




Kitakyushu's success was introduced by the OECD's Environmental Report as "from Grey City to Green City" in 1985. 4

Kitakyushu's Resources & Capabilities for Low Carbon Economy

## Key Factors: Partnerships among Multi-Stakeholders



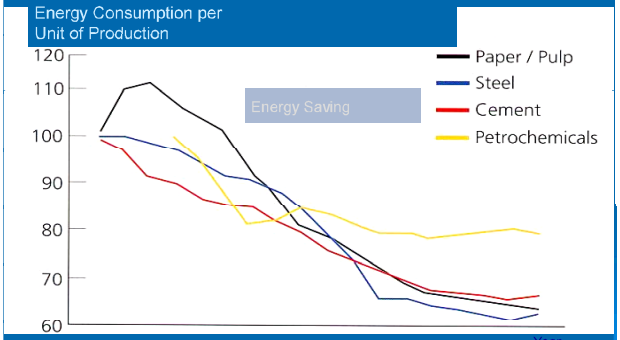
- Local Initiative & Partnership
- Environmental Technology & Environmental Investment
- Education & Participation of Citizens
- Environmental Governance

Reference: ESCAP "Kitakyushu Initiative for a Clean

5

Kitakyushu's Resources & Capabilities for Low Carbon Economy

## Co-Benefit: Saving Energy

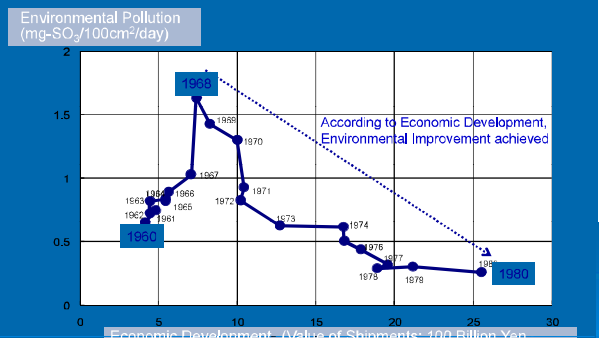



Cleaner Production increases productivity

45 6

Kitakyushu's Resources & Capabilities for Low Carbon Economy

## Co-Benefit: Economic Development and Environmental Achievement




Reference: World Bank, MEIP Report, 1993

7

Leading Urban Development with integrated Low Carbon Technologies

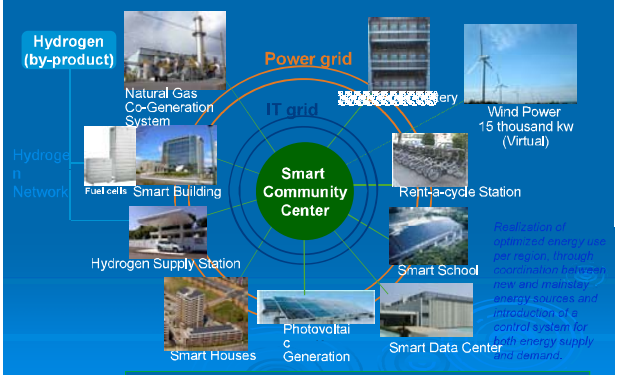
## Zero Carbon Emission Town Development (Jono Area)

1) Private Vehicle Free Zone with Convenient Public Transportation System
2) Power Self-Support by the use of Renewable Energy
3) Long-life Housing with High Heat Insulation materials and Energy-saving Facilities
4) Rich Greenery with People's Planting
5) Environmentally Friendly Town with People's advanced awareness and activities

8

Leading Urban Development with integrated Low Carbon Technologies

## Kitakyushu Smart Community Project (Higashida Area)




$CO_2$ Reduction: 50% Investment: $ 150 million (Tentative)

9

## Industrial Development by Using of Local Potential

### Smart Usage of Industrial Potential Energy

Large-scale of Photovoltaic Generation on Roofs of Factories

Usage of Abundant potential Energy of Factories

Houses & Buildings

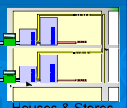
Urban Agriculture

Hydrogen Town

Coke Factory

Hydrogen

Hydrogen Station for Vehicle



Houses & Stores

1

## Industrial Development by Using of Local Potential

### Kitakyushu Eco Premium

*Low Carbon Economy through Products and Services*

**Water-saving type automatic faucet with a self-power generation function**
*(TOTO)*

**Rented type Eco-Apartment House with Photovoltaic Generation, First in Japan**
*(Shibauratokki)*

**Efficient electromagnetic plate and sheet which contributes to energy saving**
*(Nippon Steel)*

o environmental impact reduction in the city are designated as the "Eco-Premium" Environmental consideration activity of the whole city through industrial field is promoted to its expansion and osmosis.
Point: Saving Energy, Saving Resources, Maintenance Free, etc.

1

## Promoting Eco Industry in Kitakyushu

### Kitakyushu Eco-Town

**for facilitating Resource Circulation and Eco-Industries**

Practical Research Area
**Facilities for Practical Research: 16**

Comprehensive Eco-Industrial Complex,
Hibiki Recycling Area

Environment:

Economy:

61.4%

1

## Promoting Eco Industry in Kitakyushu

### Examples of Resource-Circulation Projects in Kitakyushu Eco-Town

Plastic PET Bottle Recycling Project

Office Equipment Recycling Project

Home Appliance Recycling Project

Automobile Recycling Project

1

## Kitakyushu's International Cooperation with Asian Cities

### Asian Partnership Programme towards Shared Prosperity

**Trainees Received: 138 countries 6,207 people**
**Experts Dispatched: more than 160 people**
**Coordinating Cities' Cooperation Network in Asia Promoting Environmental Projects in Asia**


City-to-City Environmental Cooperation Network

City of Dalian's Environmental Improvement, China

Dalian received the Global 500 Award from UNEP

Exchange of Memorandum on Cooperation for establishing Eco-Town with Tianjing at Prime Minister's Office

City of Surabaya's Composting Project, Spreading to more than 20 thousand households

1

## Towards Realizing Low Carbon Economy in Asia

### Kitakyushu Asian Center for Low Carbon Society

President

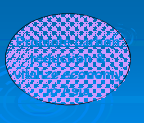
Advisory Board

KITA CITY IGES Asia Green Camp

Assistant technology transfer

Develop Specialists

Conduct Surveys/Researches& release info



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Towards Realizing Low Carbon Economy in Asia

## Method of Technology Transfer

**Services for Private Enterprises**

1 Integrate technologies as a customized package

2 Assist technologies renovation to address needs

3 Assist verification testing

4 Assist in surveys for confirming marketability

5 Assist in submission of application for subsidy

6 Sending a delegate etc.

**Establishment of Business Model For Technology Transfer**

Technology Transfer to Asian Market

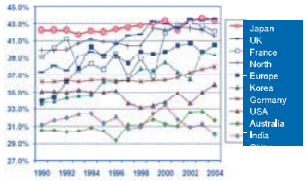
Utilizing a network of Asian cites

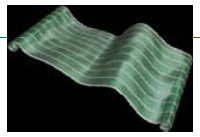
/Asian City Network for Environmental Improvement /Organization for the East Asia Economic Development

1

Towards Realizing Low Carbon Economy in Asia

## Kitakyushu's Low Carbon Technologies relevant to Asian Region

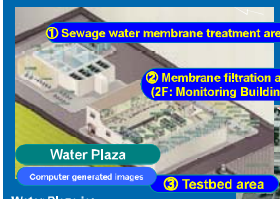


Towards Realizing Low Carbon Economy in Asia

## Example of System Technology Application

### Pilot plant for water recycling (Water Plaza)





**Water Plaza is:**

A water recycling pilot plant combining membrane filtration of waste water and seawater desalination (capacity: 1,400m³/day)

- Development & demonstration of world-class technology
- Showroom function for communicating information
- Application in field training of overseas trainees

Water output from sewage water 1,000m³/day
Output from seawater 400m³/day
(Startup in FY2010 scheduled)

1

Towards Realizing Low Carbon Economy in Asia

## International Attention to Local Actions

Mr. Xi Jinping, Vice President of the People 's Republic of China, visited Kitakyushu on 16 December 2009.

**People 's Daily on 17 December 2009:**

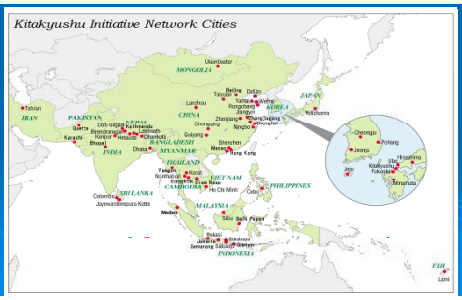
***The City of Kitakyushu has rich experiences on environmental conservation and advanced technologies, and Kitakyushu would be worth the model for Chinese cities.***

1

Towards Realizing Low Carbon Economy in Asia

## Development of WIN-WIN Relations

We will challenge to achieve mitigation of environmental pollution and realization of low carbon economy as well as improvement of quality of life with green jobs in Asia.
Kitakyushu hopes to be the base of low carbon revolution in Asia.




2

## Institute for Global Environmental Strategies (IGES)

# Replication of Surabaya's Composting Practices:
## A main activity of the Kitakyushu Initiative

JICA Kyushu, 30 June 2011
Toshizo Maeda, IGES Kitakyushu Urban Centre



### Background

Status in 2001

(Photo courtesy of PKK Surabaya)

New **Benowo Landfill**: 800 scavengers; 35km from city centre; Surrounded by fish ponds; demand for waste reduction is high

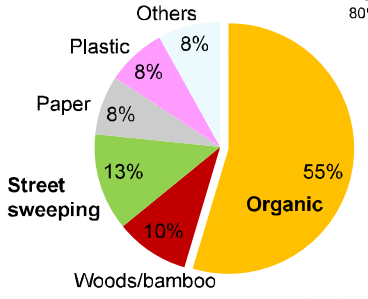
Current Status

Keputih Final disposal site was closed in 2001 due to opposition by residents. Waste filled the streets and drains.





### Waste Composition in Surabaya




Source: KITA (2002)

**Organic waste** shares more than half (as much as 70-80%) of total amount of waste generation

Prioritize reduction of **organic waste**

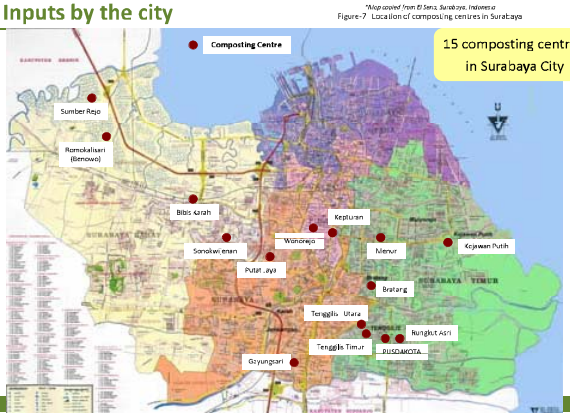
Promote **composting**
A) at each household
B) at composting centres





### Inputs by the city

*Map scaled from El Sera, Surabaya, Indonesia
Figure-7 Location of composting centres in Surabaya



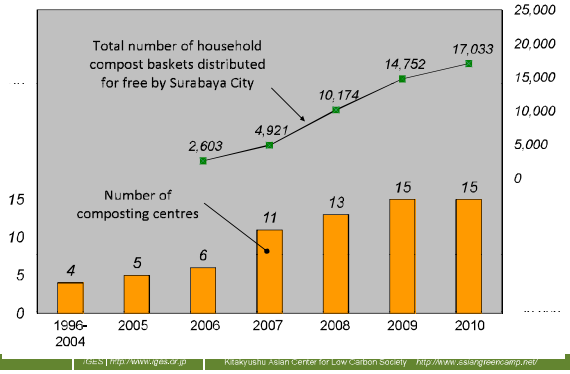

15 composting centres in Surabaya City





### Inputs by the city

(Data source: Cleansing and Landscaping Dept., Surabaya)



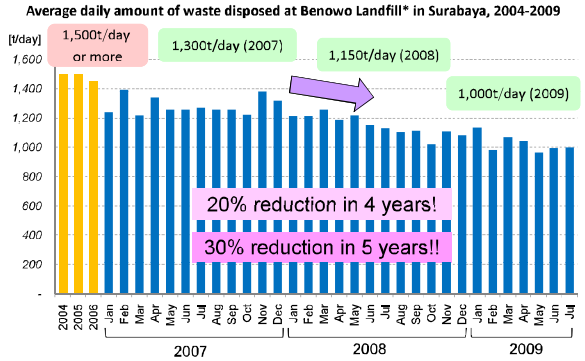





### OUTPUT: WASTE REDUCTION

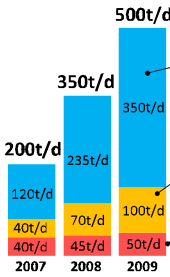
* Note: Benowo is the only final disposal site in Surabaya City.
(Data source: Cleansing and Landscaping Department, Surabaya)

**Average daily amount of waste disposed at Benowo Landfill* in Surabaya, 2004-2009**



## Output: waste reduction

(Data source: Cleansing and Landscaping Department, Surabaya)




**1 tonne of composting reduces additional 1-2 tonnes of dry waste.**

**Reuse** and **Recycling** of other **dry waste**

**Composting** at **each household**:
17,000 units distributed for free by Surabaya City
27,000 cadres train 3 household each (=81,000 hhs) (assumption)
1,300 units of a communal type distributed by Surabaya City,
which caters for about 5 households each (= 6,500 households)
→ 100,000 households x 1kg/day/household → 100t/day

**Composting** at **15 composting centres**:
Cleansing Department: 14 composting centres, 50t/d (= 100m³/d)
PUSDAKOTA (NGO): 1 composting centre, 1.4t/d

100t/d reduction by household composting,
50t/d reduction at composting centres,
**Composting capacity**: **150t/day**

Remaining **120t/d** (2007) – **350t/d** (2009) reduction by **Reuse** and **Recycling**.





## Social and environmental benefits


Better household environment

Greener and cleaner streets

Environmental education tools





## Social and environmental benefits

Employment

Production of herbs and vegetables using compost



Income by selling compost

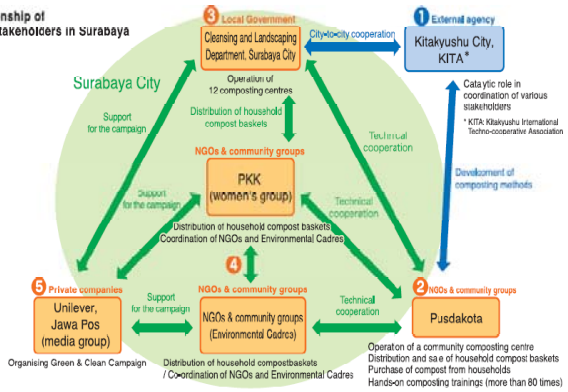
Waste segregation and promotion of recycling





## Main Stakeholders

**Relationship of main stakeholders in Surabaya**








## Surabaya's successful solid waste management model

**Step 1.**

**Development of a model community, from 2004 to 2006:**

Cooperation between Kitakyushu International Techno-cooperative Agency (KITA) and Pusdakota (a local NGO),





## Starting a model project

(photo courtesy of KITA)

Waste composition survey

Shredding of waste

Mixing with seed compost

Temperature measurement

Fermentation and pH tests

Explaining how to use baskets to residents

## Development of a model community (Pusdakota (NGO)'s activity)


Segregated waste collection from the community


Shredding at the composting centre


Fermentation


Household compost basket

Selling compost


Green streets using compost





## Achievements by KITA's intervention

(photo courtesy of KITA)

PUSDAKOTA's compost centre: before and after KITA's intervention





## Surabaya's successful solid waste management model

**Step 2.**

**Scaling up the model project by the City Government, from 2005 – 2011:**

- Setting up composting centres
- Distributing compost baskets to residents





## Composting and its positive impacts in Surabaya

(Photos cited from "Sparkling Parks in Surabaya", Cleansing Department, Surabaya City, 2008)


Parks became greener using compost


Streets became greener using compost


Bratang Composting Centre


Sonokwijenan Composting Centre


Keputran Composting Centre





## Activities of PKK (a women's group) and Environmental Cadres

Waste segregation training


Explaining how to use compost baskets

Manufacturing bags from waste


Meeting of Environmental Cadres


Activities of Environmental Cadres


Environmental Event

(Photo courtesy of PKK Surabaya (top row) and Environmental Cadre of Tegalsari, Surabaya (bottom row)





## Surabaya's successful solid waste management model

**Step 3.**

**Organisng a community clean-up campaign, from 2005 – 2011:**

- Cooperation with NGOs, private companies and the media
- Successful involvement of citizens in the waste management activities

## Community and Private Sector Involvement


(Photo courtesy of Uli Pedoth)

Award winning community

Green streets

Campaign sponsors

Entrance to a community

Products made from waste

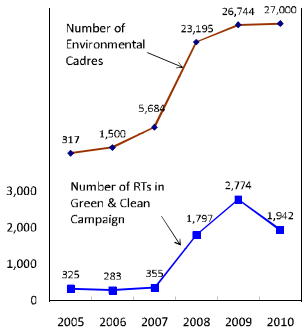
Award winning housewives group





## Community Environmental Leaders (Cadres)

Source: Surabaya City




There are 27,000 environmental Cadres (community environmental leaders) in Surabaya City

More than 20% of communities (RT) participate in the Green & Clean Campaign

Number of Environmental Cadres and participating communities in Green & Clean Campaign





## Surabaya's successful solid waste management model

**Efficient Composting Method**

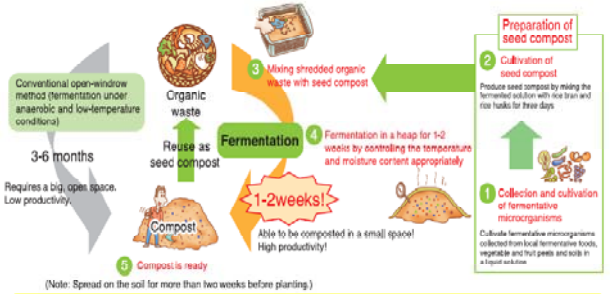
- **High productivity (within 2 weeks)**
- **Using only local materials**
- **No offensive smell, no leachate**
- **Fast, cheap and good quality!**





## COMPOSTING METHODS

Figure 8 Operational flow of Takakura Composting Method
(Prepared by Maeda (2003, with technical supervision by Koya Takakura, JPec Co., Ltd.)




(Note: Spread on the soil for more than two weeks before planting.)

Features:
1. **Fast** and less space requirement
2. No foul smell (not rotting)
3. **Low-cost**, low-tech and easy operation
4. Using **only local materials**
5. Active microorganism in compost enriches the soil





## Composting Options

Organic waste from households

Location of composting

Household compost baskets
(17,000 baskets distributed)

Community composting centre
(PUSDAKOTA's case)

Composting methods

Takakura Home Method (THM)

Takakura Susun Method (TSM)*

New Windrow Method

Organic waste from vegetable markets

Market waste composting centre
(14 centres under Cleansing Dept)

New Windrow Method

Types of composting options in Surabaya



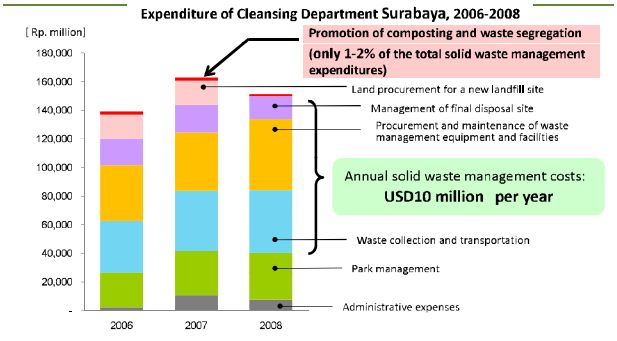


## Surabaya's successful solid waste management model

**Financial Analysis of Composting Practices**

- **Is composting financially sustainable?**

## Costs of composting promotion




Annual solid waste management costs: **USD10 million per year**

Figure 5 Annual expenditures of Cleansing and Landscaping Department, Surabaya, 2006-2008
(Data source: City Development Planning Department (BAPPEKO)Cleansing and Landscaping Department, Surabaya; prepared by Moeda (2009))





## How much is the solid waste management cost per tonne?

Waste management cost **in Surabaya**: (collection and landfill management) **USD10 million/year** (2007)

Divided by 1,300t/day x 365days: **→ USD21/t**

Landfill construction cost (27ha): **USD6.5 million**

Divided by 1,500t/d x 365days x 5yrs & 1,300t/d x 365days x 2yrs **→ USD2/t** (not including cover soil)

Waste management cost: **USD23/t** or more





## Is operation of a composting centre financially sustainable?



**PUSDAKOTA (NGO)'s composting centre:**
**1.4t/day collection →** 40t/month collection
**→** 10t/month of compost production

Sales of compost: 10t/month @ USD100/t
**→** Income **USD1,000/month**

Expenditure: **USD650/month**
(incl. labor and utility costs)

**→** Profit: **USD350/month** = USD4,200/year
**→ Can purchase a new shredder!!**
**(If all the compost is sold…)**

Plus, cost saved from waste reduction (40t/month)
**→** Hidden profit: 40t/month x USD23/t = **USD900/month = USD11,000/year**
**→ City government may think about giving a subsidy for building a composting centre.**



## How much did the city save by reducing waste?

Composting centre

**14 composting centres** in Surabaya City:
Composting **50 t/day** = **1,500 t/month**

Compost production: **300t/month** (20% of input)
**→** Replacing the purchase of **soil conditioners**
300t/m x USD20/t = **USD6,000/month**

Soil conditioners

PLUS, cost saved from waste reduction:
1,500t/month x **USD23/t**
= **USD34,000/month**

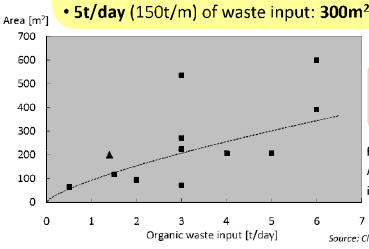
**→Profit: USD40,000/month**
**= USD48,000/year**





## How much space is required for a composting centre?

**Necessary space** for a composting centre (incl. the office space):
- **1t/day** (30t/m) of waste input: **100m²** → Compost production: **6t/m** (Income: USD600/month)
- **3t/day** (90t/m) of waste input: **200m²** → **18t/m** (USD1,800/m)
- **5t/day** (150t/m) of waste input: **300m²** → **30t/m** (USD3,000/m)




Source: Cleansing and Landscaping Department Surabaya

Composting Centre is operational in **a small space**!

Fig. Area of composting centres and Amount of processed organic waste in Surabaya





## Does free distribution of compost baskets make business sense?

Distribution of **household compost baskets in Surabaya**:
- **17,000 units** distributed for free by the city in 5 years
- Distribution cost: USD10/basket x 17,000 = USD170,000
- Campaign cost: USD10/basket x 17,000 = USD170,000
- Total cost: **USD340,000**

Benefit:
- Waste reduction: **17t/day** (= 17,000 households x 1 kg/day/household)
- Cost saved from waste reduction: 17t/d x 365days x USD23/t
  = **USD140,000/year**

**Cost recovery in 2.5 years!**

Enlarged benefit:
- Waste reduction: **40t/day** (2007)
- Cost saved from waste reduction: 40t/d x 365days x USD23/t
  = **USD330,000/year**

**Cost recovery in 1 year!!**

## Why people practice composting at home?

**Household financial analysis:**
Organic waste: **1kg/day/household**
→ **30kg/month**
→ Compost: **6kg/month** (20% of input)

Purchasing price: **USD0.07/kg** (= USD70/t)
→ Income: USD0.42/month
→ **Not enough economic incentive.**

Purchased by Pusdakota (NGO)


**Main driving forces** are:
**improvement of kitchen environment & self-use of compost** for plants and gardens

**Dropping out rate is High!**
(only 20% continue practicing)

→ **Need a monitoring system (= Community environmental leaders)**





## Estimated GHG emissions avoided at landfills

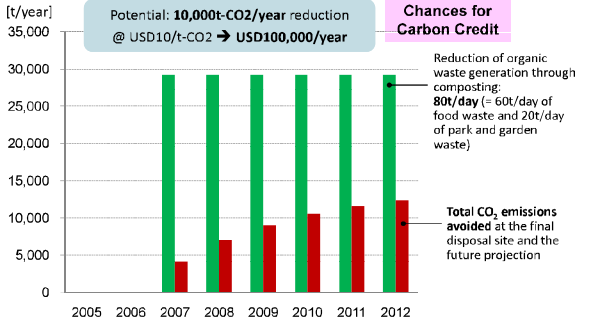



Figure 6 Reductions of organic waste generation and consequent greenhouse gas emissions in Surabaya (Prepared by Maeda (2009), based on the first order decay model from "Tool to determine methane emissions avoided from disposal of waste at a solid waste disposal site (version 04.)", CDM Executive Board, UNFCCC)





# Recommendations for other cities to achieve 10-20% waste reduction in 3 years





## e.g. Actions for 10-20% reduction in waste generation

10-20% reduction target

Inputs in **Surabaya**:
Waste generation: 1,500 t/day → 1,300 t/day
→ Composting Centres: processing **40 t/day (= 2-3% of total waste)**
Population: 3 million (= 600,000 households)
→ Household compost baskets: **17,000 units (= 2-3% of households)**

Inputs in **Sibu**, Malaysia **(proposal):**
Waste generation: 130 t/day → 110 t/day **(15% reduction)**
→ Composting Centres: process **5 t/day (= 4% of total waste)**
Population: 200,000 (= 40,000 households)
→ Compost baskets: **1,000 households (= 2.5% of households)**





## e.g. Possible actions in Sibu, Malaysia

Target 20 t/day reduction
**130 t/day → 110 t/day**
(**5 t/day** by composting & 15 t/day by recycling)

1. **Market-waste composting centres**
   - Process **2 t/day** (= producing 0.4 t/day)
2. **Composting centres** in communities and schools
   - Process **0.5t/day** @ 4 sites → **2 t/day**
3. Distribution of **compost baskets** to residents
   - 1,000 households (2.5% of the total households) → **1 t/day**
4. Organising a community clean-up **campaign**
   - Involve private companies, local newspapers and TV programmes
5. Compost **purchasing scheme**
   - City starts purchasing the compost for park maintenance
   - Free distribution to farmers; marketing of compost
6. **Technical assistance** by Kitakyushu City, KITA, IGES and JICA

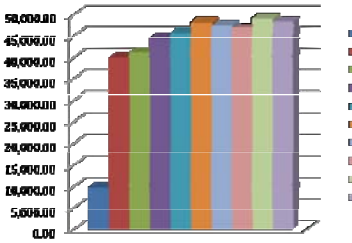




## Results in Sibu, Malaysia

Total amount of solid waste is not decreasing…

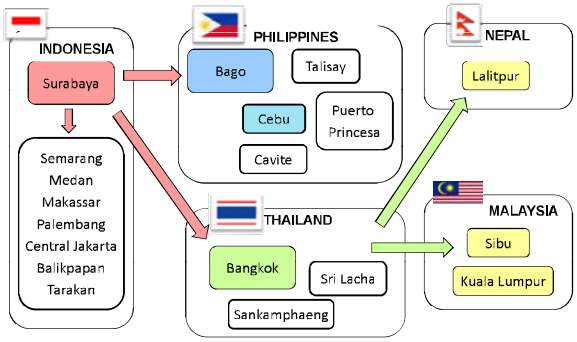
- Population is increasing
- Economy is growing
- More consumption, more waste
- The scale of composting practices may not be large enough…




It requires **a systematic and city-wide approach** to achieve total waste reduction.

**Commitment by the Mayor** (leader) and responsible officers is a prerequisite.

## Spreading Surabaya's model in other cities and countries

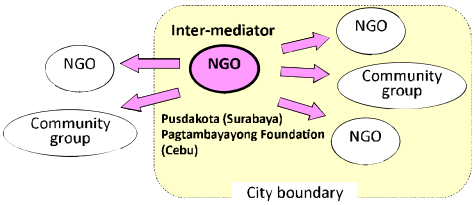







## Model 1: Replication by NGOs

Roles of **inter-mediators** are essential for replicating/scaling up good practices.

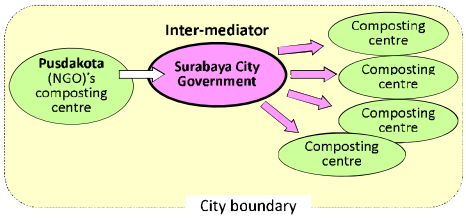



NGOs facilitate **replication** of good practices to other NGOs and community groups within and outside the city.
But, they have difficulties in mobilizing resources from local governments.





## Model 2: Scaling Up by Local Governments

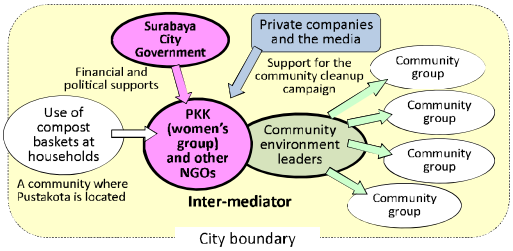



Local governments can **scale up** NGOs' good practices within the city. (It usually does not go beyond the city boundary.)





## Model 3: Scaling Up by Local Governments and NGOs

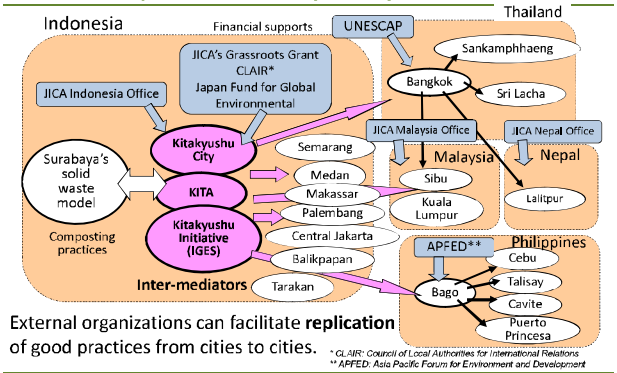



Local governments can assist NGOs/community groups in **scaling up** good practices to other NGOs/community groups within the city.





## Model 4: Replication from City-to-City



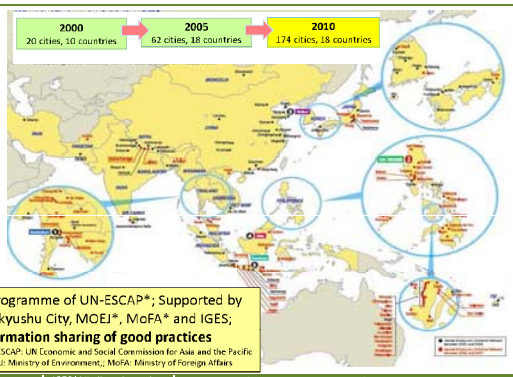

External organizations can facilitate **replication** of good practices from cities to cities.

* CLAIR: Council of Local Authorities for International Relations
** APFED: Asia Pacific Forum for Environment and Development





## Kitakyushu Initiative for a Clean Environment (2000-2010)




A programme of UN-ESCAP*; Supported by Kitakyushu City, MOEJ*, MoFA* and IGES;
**Information sharing of good practices**

* UN-ESCAP: UN Economic and Social Commission for Asia and the Pacific
* MOEJ: Ministry of Environment.; MoFA: Ministry of Foreign Affairs

## Kitakyushu Initiative Final Report


- Describes the outputs and achievements of the KI programme
- Provides recommendations to national and local governments, as well as managers of inter-city programmes similar to KI
- Presented to the Ministers and delegates of the MCED 6*, Astana, in Sep/Oct 2010

* MCED 6: 6th Ministerial Conference on Economy and Development in Asia and the Pacific

# Capacity Development in Solid Waste Management

With Special Reference to the Introduction of KitaQ Composting

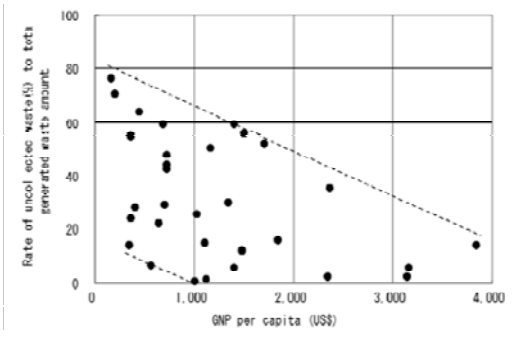
Mitsuo YOSHIDA, Ph.D.
Senior Advisor (Environment)
Japan International Cooperation Agency (JICA)
Yoshida.Mitsuo.2@jica.go.jp

Kitakyushu City, June 30, 2011

## Outline of the Presentation

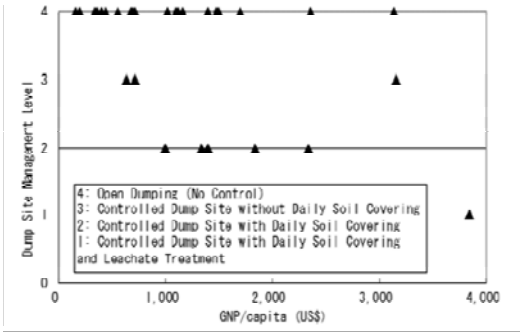
(1) Introduction – Why we discuss Capacities?
(2) Capacities required for Solid Waste Management and Composting
(3) Capacity Development
(4) Group Discussion

## Economic Growth vs. Waste Collection/Transportation in SWM




Cross-country Analysis, Yoshida(2011)

## Economic Growth vs. Waste Final Disposal in SWM

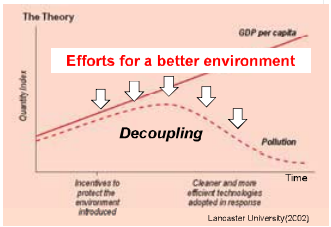



Cross-country Analysis, Yoshida(2011)

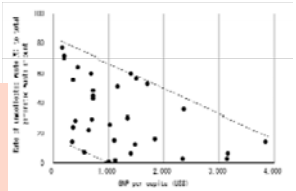
## Economic Growth vs. Development of SWM

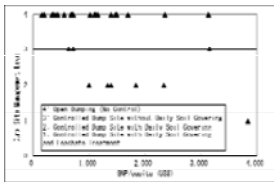
- The quality of waste collection/transportation service is enhanced with economic growth.
- The quality of waste final disposal is enhanced with economic growth.
- However, the SWM service qualities widely diversified even in the same level of economic growth.
- Economic growth is one factor for qualified SWM, but **other factor(s)** are probably much more important when .

## Environmental Kuznets Curve




Environmental pollution increases over time while a country is economically developing, and then after a certain level of economic growth is attained, environmental load begins to decrease.





## Efforts for a better environment in SWM sector

- Qualified SWM system
  - Minimizing waste generation
  - Waste discharging in good manner
  - Well-organized waste collection/transportation
  - Recycling
  - Sound environment final disposal of minimized amount of waste
- KitaQ Composting is one of the Efforts.
- Capacity Development

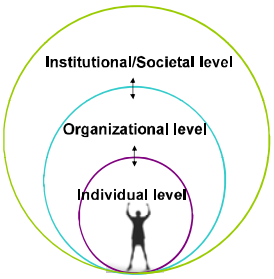
The Efforts are collectively called:

## Capacity Development (CD)

- **Capacity Development Concept:**
- **Comprehensive:** Capacity Development (CD) refers to the ongoing process of enhancing the problem-solving abilities of a country/society by taking into account all the factors at the individual, organizational, and societal levels.
- **Endogenous:** Defining capacity as the ability of a country to solve problems on their own and considering it as a complex of elements including institutions, policies, and social systems, the concept of CD attaches great importance to proactive and endogenous efforts (ownership) on the part of the country.

JICA(2006)

## Capacity at different three levels



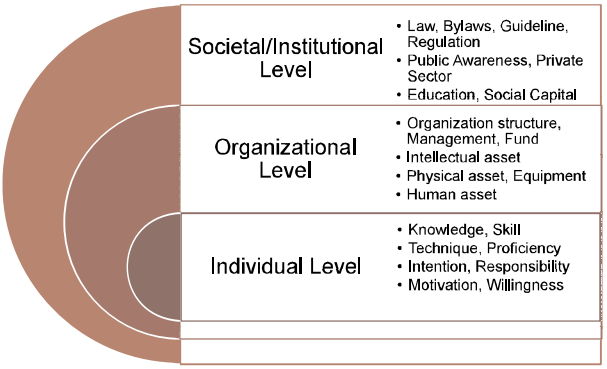

Issues in practice

(1) Organization without qualified individuals

(2) Qualified individuals but poor activity of organization

(3) Qualified individuals and well organization, but poor acceptance in the society

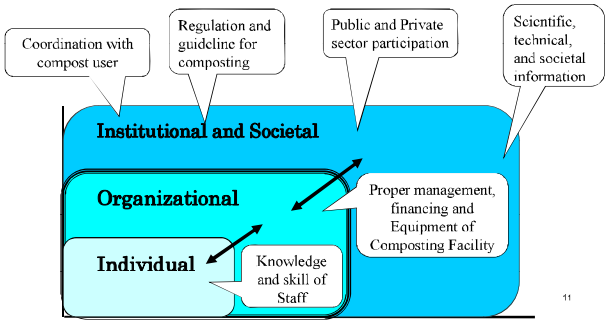
## Components of Capacity at Each Level




Yoshida(2006)

## Comprehensive feature of Capacity

(An Example for Composting Organization)

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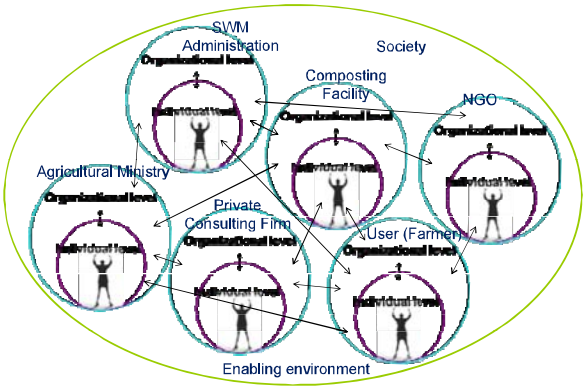


**Actual society is an ensemble of various individuals and organizations, the Stakeholders.**

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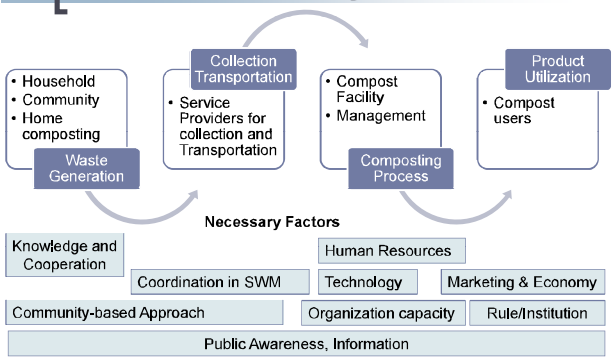
## A Flowchart of Composting in Solid Waste Management




## General Questions observed in the City Reports

- What are necessary capacities?
- What are promotion and inhibiting factors?
  For:
  - Establishing Organization/Institution for Composting
  - Introducing Community-based Approach
  - Marketing of Compost and Financial Sustainability
  - Raising Public Awareness

**[Group Discussion]**

- Scaling-up and Replication Strategy

## Discussion Groups

- Formation of the Discussion Groups
  - Group Leader
  - Group Members
  - Collaborators
- Points of Discussion
  - What is the necessary capacities?
  - What is promotion and inhibiting factors?
- Reporting (evening session)

Topics of Group Discussion:

| Promotion Factors | Inhibiting Factors (Obstacles) |
|---|---|
| | |

| Level | Capacities |
|---|---|
| Individual | |
| Organizational | |
| Institutional Societal | |

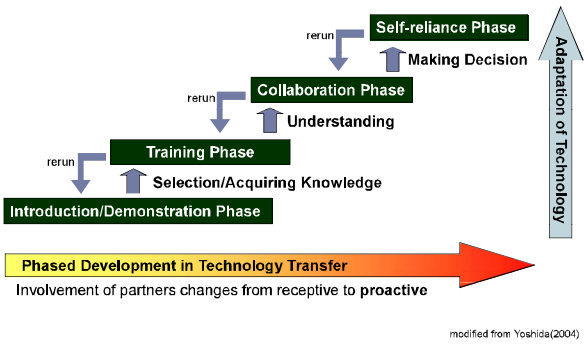
## Workshop Activities

- June 30
  - Keynote Lecture (Now)
  - Group Discussion
  - Reporting and Discussion
- July 01
  - Summary of the Promotional Factors, Obstacles, Lessons and Challenges
  - Strategy

## Transferring technology

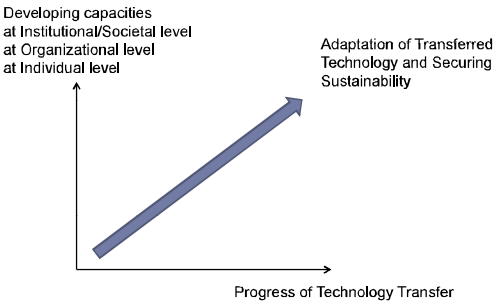
- It is widely accepted that technology is one of the major forces underpinning socio-economic growth and national development.
- Developing countries, thus, need technologies to alleviate their economic difficulties.
- Efficient technology transfer would lead to an efficient use of resources and national development.
- Main concern is what is the responsible factor to effectiveness of transferring technology.

## Phased Development in Technology Transfer




modified from Yoshida(2004)

## Technology Transfer and Capacity Development




## Practical

- Stakeholder Analysis
- Problem Analysis
- Capacity Assessment
  - SWOT Analysis
  - Organization Scanning
- Capacity Development Strategy

## (1) Stakeholder Matrix in Waste Composting

| | Waste Generation & Discharging | Waste Collection & Transportation | Composting Process | Utilization of Compost products |
|---|---|---|---|---|
| Public Sector | | | | |
| Private Sector (Formal) | | | | |
| Private Sector (Informal) | | | | |

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## (2) Problem Analysis Matrix in SWM

| | Waste Generation & Discharging | Waste Collection & Transportation | Composting Process | Utilization of Compost products |
|---|---|---|---|---|
| Problem(s) to be solved | | | | |
| Causes of the Problem | | | | |
| Background | | | | |

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## (3) Capacity Assessment Matrix in SWM

| | Waste Generation & Discharging | Waste Collection & Transportation | Composting Process | Utilization of Compost products |
|---|---|---|---|---|
| Individual level | | | | |
| Organizational level | | | | |
| Institutional level | | | | |
| Societal level | | | | |

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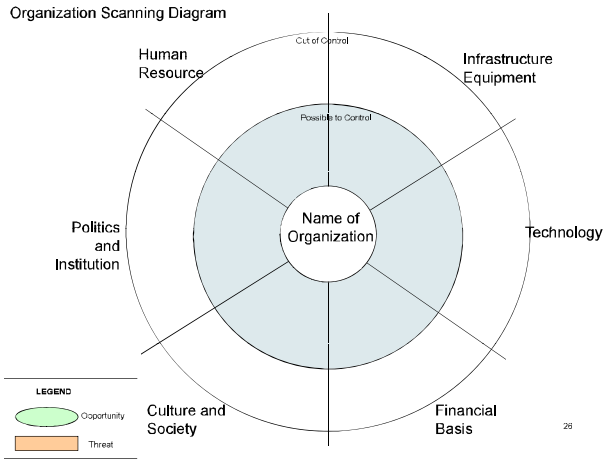
## SWOT Analysis

A SWOT analysis must first start with defining a desired end state or objective.

| | |
|---|---|
| **Strengths**<br>characteristics of the organization that give it an advantage over others in the sector. | **Weaknesses**<br>characteristics that place the organization at a disadvantage relative to others. |
| **Opportunities**<br>*external* chances to make greater profits in the environment. | **Threats**<br>*external* elements in the environment that could cause trouble for the business. |



**INVITATION TO A NETWORKING SEMINAR ON KITAQ SYSTEM COMPOSTING IN ASIA**

Date: June 30, 2011 (1:30 p.m. – 2:30 p.m.)
Place: No.1 Meeting Room, Ano-o Community Center

# Eco-friendly Recycling Activity of Ano-o Community Center

Nobuko Uchiyama, Director-General
Ano-o Community Center

Drawing upon the lessons learned by the tragic Great Hanshin-Awaji Earthquake in 1995, the city government of Kitakyushu has increased its number of community halls (social education facilities) from one per junior high school district to one per primary school district, and has renamed them "community centers," redefining their role as a base camp for voluntary activities of the community residents.

A community center is involved in a wide range of activities such as the following:

| | |
|---|---|
| 1) Community actions | 5) Youth development |
| 2) Continuing education | 6) Child-raising support |
| 3) Welfare | 7) Health care and fitness |
| 4) Eco-friendly recycling | 8) Disaster/crime prevention |

The Ano-o Community Center is currently particularly active in eco-friendly recycling activity. The following nine categories of resource materials are recovered all year round.

| | |
|---|---|
| (1) Used paper: cardboard, newspapers, magazines, wrapping paper (the City subsidizes the cooperating citizen groups)<br>(2) Cans: steel cans, aluminum cans (except for those collected by the City)<br>(3) Ink cartridges<br>(4) Caps from plastic bottles (for welfare)<br>(5) Aluminum pull-top can tabs (for welfare) | Implemented as voluntary action of the residents;<br>Collection and recycling done by contracted professionals |
| (6) Small metal items: Pot, frying pan, etc.<br>(7) Milk carton<br>(8) Styrofoam tray<br>(9) Used tempura oil from households | The City collects and recycles |

In addition, a recycling bazaar for second-hand books, daily utensils and clothes is run during summer holidays and at cultural festivals. The proceeds are donated collectively to the Japanese Red Cross Society once a year.

At the initiative of local residents, the members of the Environment Working Group and others organized the first compost workshop last January, with a follow-up class a week later. The second workshop will be held on the above date as an activity of fiscal 2011.

Through this activity, we hope to minimize kitchen waste, produce good quality compost and improve the soil of the vegetable garden that is worked on as a community effort.

Environmental problems are an urgent issue. We at the Center are focused on promoting activities that all residents of the community, children and adults alike, can participate in without much difficulty.

**Japan International Cooperation Agency**
Kyushu International Center

2-2-1, Hirano, Yahata Higashiku,
Kitakyushu, Fukuoka, 805-8505, Japan

Tel:81-93-671-8347 Fax: 81-93-671-0979
http://www.jica.go.jp/kyushu

**Institute for Global Environmental Strategies**
Kitakyushu Urban Centre

International Village Center 2F, 1-1-1, Hirano,
Yahata Higashiku, Kitakyushu-shi,
Fukuoka, 805-0062, Japan

Tel: 81-93-681-1563 Fax: 81-93-681-1564
http://www.iges.or.jp/kitakyushu

Aug. 2011