Institute for Global Environmental Strategies (IGES)

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

JICA Kyushu, 30 June 2011
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A Network Seminar on Kitakyushu, JICA Kyushu, 30 June 2011
Replication of Surabaya’s composting practices

Waste Composition in Surabaya

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

Source: KITA (2002)

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Inputs by the city

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

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Output: Waste Reduction

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

*Note: Benowo is the only final disposal site in Surabaya City.
(Data source: Cleansing and landscaping Dept., Surabaya)
Output: waste reduction

<table>
<thead>
<tr>
<th>Units</th>
<th>2007</th>
<th>2008</th>
<th>2009</th>
</tr>
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<tbody>
<tr>
<td>350t/d</td>
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<tr>
<td>200t/d</td>
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<td>120t/d</td>
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<td>40t/d</td>
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<tr>
<td>30t/d</td>
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Composting at each household: 17,000 units distributed free by Surabaya City. 23,000 cadres train 3 household each (45,000 households) = 1,300 units of a communal type distributed by Surabaya City. 100,000 households x 1kg/day/household = 100t/day

Composting at 15 composting centres: Cleaning Department: 14 composting centres, 50t/d (=100m²/1) PUSDAKOTA (KNG): 1 composting centre, 1.4t/d

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


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),
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

Surabaya’s successful solid waste management model

**Step 3.**
Organizing 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
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 Options
- Organic waste from households
- Organic waste from vegetable markets
- Household compost baskets (17,000 baskets distributed)
- Community composting centre (PUSUAMKITA’s case)
- Market waste composting centre (54 centres under Cleansing Dept)

Types of composting options in Surabaya

Financial Analysis of Composting Practices
- Is composting financially sustainable?

Composting Methods

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

Figure 8 Operational flow of Takakura Composting Method (Prepared by IGES, 2009; with technical supervision by Uli Peduli, P&Co., Inc.)
How much did the city save by reducing waste?

- Surabaya’s waste reduction: 17t/day (2007)
- Cost saved from waste reduction: 17t/day x 365days x USD23/t = USD340,000/year

Benefits:
- Waste reduction: 17t/day (= 17,000 households x 1 kg/day/household)
- Cost saved from waste reduction: 17t/day x 365days x USD23/t = USD340,000/year

Cost recovery in 2.5 years!

Enlarged benefit:
- Waste reduction: 40t/day (2007)
- Cost saved from waste reduction: 40t/day x 365days x USD23/t = USD3,300,000/year

Does free distribution of compost baskets make business sense?

- Surabaya’s composting practices:
  - 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

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

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

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**

- [Graph showing potential emissions avoided](http://www.asiangreencamp.net/)

Dropping out rate is High!

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

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

- **Components in communities and schools**
  - Distribution of compost baskets to residents
  - Organising a community clean-up campaign
  - Compost purchasing scheme
  - Technical assistance by Kitakyushu City, KITA, IGES and JICA

**E.g. Possible actions in Sibu, Malaysia**

1. Market-waste composting centres
   - Process 2 t/day (= producing 0.4 t/day)
2. Composting centres in communities and schools
   - Distribution of compost baskets to residents
   - Organisation of a community clean-up campaign
3. Compost purchasing scheme
   - City starts purchasing the compost for park maintenance
   - Free distribution to farmers; marketing of compost
4. Technical assistance by Kitakyushu City, KITA, IGES and JICA

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

**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: processing 5 t/day (= 4% of total waste)
  - Population: 200,000 (= 40,000 households)
  - Compost baskets: 1,000 households (= 2.5% of households)

**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.
Replication of Surabaya’s composting practices

**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.
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