City-to-City Cooperation for Improvement of Municipal Solid Waste Management (MSWM) In Surabaya City: Lessons Learned and Future Potential

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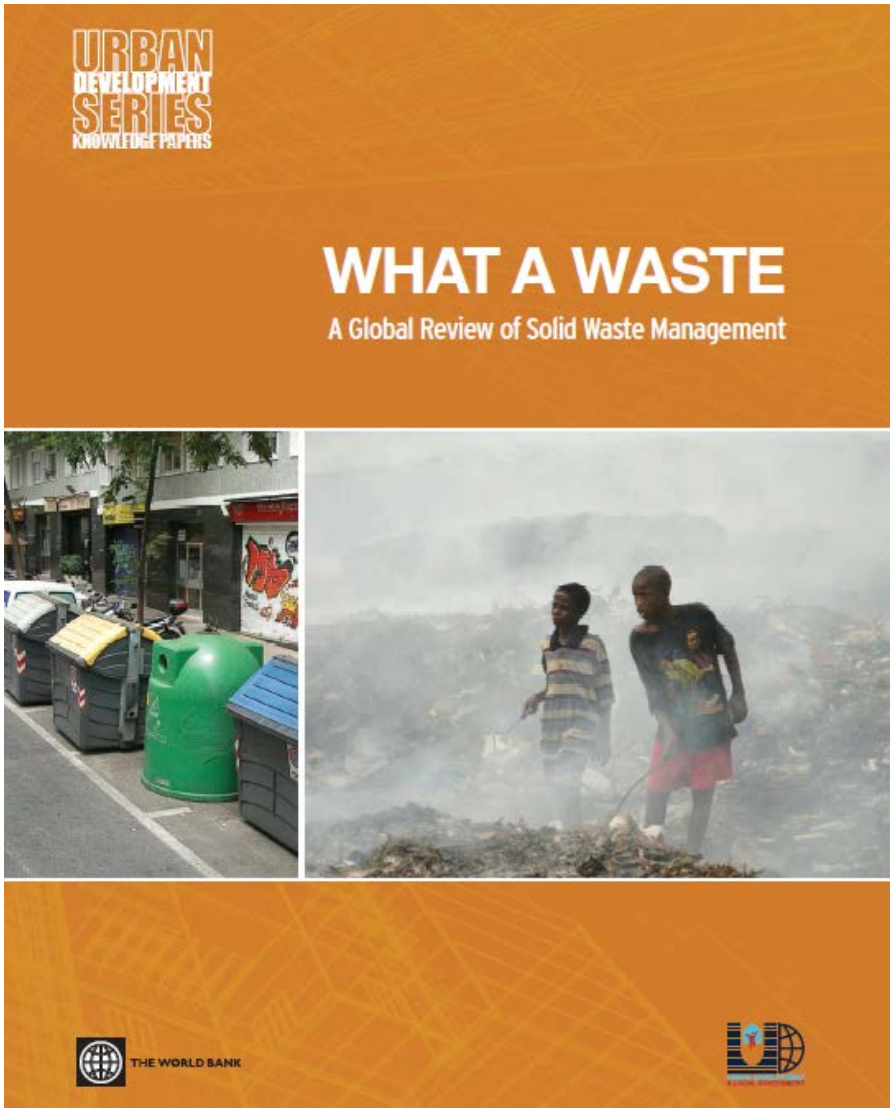
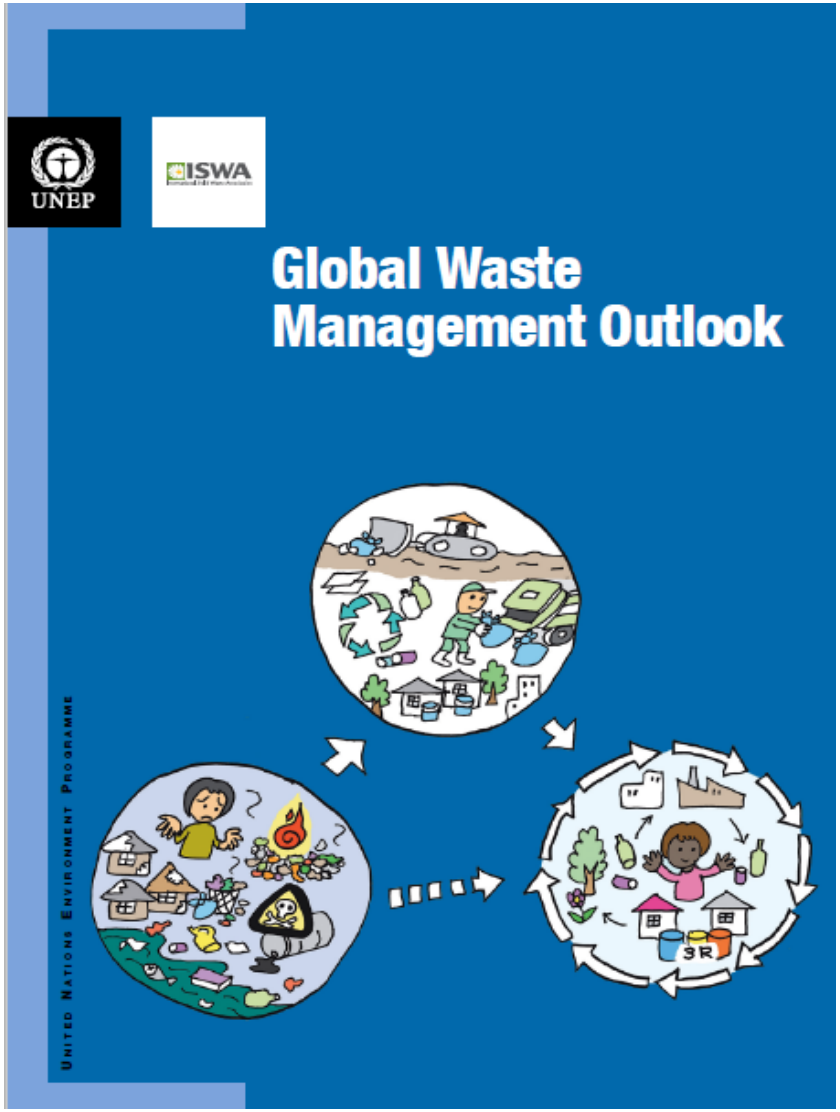
Outline of the Presentation

- Issue of Municipal Solid Waste Management (MSWM) in general
- Case study on establishing a city-to-city collaboration for improving MSWM in Surabaya City, Indonesia
- Discussion on lessons learned and the applicability in the participant's own cities/countries.

Why MSWM is a matter of developing countries?



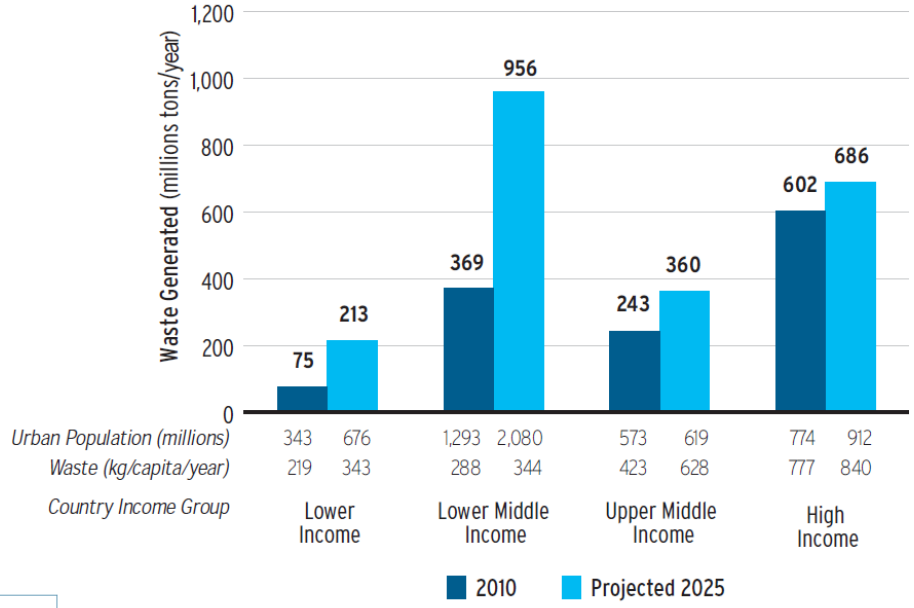
World Bank, 2012



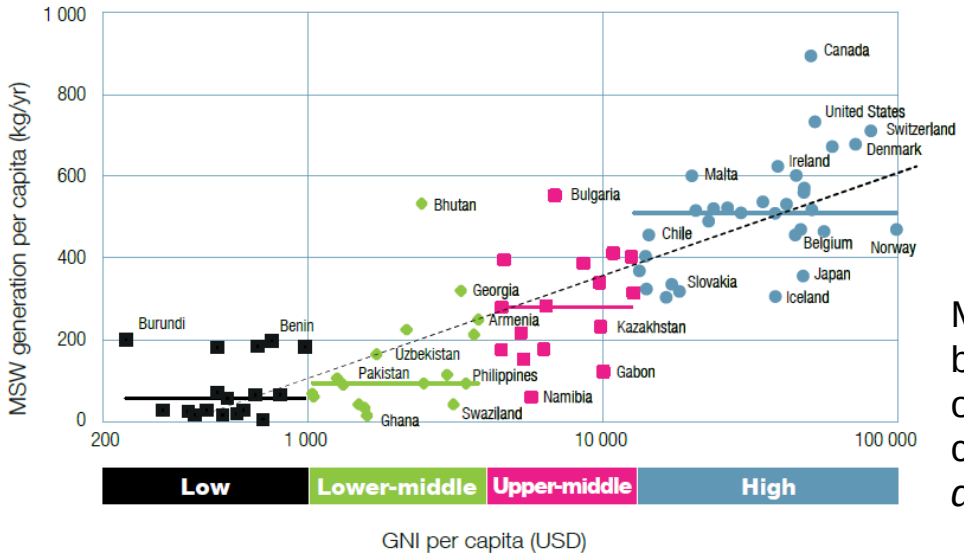
UNEP/ISWA, 2015

Increasing MSW Generation

Currently, world cities generate about 1.3 billion tonnes of solid waste per year. This volume is expected to increase to 2.2 billion tonnes by 2025. "*Lower income cities in Africa and Asia will double their municipal solid waste generation within next 15-20 years*"



Urban waste generation by income level and year, World Bank (2012)

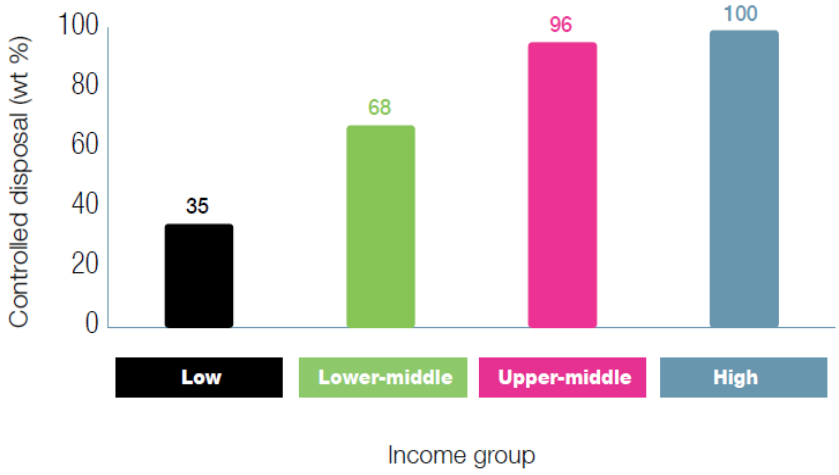


Waste generation versus income level by country, UNEP/ISWA (2015)

MSW generation rates vary widely within and between countries. The generation rates depend on income levels, socio-cultural patterns and climatic factors. *"the richer we get, more we discharged"*

MSWM is Essential Public Service

Waste Collection Rates by Income, World Bank (2012)



Controlled disposal for selected cities by income level, UNEP/ISWA (2015)

Multiple Benefits of Proper MSWM

Waste management has strong linkages to a range of other global challenges: health, climate change, poverty reduction, food and resource security, sustainable production and consumption. The political case for action can be significantly strengthened when waste management is viewed as an entry point to address a range of sustainable development issues, many of which are difficult to tackle.

Climate change

Potential impact of improved waste management on reducing GHG emissions across the economy: 15-20%

Diversion from disposal of biodegradable wastes prevents emissions of methane, a powerful greenhouse gas (GHG)

Reduction, reuse and recycling all displace virgin materials and products, and the GHG emissions in their manufacture

A clean city

- Where the solid waste management service works well
- A holistic approach is taken to managing all residuals

A successful city

- A healthy, pleasant and safe place to live
- A good place to do business and visit as a tourist
- Fosters a sense of community and belonging

Good governance

- The cleanliness of the city can be used as a proxy indicator of good governance

Enterprise and creating sustainable livelihoods

'Waste to wealth' projects in Africa have demonstrated that new waste services can be used as a catalyst for sustainable livelihoods and economic development in poor neighbourhoods of some of the world's poorest cities

15-20 million people working in the small-scale entrepreneurial 'informal' waste sector worldwide

2000-2010 in Europe **employment in waste and resource management doubled: > 2 million**

Estimate of worldwide potential for new jobs in the circular economy: 9 to 25 million

Global Waste Management Outlook, UNEP/ISWA (2015)

MSWM as an “entry point” to achieve sustainable development

A GLOBAL CALL FOR ACTION

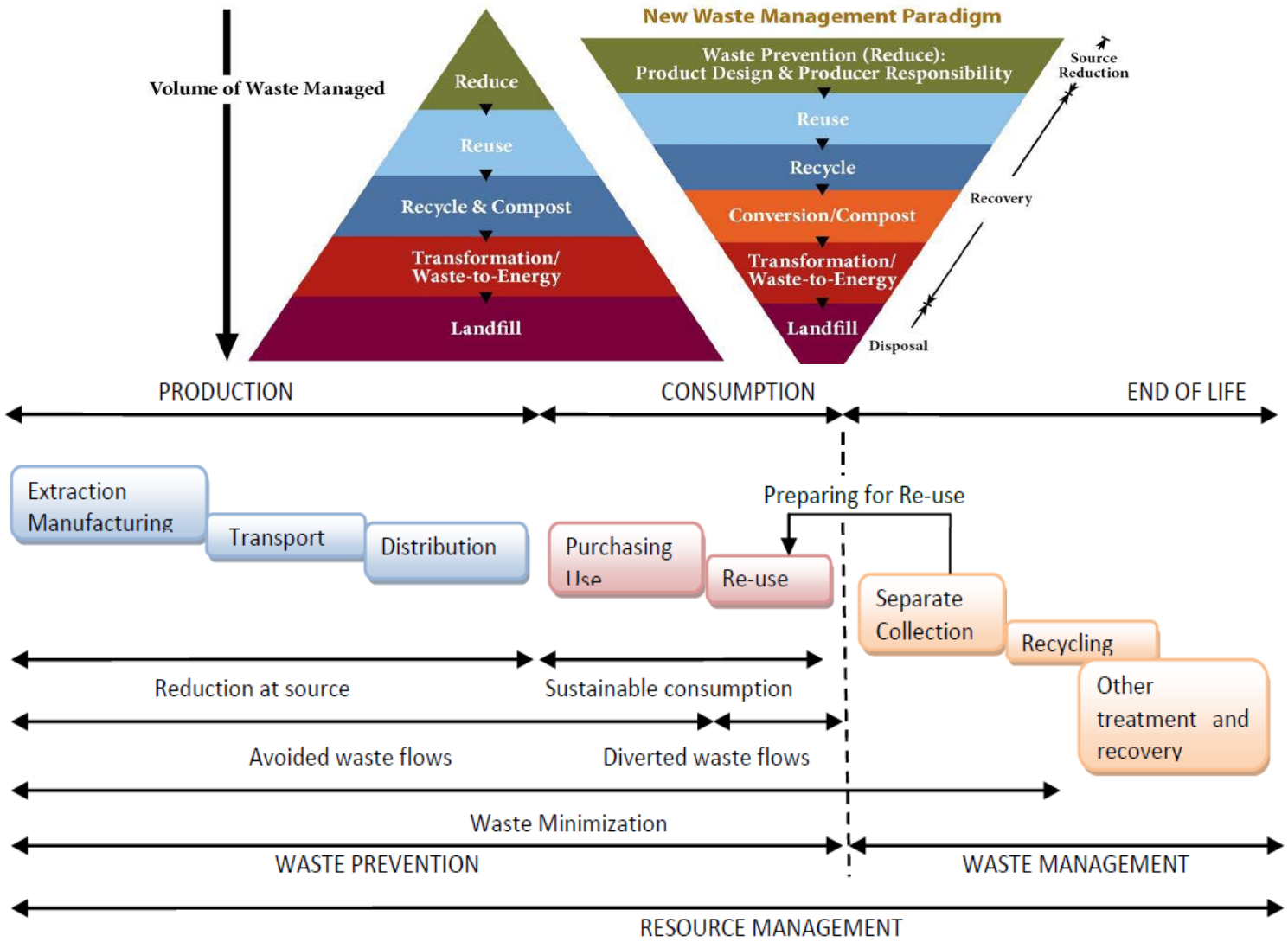
Global waste management goals

Addressing waste management as a priority will facilitate early progress towards more than half of the Sustainable Development Goals (SDGs) within the Post-2015 Development Agenda

Global waste management goals			Related SDGs	
Ensure by 2020	W.1	Access for all to adequate, safe and affordable solid waste collection services	3 – Health for all	11 – Safe cities
	W.2	Stop uncontrolled dumping, open burning	3 – Health for all 11 – Safe cities 12 – Sustainable consumption and production (SCP)	6 – Clean water and sanitation 14 – Marine resources 15 – Terrestrial ecosystems
Ensure by 2030	W.3	Achieve sustainable and environmentally sound management of all waste, particularly hazardous waste	12.4 – Managing all waste 13 – Climate change	7 – Access to energy
	W.4	Substantially reduce waste generation through prevention and the 3Rs (reduce, reuse, recycle) and thereby create green jobs	12.5 – The 3Rs 8 – Growth & employment	1 – End poverty 9 – Sustainable industry
	W.5	Halve per capita global food waste at the retail and consumer levels and reduce food losses in the supply chain	12.3 – Food waste	2 – End hunger; food security

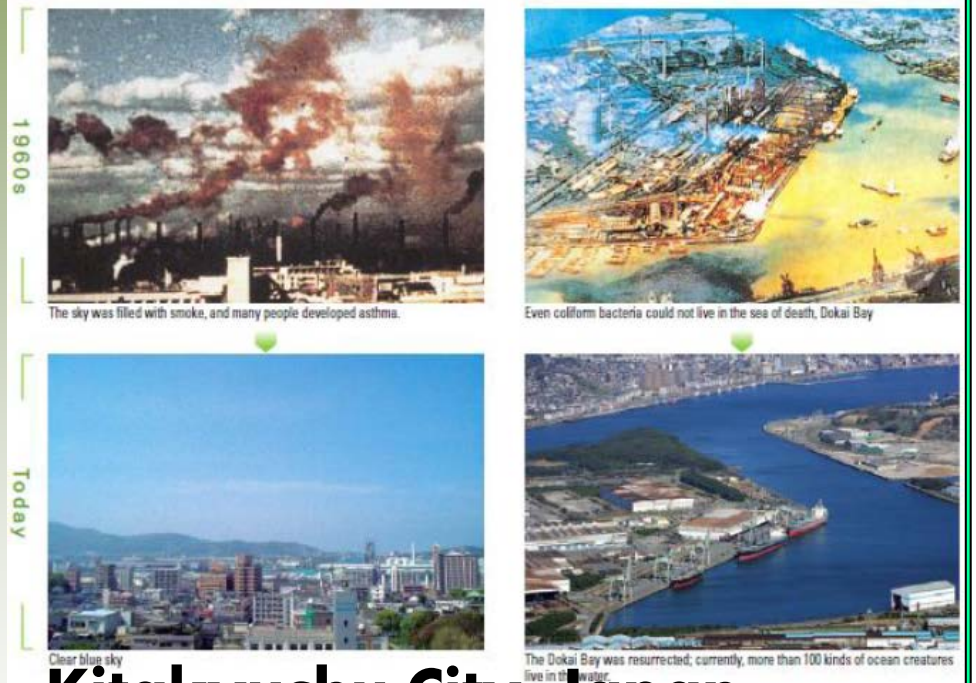
Global Waste Management Outlook, UNEP/ISWA (2015)

Paradigm shift from Waste Management to Resource Management



ISWA Key Issue Paper on Waste Prevention, Waste Minimization and Resource Management, ISWA (2012)

Case study: City-to-city cooperation for improving solid waste management in Surabaya City



Kitakyushu City, Japan

Surabaya City, Indonesia

Kitakyushu, a first industrial city in Japan

Population: 977,000 (2010)

Area: 487.88 km^2

GDP: 3,430 billion yen (2010)

Rich nature and branded food materials

Karst Plateau Hiraodai

Wakamatsuhoku Beach

Ouma Bamboo Shoots

Kanmon Straits Octopuses

Kokura Beef

Buzen-Sea Oysters

Wakamatsu Special Tomatoes

Major companies in Kitakyushu area

Nippon Steel & Sumitomo Metal Corporation

Yaskawa Electric Corporation

TOTO Ltd.

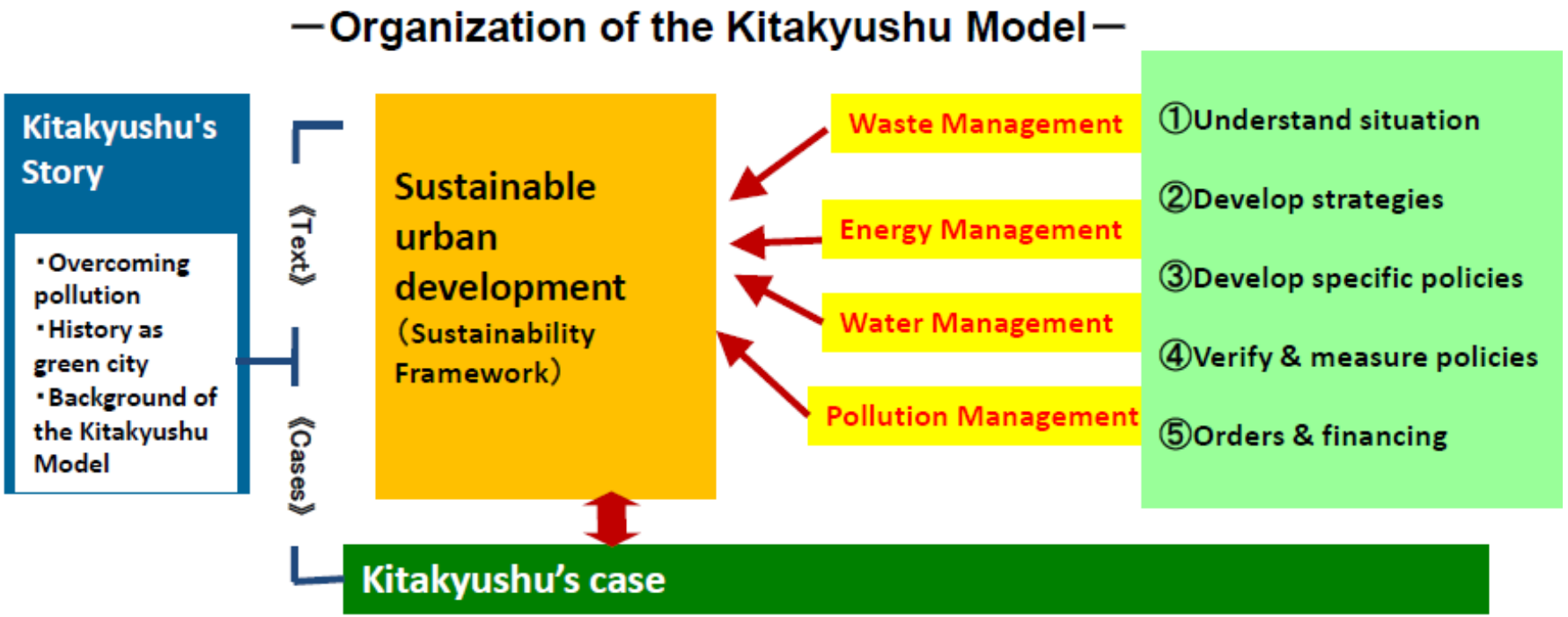
Mitsubishi Chemical Corporation

Toyota Motor Corporation · Nissan Motor Co., Ltd.

Mitsubishi Materials Corporation

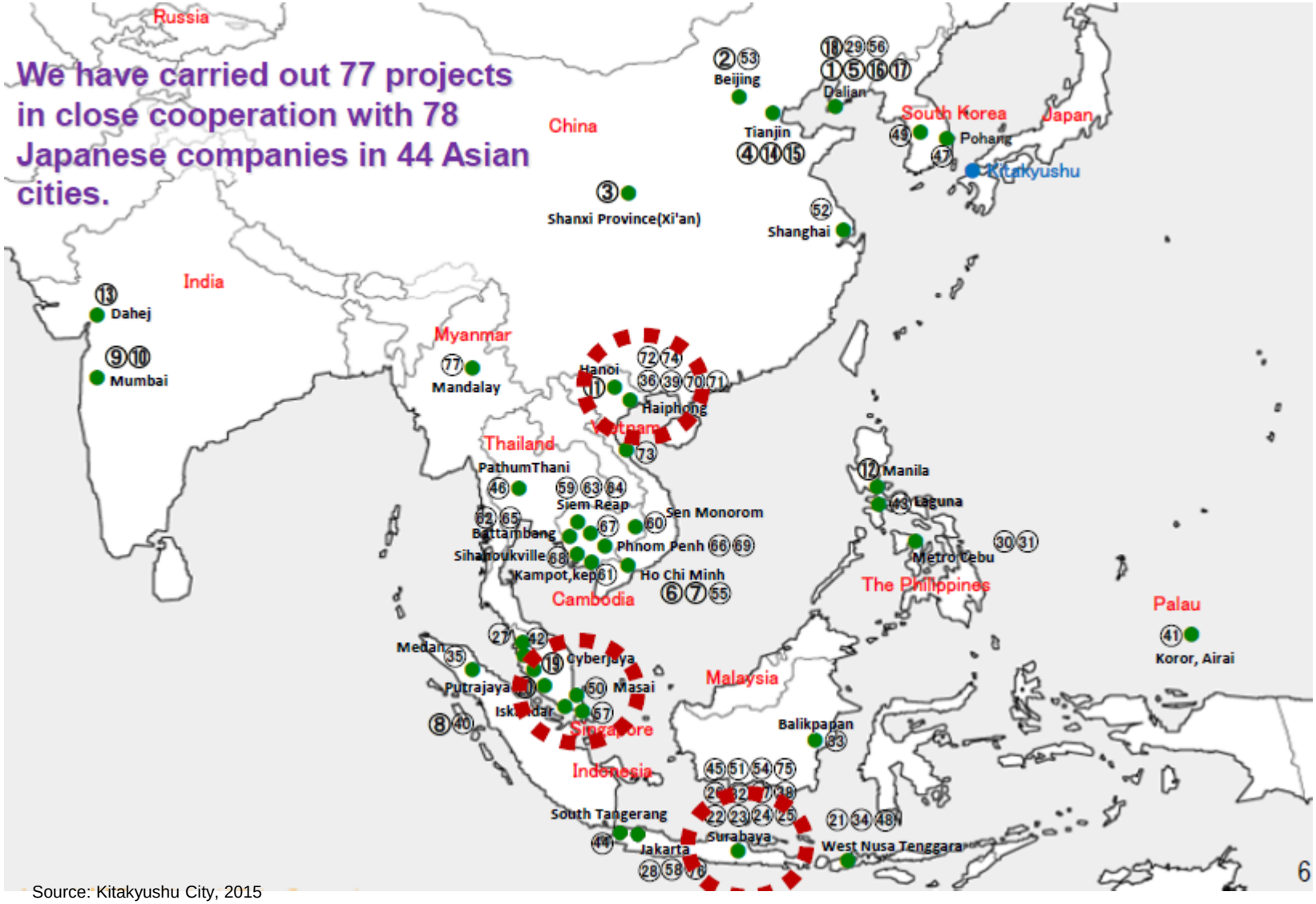
Source: Kitakyushu City, 2015

City-to-city cooperation based on Kitakyushu model



Source: Kitakyushu City, 2015

Sharing the experience with other cities



Source: Kitakyushu City, 2015

Transition of city-to-city between Kitakyushu and Surabaya

2003 2004 2005 2006 2007 2008 2009 2010 2011 2012 2013

Policies

New Growth Strategy (2009.12~)
JICA Partnership Program (PPP, BOP, support for small- and mid-sized businesses)

Kitakyushu New Green Growth Strategy (2013.3)

Intercity cooperation framework

Environmental Cooperation Network of Asian Cities (1997~)

Kitakyushu Initiative Network (2000-2010)

Joint Statement on Strategic Environmental Partnership (2011.3)

Kitakyushu Asian Center for Low Carbon Society est. (2010.6)

Green Sister Cities agreement (2012.11)

Reduction of CO_2 emissions by 150% in the Asian region (2050)
(Eco-Model City Action Plan (2009.3))

Human resource exchange

Director, Cleaning & Parks Dep't. (DKP) (2005~) → Director, Development and Planning Agency (BAPPEKO) (2008~) → Mayor of Surabaya (2011~)

Ir. Tri Rismaharini

Training for Surabaya city staff: CLAIR project

Mr. Gingin Ginanjar 2012

Mr. Satriyo Soesanto 2014

Training on environmental protection: Surabaya city officials (2003,2004)

Training on composting practices: Surabaya city officials, NGO staff (2005)

Organization of trainings:
JICA trainings, CLAIR projects, city projects, IGES projects (2006~2011)

Technology transfer

Survey on Proper Treatment of Waste (FY 2002), JBIC

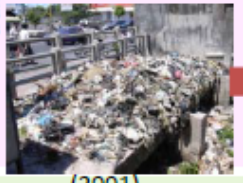
Cooperation Project on Composting of Kitchen Waste (FY 2004-2006), JFGE assistance project

F/S on the Production and Sale of Compost (FY 2007)

Energy: Cogeneration and energy-saving project: Nippon Steel & Sumikin Engineering, other (2012.3~)

Waste: Waste treatment project: Nishihara Corporation (2012.12~)
Waste power generation project: Hitachi Zosen, other (2014.6~)

Water resources: Sewerage system improvement project: Original Engineering Consultants, other (2012.12~)
Drinking water supply project in areas without electricity: Suido Kiko Kaisha, other (2011.11~)
Drinking water supply project: Ishikawa Engineering, other (2014.5~)



(2001)

(Today)

Improvement of water quality management capacity (FY 2007-2008) JICA Grassroots Cooperation project

Improvement of decentralized wastewater treatment facilities
(FY 2011-2013) JICA Grassroots Cooperation project

F/S on JCM Projects towards Environmentally Sustainable Cities in Asia : IGES, other (2013~)

System development

Surabaya Vision Plan (2005-2025)

Support for the development of master plans in each sector

Source: Kitakyushu City, 2015

Surabaya City, Indonesia

The city of 3 million people (2010) is the second largest city in Indonesia and serves as an important commercial and industrial capital of East Java

Source: Ema, 2011

Waste management in Surabaya City

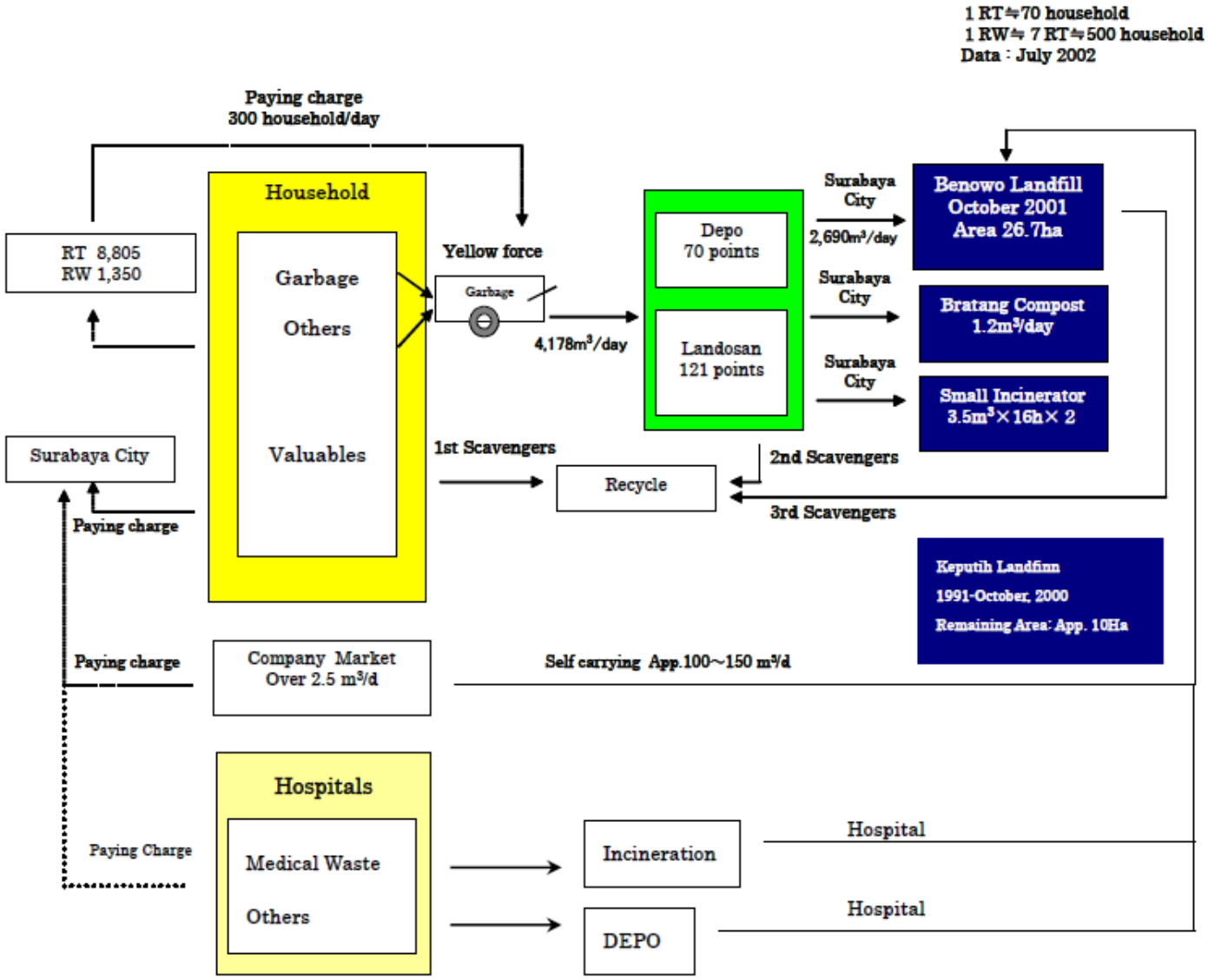


Fig.5-1 The Structure of Solid Waste Treatment in the City of Surabaya

Source: Kitakyushu City, 2003

Solid waste composition

Total waste generation: 678,900 tonnes/year (Average 1,860 tonnes/day) in 2012
Waste collection: Approximately 75-80%
Final landfill: 467,565 tonnes/year (1,281 tonnes/day)

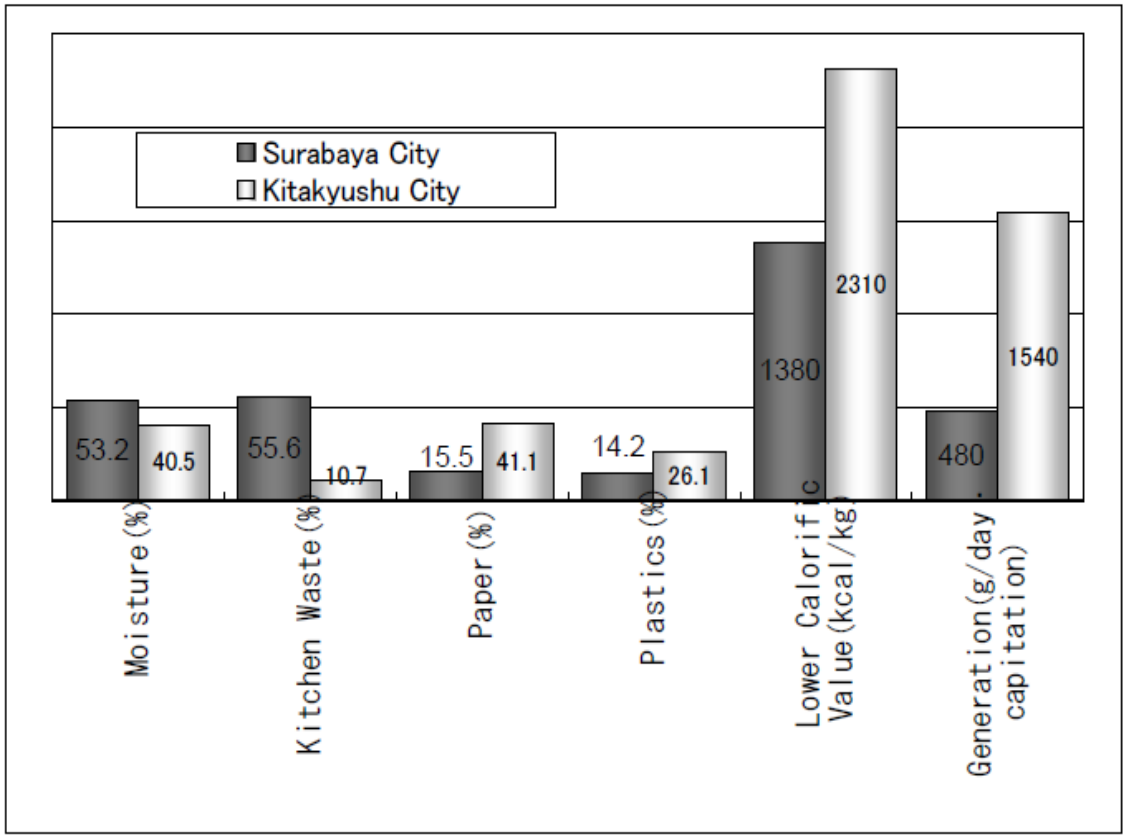


Fig. 5-2 Solid Waste Composition[3] in the City of Surabaya (in comparison with the City of Kitakyushu) Source: Kitakyushu City, 2003

Development of Model Community in Kampong Rungkut Lor

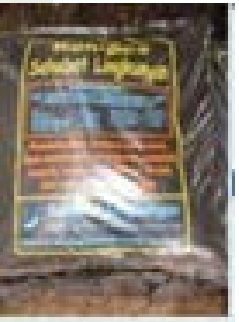
Educated women to start H/H business from recycling materials

Educated residents to separate waste at source and use of compost bin

Educated residents to start organic farming at H/H and community

Model community for community based SWM (200 H/H)

Collected H/H waste separately



Rest sell in Market

Organic waste treated at composting center

Up-scaling the model project by the Surabaya City Government

Successful model

Pusdakota's community-based SWM and composting method

Appreciation and up-scaling by the City Government

Surabaya City in collaboration with the PKK (women's group), other NGOs, private company and the media

Strategic actions

Recruit environmental cadres for awareness rising

Distribution of Takakura baskets

Establish compost facility

Surabaya Green and Clean programme

Other communities

Community groups

Community groups

Community groups

Community groups

Expansion to other communities through public awareness campaign

Counseling activities

counseling
To student

Counseling to
Businessman

Counseling to
community

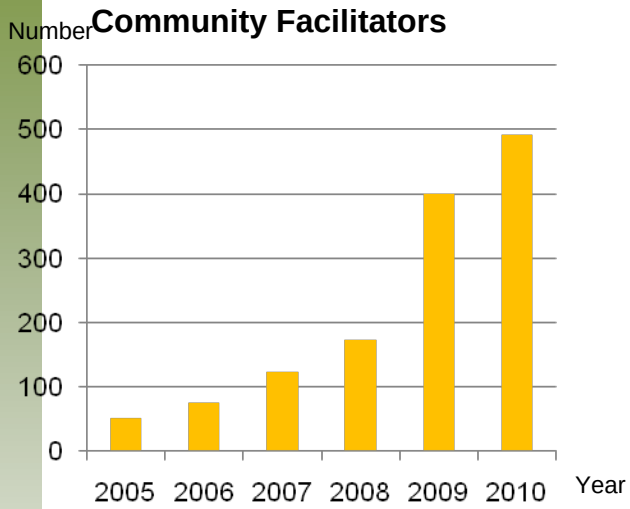
Counseling to
officer

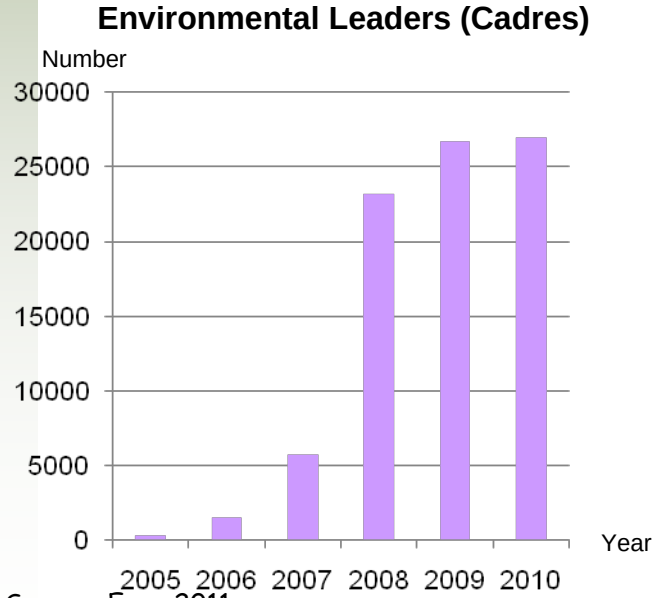
Environmental campaign

Socialization in school

Source: Ema, 2011

Training of Environmental Leaders (Cadres) for community mobilisation





Source: Ema, 2011

Waste segregation training

Explaining how to use compost baskets

Manufacturing bags from waste

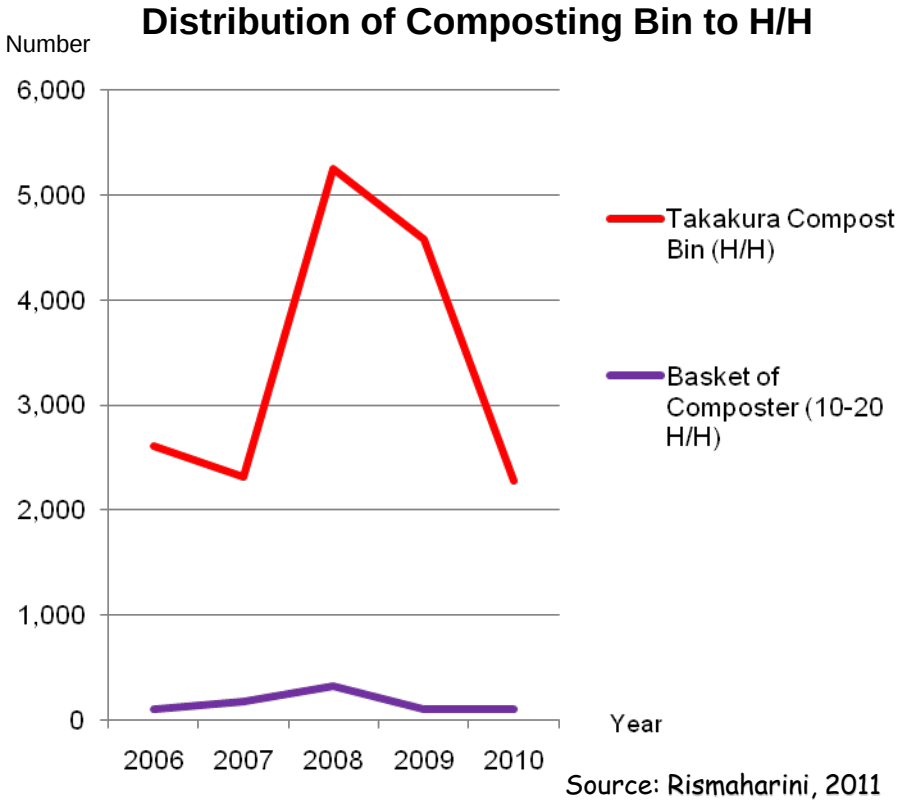
nmental Event

Source: Rismaharini, 2011

Developed training materials for awareness raising

Support for starting composting programmes

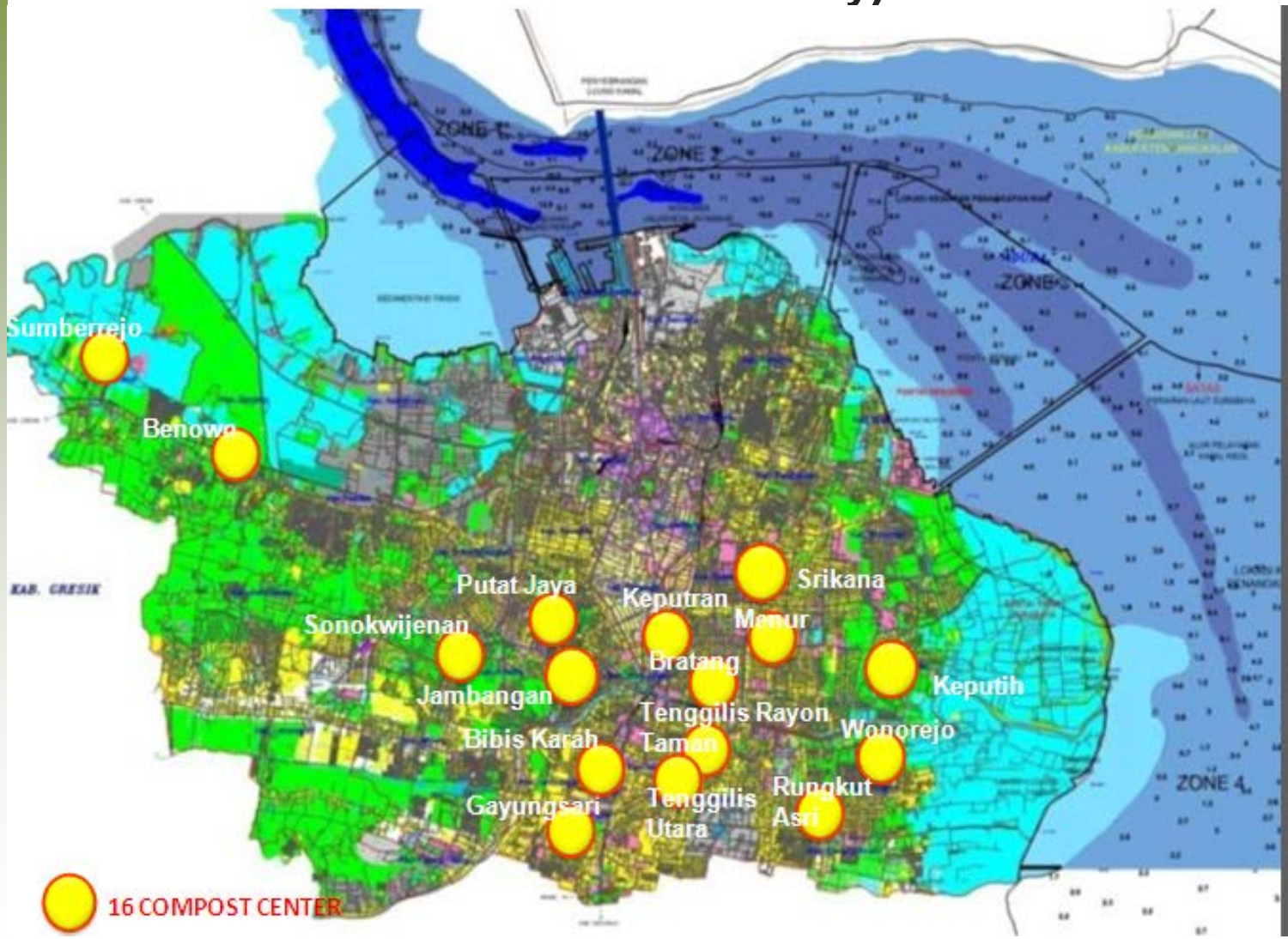
Distribution of compost bins to attended to training and willing to do residents (Over 20,000 H/H)



Provide necessary support for starting community composting centres: cleansing tools, composting tools, lands and capital cost for building, and buying composting products for city greening

Establish Composting Centres in the City

(16 composting centers operate to treat 110 tonnes of organic waste in the city)



Source: Ema, 2011

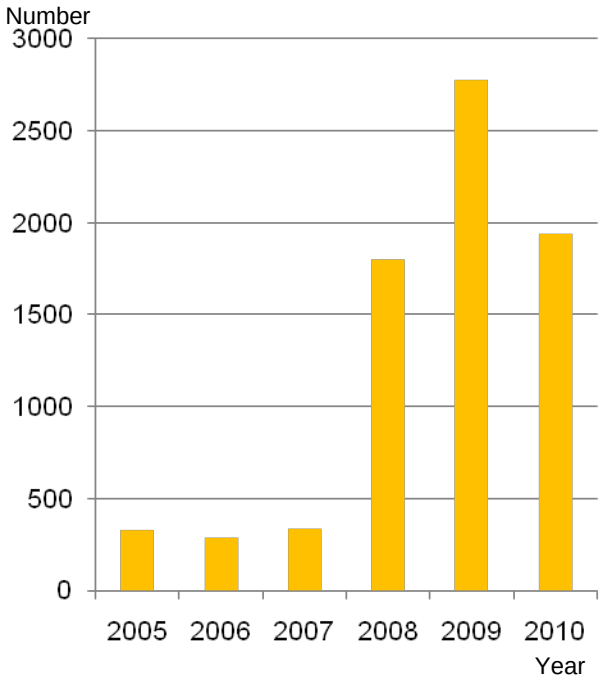
Establish Waste bank system

WASTE BANK IN SURABAYA

Establish both rewarding and enforcements for motivating community to participate

- Rewards are given to the communities willing to participate through Surabaya Green and Clean Programme
- Reward s are given to Outstanding Environmental Leaders at the National Day Awarding Ceremony

Number of communities wiling to contest to Surabaya Green and Clean Award has been increased



Source: Ema, 2011

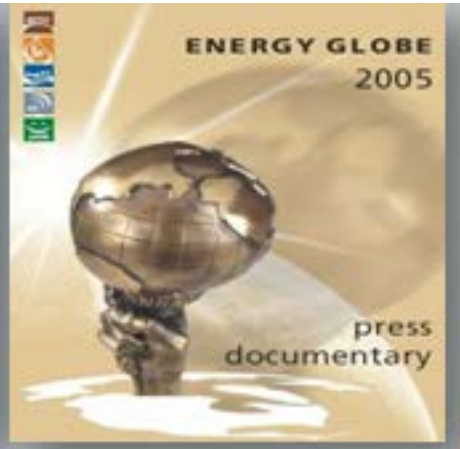
Strict in law enforcement to the communities not properly handle the SWM

Motivation of Staff and Local Politicians

Capacity building (locally and internationally) for staff and local politicians

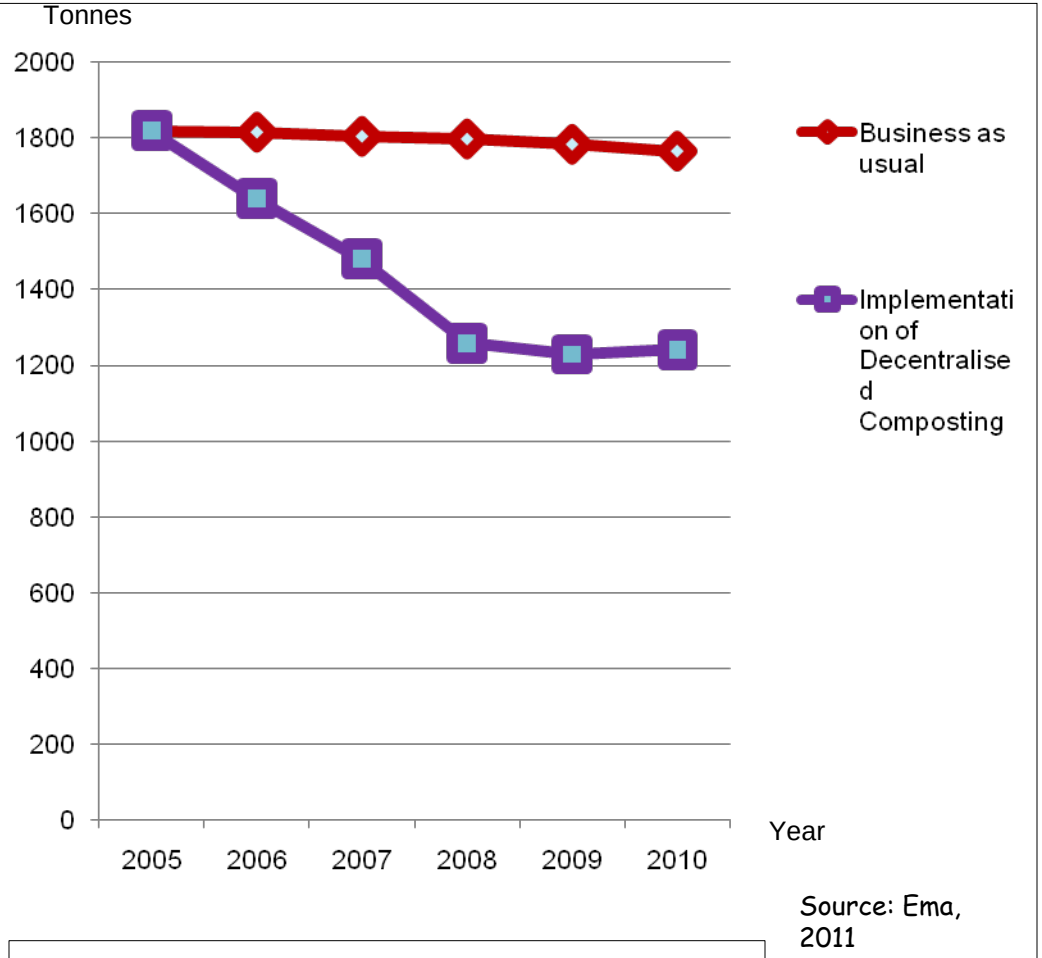


Recognition of its efforts at national and international level



Source: ema, 2011

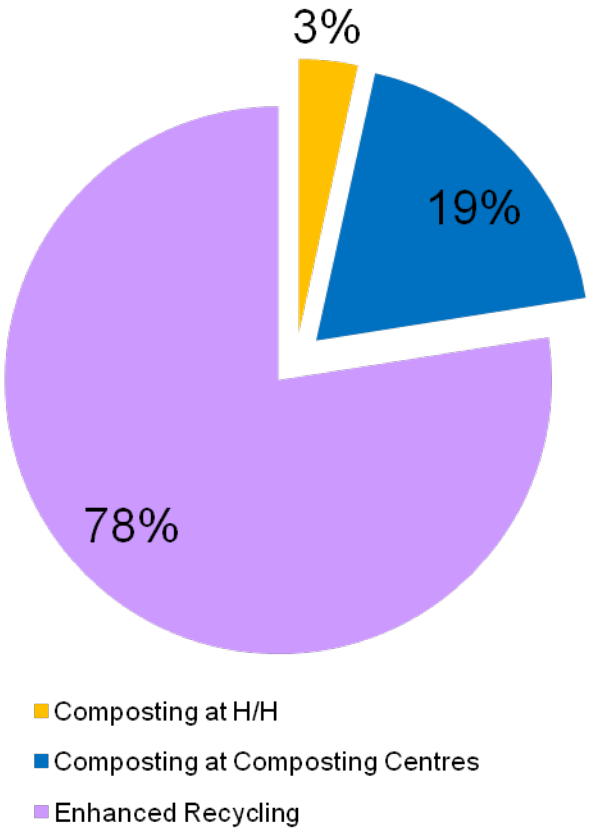
Achievement: Reduction of waste to be final dumped



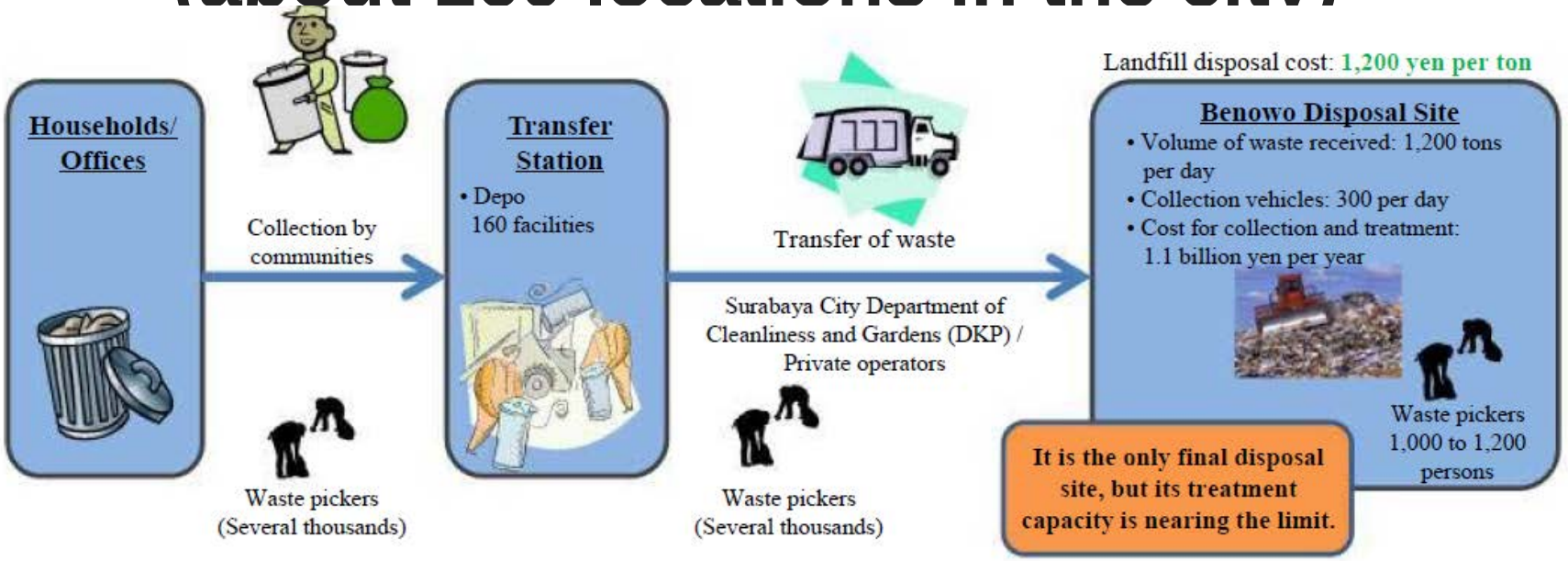
Source: Ema, 2011

30% waste reduction to be land filled by 5 years

Enhanced recycling by removing organic matters from the waste stream (78% of waste reduction from recycling materials)



Improvement of transfer stations for more waste reduction (about 160 locations in the city)

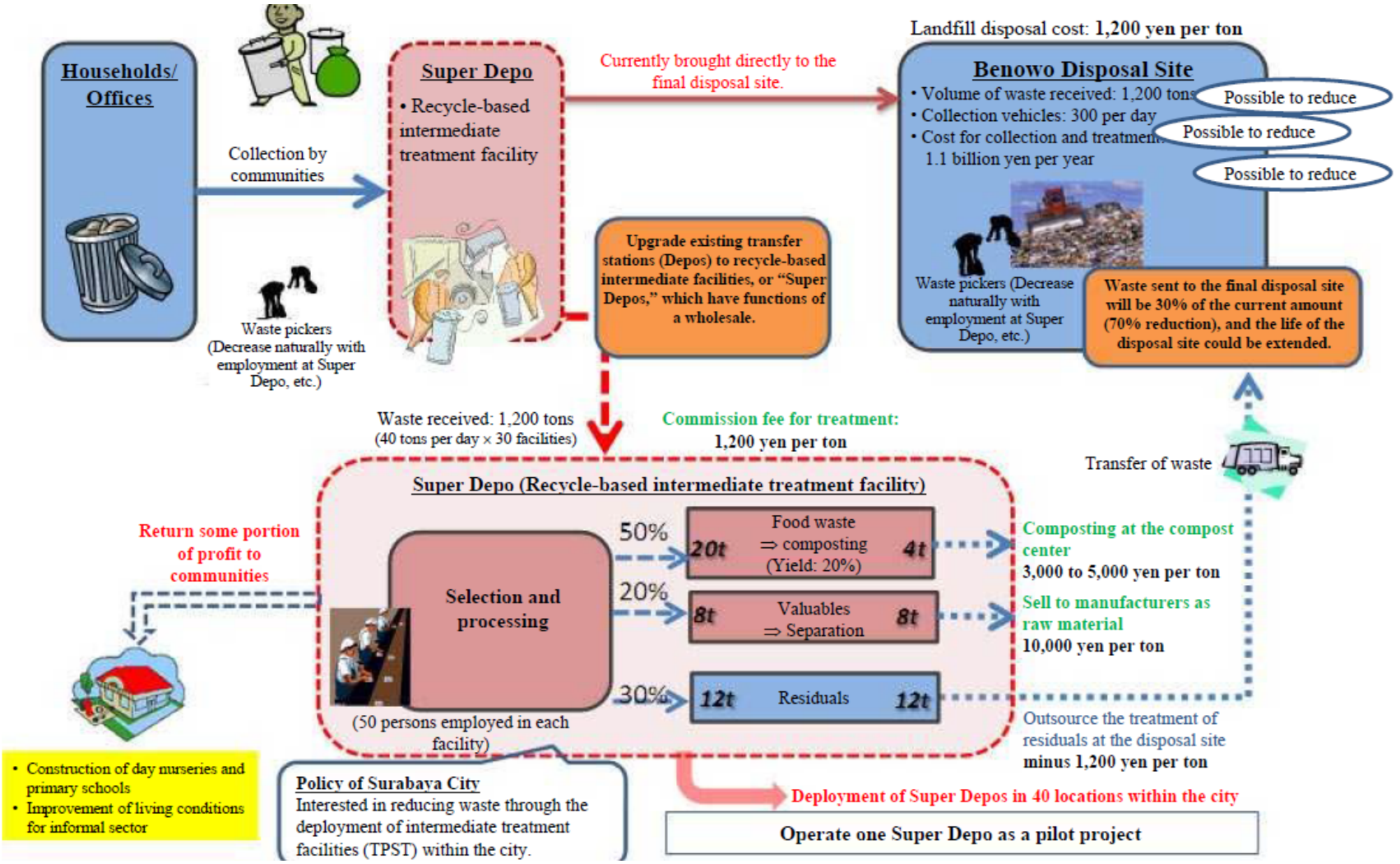


Source: Nishihara, 2014

Development of pilot project for transfer facilities

Source: Nishihara, 2014

Development of Nishihara Model Material Recovery Facility (MRF)



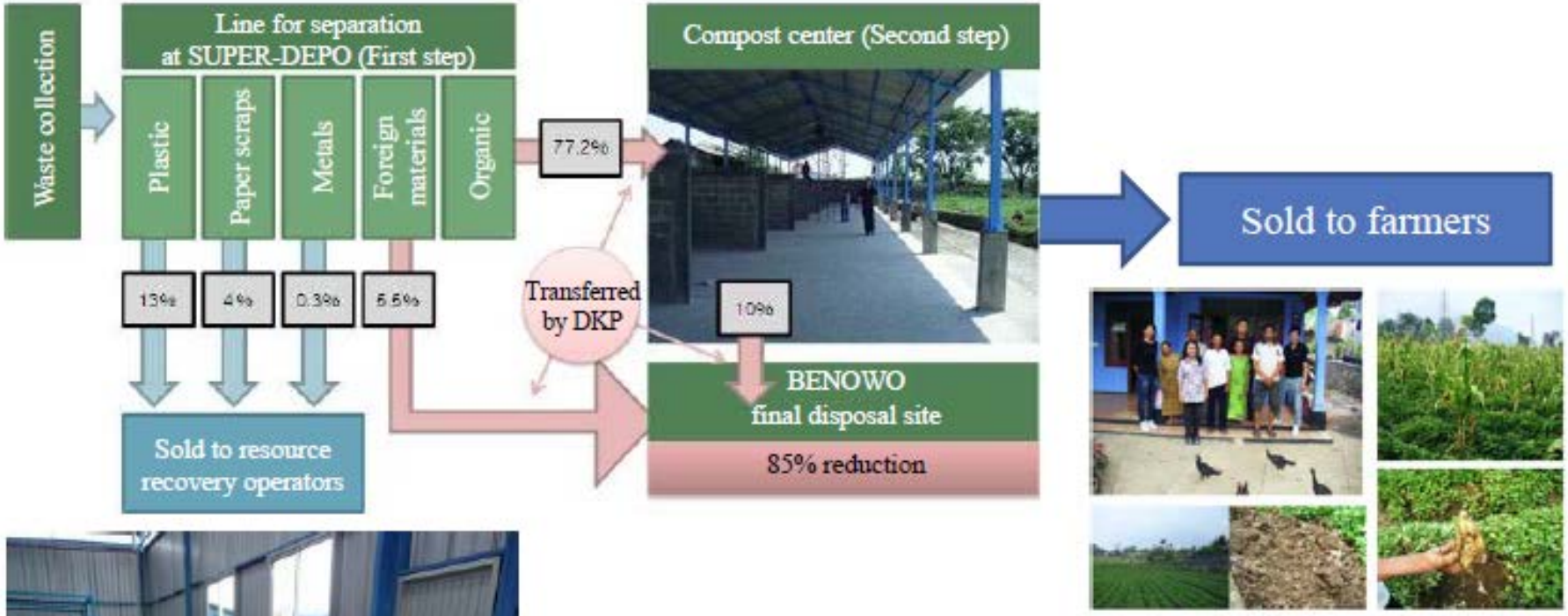
Source: Nishihara, 2014

Establishment of Super Depo

- Nishihara constructed "Super Depo" on March 2013.
- With support from DKP, Nishihara dispatched a stuff to operate "Super Depo".
- "Super Depo" was handed over to Surabaya City on September 1, 2014.
- In clean and efficiently equipped facility, workers sort valuables (plastics/papers) from MSW, and organic waste to be composted is collected.
- Super Depo hire ex-waste pickers as workers.

Source: Nishihara, 2014

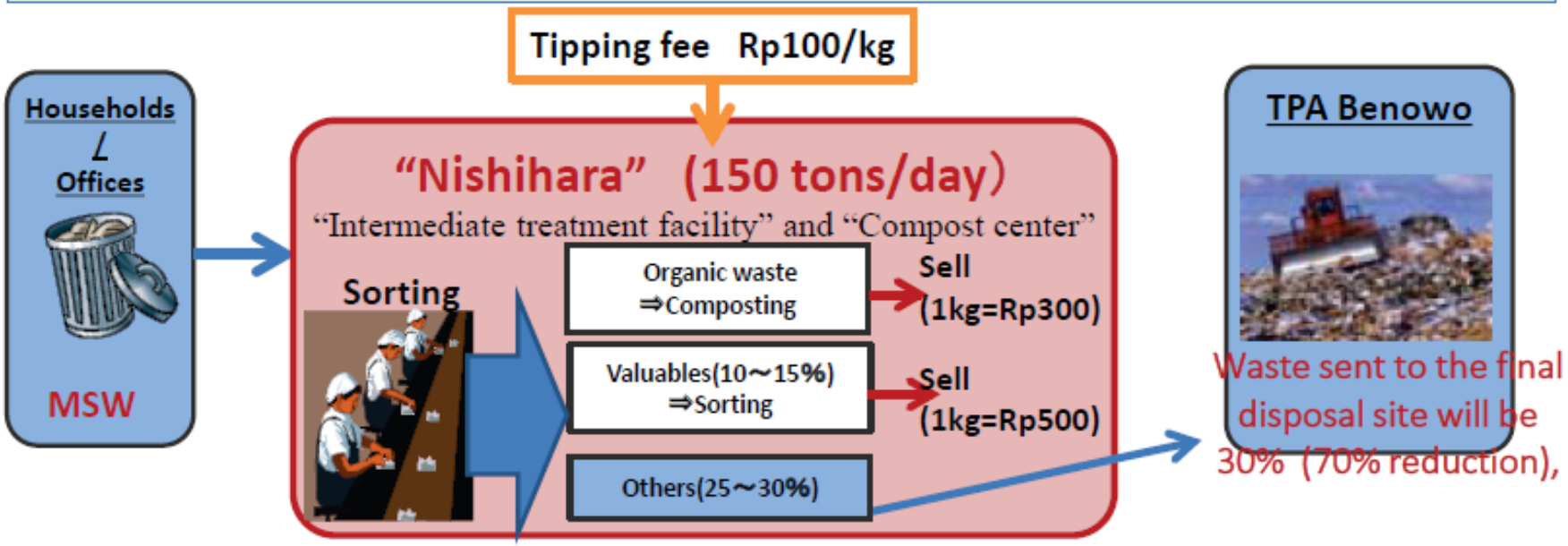
Current operation



Source: Nishihara, 2015

Future expansion

- After the operation of "Super Depo (Intermediate treatment facility)" and "Compost center", we would like to develop the new business "Neshihara model".
- "Nishihara model" aims to integrate the function of "Super Depo" and "Compost center" into one large facility. The facility will accept 150tons/day of MSW(Municipal Solid Waste)



*Amount of MSW will be the excess of the waste treated by PT Sumber Organik.

Profit

- Surabaya can reduce the amount of waste sent to TPA by tipping fee and land offer.
- Other profits are "GHG emission reduction", "hiring Scavengers" and "contribution to agriculture by providing compost".

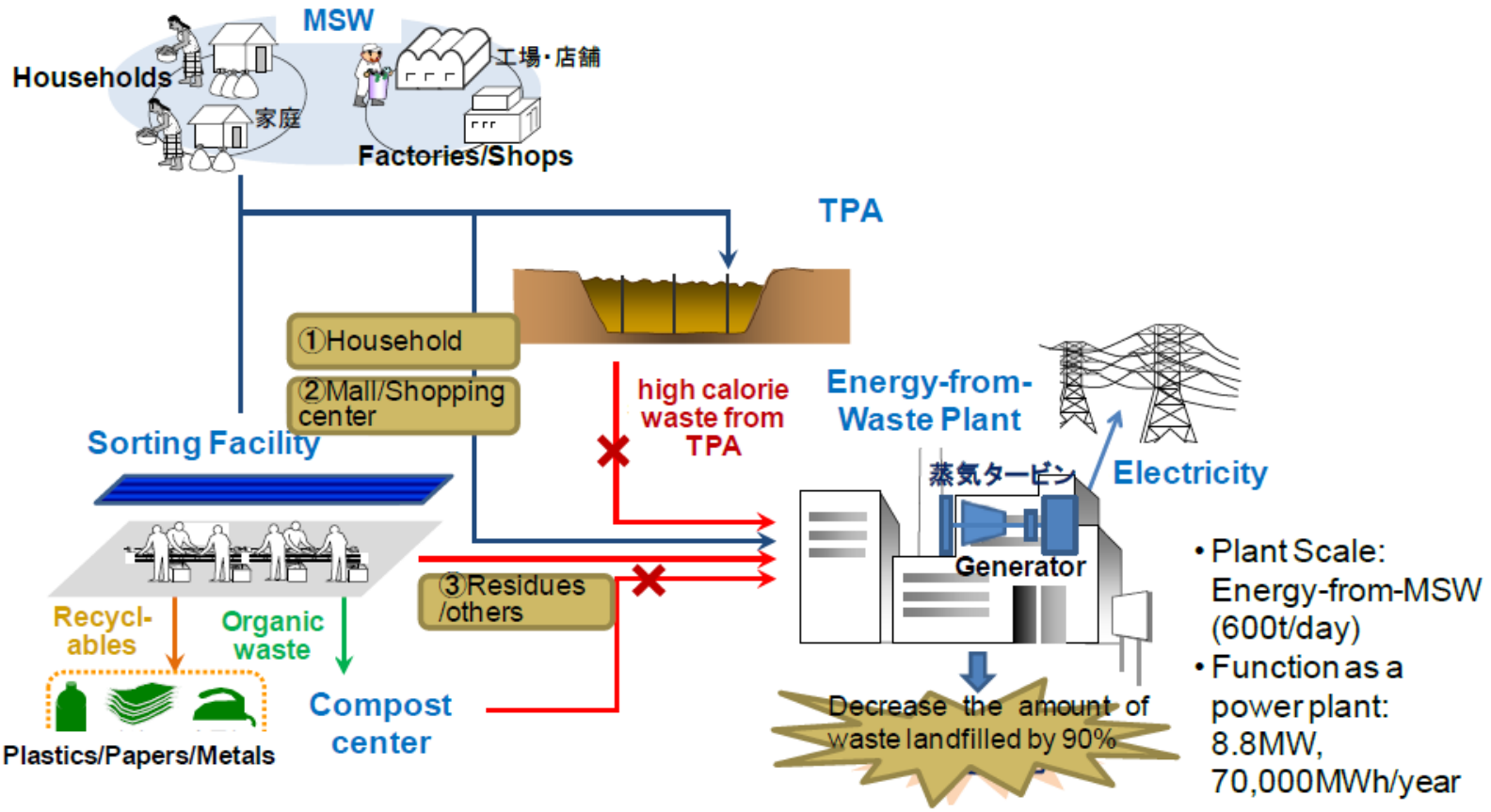
Source: Nishihara, 2014

Design of future expansion

- This ARCHITECTURAL PERSPECTIVE DRAWINGS shows the image of Large facility with Separation and Composting (150tons/day of MSW) .
- The site will be at Wonorejo.

Source; Nishihara, 2015

Design for final treatment (w2E)
Hitachi Zosen (2015)



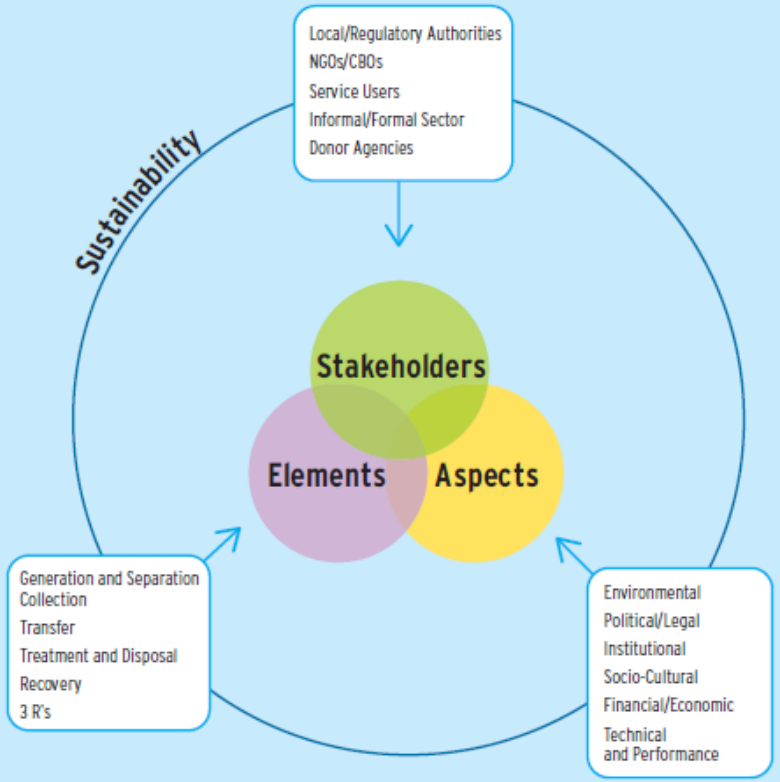
Lesson 1: Integrated Thinking

Integrated Sustainable Waste Management Framework

Stakeholders: include individuals or groups that have an interest or roles. All stakeholders should be identified and where practical involved in creating a SWM program.

Elements (Process): include the technical aspects of solid waste management. All stakeholders impact one or more of the elements. The elements need to be considered simultaneously when creating an SWM program in order to have an efficient and effective system.

Aspects (Policies and Impacts): encompass the regulatory, environmental and financial realities in which the waste management system operates. Specific aspects can be changeable, e.g. a community increases influence or environmental regulations are tightened. Measures and priorities are created based on these various local, national and global aspects.



Adapted from van de Klundert and Anschütz 2001.

Lesson 2: Technologies adopted to local needs/ condition

Waste Management Component	Technology Options
Waste Reduction	Design of longer-lasting and reusable products; reduced consumption.
Waste Collection	Use of alternative, non-fossil fuels (bio-fuel, natural gas).
Recycling/Materials Recovery	Materials recovery facility (MRF) to process source separated materials or mixed waste, although source separated is the preferred option as the materials would have less contamination from other discards. MRFs use a combination of manual and mechanical sorting options. Waste pickers could be used as a source of labor for manual sorting stages.
Composting/Anaerobic Digestion	Institute composting programs ideally with source separated organics. As with recyclables source separated materials reduce the contamination associated with recovery from mixed waste. Compost the organic material after digestion to produce a useful soil conditioner and avoid landfill disposal. Finished compost applied to soils is also an important method to reduce GHG emissions by reducing nitrogen requirements and associated GHG emissions.
Incineration/Waste-to-energy/ Refuse-Derived Fuel (RDF)	Use the combustible fraction of waste as a fuel either in a dedicated combustion facility (incineration) with or without energy recovery or as RDF in a solid fuel boiler.
Landfill	Capture the methane generated in disposal sites and flare or use as a renewable energy resource.

Source: WB, 2012

Thank you