A Networking Seminar on KitaQ System Composting in Asia

SEMINAR REPORT

29 June – 01 July 2011

JICA Kyushu International Center, Kitakyushu, JAPAN
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A Networking Seminar on KitaQ System Composting in Asia

29 June-01 July 2011

Japan International Cooperation Agency,
Kyushu International Center,
Kitakyushu, Japan
DAY 1: 28 June
A Courtesy Visit to Kitakyushu City Office

DAY 2: 29 June
Welcoming Remarks

Presentations from Each Participating City
DAY 3: 30 June
Discussions on Capacity Development in Solid Waste Management

Site Visit to Ano Community Center

DAY 4: 1 July
Site Visit to Bin/Can Center

Presentations on Action Plans of Respective Cities
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1. Summary

Solid Waste Management (SWM) is considered to be one of the most serious environmental issues confronting urban areas in Asia. The growth of urban populations and economies has resulted in a corresponding growth of solid waste that local governments are finding difficult to manage. Existing dumpsites are reaching capacity and finding new candidate sites for dumpsites is becoming increasingly difficult. The solution lies in reducing the amount of waste that reaches dumpsites. Composting of organic waste is considered not only to be an effective measure for municipal solid waste reduction, but for raising environmental awareness and community building as well, especially in developing countries, where organic waste accounts for more than half of the total amount of waste. The Japan International Cooperation Agency (JICA) is also taking steps to apply composting through its various environmental programmes aiming to promote the 3Rs (reduce, reuse and recycle) around the world.

The KitaQ System Composting evolved from the experiences of Surabaya’s Solid Waste Management Model. It was first piloted in Kampung Rungkot Lor, an urban community adjacent to Surabaya’s largest industrial site, where a local non-governmental organisation (NGO), Pusdakota, with technical assistance provided by the Kitakyushu International Techno-Cooperative Association (KITA), encouraged the community to separate waste at source. The organic waste is then collected separately and treated at a nearby composting centre adopting the Takakura Method of composting, a simple composting method introduced by Koji Takakura of J-POWER group/JPec, utilising locally available fermentation microorganisms or native microorganisms (NM), rather than effective microorganisms (EM). The material recovery facility (MRF) was established to collect inorganic materials and linked them with existing informal recycling businesses.

The organic material easily putrefies and emits foul odours unless it is treated properly. The Takakura Method of composting dissolved many of the organic components of raw garbage in a short period of time (particularly in the tropics) by cultivating fermentation microorganisms from locally available materials such as fruit skin, fermented foods, rice bran, chaff and leaf mould, and mixing the cultivated microorganisms with organic waste to achieve natural fermentation. Further, the method is simple and economically viable as it requires only readily available materials and emits no foul odours and leachate.

The pilot project brought about various benefits in addition to the production of compost, such as extra economic opportunities for community members, improved sanitary conditions and a greener and cleaner environment. Based on this success, Surabaya City started to support the decentralised, community-based composting programmes at the city-wide level, building partnerships with other stakeholders, such as the women’s network (PKK), local NGOs, academic institutions, waste pickers, private ventures and the media, in heavy contrast to centralised, larger-scale and highly technical composting methods. This supportive policy environment has helped to reduce the amount of waste being transported to final disposal sites by as much as 30% within six years, enhanced recycling by removing organic matter from the waste stream and improved the city’s overall waste collection system. Surabaya’s achievement exemplifies how a city can reduce a large amount of waste in a short period of time with a limited budget by integrating composting into municipal solid waste management, emphasising decentralised, community-managed methods with appropriate technology,
enabling participation of various stakeholders, and providing supportive policy and capacity building.

Utilising the Kitakyushu Initiative for a Clean Environment (KI), a programme of the United Nations Economic and Social Commission for Asia and the Pacific (ESCAP), which was adopted at the 4th Ministerial Conference on Environment and Development in Asia and the Pacific (MCED4) held in Kitakyushu, Japan in 2000, Kitakyushu City, KITA, and the Institute for Global Environmental Strategies (IGES) has worked together to share Surabaya’s successful waste management model with other cities in Asia. It was further used in JICA technical cooperation projects for solid waste management and training programmes for overseas participants and Japan Overseas Cooperation Volunteers (JOCVs). This was followed by reports of other successful applications by local governments mobilising support from various sources. For this reason, the Takakura Method of composting has become a popular technology for organic waste recycling, and the applicable model of municipal composting in cities has become known as the KitaQ System Composting.

Against this background, a regional seminar was organised in Kitakyushu City from 29 June to 1 July 2011, inviting related cities and organisations to share and discuss their successful experiences and challenges in promoting the KitaQ System Composting in municipal solid waste management in Asia, develop/promote relationships and identify areas for future cooperation. The seminar further assisted participants in:

- assessing good practices and challenges in waste management in respective cities,
- developing networks among related cities and organisations which are promoting composting of organic waste for further cooperation in the future, and
- assessing needs to develop capacity building materials for KitaQ System Composting.

The seminar was attended by 20 participants representing 10 cities from Asia, including cities from Indonesia (Balikpapan, Makasar, Palembang, Semarang, Surabaya, Tarakan), Philippines (Cebu), Malaysia (Sibu, Kampar), and Thailand (Nonthaburi), plus a number of additional speakers and observers from the host country, Japan. Invited participants included representatives from respective local governments. The seminar featured presentations, interactive discussions and site visits. The second and third days of the seminar were made up of workshops, both in small group discussions and in plenary sessions, which were designed to draw on the lessons learnt from the city presentations in the first day.

The participants identified the following promotional factors that create a favourable environment for the composting of municipal solid waste management (MSWM): increasing waste generation, inadequate collection and uncontrolled disposal of solid waste; high proportion of organic waste; recent efforts at global, national and local levels in promoting the 3Rs; strong political interest and support; public education, awareness and pressure; partnerships with relevant stakeholders; existing knowledge and pilot programmes on composting; and existing networks with international agencies.

Further, it was identified that the decentralised, community-based approach of the KitaQ System Composting is effective for cities in reducing waste generation due to its low financial costs, and thereby facilitates the establishment of a sound material-cycle society. The composting process can be initiated with very little capital and low operating costs, is flexible for implementation at the household, community and city-wide levels, integrates
existing informal sectors involved in the MSWM, and provides excellent opportunities to improve the city’s overall MSWM system. As well, the Takakura Method, a composting technology in the KitaQ System Composting, is also simple, easy-to-follow, locally-relevant and has great potential to be transferred, adapted and replicated without too many outside resources.

By all accounts, the seminar and workshop were successful in achieving planned objectives. A key outcome of the seminar was a commitment of the participants to take initiatives in planning, design and implementation of community-based composting programmes at the city level, taking into account their specific situations in collaborating with other organisations, entities and local residents. They further identified the importance of the following actions to promote successful community-based composting programmes, such as strong political will and commitment; integrated SWM strategies developed with the involvement of all stakeholders; inter-departmental coordination and networking with other organisations; clear guidelines and education programmes for waste separation, collection, transportation and composting; integrating informal recycling systems; strong community leadership and public participation; establishing both community award systems and legal enforcement to motivate community participation; and enabling policies, laws and regulations.

The participants further agreed to work together regardless of borders and share their knowledge and experience so that they might help each others to promote composting in SWM in their cities. Participants also noted that this type of seminar was very useful as a forum for sharing knowledge and information, so that those with less understanding and experience could benefit from those with more experiences, and recommended that it be repeated regularly to advance this endeavour. Another key message that emerged from the seminar was the importance of establishing the KitaQ System Composting network involving key organising institutions (JICA Kyushu, Kitakyushu City, KITA and IGES) in order to raise awareness and educate all stakeholders about relevant issues and to increase capacity among the participants, begin new training programmes, document best practices and develop training manuals for knowledge transfer and technical cooperation in SWM from the perspective of capacity development.
2. Proceedings

The seminar consisted of plenary presentations and interactive discussions, site visits and was followed by workshops and break-out sessions. Presentations and conclusions are summarised below. All speaker presentations as well as supplementary materials, such as the seminar background paper and list of participants, are attached in the annexes.

Wednesday, 29 June

2.1. Opening Ceremony and Introduction to Seminar

2.1.1. Welcoming Remarks

- Mr. Keiichi Muraoka, Director General, JICA Kyushu
- Mr. Hiroshi Imanaga, Director General, Environmental Bureau, Kitakyushu City

The seminar officially started with welcoming remarks from Mr. Keiichi Muraoka, Director General of JICA Kyushu. He warmly welcomed the participants from different countries to the seminar. Mr. Muraoka then highlighted the environmental impacts of cities in Asia and briefly explained JICA’s involvement in the field of environmental management, such as air pollution, water pollution, waste management and climate change measures. He further emphasised that composting is an effective method to reduce organic waste that needs to be dumped and can be easily replicated in many cities in Asia. For this reason, this seminar provided a good opportunity for participants to share good practices, discuss lessons learned and strengthen networking.

Following this, Mr. Hiroshi Imanaga, Director General of the Environmental Bureau, Kitakyushu City, welcomed the participants. He explained that since 1980, Kitakyushu City has been engaged in international environmental cooperation in Asia. To date, more than 6,000 participants have been invited to Kitakyushu City for technical training on environmental issues under a cooperation scheme between JICA, KITA, and the City of Kitakyushu. One of its very successful initiatives was the promotion of composting in Surabaya City. As a result, Surabaya City has been successful in reducing its waste generation by 30% with the adoption of composting and raising public awareness. Mr. Imanaga also stressed that this composting method can be applied in other cities in Asia.

2.1.2. Introduction to Seminar and JICA Training Activities in KIC (Kyushu International Center)

- Mr. Akihiko Kodama, Training Programme Division, JICA Kyushu

Mr. Akihiko Kodama, Training Programme Division, JICA Kyushu, gave a brief introduction to the seminar. He explained the activities of JICA Kyushu and gave some examples of public participation and training programmes. Public participation programmes include the Japan Overseas Cooperation Volunteers (JOCV) programme and JICA partnership programmes; training programmes focus on environmental management, energy and resources, such as waste management techniques and environmental education. As of 2010, JICA Kyushu has conducted 146 training programmes, inviting 823 participants from 97 countries. Among them, 333 participants attended 39 training programmes on environmental
management and energy and resources.

Mr. Kodama further explained JICA’s strategy on solid waste management (SWM) and emphasised the importance of building a sound material-cycle society, developing the capacities of governmental organisations, improving collection, transportation and disposal and promoting activities to address climate change issues. After that, he explained the purpose of the seminar and mentioned that the main objective was to share good practices and challenges and enhance partnership among participant cities. He further stated that presentations by participant cities, related organisations and experts would be highlighted at the workshop, site visits and observations would be carried out at an organic farming compost site and community activities in the Ano community centre and recycling facilities, and that a workshop session would be held to facilitate discussions among participants.

2.2. Lessons Learned: Solid Waste Management and Composting in Asian Cities

During the session of lessons learned, a representative from each city made a presentation about SWM and composting in their respective cities. The participants were provided guidelines prior to the seminar to help in the development of their presentations and were requested to consider the following topics, such as a basic introduction to the city; overview of solid waste management, trends and strategies; composting in municipal solid waste management; success factors, barriers and challenges in promoting composting in SWM; required international assistance and a conclusion to the presentation.

2.2.1. Balikpapan, Indonesia

- Mr. Arie Soetjiadi, Expert Staff, Conservation of Natural Resources, Environmental Agency, Balikpapan City

Balikpapan City is located in East Kalimantan and has a total population of 614,681 (2010). The total land area of the city is 503.33 sq. km and 85% of the city is covered with hilly areas. The total waste generation in the city is 160 tons per day and more than 60% is organic waste. Mr. Arie explained that Balikpapan City has developed a SWM strategy to reduce the waste to be disposed by 10% in the next three years, and tried to improve the legal system and raise public awareness toward environment conservation, including solid waste management. Some of the key points from his presentation are as follows:

- Currently, the city has only treated about 70% of the total waste generated. The remainder is not collected.
- Though the city has spent 35% of the SWM budget for operational waste disposal services, only 1% is allocated to composting.
- The municipality has developed the vision of a “clean, beautiful, and comfortable city” under the Community-Based Solid Waste Management (Pengelolaan Sampah Berbasis Masyarakat – PESAMAS) project, which drives all environment activities in the city.
- Both through formal and non-formal education, the municipality is involved in raising public awareness on environmental issues in general and SWM, specifically.
- Currently, Balikpapan City has eight composting programmes at the household, neighbourhood and city levels that have been initiated by different stakeholders, such as NGOs, the private sector, city government and the provincial government.
• The market mechanism for composting is not yet fully functioning. Thus, composting activities are still limited. The final composting product from the compost centres operated by the city office is used for public parks and greenery. As well, there are problems in marketing the compost produced by NGOs and communities.
• The successful factors for the progress of SWM and composting are incentives via Adipura awards and enforcement of environmental regulations.
• The key barriers are a lack of awareness and poor service coverage due to the city’s hilly topography and poor spatial planning.
• The municipality requires assistance in improving urban planning, developing an approach to strategy planning to alert the people about the importance of proper waste management, policy advocacy, capacity building for relevant stakeholders, and extending possibilities to market compost products.
• The city has tried to solve these issues by improving urban planning and policymaking abilities.

2.2.2. Makassar, Indonesia

➢ Mr. Andi Murtan, Chief of Urban Cleaning Management Division, Makassar City

Makassar City had a total population of 1,339,374 in 2010. According to Mr. Andi, the city has faced tremendous challenges in SWM and key points from his presentation are as follows:

• Due to a lack of appropriate facilities and infrastructure, the collection of waste has been inadequate. The city collects only 80% of waste generation in the city.
• There has been an increase in waste generation in line with population growth and urban functions. Further, the city is facing some other issues in SWM, such as high disposal cost, high transporting cost, and unclear assignment of roles for local societies and businesses.
• As a result, the municipality has tried to formulate a new SWM system and action plan based on the 3Rs with support from JICA and Kitakyushu City under the PESAMAS.
• Under this new SWM strategy, the city is aiming to reduce the waste to be disposed by 5-10% within the next three years by promoting waste separation at source and establishing composting programmes at household and neighbourhood levels.
• The municipality is planning to establish three composting centres by 2012, carry out campaigns to raise public awareness, promote recycled products, and enhance monitoring of environmental management projects. Further, the city has planned to develop manuals for community-based solid waste management and training programmes for capacity development for city staff.

2.2.3. Palembang, Indonesia

➢ Ms. Nyimas Ida Apriani, Head of Environmental Degradation Control Division, Environmental Agency, Palembang City

Palembang City had a population of 1,665,681 in 2009. The total land area of the city is 400.61 sq. km and is divided into 16 districts and 103 sub-districts for administrative functions. The city showed a high economic growth rate of 8.24% in 2010. The total waste generation in the city is about 100 tons per day and 79% is residential waste. According to the waste composition in the city, 47% of the waste is organic. About 66% of the total waste
generated is treated by the city and of this, 8% is recycled, including composting. Ms. Apriansi explained the new SWM paradigm in the city based on the ECO CITY concept and key points are summarised as follows:

- The city has developed a new SWM strategy based on the ECO CITY concept.
- To achieve the city’s aim of becoming an ECO CITY, Palembang has introduced four programmes, such as eco-friendly villages, eco-friendly offices, eco-friendly schools and eco-friendly markets.
- The eco-friendly village programme aims to decrease waste at the household level and awarded the best practices of households, through which the city has promoted the efforts of local residents.
- The eco-friendly school programme aims to develop environmental education and reduce waste generation at school through the introduction of 3R programmes.
- The eco-friendly office programme focuses on introducing waste management and 3R systems at offices.
- The eco-friendly market programme was introduced to reduce the waste generated at city markets.
- The mayor himself has made a commitment to these programmes.
- The city is working in partnership with the private sector to produce compost from the PT.Pusari area and the traditional market in the city.
- The main challenge is the lack of an integrated SWM system. The municipality has been facing budget shortages and human resource limitations in SWM. The city has also faced difficulties in raising public awareness. Since some residents think that the municipality takes full responsibility for environmental management, it is difficult to change public behaviour. There is also a lack of social environmental responsibility by many local companies.

2.2.4. Semarang, Indonesia

- Mr. Berkah Wahyudi, Environmental Board, Semarang City

Semarang City had a population of 1,555,984 in 2010. The city generates about 700 tons of waste per day and 62% is organic. Mr. Berkah presented the SWM in the city, with the following key points:

- The city has the large area for landfills and the recycling rate is only 9%.
- There are many insects swarming around untreated waste, which has caused sanitary issues. Unauthorised cows roam freely around the landfill site.
- The KitaQ System Composting has been promoted in some neighbourhoods after proper training has been carried out for households. Composting baskets have been distributed free of charge to the households who have received training.
- The importance of waste separation, collection and composting has been officially recognised by the city authority under the leadership of the mayor.

2.2.5. Tarakan, Indonesia

- Ms. Sonya Wijayanti, Cleansing Department, Tarakan City

Tarakan City had a total population of 230,093 people in 2010. The area of the city is 657 sq. km and total waste generation is about 577 tons per day. The waste collection coverage of the city is about 87%, and 54% of this waste is generated in residential areas. According to the
waste composition, 52% of waste is comprised of organic materials. Ms. Sonya explained the SWM and composting programmes in Tarakan City and key points of her presentation are as follows:

- The disposal system for solid waste has changed since 2005.
- The municipality has established the 3SR (Sorting, Reuse, Reduce, and Recycle) system.
- The city is aiming at 10% waste reduction in the city by 2014, increasing the coverage of waste management services.
- Since 2007, the municipality has been promoting composting programmes at household, community-based and market facilities.
- There are three types of composting methods are applied by Tarakan City, including the Takakura Home Method, Windrow and Barrel Composter.
- The city has taken initiatives to build partnerships with different stakeholders, such as schools, the private sector, community groups, and the media to implement composting programmes.
- The final products are used for city gardens, purchased by private companies, and sold to markets.
- The success of composting programmes is dependent upon the involvement of all stakeholders. The main barrier is finding good markets for the final product.

2.2.6. Cebu, Philippines

- Mr. Pacres Jose Rey, Officer-in-charge, Cebu City Environment and Natural Resources Office, Cebu City

Cebu City is the second largest in the Philippines, next to Manila and has a total land area of 326.10 sq. km. As of the 2000 census, the total population of Cebu City was 718,821 people in 137,864 households. The total waste generated in the city is about 411 tons per day and organic waste is about 50%. Mr. Rey presented the SWM strategy of the city and the progress in promoting pilot compost programmes.

- SWM is one of the key environmental issues in the city.
- The municipality has set up relevant legal and institutional frameworks for SWM and aimed to reduce half of its waste to be disposed within next three years.
- To achieve its objectives, new initiatives and actions are being taken to build partnerships with relevant stakeholders, such as City Academic Network, the business and industry sector, religious sector, and international organisations.
- The city started its composting programme in 2004 with the City Agriculture Department and took initiatives to establish a vermin-composting programme in one community. The programme became a showcase project in the applicability of the technology, but was not scaled up for wider practice.
- In 2007, the KitaQ System Composting was introduced to Cebu City under the Kitakyushu Initiative for Clean Environment implemented by Kitakyushu City and IGES. Through a wider network of the urban poor, academia, parishes and businesses, the city aimed to introduce the KitaQ System Composting for half of its city population. In addition to that, composting centres will be introduced for markets and other larger organic waste producers.
- The compost product will be purchased by the city government for its greening programme and support for farmers in upland agricultural areas. For this, the city has
already allocated PHP 2.5 million, but the mechanism for the purchase has yet to be established.

- The success factors for community-based composting programmes are political support, public participation, and technical know-how.
- The main challenges are inadequate information concerning solid waste management, shortage of human resources, and budget constraints.

2.2.7. Kampar, Malaysia

- **Mr. Goh Seng Chee, Assistant Environmental Health Officer, Kampar District Council**

The total population in the Kampar District Council area was 101,183 people in 2010. Estimated total waste generation is 117 tons per day and waste collection coverage is 67%. According to the waste composition, 59% of waste is food waste and 60% of waste is generated by households. Mr. Goh presented the SWM strategy of Kampar District Council and its efforts to promote composting at the community level.

- According to the new SWM strategy of Kampar, the city aims to decrease landfills by 22% by 2020. It was developed under a JICA supported project with an original completion date in 2010, but the city has decided to try to complete this initiative by 2020 by promoting public awareness and establishing an effective recycling system to minimise the amount of waste.
- Currently, the recycling rate in Kampar is about 13% of total waste generated. Thirteen model schools, two community initiatives, 20 trainers, recycling network units in district offices, and an information network have already been established.
- The city has been promoting participation of communities, NGOs, and universities with international cooperation, such as JOCV.
- The composting programme started in 2010 and the Takakura baskets were distributed to 86 households on a trial basis. However, the programme identified some barriers such as a lack of knowledge, attitudes and skills, market for final products, low market value for compost, and the sensitive characteristics of compost content, especially for *halal* food or *haram* religious periods.
- The success factors for composting are waste segregation at source, pure organic materials, larger quantities, good quality and market value.

2.2.8. Sibu, Malaysia

- **Mr. Yong Ing Chu, Assistant Secretary, Sibu City**

Sibu City is located in central Sarawak. The area under the jurisdiction of Sibu City is 129.5 sq. km with a population of 162,348 people in 2010. The key points of Mr. Yong’s presentation are as follows:

- According to the waste composition, 49% of the waste generated is organic and can be used for composting.
- The community composting programme started in 2008, with pilot projects in two residential neighbourhoods and two secondary schools. Activities are mainly focused on awareness raising, demonstration projects, free compost bin distribution and follow-up inspection. Further, a community-based composting centre was established for market waste.
- With regard to community composting, JICA has assisted with solid waste
management projects in Sibu municipality under the JICA Partnership Program.

- The KitaQ System Composting was introduced to the city in 2009 and 288 baskets have been distributed thus far. In order to promote this initiative, the municipality has enhanced monitoring and follow-up.
- Despite the efforts to promote composting, the scale is small in comparison with Surabaya.
- The municipality has been facing technical issues to ensure the sustainability of the composting initiative. The city has been trying to equip its residents with the appropriate knowledge and skills to encourage them to continue composting even if they have difficulties.

2.2.9. Nothaburi, Thailand

➤ Ms. Pornsri Kicham, Municipal Secretary, Nothaburi City

Nothaburi City has an area of 38.9 sq. km and a population of 263,553 people (106,074 households) in 2010. Ms. Pornsri explained the environmental management and composting programmes in the city. Key points follow:

- Nothaburi was one of the first cities to join the Kitakyushu Initiative Network in 2001.
- In 2002, the city started a pilot project on waste reduction through the promotion of waste separation and recycling with support from UNESCAP and IGES. As a result, the city has succeeded in achieving a 37% waste reduction within one year.
- Since then, the city has taken initiatives to implement one project per year with assistance from different agencies, such as the construction of a composting plant in 2002, implementation of infectious waste management in 2004, GPS vehicle monitoring system in 2005, night soil (human faeces) management in 2006, hazardous waste management in 2007, the establishment of a wastewater treatment plant at the municipal office in 2009, and PSP & EPS foam separation and solar cell in 2011.
- The only composting plant in Nothaburi started operations in 2002 by applying Italian technologies with financial assistance from the Asia Urbs Programme. The capacity of the compost plant is five tons per day and uses market waste. The technology is called Entsorga Technology.
- KitaQ System Composting recently began operations in 2011, and faces difficulties in dissemination. This is one of the biggest reasons that Nothaburi participated in the seminar.
- The municipality has realized that policy, small scale, simple techniques, team work and motivation are keys to success of the community-based composting programmes.

2.3. A Successful Application of KitaQ System Composting in Surabaya

In this session, participants had an opportunity to acquire both theoretical and practical knowledge on KitaQ System Composting and its evolution in Surabaya City. Further, participants visited one of the organic farming sites located in Wakamatsu (near J-POWER group/JPec ) to get firsthand experience in utilising compost for organic farming in Japan.

2.3.1. How to Make Takakura Compost and Solve the Practical Problems when Using Compost

➤ Mr. Koji Takakura, Deputy Director, Wakamatsu Environment Research Institute, J-
Mr. Takakura and Ms. Yaoya explained to the participants about the basic methods of using the Takakura composting system and elaborated on how to solve the practical problems that emerge during the implementation of composting schemes. Key points from their presentation are as follows:

- Microorganisms, moisture control, and aerobic conditions are important elements for Takakura composting.
- Various microorganisms are used during the composting process. It cannot be finished using only one kind of microorganism. The priority of the microorganism changes according to the stage of composting. The most important point to remember is not to expect the natural proliferation of the microorganisms, but to adjust accordingly.
- Composting has three stages of transition.
- In the first stage, easily decomposable organic matters are quickly decomposed with useful microorganisms. Both good and bad microorganisms can be used in the easily decomposable organic materials. The large amounts of harmless moulds and bacillus in the compost should be increased by adding fermented food such as Aspergillus oryazae and lactic acid bacteria. This is important to prevent rot.
- In the second stage, the majority of a botanical organism, such as the vegetables, is fibered. To deal with this situation, actinomycetes are suitable for decomposition of cellulose and the hemi cellulose. *Actinomyces* live in the hums.
- In the third stage, decomposition of the lignin contained in the plant, such as the vegetables, is slow. The basidiomycete, a mushroom, is suitable for resolution of lignin.
- Fermentation microorganisms and bacterium can be found in the region. Microorganisms that are related to the fermented food are effective. When the fermented food is unavailable, decomposed fallen leaves (hums) are very effective. It is not only effective for the composting, but also collecting microorganisms from the local area are good for matching the soil in the respective area.
- Aerobic decomposition is effective for composting and is quicker than anaerobic decomposition.
- Effective moisture conditions for composting are 40-60%. Microorganisms perform poorly when moisture is low. However, when moisture is too high, the microorganisms become oxygen-deficient and result in anaerobic decomposition and rot.
- The best C/N ratio of compost is 20.

2.3.2. Successful Implication of KitaQ System Composting in Municipal Solid Waste Management in Surabaya City

- Ms. Ema Agustina, Department of Public Works and Spatial Planning, Surabaya, Indonesia

Surabaya City, the second largest city in Indonesia, next to Jakarta, had a population of two million in 2010. It is the centre of development in East Indonesia and can be divided into 31 districts and 160 sub-districts for administrative purposes. As many other cities in developing Asia, Surabaya City faced tremendous challenges in managing solid waste. The total waste
has increased with population growth, economic development, urbanisation and new lifestyles. As a result, the city authority took initiatives to implement the new SWM strategy which is focused on reducing waste at its source and processing waste in the landfill by using environmentally friendly technologies. Ms. Ema explained how Surabaya has succeeded in reducing its waste generation by 30% especially through the introduction of community-based solid waste management and composting. In addition to her presentation, she used a short video to explain Surabaya’s efforts in SWM and composting. Key points from her presentation are as follows:

- The municipality has been promoting community-based waste management programmes with community involvement in its management through 3R implementation. The basic concept of these community-based programmes is reducing waste at source, waste sorting (organic and non-organic waste) and proper waste treatment, such as organic waste processed into compost, recycling waste sold to scavengers or used to make recycled products. The remainder is sent to a sanitary landfill.

- The implementation structure of the community-based solid waste management programme is socialization to the community (city authority in partnership with NGOs), recruitment and training of cadres, distribution of cleaning tools (composter bin, Takakura composting baskets, cart, and establishing composting centres), involving communities, processing organic waste into compost, selling recyclable materials to scavengers or used for recycled products.

- Since 2002, the municipal authority distributed about 20,000 compost baskets to households and established 16 composting centres throughout the city.

- Further, the municipal authority took the initiative to motivate communities to create community-based SWM programmes by giving incentives to those communities that are willing to become involved (Green and Clean Campaign), as well as incentives to environmental carders through the national day award system in recognition of their service. At the same time, the city strictly enforced the laws and regulations for those that do not obey the rules.

- Surabaya’s achievement in reducing waste generation is highly recognised at the international level. The city has received nine international awards so far.

- However, the municipality is still facing some issues, such as low awareness of waste disposal, generation of waste by hawkers and markets, increase of product waste, which cannot be reused, reduced, and recycled, and little knowledge on simple waste technology, which can create products with economic value.

2.3.3. Observation of Community Composting and Organic Farming

- Ms. Sanae Yoshihara, Yoshihara Farm

At the end of the session, participants visited Yoshihara Farm, an organic farm in Wakamatsu, Kitakyushu City and observed how compost was produced and how it is utilised in organic farming. Through communication with Ms. Yoshihara, owner of the farm, the participants explored the challenges and constraints in promoting composting and organic farming. Ms. Yoshihara explained that three important points need to be considered for organic farming:

- Organic farming is not only farming without using pesticides and fertilisers, it is also a way to enrich the earth from the food.

- Organic farming is a system to manage foods from soil to mouth.
Organic farming is a system that circulates and sustains life.

Thursday, 30 June

2.4. Experiences in Establishing a Sustainable Material-Cycle Society in Kitakyushu City

This session was devoted to give participants some ideas about the national policy framework for the establishment of a Sound Material-Cycle Society in Japan and shared the experiences of Japanese cities in implementing this aim in collaboration with different stakeholders. Kitakyushu City shared its experiences in building an internationally recognised, environmentally leading city through the establishment of a sustainable material-cycle society. Following this, IGES made a presentation on the success of Surabaya case from an academic perspective and its replication in other Asian cities under the Kitakyushu Initiative. Further, IGES shared the findings of its recent study on the best practices of Japan in municipal solid waste and the 3Rs approach and announced its new initiative in establishing the environmental model cities programme in Asia with the Secretariat of ASEAN.

2.4.1. International Environmental Cooperation Strategies and Municipal Solid Waste Management in Kitakyushu City

- Ms. Seiko Kubo, Deputy Director, Office for International Environmental Strategies, Kitakyushu City

Kitakyushu City has a long history of tackling and recovering from environmental pollution. The city has been recognised as an environmental model city in and outside the country and has been exporting its environmental technologies and knowledge to many Asian countries. Ms. Kubo explained to the participants about the city’s environmental strategies, highlighted its experiences in building a Sound Material-Cycle Society based on the national policy framework and discussed the city’s waste administration, basic plan for SWM, waste separation and collection, promotion of eco-town for waste recycling and final treatment methods including the new initiative to promote composting for kitchen waste at the household level. Key points from her presentation are as follows:

Municipal Waste Management

- According to the Waste Disposal and Public Cleansing Law, waste refers to refuse, bulky refuse, ashes, sludge, excreta, waste oil, waste acid and alkali, carcasses and other filthy and unnecessary matter in solid or liquid state.
- Municipal wastes have been treated by the local government, while industrial waste is treated by businesses directly.
- The legal framework has been strategically set up to establish a recycling-based society and the role assignment between parties is clearly demarcated.
- The Extended Producer Responsibility aims to control the generation of waste by holding producers responsible not only for the production and delivery of products, but also for the disposal of the products after use.
- The development of strategies for waste treatment in Kitakyushu City can be divided into three stages: Stage 1—Disposal oriented process (before 1993), Stage 2—Recycling-oriented process (1993-2000) and Stage 3—Environmentally-sound process
The basic plan of municipal waste treatment in Kitakyushu City was formulated in 2001 and aimed to increase in the recycling rate from 13% to 25% within 10 years.

To achieve this target, the city developed a basic view on the sorting and recycling of wastes, such as raising awareness and understanding of residents, establishment of recycling technology, demand for recycled products, and efficiency including cost performance.

Local efforts for recycling domestic garbage were further encouraged by subsidising collection by local volunteer organisations and promoting household composting.

**Green Growth Strategies**

- The Kitakyushu Green Frontier Plan includes the city’s strategy for the establishment of a low carbon economy. According to the plan, the city aims to establish a sustainable society with prosperity to be shared through generations by reducing CO\(_2\) to protect the environment, achieve happiness, health, a comfortable and convenient life while also simultaneously pursuing the achievement of sustainable economic development. The city further aimed to achieve a CO\(_2\) reduction target of 40% of economic growth in 2050, including 50% within the city and 150% in Asia.

- Kitakyushu’s five development strategies for sustainable development are urban development, industrial development, human development, social development and sustainable development in Asia.

- To achieve a low carbon economy, the smart usage of industrial potential energy has been encouraged. As a part of this initiative, the Zero Carbon Emission Town Development (Jono Area) has been formulated.

- The Kitakyushu Eco Premium and Eco-Town has been established to facilitate resource circulation and eco-industries.

- Kitakyushu has been involved in developing win-win relationships in Asia through environmental cooperation to mitigate environmental pollution and realise the creation of a low carbon economy.

- The Asian Partnership Programme towards shared prosperity has trained 6,207 participants from 138 countries and dispatched 160 experts to promote environmental projects in Asia.

- The Kitakyushu Initiative, a city-to-city environmental cooperation network of the United Nations Economic and Social Commission for Asia and the Pacific (ESCAP), was established to share good practices in urban environmental management.

- The Kitakyushu Asian Centre for Low Carbon Society was established in 2010 aiming to promote carbon reduction and vitalise economies in Asia.

- Kitakyushu’s low carbon technologies are transferred to realise the creation of a low carbon economy in Asia.

### 2.4.2. Kitakyushu Initiative and Replication of Surabaya Composting Model in Other Asian Cities

- **Mr. Toshizo Maeda, Acting Director, IGES Kitakyushu Urban Centre**

The Kitakyushu Initiative is a programme of ESCAP, which was adopted at the 4\(^{th}\) Ministerial Conference on Environment and Development in Asia and the Pacific (MCED4) held in Kitakyushu City, Japan. Its main objective is to improve the urban environment and
human health by promoting environmental actions at the local level. IGES Kitakyushu Urban Centre served as the Secretariat of the Kitakyushu Initiative Network during its implementation and facilitated the replication of good practices as well as capacity-building programmes for integrated urban environmental management in Asia. The replication of Surabaya’s community-based solid waste management and composting model in many other cities utilising city-to-city cooperation and inter-city networks was a successful dissemination of good practices under the Kitakyushu Initiative in Asia. Mr. Maeda briefly presented the experiences of the Kitakyushu Initiative and replication of the Surabaya composting model in other Asian cities. Key points from the presentation:

- Summarising the presentations made by the participant cities in the first day, Mr. Maeda emphasised that the total amount of wastes in all participating cities has continued to increase due to the economic growth. This shows that immediate attention is required to develop strategies for waste reduction in these cities.

- Surabaya, the second largest city in Indonesia has already proven that it can achieve substantial waste reduction (20% within four years and 30% in five years) by promoting composting at household and community levels. It was evident that one ton of composting can be reduced to an additional 1-2 tons of dry waste through the reuse and recycling of waste.

- This results in not only waste reduction, but also social and environmental benefits, such as better household environments, greener and cleaner streets, environmental education, employment opportunities, promotion of recycling, production of herbs and vegetables and income from the sales of compost products.

- It was important to build partnerships among different stakeholders for the successful implementation of the composting programmes. Surabaya’s model compost project started from one community. It was then scaled up by the city government with the establishment of composting centres and distribution of compost baskets. The programme was further replicated by organising community clean-up campaigns in cooperation with NGOs, the private sector and the media.

- Selecting a suitable composting method was another successful factor of the Surabaya model. KitaQ System Composting is low-cost, low-tech, easy to operate, uses only local materials, has no offensive smell, no leachate, is fast, requires less space required and results in good quality compost.

- Financial analysis of composting in Surabaya has shown that promotion of composting and waste segregation required only 1-2% of the total SWM cost of the city and a reduction of USD 48,000 can be achieved per year by reducing waste.

- Based on the experiences of Surabaya City, Sibu City derived some recommendations for its aim to reduce waste generation by 10% to 20% in a period of three years. These recommendations included the construction of a market waste composting centre (processes two tons per day), four community composting centres (processes two tons per day), distribution of compost baskets to 1,000 households, organisation of a clean-up campaign, establishment of compost purchasing scheme and technical assistance from KITA, Kitakyushu City, IGES and JICA.

- The support from the national and local governments are important, especially at the initial stage of SWM, and the roles of inter-mediators, such as NGOs and community groups, are essential for replicating and scaling up good practices. Replication from city-to-city can be facilitated by external agencies.
2.4.3. Best Practices of Japan: Municipal Solid Waste and the 3R Approach

Dr. D.G.J. Premakumara, Policy Researcher, IGES, Kitakyushu Urban Centre

Japan had moved towards the principle of sustainable development as the basis of its society and to establish the Sound Material-Cycle Society in 2000. This law aims to promote sustainable societies where the consumption of natural resources and environmental loads are minimised through shared responsibility among authorities, businesses and residents. It calls for preventing waste generation (reduce), promoting the cyclical use of products (reuse, recycling) and ensuring proper waste disposal. The Ministry of Environment Japan (MOEJ) formulated the fundamental plan for establishing a Sound Material-Cycle Society (2003, 2008), which outlined the practical steps that should be taken to reach the goal of becoming a Sound Material-Cycle Society.

Under the above legislative foundation provided by the central government, local governments in Japan have enacted measures to achieve targets through the cooperation of different stakeholders, especially through the encouragement of community participation. Dr. Premakumara presented the key findings of some case studies that focused on the efforts being taken across Japan to establish a more resource efficient society, including both large cities (Yokohama, Nagoya, Kitakyushu) and small cities (Minamata, Oki Town). It gave the participants some idea about the implementation processes, innovative actions and major achievements in each case study city. A key message was that a 20%-40% waste reduction was achieved by each city promoting waste separation, collection and recycling with its residents. This requires:

- strong leadership and commitment of the local government (both political and responsible agencies),
- a joint vision generated through active involvement of key stakeholders, including local authority, civil society, business sector (formal and informal) and academics,
- establishing a clear definition and classification rules and proper sorting, collection and treatment mechanism based on local conditions,
- increasing public awareness on new waste separation and collection systems,
- promoting partnership among different stakeholders in the city, while facilitating their own innovative activities,
- establishing recycling stations to convert the waste into resources after they are collected, and
- no high-end inputs, but only continuous communication and enabling environment.

2.5. Capacity Development in Solid Waste Management with Special Reference to the Introduction of KitaQ System Composting

Overall facilitator: Dr. Yoshida Mitsuo, Senior Advisor (Environment), JICA

Reporter: Dr. D.G.J. Premakumara, Policy Researcher, IGES

Surabaya’s achievement exemplifies the reduction of a large amount of waste in a short period of time with a limited budget by establishing an Integrated Sustainable Waste Management System, which is based in institutional, social, environmental, political, technical and financial aspects. It also emphasises the critical role of involving various stakeholders, covering waste prevention and resource recovery, including interactions with other urban systems and promoting and integrating different habitat scales from household,
neighbourhood to city. It was not only a technical matter in introducing the KitaQ System Composting. This requires providing support for capacity development of the beneficiary city, instead of simple technical transfer.

2.5.1. Introductory Session and Visioning Exercise

➢ Dr. Yoshida Mitsuo, Senior Advisor (Environment), JICA

Dr. Yoshida gave an introductory lecture on capacity development in solid waste management with special reference to the KitaQ System Composting. His presentation included the following topics, including the reasons why capacity is required for solid waste management and composting, the concept of capacity development, different levels in capacity development and components of capacity at each of these levels. He emphasised that the quality of waste collection/transportation service and final disposal is enhanced in line with economic growth in cities. However, the SWM service qualities are widely diversified even in the same level of economic growth. Economic growth is not only a factor for qualified SWM. Many other factors including capacity development must be considered. He then briefly explained the flowchart of composting in solid waste management and necessary factors for capacity development at each level including waste generation, collection transportation, composting processes and product utilisation. Further, he explained the comprehensive feature of capacity development in the organisational aspect for composting and the enabling environment that is required.

2.5.2. Discussion Session 1: Identify the Necessary Capacities for Promotion of Composting in Municipal Solid Waste Management

After the introductory presentation of Dr. Yoshida, participants were broken into four discussion groups, including organisation/institution for composting, community-based approach, marketing of compost and financial sustainability and public awareness. These groups were divided based on the successful factors and key challenges identified by the participants in their city presentations in the first day of the seminar. Participants were then asked to choose a group on their own considering the situation and most relevance for their cities. The three participants came from Balikpapan City were requested to join with three different groups to provide more variation within the discussions. Participants from the host country were able to select the group of their choosing.

The participants were then asked to select a group leader to present the group findings voluntarily in the presentation session at the end of the day. Each group was given a summary sheet of key points identified under the each theme from the city presentations and asked them to consider these points during their discussions. Within each group, participants debated and identified the necessary capacities required at different levels and promoting/inhibiting factors to achieve them. Each group has a group facilitator to make the discussion more effective by creating interaction and exchange between the group members. The breakout groups had the following composition:
<table>
<thead>
<tr>
<th></th>
<th>Group 1: Organisation/institution for composting</th>
<th>Group 2: Community-based approach</th>
<th>Group 3: Marketing/financial sustainability</th>
<th>Group 4: Public awareness</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Group Leader</strong></td>
<td>Cebu</td>
<td>Sibu</td>
<td>Balikpapan</td>
<td>Nonthaburi</td>
</tr>
<tr>
<td><strong>Group Member</strong></td>
<td>Balikpapan</td>
<td>Kampar</td>
<td>Makassar</td>
<td>Surabaya</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Palembang</td>
<td>Semarang</td>
<td>Tarakan</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Balikpapan</td>
<td>IGES</td>
<td></td>
</tr>
<tr>
<td><strong>Group Facilitator</strong></td>
<td>Mr. Maeda Toshizou, IGES</td>
<td>Ms. Tamura Eriko, JICA</td>
<td>Mr. Yao Kazuya, JICA</td>
<td>Ms. Murakami Emiko, IGES</td>
</tr>
</tbody>
</table>

### 2.5.3. Introduction of Citizen Participation in Promoting 3R Activities and Observation of Community Composting Programme in Ano Community Centre

*Ms. Nobuko Uchiyama, Manager, Ano Community Centre*

Drawing upon the lessons learned by the Great Hanshin-Awaji Earthquake in 1995, Kitakyushu City has taken actions to establish the number of community halls (social education facilities) in primary school districts and renamed them as community centres which serve as a place for voluntary activities of the respective community. Ms. Uchiyama explained about public participation in promoting 3R activities at Ano Community Centre. In addition, the participants had a chance to attend the practical observation in a Training of Trainers programme in the community centre to promote composting at the household level. Key points from Ms. Uchiyama’s presentation are as follows:

- Ano Community Centre was established with subsidies from Kitakyushu city to support social welfare for the local community and encourage the voluntarily activities of the residents.
- The centre has been involved in a wide range of activities, such as community actions, continuing education, welfare, eco-friendly recycling, youth development, child-raising support, health care and fitness, disaster and crime prevention.
- The Ano community centre is one of the most active community centres in the city in promoting recycling activities. Nine categories of resource materials are covered all year around. In addition, a recycling bazaar for second-hand books, daily utensils and clothes is organised in summer holidays and cultural festivals.
- The community centre has set up an environmental working group and has been organising composting seminars since January 2011 aiming to minimise kitchen waste and produce good quality compost for the soil of vegetable gardens.
- It was focused on promoting activities that can be involved by all sections of the society, such as children, adult and elderly people.
2.5.4. Group Presentation: Identify the Necessary Capacities for Promotion of Composting in Municipal Solid Waste Management

After participants returned from Ano Community Centre, they further engaged in group discussions and then returned to the plenary session to share the results of their discussions. The group leaders presented their discussion outputs. Others were given an opportunity to add or make any comments after the each presentation. These were considered in putting together the final list as below:

Group 1 – Organisation/institution for composting
  ➢ Group Presenter: Mr. Pacres Jose Rey, Cebu City

<table>
<thead>
<tr>
<th>Promotion Factors</th>
<th>Inhibiting Factors (Obstacles)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Strong support from the Mayor</td>
<td>Weak support from other departments</td>
</tr>
<tr>
<td>Available knowledge and experience of composting in the city</td>
<td>Limited budget and financial resources</td>
</tr>
<tr>
<td>Existing SWM programmes in the schools</td>
<td>Inadequate personal staff and equipment</td>
</tr>
<tr>
<td>Existing network with other stakeholders, such as academic, civil society, business sector and international agencies</td>
<td>Lack of incentives and enforcements</td>
</tr>
<tr>
<td>Existing SWM laws and ordinances</td>
<td></td>
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<tr>
<td>Trained staff available for composting promotion</td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>Capacity Level</th>
<th>Description of Capacities</th>
</tr>
</thead>
<tbody>
<tr>
<td>Individual</td>
<td>Better communication skills for leaders</td>
</tr>
<tr>
<td></td>
<td>Improve motivation and moral of staff</td>
</tr>
<tr>
<td></td>
<td>Education and skill development programmes for staff in each level</td>
</tr>
<tr>
<td>Organisational</td>
<td>Develop briefing materials about SWM</td>
</tr>
<tr>
<td></td>
<td>Measures for additional funding</td>
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<tr>
<td></td>
<td>Sufficient staff and equipment</td>
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<tr>
<td></td>
<td>Reward system within the organisation</td>
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<tr>
<td></td>
<td>Education of staff management</td>
</tr>
<tr>
<td>Institutional &amp; Societal</td>
<td>Network between decision makers and other staff</td>
</tr>
<tr>
<td></td>
<td>Public awareness campaign</td>
</tr>
<tr>
<td></td>
<td>Coordination among different departments</td>
</tr>
<tr>
<td></td>
<td>New regulations, laws and by-laws for introducing waste separation, collection and composting</td>
</tr>
<tr>
<td></td>
<td>Strong enforcement of existing laws</td>
</tr>
<tr>
<td></td>
<td>Reward system</td>
</tr>
</tbody>
</table>
**Group 2 – Community-based initiatives**

➤ **Group Presenter: Mr. Yong Ing Chu, Sibu City**

<table>
<thead>
<tr>
<th>Promotion Factors</th>
<th>Inhabiting Factors (Obstacles)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Existing community-based composting centers</td>
<td>Low education among community members</td>
</tr>
<tr>
<td>Available partnership with other stakeholders</td>
<td>Low-priority of SWM for residents</td>
</tr>
<tr>
<td>Strong community leaders</td>
<td>Misconception that SWM is the responsibility of the local authority</td>
</tr>
<tr>
<td>Existing community-based organisations and social capital</td>
<td>Lack of law enforcement</td>
</tr>
<tr>
<td>Existing networks with international agencies, like JICA</td>
<td>Lack of human resources</td>
</tr>
<tr>
<td>Environmental awareness among residents</td>
<td>Weak network among people within the community as well as outside community</td>
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<tr>
<td></td>
<td>Lack of budget allocation for community-based initiatives</td>
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<td></td>
<td>No incentives</td>
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<tr>
<td></td>
<td>Lack of commitments by both residents and authorities</td>
</tr>
<tr>
<td></td>
<td>Cultural differences</td>
</tr>
<tr>
<td></td>
<td>Political influence at community level</td>
</tr>
<tr>
<td></td>
<td>Lack of awareness</td>
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<table>
<thead>
<tr>
<th>Capacity Level</th>
<th>Description of Capacities</th>
</tr>
</thead>
<tbody>
<tr>
<td>Individual</td>
<td>Motivation for cadres</td>
</tr>
<tr>
<td></td>
<td>Training courses, seminars on SWM</td>
</tr>
<tr>
<td></td>
<td>Communication skills</td>
</tr>
<tr>
<td>Organisational</td>
<td>Integrated SWM system</td>
</tr>
<tr>
<td></td>
<td>Coordination between stakeholders</td>
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<tr>
<td></td>
<td>Gender participation</td>
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<tr>
<td></td>
<td>Waste bank programme</td>
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<tr>
<td></td>
<td>Community centres and community-based organisations</td>
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<tr>
<td></td>
<td>Strong leadership at community level</td>
</tr>
<tr>
<td></td>
<td>Clear role and responsibilities for community leaders</td>
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<tr>
<td></td>
<td>3R programmes at community level</td>
</tr>
<tr>
<td></td>
<td>Training on composting methods</td>
</tr>
<tr>
<td></td>
<td>Strengthened networks</td>
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<tr>
<td>Institutional &amp; Societal</td>
<td>Local regulations</td>
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<tr>
<td></td>
<td>Incentives and enforcements</td>
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<tr>
<td></td>
<td>Private sector partnership and CSR</td>
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<tr>
<td></td>
<td>Technical guidelines</td>
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<tr>
<td></td>
<td>Strong political will</td>
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<tr>
<td></td>
<td>Integrated environmental management programmes</td>
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<tr>
<td></td>
<td>Policy and guidelines</td>
</tr>
<tr>
<td></td>
<td>External funding from donors</td>
</tr>
<tr>
<td></td>
<td>Partnership with different stakeholders</td>
</tr>
</tbody>
</table>
**Group 3 – Marketing and economic sustainability**  
➤ **Group Presenter: Mr. Arie Soetjiadi, Balikpapan City**

<table>
<thead>
<tr>
<th>Promotion Factors</th>
<th>Inhabiting Factors (Obstacles)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Promotion campaign</td>
<td>Less demand</td>
</tr>
<tr>
<td>National standards for composting are set</td>
<td>Subsidy provided for chemical fertiliser</td>
</tr>
<tr>
<td>Cost-benefits analysis</td>
<td>Lack of regulation</td>
</tr>
<tr>
<td></td>
<td>No agricultural functions in the city</td>
</tr>
</tbody>
</table>

**Capacity Level** | **Description of Capacities**
--- | ---
**Individual**   | Knowledge and coordination skills of cadres   |
|                   | Cost-benefit analysis skills of head of official |
|                   | Fostering knowledge of facilitation to strengthen linkages with communities |

**Organizational** | **Description of Capacities**
--- | ---
| Advertising and marketing by involving other stakeholders |

**Institutional & Societal** | **Description of Capacities**
--- | ---
| Standard procedure |
| Strengthening collaboration between different stakeholders, especially with private sector ventures |
| Raise awareness for CSR |
| Political will and support |

**Group 4 – Public Awareness**  
➤ **Group Presenter: Ms. Pornsri Kicham, Nonthaburi City**

<table>
<thead>
<tr>
<th>Promotion Factors</th>
<th>Inhabiting Factors (Obstacles)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Existing public awareness campaigns</td>
<td>Culture differences to achieve consensus</td>
</tr>
<tr>
<td>Organizes seminars for socialisation</td>
<td>People mindset</td>
</tr>
<tr>
<td>Good education</td>
<td>Lack of responsibility</td>
</tr>
<tr>
<td>Demonstration</td>
<td>Lack of supportive policies, regulations and laws</td>
</tr>
<tr>
<td>Participation of stakeholders</td>
<td>Economic disparities</td>
</tr>
<tr>
<td>Good cooperation</td>
<td></td>
</tr>
<tr>
<td>Incentives</td>
<td></td>
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<tr>
<td>Competition</td>
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<tr>
<td>Reward and punishment system are available</td>
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<tr>
<td>Documentation and sharing of best practices</td>
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</tbody>
</table>

**Capacity Level** | **Description of Capacities**
--- | ---
**Individual**   | Knowledge, attitude, individual skills   |
|                   | Accumulate experiences                   |

**Organizational** | **Description of Capacities**
--- | ---
| Seminars planning and implementation |
| Infrastructure (building)            |
| Technology                           |
| Database/information                 |
| Build networking                     |

**Institutional & Societal** | **Description of Capacities**
--- | ---
| Local regulations, environmental permit and laws |
| Education programme for residents through media |
| Educate local leaders to guide small groups for one direction |
Friday 01 July

2.5.5. Site Visit to Bin/Can Recycling Centre in Honjo

There are two facilities in the Kitakyushu City for can and glass bottle recycling, where waste is separated into cans, glass bottles, plastic bottles, paper containers (milk cartons) and plastic trays for sale. In the morning of Day 3, the participants visited Honjo recycling centre and observed its functions. This centre was built for two objectives with subsidies from Kitakyushu City: the promotion of recycling and to guarantee jobs for handicapped people (fifteen handicapped workers are employed at the centre). The separated waste is sent to Eco-Town for recycling.

2.5.6. Discussion Session 2: Identify Strategic Actions for Composting Model Cities in Asia

Participants were once again divided into four groups to discuss the actions needed to achieve the strategies identified in the previous session. The group composition was primarily the same as the previous session. Dr. Premakumara then presented the draft actions, which was identified by him after a brainstorming session with Dr. Yoshida and key members of the coordination committee, including JICA, IGES, Kitakyushu City, KITA and Mr. Yao from JICA, and was also based on the group findings of the previous session. Following this, there were discussions within each group about the list and each group was asked to share their ideas or comments. There were further discussions before finalising the list of actions and other groups are also provided opportunity for additional points. At the end of the session, the following list of actions were identified as the strategic actions to overcome the key challenges cities are facing in implementing community-based composting programmes in Asia.

**Group 1: Marketing**

**Challenges/Issues**

- Insufficient market demand for composting
- Scepticism and lack of awareness on organic fertiliser
- Competition from chemical fertilisers
- Far distance to market (farmers)
- Poor quality

**Suggested Solutions/Actions**

*Create and sustain a market for compost*

- Develop an appropriate marketing strategy
- Prepare a demand map and business plan based on production capacity
- Set-up demonstration projects and offer free samples
- Integrated with existing markets and distribution networks
- Use of compost by local government for its city greening and parks
- Promote new life-styles on organic farming
- Offer support to composters conceptually and financially that is accessible, applicable and consistent
• Shift subsidies towards organic fertiliser
• Use compost for soil rehabilitation
• MoU among local authorities

**Ensure quality control**
• Separate waste at source as much as possible
• Collect and contain industrial waste stream separately from street sweeping waste, market waste and household waste
• Introduce and support waste segregation at the household level into organic and non-organic
• Develop national/local standards for compost
• Establish national/local certification system for compost
• Carry-out research and development on compost quality in cooperation with academic and research institutes
• Design and implement training programmes on compost quality control

**Regulation**
• Enforcement for officers to buy compost
• Spatial planning (e.g. building parks)
• Eliminate subsidy for chemical fertiliser and shift to compost

**Group 2: Public Awareness**

**Challenges/Issues**

➢ Community lacks commitments
➢ Lack of awareness, understanding and enthusiasm

**Suggested Solutions/Actions**

*Generate awareness, understanding and enthusiasm*

• Design and implementation of information, education and communication programmes with assistance of CBOs, NGOs and others
• Explain and promote the economic, social and environmental benefits of community composting schemes
• Select appropriate organisational approaches for composting schemes based on the level of community capacity
• Integrate all stakeholders into planning, design and implementation and marketing of a composting programme
• Establish an award system to motivate public participation for community composting activities
• Establish partnerships with the private sector, mass media, and academic institutions in designing and implementing socialisation programmes and award systems
• Create community rules and law enforcement for ones who not obey the schemes
• Social punishment for non-cooperative body
Group 3: Design of Community-based Composting Schemes

Challenges/Issues

- Insufficient knowledge and technical expertise
- Trepidation prevents those yet to acquire the necessary skills from initiating compost schemes.
- Those with limited knowledge produce low-quality compost that is less marketable and could be contaminated.
- Lack of seed capitals for infrastructure development (land cost, building cost, and other equipment necessary)
- Cost for operational and maintenance

Suggested Solutions/Actions

Selection of appropriate approach

- Appropriate composting approach (household basket/backyard composting or community composting centre) and appropriate composting method (Takahura, Windrow, box or in-vessel) need to be selected taking into account technical, financial, socio-cultural and institutional capacity.
- Select appropriate sites for community composting centres
- Support of community leader (opinion leader)

Development and design of collection system

- Assess the target community interest and land availability for construction of community composting centres
- Collect possible data on the solid waste generation in the community, its composition and existing conditions of the service
- Select the appropriate waste collection system
- Promote waste separation at household level
- Organise and introduce fcc collection
- Integrated solid waste management strategy

Community participation and mobilisation for composting programme

- Creating networks between competent composters (public organisations, private entrepreneurs and NGOs) and those institutions and individuals eager to learn more can vastly improve the quality and quantity of compost production.

Operation and maintaining a composting programme

- Operation and monitoring
- Trouble shooting
- Control the quality

Group 4: Organisational_Institutional

Challenges/Issues

- Lack of appropriate legal framework
- Lack of clear vision and strategic plans
- Lack of coordination among staff in the same department and also different departments and sections
Lack of coordination between other stakeholders
Existing procedures have limitations
Lack of skills and capacities
Political influence

Suggested Solutions/Actions

Developing strategic plans
- Collect baseline data
- Prepare an integrated plan showing clear vision with active participation of different stakeholders
- Establish appropriate legal framework
- Allocate sufficient budget
- Create coordinating system
- Invite different stakeholders to coordinating, monitoring committees
- Establish training programmes
- Create network with international agencies
- Facilities and equipment
- Intellectual asset
- Resource centre (e.g. data collection, information sharing)
- Commitment of the staff for implementation
- National policy and strategy to support compost promotion

2.5.7. Discussion Session 3 – Identify Follow-up Actions

- Facilitator: Dr. Yoshida Mitsuo, Senior Advisor (Environment), JICA
- Reporter: Mr., Yao Kazuya, Associate Expert, Global Environmental Department, JICA

Finally, participants were given an opportunity to identify and present some follow-up actions after their return based on the experiences gained through attending the seminar. They were advised not to list up long list of dreams of actions and asked to focus on more practical and easy to implement within their regular work responsibilities. Participants then came to plenary and shared the list of actions to work on. Further, key members of the organising committee also shared their views and possible opportunities for follow-up action. The lists of recommended actions are as follows:

Balikpapan
- Establish regulation for marketing compost
- Establish special mechanism for promoting composting in the municipal office
- Initiate collaboration with mining companies for marketing compost
- Consider the importance of promoting gardening and parks in spatial planning
- Campaign for the mayor to promote compost

Makassar
- Obtain support of the mayor to establish regulations for composting
- Establish composting centres in district and sub district
- Promote household composting
- Establish campaigns for the communities to promote
• Collaborate with private sector, university, NGO and schools

**Palembang**
• Continue on-going activities in the area of composting (environmental cadre in the community, eco-community)
• Strengthen staff capacity to support community-based programmes
• Initiative to collaborate, network and lobby with other stakeholders (private sector, farms, NGOs, etc.)

**Semarang**
• Establish compost centres in every sub-district
• Collaboration and getting strong commitment from every stakeholder for implementation
• Establish regulation to encourage participation of other stakeholders

**Tarakan**
• Improve commitment and effort on composting and community-based SWM (five community-based solid waste management projects)
• Promote waste separation at household level
• Socialization and promotion of composting at the community-level (especially schools, women groups, etc.)
• Develop compost quality standard for local government to promote use in farming
• Improve partnership with other stakeholders (media, academic bodies, etc.)

**Cebu**
• Publish manual of KitaQ System Composting and centralised windrow composting
• Prepare the next year budget for compost activities (500,000 pesos → double in 2011)
• Modification of 2011 budget for community-based composting

**Kampar**
• Establish compost centre in the market
• Replication of household composting to two new communities
• Implement training of trainers programme (university and school students)
• Networking and dissemination of information in 13 local authorities

**Sibu**
• Management of existing compost centre by collaborating with other stakeholders (e.g. private company)
• Replication of KitaQ System Composting in one more community
• Share experience with neighbouring cities

**Nonthaburi**
• Start a pilot project for KitaQ System Composting
• Prepare education, seminars, communities, budget, leaflets, schools, city-produced seed compost
• Take action to decrease the use of chemical fertiliser in the municipality (e.g. public parks)
Surabaya

- Moving towards integrated environmental planning (Not only waste management)
- Continue and improve community activities on composting
- Introduce more community compost centres (involvement of shopping centres)
- Encourage recycling business

Key members of the organising team shared the possible support that could be provided from their side. Mr. Takakura recommended that the best way to recycle kitchen waste is to make compost. It can rehabilitate degraded soil and has a lot of advantages for city authorities. However, the successful implementation of KitaQ System Composting requires initiatives by local authorities, collaboration with residents, private companies through Corporate Social Responsibility (CSR) and the development of human resources.

Mr. Mitoma from Kitakyushu City indicated that the city has already take actions to inform the people in Kitakyushu City about this seminar through mass media and hope to collaborate with participating cities not only to promote composting, but also in other SWM activities, such Eco-Town development.

Representing KITA, Mr. Nagaishi said it will take action to follow-up with Kitakyushu City and IGES. Ms. Morimoto from KITA also emphasised that environmental education for young people is a very effective tool to educate adults and that real, hands-on experience for children is very important (e.g. site visit for children to see environmental facilities).

Dr. Premakumara from IGES pointed that as a research institution, IGES would like to work closely with JICA, Kitakyushu City and KITA in the following actions, such as further studies on the success of the Surabaya case study and the development of training materials (manuals, video documentary, and case study series) to share this information and experience with other cities, assist cities in preparing integrated solid waste management plans based on composting and 3Rs, document and share the experiences of Japanese cities in promoting 3Rs, conduct policy dialogues to promote community-based composting in SWM, and design and implement training and capacity building programmes.

Ms. Tamura, JICA Kyushu, thanked the all participant cities for their commitment and active participation throughout the seminar. The seminar was very successful in identifying opportunities to share experiences and promote activities on composting. Further, JICA had a great opportunity to learn from the practical experiences of the cities, which will help in developing training/capacity building materials and new training programmes to support composting in SWM. She also indicated JICA’s interest in continuing this type of seminars in the future.

2.6. Wrap-up and Closing Remarks

- Mr. Keiichi Muraoka, Director General, JICA Kyushu
- Mr. Hideo Naito, Executive Director, Office for International Environmental Strategies, Environmental Bureau, Kitakyushu City
- Ms. Pornsri Kitcham, Municipal Secretary, Nonthaburi, Thailand

The three-day seminar concluded with closing remarks from Mr. Keiichi Muraoka, Director General of JICA Kyushu. He thanked all participants and emphasised his great expectations
of the outcomes of the seminar. The information shared and lessons learned during last three
days of the seminar will benefit the new initiatives of all participating cities. Specially, action
plans formulated by respective cities will be effective in enforcing sustainable SWM.
Strengthening the local administration in developing countries is one of the JICA missions
and this seminar is one of themes.

Mr. Hideo Naito, Executive Director of Office for International Environmental Strategies,
Environmental Bureau, Kitakyushu City extended his the gratitude to the participating cities
for their attendance and active participation in the seminar. He spotlighted Kitakyushu’s work
on the composting project in Surabaya and other Asian cities with Mr. Takakura, J-POWER
group/JPec, since 2002. KitaQ System Composting has great potential for replication,
especially in Asian cities. Making adjustments with local conditions is the key to
dissemination of KitaQ System Composting. Mr. Naito concluded his remarks saying that
Kitakyushu City welcomes all contact and inquires from respective cities.

In response to the above remarks, Ms. Pornsri Kitcham, Municipal Secretary of Nonthaburi
City in Thailand, expressed her appreciation to Kitakyushu City, JICA, IGES and all
organisations on behalf of all the delegates for the organisation of the seminar. Further, she
expressed her expectation that all participating cities would implement action plans making
full use of the knowledge, skills, and lessons learned in this seminar and noted that there is a
need for mechanisms to make many of the actions coming out from the seminar and group
discussions a reality.
Map of Cities
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 (Baliikipapan, Makassar, Palembang, Semarang, Surabaya, Tarakan)
   • Philippines (Cebu, Talisay)
   • Malaysia (Sibu, Kampar)
   • Thailand (Nonthaburi)

6. Programme Outline:
   Sponsor: JICA Kyushu
Cosponsor: Kitakyushu City, KITA, IGES

<table>
<thead>
<tr>
<th>Day 1 – 28 June</th>
<th>Arrival in Japan</th>
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<tbody>
<tr>
<td>15:00 – 15:30</td>
<td>• A courtesy visit to Kitakyushu city office</td>
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<tr>
<td>15:30 – 16:00</td>
<td>• Visit to Environmental Museum in Yahata</td>
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<tr>
<th>Day 2 – 29 June</th>
<th>Opening Session</th>
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<tr>
<td>09:00 – 10:15</td>
<td>• Welcoming Remarks</td>
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<tr>
<td></td>
<td>- Mr. Keichi Muraoka, Director general, JICA, KIC</td>
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<td></td>
<td>- Mr. Hiroshi Imanaga, Director general, Environmental Bureau, Kitakyushu City</td>
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<tr>
<td>09:15 – 09:30</td>
<td>• Introduction to seminar and JICA Training Activities in KIC, Mr. Akihiko Kodama, Training Programme Division, JICA, KIC</td>
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<tr>
<td>09:30 – 12:30</td>
<td>• Lessons learned: solid waste management and composting in participant cities</td>
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<td>Presentations by the participant cities (20 minutes for each presentation)</td>
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<tr>
<td>12:30 – 13:30</td>
<td>Lunch Break</td>
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<tr>
<td>13:30 – 14:30</td>
<td>• Lessons learned: solid waste management and composting in participant cities</td>
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<td></td>
<td>Presentations by the participant cities (20 minutes for each presentation)</td>
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<tr>
<td>14:30 – 15:00</td>
<td>Moving to Jpec, Wakamatsu</td>
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<tr>
<td>15:00 – 16:10</td>
<td>• Demonstration and discussions on how to make a Takakura Composting</td>
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<td>and how to solve the practical problems in using compost.</td>
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<td></td>
<td>- Mr. Koji Takakura, Deputy Director, Wakamatsu Environment Research Institute</td>
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<td></td>
<td>- Ms. Sayaka Yaoa, Wakamatsu Environment Research Institute</td>
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<tr>
<td>16:10 – 16:50</td>
<td>• Successful practice of composting in municipal solid waste management in Surabaya City</td>
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<td>- Presentation by the representatives from Surabaya City (30 minutes)</td>
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<td>- Q&amp;A (10 minutes)</td>
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<tr>
<td>16:50 – 17:10</td>
<td>Moving to Yoshihara Farm</td>
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<tr>
<td>17:10 – 18:10</td>
<td>• Observation on community composting and organic farming</td>
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<td>Guide by Ms. Sanae Yoshihara, Yoshihara farm</td>
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<tr>
<th>Day 3 – 30 June</th>
<th>Experience's in Promoting Sustainable Material-Cycle Society in Kitakyushu City</th>
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<tbody>
<tr>
<td>09:00 – 10:00</td>
<td>• International Environmental Cooperation Strategies and Municipal Solid Waste Management in Kitakyushu City</td>
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<td></td>
<td>Ms. Seiko Kubo, Deputy Director, Office for International Environmental Strategies, Kitakyushu City</td>
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<tr>
<td>10:00 – 10:20</td>
<td>• Kitakyushu Initiative and replication of Surabaya composting model in other Asian cities</td>
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<td></td>
<td>Mr. Toshizo Maeda, Act. Director, IGES-KUC</td>
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<tr>
<td>10:20 – 10:30</td>
<td>Tea Break</td>
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<tr>
<td>10:30 – 12:00</td>
<td>• Capacity development for Municipal Solid Waste Management and Composting in Asia</td>
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<td></td>
<td>Dr. Mitsuo Yoshida, Senior Advisor (Environment), JICA</td>
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<tr>
<td>Time</td>
<td>Activity</td>
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<tr>
<td>12:00 – 13:00</td>
<td>Lunch Break</td>
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<tr>
<td>13:00 – 13:30</td>
<td>Moving to Ano Community Center</td>
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<tr>
<td>13:30 – 14:00</td>
<td>Introduction of citizen participation in promoting 3R activities</td>
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<td></td>
<td>Ms. Nobuko Uchiyama, Manager, Ano Community Center</td>
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<tr>
<td>14:00 – 16:00</td>
<td>Observation of community composting programme in Ano Community Center</td>
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<td>16:00 – 16:30</td>
<td>Moving to JICA, KIC</td>
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<tr>
<td>16:30 – 18:00</td>
<td>Discussions on successful factors, constraints, and challenges in</td>
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<td>promoting composting in municipal solid waste management in participant</td>
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<td>cities</td>
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<tr>
<td></td>
<td>Facilitator: Dr. Mitsuo Yoshida, Senior Advisor (Environment), JICA</td>
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<tr>
<td></td>
<td>Assistant: Dr. D.G.J.Premakumara, IGES-KUC</td>
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<tr>
<td>18:00 – 20:00</td>
<td>Reception at JICA, KIC</td>
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Day 4 – 01 July

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<tr>
<th>Time</th>
<th>Activity</th>
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<tbody>
<tr>
<td>08:00 – 10:30</td>
<td>Site Visit: bin/can recycling center</td>
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<tr>
<td>10:30 – 12:00</td>
<td><strong>Group Discussions</strong></td>
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<tr>
<td></td>
<td>Facilitator: Prof. Mitsuo Yoshida, Senior Advisor (Environment), JICA</td>
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<tr>
<td></td>
<td>Assistant: Dr. D.G.J.Premakumara, IGES-KUC</td>
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<td></td>
<td>• Preparation on follow-up action plans and implementation strategies for</td>
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<td>composting model cities programme.</td>
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<tr>
<td>12:00 – 13:00</td>
<td>Lunch Break</td>
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<tr>
<td>13:00 – 16:45</td>
<td>Discussions on identifying effective mechanisms for follow-up and</td>
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<td>networking among participants.</td>
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<tr>
<td>16:45 – 17:00</td>
<td><strong>Wrap-up and Closing Remarks</strong></td>
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<tr>
<td></td>
<td>➢ Mr. Keiichi Muraoka, Director general, JICA, KIC</td>
</tr>
<tr>
<td>17:30 – 19:00</td>
<td><strong>Farewell Party</strong></td>
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Participant List
# List of Participants

<table>
<thead>
<tr>
<th>Name</th>
<th>Institution/Position</th>
</tr>
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<tbody>
<tr>
<td><strong>Balikpapan City, Indonesia</strong></td>
<td></td>
</tr>
<tr>
<td>Arie Soetjiadi</td>
<td>Expert staff</td>
</tr>
<tr>
<td></td>
<td>Conservation of Natural Resources</td>
</tr>
<tr>
<td></td>
<td>Environmental Agency of Balikpapan (BLH)</td>
</tr>
<tr>
<td>Panti Suhartono</td>
<td>Head of Natural Resources Conservation Division</td>
</tr>
<tr>
<td></td>
<td>Environmental Agency of Balikpapan (BLH)</td>
</tr>
<tr>
<td>Amiruddin Abdul Malik</td>
<td>Head of Community Supervision Division</td>
</tr>
<tr>
<td></td>
<td>Environmental Cleanliness, Parks and Cemetery Service of Balikpapan (DKPP)</td>
</tr>
<tr>
<td>Sudirman Djaya Leksana</td>
<td>Head of Park and Cemetery Service Division</td>
</tr>
<tr>
<td></td>
<td>Environmental Cleanliness, Parks and Cemetery Service of Balikpapan (DKPP)</td>
</tr>
<tr>
<td>Hairul Ilmi</td>
<td>Head of Sanitary Landfill Manggar</td>
</tr>
<tr>
<td></td>
<td>Environmental Cleanliness, Parks and Cemetery Service of Balikpapan (DKPP)</td>
</tr>
<tr>
<td>Astani Abdul Manap</td>
<td>Head Secretary</td>
</tr>
<tr>
<td></td>
<td>Environmental Cleanliness, Parks and Cemetery Service of Balikpapan (DKPP)</td>
</tr>
<tr>
<td>Fahrianoor Rullah Hakim</td>
<td>Head of Environmental Law Enforcement Sub-division</td>
</tr>
<tr>
<td></td>
<td>Environmental Agency of Balikpapan (BLH)</td>
</tr>
<tr>
<td>Murni Supeno Wijanarko</td>
<td>Head of Natural Resources and Environmental Management Subdivision</td>
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<tr>
<td></td>
<td>Regional Development Planning Board of Balikpapan (BAPPEDA)</td>
</tr>
<tr>
<td>Rosmarini</td>
<td>Head of Environmental information and regulation Division</td>
</tr>
<tr>
<td></td>
<td>Environmental Agency of Balikpapan (BLH)</td>
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<tr>
<td>Elvin Junaidi Malik Saleh</td>
<td>Head of Cleanliness Division</td>
</tr>
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<td></td>
<td>Environmental Cleanliness, Parks and Cemetery Service of Balikpapan (DKPP)</td>
</tr>
<tr>
<td>Antos Padmawidjaja</td>
<td>Director</td>
</tr>
<tr>
<td></td>
<td>Environmental NGO YAYASAN PEDULI</td>
</tr>
<tr>
<td><strong>Makassar City, Indonesia</strong></td>
<td></td>
</tr>
<tr>
<td>Andi Murtan</td>
<td>Chief of Urban Cleaning Management Division</td>
</tr>
<tr>
<td></td>
<td>City Government Makassar South Sulawesi</td>
</tr>
<tr>
<td><strong>Palembang City, Indonesia</strong></td>
<td></td>
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<tr>
<td>Nyimas Ida Apriani</td>
<td>Head of Environmental Degradation Controll Division</td>
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<tr>
<td></td>
<td>Environmental Agency-Palembang City</td>
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<tr>
<td><strong>Semarang City, Indonesia</strong></td>
<td></td>
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<tr>
<td>Berkah Wahyudi</td>
<td>Environmental Board, Semarang Municipality</td>
</tr>
<tr>
<td>Name</td>
<td>Institution/Position</td>
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<tr>
<td><strong>Surabaya City, Indonesia</strong></td>
<td></td>
</tr>
<tr>
<td>Ema Agustina</td>
<td>Public Works and Spatial Planning Department, Surabaya City</td>
</tr>
<tr>
<td><strong>Tarakan City, Indonesia</strong></td>
<td></td>
</tr>
<tr>
<td>Sonya Wijayanti</td>
<td>Cleansing Department, Tarakan City</td>
</tr>
<tr>
<td><strong>Cebu City, Philippines</strong></td>
<td></td>
</tr>
<tr>
<td>Pacres, Jose Rey</td>
<td>Officer-in-Charge</td>
</tr>
<tr>
<td></td>
<td>Environment and Natural Resources Office, Cebu City</td>
</tr>
<tr>
<td><strong>Kampar City, Malaysia</strong></td>
<td></td>
</tr>
<tr>
<td>Goh Seng Chee</td>
<td>Assistant Env. Health officer</td>
</tr>
<tr>
<td></td>
<td>Kampar district council, Perak, Malaysia</td>
</tr>
<tr>
<td><strong>Sibu City, Malaysia</strong></td>
<td></td>
</tr>
<tr>
<td>Yong Ing Chu</td>
<td>Assistant Secretary, Sibu Municipal Council</td>
</tr>
<tr>
<td><strong>Nonthaburi City, Thailand</strong></td>
<td></td>
</tr>
<tr>
<td>Pornsri Kietham</td>
<td>Municipal Secretary, Nonthaburi City</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Name</th>
<th>Institution/Position</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Kitakyushu City</strong></td>
<td></td>
</tr>
<tr>
<td>Imanaga Hiroshi</td>
<td>Chief Executive, Environment Bureau</td>
</tr>
<tr>
<td>Naito Hideo</td>
<td>Executive Director, Office for International Environmental Strategies Environment Bureau</td>
</tr>
<tr>
<td>Hitsumoto Reiji</td>
<td>Director, International Environmental Strategies Division Environment Bureau</td>
</tr>
<tr>
<td>Shigeoka Akinori</td>
<td>Director, Kitakyushu Asian Center for Low Carbon Society International Environmental Strategies Division Environment Bureau</td>
</tr>
<tr>
<td>Ogata Shinichi</td>
<td>Director, Kitakyushu Asian Center for Low Carbon Society International Environmental Strategies Division Environment Bureau</td>
</tr>
<tr>
<td>Kubo Seiko</td>
<td>Deputy Director, International Environmental Strategies Division Environment Bureau</td>
</tr>
<tr>
<td>Name</td>
<td>Institution/Position</td>
</tr>
<tr>
<td>--------------------</td>
<td>--------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Motoshima Naoki</td>
<td>Deputy Director, International Environmental Strategies Division Environment Bureau</td>
</tr>
<tr>
<td>Takeuchi Shinsuke</td>
<td>Manager, Kitakyushu Asian Center for Low Carbon Society Environment Bureau</td>
</tr>
<tr>
<td>Iizuka Makoto</td>
<td>Manager, Kitakyushu Asian Center for Low Carbon Society Environment Bureau</td>
</tr>
<tr>
<td>Morimoto Misuzu</td>
<td>Deputy Director, Kitakyushu Asian Center for Low Carbon Society Environment Bureau</td>
</tr>
<tr>
<td>Masuda Ryouji</td>
<td>Kitakyushu Asian Center for Low Carbon Society Environment Bureau</td>
</tr>
<tr>
<td>Mitoma Yousuke</td>
<td>International Environmental Strategies Division Environment Bureau</td>
</tr>
<tr>
<td>Yamashita Shingo</td>
<td>International Environmental Strategies Division Environment Bureau</td>
</tr>
</tbody>
</table>

**KITA (Kitakyushu International Techno-cooperative Association)**

<table>
<thead>
<tr>
<th>Name</th>
<th>Institution/Position</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nakazono Satoshi</td>
<td>Chief Executive, KITA Environmental Cooperation Center Kitakyushu International Techno-cooperative Association</td>
</tr>
<tr>
<td>Nagaishi Masaya</td>
<td>Director, KITA Environmental Cooperation Center Kitakyushu International Techno-cooperative Association</td>
</tr>
</tbody>
</table>

**JPEC (J-POWER Group Jpec Co.,Ltd)**

<table>
<thead>
<tr>
<th>Name</th>
<th>Institution/Position</th>
</tr>
</thead>
<tbody>
<tr>
<td>Suetake Shinji</td>
<td>Director, J-POWER Group Jpec Co.,Ltd Wakamatsu Environment Research Institute</td>
</tr>
<tr>
<td>Takakura Kouji</td>
<td>Deputy Director, J-POWER Group Jpec Co.,Ltd Wakamatsu Environment Research Institute</td>
</tr>
<tr>
<td>Yuoya Sayaka</td>
<td>J-POWER Group Jpec Co.,Ltd Wakamatsu Environment Research Institute</td>
</tr>
</tbody>
</table>

**JICA (Japan International Cooperation Agency)**

<table>
<thead>
<tr>
<th>Name</th>
<th>Institution/Position</th>
</tr>
</thead>
<tbody>
<tr>
<td>Muraoka Keiichi</td>
<td>Director General, Japan International Cooperation Agency Kyushu International Center</td>
</tr>
<tr>
<td>Yoshida Mitsuo</td>
<td>Senior Advisor, Japan International Cooperation Agency</td>
</tr>
<tr>
<td>Yao Kazuya</td>
<td>Associate Expert, Global Environment Department Japan International Cooperation Agency</td>
</tr>
</tbody>
</table>

A Networking Seminar on KitaQ System Composting in Asia
Kitakyushu City, Japan
29 June - 01 July 2011
<table>
<thead>
<tr>
<th>Name</th>
<th>Institution/Position</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tamura Eriko</td>
<td>Director, Training Program Division, Japan International Cooperation Agency Kyushu International Center</td>
</tr>
<tr>
<td>Nishida Shuiko</td>
<td>Program Officer, Training Program Division, Japan International Cooperation Agency Kyushu International Center</td>
</tr>
<tr>
<td>Kodama Akihiko</td>
<td>Program Officer, Training Program Division, Japan International Cooperation Agency Kyushu International Center</td>
</tr>
<tr>
<td>Suzuki Makiko</td>
<td>Translator, Japan International Cooperation Center</td>
</tr>
</tbody>
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**JICE (Japan International Cooperation Center)**

<table>
<thead>
<tr>
<th>Name</th>
<th>Institution/Position</th>
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<tbody>
<tr>
<td>Murakami Emiko</td>
<td>Director, Kitakyushu Urban Centre, Institute for Global Environmental Strategies</td>
</tr>
<tr>
<td>Maeda Toshizo</td>
<td>Acting Director, Kitakyushu Urban Centre, Institute for Global Environmental Strategies</td>
</tr>
<tr>
<td>Premakumara Jagath</td>
<td>Researcher, Kitakyushu Urban Centre, Institute for Global Environmental Strategies</td>
</tr>
<tr>
<td>Dickella Gamaralalage</td>
<td>Visiting Researcher, Kitakyushu Urban Centre, Institute for Global Environmental Strategies</td>
</tr>
<tr>
<td>Huang Jian</td>
<td>Associate Researcher, Kitakyushu Urban Centre, Institute for Global Environmental Strategies</td>
</tr>
<tr>
<td>Hirohata Kazuyoshi</td>
<td>Research Assistant, Kitakyushu Urban Centre, Institute for Global Environmental Strategies</td>
</tr>
<tr>
<td>Aoi Mutsumi</td>
<td>Intern, Kitakyushu Urban Centre, Institute for Global Environmental Strategies</td>
</tr>
<tr>
<td>Sakai Risako</td>
<td>Intern, Kitakyushu Urban Centre, Institute for Global Environmental Strategies</td>
</tr>
</tbody>
</table>
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

What is KIC? - location
JICA branches in Japan

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

What does KIC do? (2)
Training programs
- Seeing is believing
- Focus on Environmental management and energy & resources
Waste Management Technique and Environmental Education

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: Achievement in waste management (FY 2011 to FY 2015)

<table>
<thead>
<tr>
<th>JICA's Project</th>
<th>KitaQ System Composting</th>
</tr>
</thead>
</table>

2. Introduction to the Networking Seminar

Background

JICA's works

Kitakyushu's works

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

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

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

Geography

Introduction to Balikpapan

Topography and Demography

- Total Area: 501.33 km² (50,133 ha)
- Bordering 2 other Municipalities

- Topography: 85% hilly, 15% flat area

- Soil Type: Red Podzols and Yellow-red Podzols & Silica Sand (vulnerable to landslide)

- Growth rate: 4.52% per year
  - Natural growth: 1.56% and Immigration: 2.96%

Solid Waste Management Portrait
Recent and Future Strategy (1)

**VISION**: Banyuapan 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 public awareness and involvement in sanitation in residential and urban areas.
3. To improve solid waste management and extend the capacity building in environmental management.
4. To improve city infrastructure and upgrade the solid waste management until 2015.
5. To improve the infrastructure for solid waste management until 2015.

Recent and Future Strategy (2)

**Baliyapan Towards Environmentally Sustainable City**

- **Biodiversity Conservation**
- **Environmental Sound Regulation**
- **Sanitation**

Initial PESAMAS by PCA = Pengelolaan Sampah Berbasis Masyarakat (Community-based Solid Waste Management)

**Out PESAMAS** by PCA = Pengelolaan Sampah Berbasis Masyarakat (Community-based Solid Waste Management Project)

Recent and Future Strategy (3)

Progress, results, or targets are achieved already:

- Landfill gas utilisation is in progress.
- Some behavior change has been observed to be more aware of the regulation regarding littering.
- Law enforcement operation from once a year to 4 times a year.
- Total solid waste reduction by 8.8% in 2010.
- Construction of new composting center, especially in the coastal residential areas.

Recent and Future Strategy (4)

**FUTURE PLANS**

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

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 school level ("Marigold High School" and "Rainforest High School").
- In the recent date, 13 schools in Banyuapan are officially appointed as "Schools of Tomorrow".

**Through Non-Formal Education**

- Public counseling emphasizing on 3R concepts and practices, legal aspects.
- Marigold Landfill as an environmental education center emphasizing on solid waste issues.
- RWERT (Rwanda Women Empowering through Recycling) as a new facility for making surfaces, also promotes composting.
- Well-out Composting Centers as learning places.
Composting in Balikpapan

<table>
<thead>
<tr>
<th>Name</th>
<th>Role</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chief</td>
<td>DONR via DAU</td>
</tr>
<tr>
<td>Total</td>
<td>DONR via DAU</td>
</tr>
<tr>
<td>HUTAN BRIKEMA</td>
<td>DONR via DAU</td>
</tr>
<tr>
<td>YAYasan PEDU</td>
<td>Motivator</td>
</tr>
<tr>
<td>PT SCG</td>
<td>SMBH Business company</td>
</tr>
<tr>
<td>BP MINAS</td>
<td>BUN Secretary</td>
</tr>
<tr>
<td>Akademi schools</td>
<td>Facilitator</td>
</tr>
<tr>
<td>Reform group</td>
<td>Campaign and Dissemination</td>
</tr>
<tr>
<td>PERMASUPAN STANI</td>
<td>Motivator</td>
</tr>
<tr>
<td>Consortium of Environmental Organization in Balikpapan</td>
<td>Motivator and Coordinator</td>
</tr>
</tbody>
</table>

Mobilization via Governmental Instances (BAPPEDA, BLH and DEPP)

Lessons Learned

Success Factors

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

The City Government of Balikpapan is striving to improve solid waste management, water resources management, air quality with solid planning and other principles.

PESANAS has been integrated into 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.

Improvement of Slum Areas (1)

Improvement of Slum Areas (2)

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.

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.

Improvement of Slum Areas (1)

Located in the buffer zone area of Perumerta No V (31 letters).

Was built to local community over 30 years ago through encroachment of formerly managed area.

Measures are needed to minimize environmental impacts through ECDM process since 2007.

Failing Environmental Awareness

Improvement of Slum Areas (2)

Before the Project

After the Project

Thank You

ありがとうございます
Economic & social conditions affect garbage problem

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

MAKASSAR CITY POPULATION IN THE LAST TEN YEARS

<table>
<thead>
<tr>
<th>Nu</th>
<th>Year</th>
<th>NUMBER OF MALES (Unit)</th>
<th>NUMBER OF WOMEN (Unit)</th>
<th>NUMBER OF POPULATION (Unit)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>2000</td>
<td>547,687</td>
<td>566,031</td>
<td>1,113,718</td>
</tr>
<tr>
<td>2</td>
<td>2001</td>
<td>557,050</td>
<td>573,324</td>
<td>1,130,374</td>
</tr>
<tr>
<td>3</td>
<td>2002</td>
<td>566,882</td>
<td>582,430</td>
<td>1,151,312</td>
</tr>
<tr>
<td>4</td>
<td>2003</td>
<td>572,686</td>
<td>587,325</td>
<td>1,160,011</td>
</tr>
<tr>
<td>5</td>
<td>2004</td>
<td>582,382</td>
<td>596,641</td>
<td>1,179,023</td>
</tr>
<tr>
<td>6</td>
<td>2005</td>
<td>582,577</td>
<td>610,862</td>
<td>1,193,439</td>
</tr>
<tr>
<td>7</td>
<td>2006</td>
<td>611,949</td>
<td>617,431</td>
<td>1,229,380</td>
</tr>
<tr>
<td>8</td>
<td>2007</td>
<td>618,233</td>
<td>617,036</td>
<td>1,235,269</td>
</tr>
<tr>
<td>9</td>
<td>2008</td>
<td>601,304</td>
<td>652,352</td>
<td>1,253,656</td>
</tr>
<tr>
<td>10</td>
<td>2009</td>
<td>610,270</td>
<td>662,079</td>
<td>1,272,349</td>
</tr>
<tr>
<td>11</td>
<td>2010</td>
<td>642,098</td>
<td>597,275</td>
<td>1,339,373</td>
</tr>
</tbody>
</table>

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

<table>
<thead>
<tr>
<th>LOCATION</th>
<th>GENERATION (M3/Day)</th>
<th>TO THE TOTAL GENERATION (%)</th>
<th>UNTREATED WASTE (M3/Day)</th>
<th>DIFFERENCE IN THE GENERATION AND UNTREATED (M3/Day)</th>
</tr>
</thead>
<tbody>
<tr>
<td>J / Household</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Rural</td>
<td>226.46</td>
<td>6.15</td>
<td>216.81</td>
<td>9.65</td>
</tr>
<tr>
<td>Estate</td>
<td>318.42</td>
<td>8.65</td>
<td>282.18</td>
<td>36.24</td>
</tr>
<tr>
<td>NUMBER</td>
<td>1,870.49</td>
<td>50.82</td>
<td>1,654.66</td>
<td>215.83</td>
</tr>
<tr>
<td>Data</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>City</td>
<td>588.36</td>
<td>15.99</td>
<td>532.99</td>
<td>55.37</td>
</tr>
<tr>
<td>Area</td>
<td>134.41</td>
<td>3.65</td>
<td>120.47</td>
<td>13.94</td>
</tr>
<tr>
<td>Area</td>
<td>117.95</td>
<td>3.07</td>
<td>108.82</td>
<td>4.13</td>
</tr>
<tr>
<td>Non Area</td>
<td>34.68</td>
<td>0.93</td>
<td>67.45</td>
<td>32.23</td>
</tr>
<tr>
<td>Area</td>
<td>54.76</td>
<td>2.16</td>
<td>84.32</td>
<td>9.44</td>
</tr>
</tbody>
</table>


<table>
<thead>
<tr>
<th>NU</th>
<th>YEARS OF SERVICE</th>
<th>WASTE GENERATION (M3/Day)</th>
<th>UNHANDLED</th>
<th>% OF THE GENERATION</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>1997/1998</td>
<td>2.913,40</td>
<td>2.753,79</td>
<td>94.52%</td>
</tr>
<tr>
<td>2</td>
<td>1998/1999</td>
<td>3.311,60</td>
<td>2.987,40</td>
<td>90.21%</td>
</tr>
<tr>
<td>3</td>
<td>1999/2000</td>
<td>3.535,20</td>
<td>2.996,67</td>
<td>84.77%</td>
</tr>
<tr>
<td>4</td>
<td>2000</td>
<td>3.816,00</td>
<td>3.064,00</td>
<td>80.29%</td>
</tr>
<tr>
<td>5</td>
<td>2001</td>
<td>3.918,00</td>
<td>2.675,30</td>
<td>68.28%</td>
</tr>
<tr>
<td>6</td>
<td>2002</td>
<td>3.560,00</td>
<td>2.873,84</td>
<td>80.67%</td>
</tr>
<tr>
<td>7</td>
<td>2003</td>
<td>3.748,00</td>
<td>3.251,74</td>
<td>85.76%</td>
</tr>
<tr>
<td>8</td>
<td>2004</td>
<td>3.580,15</td>
<td>3.121,55</td>
<td>87.15%</td>
</tr>
<tr>
<td>9</td>
<td>2005</td>
<td>3.346,21</td>
<td>3.109,56</td>
<td>87.69%</td>
</tr>
<tr>
<td>10</td>
<td>2006</td>
<td>3.582,01</td>
<td>3.151,77</td>
<td>87.57%</td>
</tr>
<tr>
<td>11</td>
<td>2007</td>
<td>3.665,83</td>
<td>3.345,29</td>
<td>88.63%</td>
</tr>
<tr>
<td>12</td>
<td>2008</td>
<td>3.812,69</td>
<td>3.315,20</td>
<td>85.95%</td>
</tr>
<tr>
<td>13</td>
<td>2009</td>
<td>3.680,03</td>
<td>3.278,12</td>
<td>89.08%</td>
</tr>
</tbody>
</table>
GARDENING BUDGET ALLOCATION AND CLEANLINESS
FISCAL YEAR 2011

<table>
<thead>
<tr>
<th>Capping Fund</th>
<th>Realization</th>
<th>Physical</th>
<th>Rest C</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rp 2,197,070,000</td>
<td>Rp 458,777,500</td>
<td>Rp</td>
<td></td>
</tr>
</tbody>
</table>

- Garbary Rp 31,787,000 Rp 600,000 Rp
- Water Resources and Electricity Rp 109,800,000 Rp 27,450,000 Rp
- Lease Licensing Office / Operations Rp 101,380,000 Rp 22,500,000 Rp
- Rp 5,454,100 Rp - Rp
- Garbary Rp 2,975,000 Rp - Rp
- Garbary Rp 70,750,000 Rp 17,500,000 Rp
- Garbary Rp 6,720,000 Rp 1,660,000 Rp

WASTE MANAGEMENT OF OPERATING COSTS LAST SEVEN YEARS

<table>
<thead>
<tr>
<th>YEARS</th>
<th>COST OF OPERATIONS &amp; MAINTENANCE</th>
<th>COST ADMINISTRATION</th>
<th>CAPITAL EXPENDITURES</th>
<th>TOTAL COST SERVICES</th>
</tr>
</thead>
<tbody>
<tr>
<td>2005</td>
<td>Rp 5,184,467,988 Rp 3,540,370,000 Rp 208,000,000 Rp 4,929,942,968</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2006</td>
<td>Rp 8,068,802,500 Rp 1,568,757,725 Rp 528,000,000 Rp 11,553,559,225</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2007</td>
<td>Rp 9,084,288,890 Rp 4,528,584,195 Rp 331,226,000 Rp 13,985,100,095</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

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 ENVIRONMENTAL IMPACTS:
   - AIR POLLUTION
   - WATER POLLUTION
   - SOIL CONTAMINATION
4. WASTEFUL OF RESOURCES
5. LESS ROOM FOR THE ROLE OF COMMUNITY & BUSINESSES

CURRENT PARADIGM MANAGING WASTE
WASTE MANAGEMENT OF A NEW PARADIGM

PRINCIPLES OF WASTE AS A RESOURCE prioritize
Prioritize PRINCIPLE POLLUTION CONTROL

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

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

INDIVIDUAL

SKAL LINGKUNGAN

Pemilihan

Pengurangan

Pengumpulan

Pengangkutan

Pemrosesan

SKAL KOTA/REGIONAL

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

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

NEW PARADIGM MANAGING WASTE

COMMITMENT OF CITY GOVERNMENT 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)
Examples:
- Takakura Home Method (THM) and Aerobic Composter volume 110 ltr

Thank You
Basic Information of Solid Waste:

<table>
<thead>
<tr>
<th>NO</th>
<th>Waste</th>
<th>VOLUME (m³)/Month</th>
<th>% (from total waste generation)</th>
</tr>
</thead>
<tbody>
<tr>
<td>a.</td>
<td>Transfer to FDS.</td>
<td>75.000</td>
<td>66.0</td>
</tr>
<tr>
<td>b.</td>
<td>Waste Management:</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>(1). Composting</td>
<td>3.300</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td>(2). Recycle</td>
<td>1.350</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td>(3). Others</td>
<td>4.000</td>
<td>-</td>
</tr>
<tr>
<td>c.</td>
<td>Not Transport to FDS</td>
<td>28.850</td>
<td>25.64</td>
</tr>
</tbody>
</table>

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%

Waste Management in Palembang City–Indonesia

NEW PARADIGM

SORTED WASTE FROM THE SOURCE
Solid Waste Management
Strategy of Palembang City

Vision: Palembang Ecolity
Mission: 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 flat 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 from office.

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 Residential in around of PT.PUSRI
2. Organic waste from Traditional market in Palembang City

PENGOMPOSAN SKALA INDUSTRI

LOKASI PT. PUSRI

Sampah Pasar yang dikendalikan
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 DENGAN KOPERASI PEMULUng
LOKASI SUKAWINATAN KECAMATAN SUKARAMI

63
3. PELATIHAN KADEK LINGKUNGAN

UPAYA PENGEMBANGAN PENGELOLAAN PERSAMPANAH

1. Penyusunan kebijakan manajemen 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**

- Volume timbunan sampah di Kota Semarang sebesar 6500 m³/hari
  - sampah organik: 62%
  - sampah anorganik dapat dimanfaatkan: 29%
  - sampah anorganik tidak dapat dimanfaatkan: 9%
- Total sampah yang ada di TPA: 700 ton

**ALUR PELAYANAN SAMPAH Di Kota Semarang**

- RUMAH TANGGA
  - BECAK SAMPAH
  - CONTAINER SAMPAH
  - TRUCK SAMPAH
  - TPA SAMPAH

- NENGAT TEMPAT USHA
  - TRUCK SAMPAH
  - TPA SAMPAH

- FASILITAS SOSIAL
  - TRUCK SAMPAH
  - TPA SAMPAH

---

**Beberapa Upaya Pengelolaan Sampah Yang Dilakukan di Kota Semarang**

1. Pembatasan penggunaan limbah sampah (Reduce)
   - Dengan menggunakan Takakura

2. Pemanfaatan kembali sampah (Reuse)

---

**Rumah Pilihan Di Kota Semarang Bantuan Jepang**
Beberapa Contoh Rumah Pila & Rumah Kompos Di Semarang

Lokasi Tempat Pengolahan Sampah Terpadu Di Kota Semarang

Kelompok Pengolahan Sampah Terpadu Di Kota Semarang

Daftar Penerima Keranjang Takakura Di Kota Semarang
Terima Kasih
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. Increase Community Participation;
3. Building Coordination of partnership between government, business and society;
4. Doing Guidance;
5. Doing Supervision.

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

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

70
### CHALLENGES, CONSTRAINTS AND OPPORTUNITIES

**CHALLENGES**
- Community Participation
- Optimization and Efficiency
- Improvement & Development of Existing Systems
- Stability & Affordability

**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:
    - Household Scale
    - Community-based composting
    - Composting center in the market
  - Types of composting technology
    - Takakura Method
    - Open Windrow
    - Barrel Composter

---

### Composting in Municipal Solid Waste Management

- Stakeholders involved in the composting:
  - a. Local Government
  - b. Community Groups
  - c. Media Organizations
  - d. School
  - e. Private Company

- Handling End Compost
  - a. For sale to the public
  - b. In order to reclamation
  - 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 reclamation
  - 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

Waste Characteristics

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

Waste Composition

- Paper: 16.90%
- Plastic: 16.30%
- Mixed Wastes: 14.30%
- Wood: 13.20%
- Metal: 2.10%
- Other Material: 5.90%

Over-all Waste Stream

Solid Waste Management Strategy

Year of Preparation

Diagram showing waste management strategy and year of preparation.

Diagram showing waste management strategy and 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 95% in the next 3 years.
- Complete enforcement of the SWM laws and ordinances

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

- Partnership with the academe through the City Academic 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 IGEI, 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 produce 4.5 tons of Takakura mother compost
- Partnered with schools and universities to put up their own Takakura distribution center
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.

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

Part II: Existing composting programs in Cebu city

Composting programs began with implementation R.A. 9083 in 2003. The City Agriculture Department initiated vermi-composting in the agricultural areas in Cebu City. Hon. Nester Andaya 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. Erdeny Javazo, then a city counselor. With Pag-asa Philippines 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, academic, parishioners 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 encouraging program and support for farmers in agro-lifestyle 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 Takakuwa 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, skid steer
  - Financial support
    - Support for purchase of supplies
    - Personnel salaries
5. Total Recyclables (2005-2010)

<table>
<thead>
<tr>
<th>No</th>
<th>Materials</th>
<th>2005</th>
<th>2006</th>
<th>2007</th>
<th>2008</th>
<th>2009</th>
<th>2010</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Papers</td>
<td>5,975.41</td>
<td>6,247.82</td>
<td>6,919.98</td>
<td>6,897.06</td>
<td>7,158.05</td>
<td>7,484.27</td>
</tr>
<tr>
<td>2</td>
<td>Plastic</td>
<td>2,870.37</td>
<td>2,537.31</td>
<td>3,089.03</td>
<td>3,701.37</td>
<td>3,358.41</td>
<td>3,474.04</td>
</tr>
<tr>
<td>3</td>
<td>Glass</td>
<td>1,336.36</td>
<td>1,388.06</td>
<td>1,463.20</td>
<td>1,521.41</td>
<td>1,652.82</td>
<td>1,677.71</td>
</tr>
<tr>
<td>4</td>
<td>Ferrous Metal</td>
<td>103.99</td>
<td>379.02</td>
<td>605.02</td>
<td>633.33</td>
<td>652.44</td>
<td>662.82</td>
</tr>
<tr>
<td>5</td>
<td>Aluminum</td>
<td>141.12</td>
<td>147.76</td>
<td>154.36</td>
<td>162.28</td>
<td>168.76</td>
<td>177.62</td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>9,616.17</td>
<td>11,304.88</td>
<td>11,817.84</td>
<td>12,384.07</td>
<td>12,917.34</td>
<td>13,804.81</td>
</tr>
</tbody>
</table>

MDKpr recycling Rate...

<table>
<thead>
<tr>
<th>Recycling Rate (%)</th>
<th>2006</th>
<th>2007</th>
<th>2008</th>
<th>2009</th>
<th>2010</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>5%</td>
<td>7%</td>
<td>9%</td>
<td>11%</td>
<td>13%</td>
</tr>
</tbody>
</table>

Waste characteristic

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

<table>
<thead>
<tr>
<th>No</th>
<th>Generation Sources</th>
<th>Waste as collected (tonnes/day)</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Household</td>
<td>40.71</td>
<td>60.27%</td>
</tr>
<tr>
<td>2</td>
<td>Commercial</td>
<td>12.43</td>
<td>18.40%</td>
</tr>
<tr>
<td>3</td>
<td>Market</td>
<td>11.40</td>
<td>16.88%</td>
</tr>
<tr>
<td>4</td>
<td>Incineration</td>
<td>1.3</td>
<td>1.78%</td>
</tr>
<tr>
<td>5</td>
<td>Public Parks/Garden</td>
<td>1.8</td>
<td>2.67%</td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>67.54</td>
<td>100.0%</td>
</tr>
</tbody>
</table>

Total Municipal budget and its allocation for SWM

<table>
<thead>
<tr>
<th></th>
<th>2006</th>
<th>2007</th>
<th>2008</th>
<th>2009</th>
<th>2010</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>RM8mil</td>
<td>8 mil</td>
<td>9 mil</td>
<td>10mil</td>
<td>12mil</td>
</tr>
<tr>
<td></td>
<td>RM 2.7 mil</td>
<td>3.4 mil</td>
<td>4.0 mil</td>
<td>4.3 mil</td>
<td>4.7 mil</td>
</tr>
</tbody>
</table>

3. Waste Composition

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

Waste Flow in MDKpr

![Waste Flow Diagram](image-url)
### 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.
- **Recyclers**
  - Registration system
  - Intensive PR and set up partnership for pilot area
  - Billboard
  - Brochure etc.
- **Shops**
  - Reduce plastic bag
- **Residents**
  - In-house MDGs
- **Schools**
  - Activities, events for pilot schools
  - In-house promotion of recycling

### 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

**How it get started?**

- JOCV

**Promotion of composting in Kampar**

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

***Optional***

- Rice bran
Existing Composting Program

- Started in 2010

A) Technical workshops
- Community Hall
- Operated by
- NGO
- Resident association
- Charity organizations
- MASA
- Schools

B) Networking at Batu Putih new villages
- Recycling activities carried out by:
  - Community committee
  - Village headman
  - Distribution of basket
  - Launching by a statesman
  - Information dissemination

THM – household program (Pilot Project)

Takakura home method – 2 baskets 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 – JOCY

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
<table>
<thead>
<tr>
<th><strong>Lesson Learned</strong></th>
<th><strong>Barriers</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Success factor</strong></td>
<td>• Lack of knowledge, attitude (do not segregate waste) and skills</td>
</tr>
<tr>
<td>• Segregation at source</td>
<td>• need continuous strengthening of project</td>
</tr>
<tr>
<td>• Pure organic waste (homogenous) such as food and beverages industries is easier</td>
<td>• Market for compost is small</td>
</tr>
<tr>
<td>• Bigger quantity and more sustainable</td>
<td>• Price is low</td>
</tr>
<tr>
<td>• Market value for compost is also crucial</td>
<td>• Characteristic of compost content sensitive (Halal or haram perspective from religious point of view</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>External assistance</strong></th>
<th><strong>Thank You</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>• Demand market with reasonable price</td>
<td>Reyapa Network Unit</td>
</tr>
<tr>
<td>• Budget to implement compost needed</td>
<td>Kempar District Council</td>
</tr>
<tr>
<td>• If market is available → feasible doing compost)</td>
<td>Jalan Rehoboth, 51900,</td>
</tr>
<tr>
<td>• E.g. sell it back to landscape department of own office usage for public landscaping works</td>
<td>Kempar, Perak, Malaysia</td>
</tr>
<tr>
<td></td>
<td>05.487 1620 / 487 1647</td>
</tr>
<tr>
<td></td>
<td><a href="http://www.mukimper.gov.my">www.mukimper.gov.my</a></td>
</tr>
</tbody>
</table>
Solid Waste Management and Composting in Sibu

SIBU MUNICIPAL COUNCIL,
SIBU, SARAWAK, MALAYSIA

JICA
Kyushu International Centre
29 June 2011

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)

Present Sibu Town

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

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

Area under the jurisdiction of City of Sibu
(south-eastern part of Sibu Municipal area)

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

---

**Sanitary Landfill at Kemunyang**

**Refuse Composition [By Weight]**

<table>
<thead>
<tr>
<th>Item</th>
<th>Material</th>
<th>Percent [%]</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Organic matters</td>
<td>49.50</td>
</tr>
<tr>
<td>2</td>
<td>Plastic</td>
<td>14.50</td>
</tr>
<tr>
<td>3</td>
<td>Paper</td>
<td>10.61</td>
</tr>
<tr>
<td>4</td>
<td>Paper Carton</td>
<td>8.80</td>
</tr>
<tr>
<td>5</td>
<td>Textile Waste</td>
<td>5.20</td>
</tr>
<tr>
<td>6</td>
<td>Glass</td>
<td>3.80</td>
</tr>
<tr>
<td>7</td>
<td>Ferrous Material</td>
<td>3.40</td>
</tr>
<tr>
<td>8</td>
<td>Rubber</td>
<td>2.80</td>
</tr>
<tr>
<td>9</td>
<td>PVC</td>
<td>1.20</td>
</tr>
<tr>
<td>10</td>
<td>Polyethylene</td>
<td>0.10</td>
</tr>
<tr>
<td>11</td>
<td>Aluminium</td>
<td>0.10</td>
</tr>
</tbody>
</table>

**Waste Characterization**

- **Percent (%)**

---

**Total Tonnage Up to Date = 425,388.63**

**Population Served**: 1,862,240

---

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

---

**Data Table**: 2001-2019

---

**Graph**: Monthly waste disposed at Kemunyang Sanitary Landfill, KLPU from 2001 up to date
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

<table>
<thead>
<tr>
<th>Year</th>
<th>Total Amount Collected (kg)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2008</td>
<td>756</td>
</tr>
<tr>
<td>2009</td>
<td>1932</td>
</tr>
<tr>
<td>2010</td>
<td>1100</td>
</tr>
<tr>
<td>Jan – April 2011</td>
<td>181</td>
</tr>
</tbody>
</table>

Recycling – Old Newspaper (ONP) and Mixed Paper

<table>
<thead>
<tr>
<th>Year</th>
<th>Total Amount Collected (kg)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>ONP</td>
</tr>
<tr>
<td>2008</td>
<td>150,312</td>
</tr>
<tr>
<td>2009</td>
<td>132,279</td>
</tr>
<tr>
<td>2010</td>
<td>113,952</td>
</tr>
<tr>
<td>Jan – April 2011</td>
<td>33,162</td>
</tr>
</tbody>
</table>

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 (IPP)
- Community-based Solid Waste Management System Development Project in Sibu Municipality assisted SWMC 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
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

PORN SRI KIC THAM – Municipal Clerk

Urban Environment Management

Nonthaburi municipality
Area 38.9 sq. km.
Population 263,553
105,074 households

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

Recycling rate 28.18 %

2001: First Meeting of the Kitakyushu Initiative Network, Japan

Organic fertilizer
5 tons/month

2002: Nonthaburi Composting Plant


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: Kind of composting technology: market capacity: 5 tons/day

Budget supporting: Asia
Urbs Program

Partner: Nonthaburi, Thailand & Reggio Emilia, Italy & Barcelona, Spain
**Key success factors**
- Policy
- Small scale
- Simple technique
- Teamwork
- Motivation

**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 -
Important item of composting

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

Various Microorganisms relate 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.

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**
  \[ \text{C}_6\text{H}_{12}\text{O}_6 + \text{O}_2 + \text{H}_2\text{O} \rightarrow 6\text{CO}_2 + 12\text{H}_2\text{O} + 38\text{ATP} \]

- **Anaerobic decomposition** (alcoholic fermentation)
  \[ \text{C}_6\text{H}_{12}\text{O}_6 \rightarrow 2\text{C}_2\text{H}_5\text{OH} + 2\text{CO}_2 + 2\text{ATP} \]

  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 becomes 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

<table>
<thead>
<tr>
<th>aerobic</th>
<th>anaerobic</th>
</tr>
</thead>
<tbody>
<tr>
<td>CO₂</td>
<td></td>
</tr>
<tr>
<td>H₂O</td>
<td></td>
</tr>
<tr>
<td>NH₃</td>
<td></td>
</tr>
<tr>
<td>Nitrate</td>
<td></td>
</tr>
<tr>
<td>Garbage</td>
<td></td>
</tr>
</tbody>
</table>

Difference between aerobic and anaerobic -2

<table>
<thead>
<tr>
<th>aerobic</th>
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</tr>
</thead>
<tbody>
<tr>
<td>CO₂</td>
<td></td>
</tr>
<tr>
<td>H₂O</td>
<td></td>
</tr>
<tr>
<td>NH₃</td>
<td></td>
</tr>
<tr>
<td>CH₄</td>
<td></td>
</tr>
</tbody>
</table>

Difference between aerobic and anaerobic -3

<table>
<thead>
<tr>
<th>aerobic</th>
<th>anaerobic</th>
</tr>
</thead>
<tbody>
<tr>
<td>CO₂</td>
<td></td>
</tr>
<tr>
<td>H₂O</td>
<td></td>
</tr>
<tr>
<td>CH₄</td>
<td></td>
</tr>
<tr>
<td>Valeric acid</td>
<td>Butyric acid</td>
</tr>
</tbody>
</table>

Difference between aerobic and anaerobic -4

<table>
<thead>
<tr>
<th>aerobic</th>
<th>anaerobic</th>
</tr>
</thead>
<tbody>
<tr>
<td>CO₂</td>
<td></td>
</tr>
<tr>
<td>H₂O</td>
<td></td>
</tr>
<tr>
<td>NH₃</td>
<td></td>
</tr>
<tr>
<td>Nitrate</td>
<td></td>
</tr>
<tr>
<td>Valeric acid</td>
<td>Butyric acid</td>
</tr>
</tbody>
</table>

Difference between aerobic and anaerobic -5

<table>
<thead>
<tr>
<th>aerobic</th>
<th>anaerobic</th>
</tr>
</thead>
<tbody>
<tr>
<td>CO₂</td>
<td></td>
</tr>
<tr>
<td>H₂O</td>
<td></td>
</tr>
<tr>
<td>NH₃</td>
<td></td>
</tr>
<tr>
<td>CH₄</td>
<td></td>
</tr>
<tr>
<td>Valeric acid</td>
<td>Butyric acid</td>
</tr>
</tbody>
</table>

Difference between aerobic and anaerobic -6

<table>
<thead>
<tr>
<th>aerobic</th>
<th>anaerobic</th>
</tr>
</thead>
<tbody>
<tr>
<td>CO₂</td>
<td></td>
</tr>
<tr>
<td>H₂O</td>
<td></td>
</tr>
<tr>
<td>NH₃</td>
<td></td>
</tr>
<tr>
<td>CH₄</td>
<td></td>
</tr>
<tr>
<td>Valeric acid</td>
<td>Butyric acid</td>
</tr>
<tr>
<td>Composting and C/N ratio (ratio of carbon/nitrogen)-1</td>
<td></td>
</tr>
<tr>
<td>-----------------------------------------------------</td>
<td></td>
</tr>
<tr>
<td>• The best C/N ratio of the composting is 20.</td>
<td></td>
</tr>
<tr>
<td>• When the C/N ratio is high, decomposition is</td>
<td></td>
</tr>
<tr>
<td>slow.  (It needs long time)</td>
<td></td>
</tr>
<tr>
<td>• We need to adjust the C/N ratio for the garbage</td>
<td></td>
</tr>
<tr>
<td>composting?</td>
<td></td>
</tr>
<tr>
<td>→No necessary, because the C/N ratio of</td>
<td></td>
</tr>
<tr>
<td>garbage is 20 or less.</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Composting and C/N ratio (ratio of carbon/nitrogen)-2</th>
</tr>
</thead>
<tbody>
<tr>
<td>• What material is high C/N ratio?</td>
</tr>
<tr>
<td>→Hard plants are high.</td>
</tr>
<tr>
<td>Fallen leaves : 50～100, Straw : 110～150, Rice straw</td>
</tr>
<tr>
<td>and Rice husk : 70,</td>
</tr>
<tr>
<td>Sawdust : 300～1300 (The conifer is high.)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Composting and C/N ratio (ratio of carbon/nitrogen)-3</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Then, when material of the fermentation is</td>
</tr>
<tr>
<td>made by sawdust, adjustments are necessity?</td>
</tr>
<tr>
<td>→Sawdust is not made compost. It only uses as a</td>
</tr>
<tr>
<td>base material.</td>
</tr>
<tr>
<td>When garbage is decomposed, the entire C/N ratio</td>
</tr>
<tr>
<td>falls. At the end, It becomes C/N ratio that</td>
</tr>
<tr>
<td>can be used as compost.</td>
</tr>
</tbody>
</table>
The Second Biggest City in Indonesia after Jakarta.

SURABAYA CITY IMAGE

Area: ± 32,048 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.

PERKEMBANGAN RTRW KOTA SURABAYA

BACKGROUND

Population Growth
Garbage Accumulations
Economic Development
Urbanization
PROBLEMS
1. Low awareness on waste dumping
2. Hawker and market along the pedestrian causing waste
3. Product waste which cannot be reused/refresh/recycle
4. Low knowledge on simple waste technology, which create product with economic value

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

<table>
<thead>
<tr>
<th>No.</th>
<th>Budget</th>
<th>2019 (€)</th>
<th>%</th>
<th>2020 (€)</th>
<th>%</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Infrastructure</td>
<td>9,364,402,762,038</td>
<td>100%</td>
<td>4,382,712,672,208</td>
<td>100%</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Environmental budget</td>
<td>4,902,286,067,600</td>
<td>47%</td>
<td>2,963,603,085,346</td>
<td>54%</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>Taxi, Pedestrian and Parking Development Program</td>
<td>33,364,000,000</td>
<td>3%</td>
<td>23,825,000,000</td>
<td>4%</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>Environment Protection and Conservation Program</td>
<td>91,720,056,000</td>
<td>1%</td>
<td>89,712,056,000</td>
<td>1%</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>Green Open Space and City Park Program</td>
<td>42,901,010,000</td>
<td>1%</td>
<td>14,301,010,000</td>
<td>0%</td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>Citywide Waste Management Program</td>
<td>159,651,523,977</td>
<td>3%</td>
<td>169,731,523,977</td>
<td>3%</td>
<td></td>
</tr>
<tr>
<td>TOTAL</td>
<td></td>
<td>157,351,523,977</td>
<td>3%</td>
<td>169,731,523,977</td>
<td>3%</td>
<td></td>
</tr>
</tbody>
</table>

CLEANING AND LANDSCAPING DEPARTMENT OPERATIONAL BUDGET

Waste Dumped in Benowo Landfill

Waste Dumped in Benowo Landfill
Waste Management Facility
A. Temporary Depot (TD)

<table>
<thead>
<tr>
<th>No.</th>
<th>TYPE</th>
<th>NUMBER</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>TD</td>
<td>163</td>
</tr>
<tr>
<td>2.</td>
<td>Waste treatment facility</td>
<td>16 compost center</td>
</tr>
</tbody>
</table>

PART 2

BEST PRACTICE IN SURABAYA CITY

1. 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 recycling 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: Bapak Penggal, Pundekuro, Selerat Lingkungan etc)
   2. Recruitment and training of cadres
   3. Distribution of cleaning tools (compost bin, takakure basket, cart, and build compost centre)
   4. Involving 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

b. 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

Counselling activities

Enduser campaign

Recycling in Surabaya
IMPLEMENTATION OF 3R IN SURABAYA CITY

b. Recruitment and training of Cadre
- Environmental cadres have the responsibilities to guide their communities to conserve their own environment, especially in 3R issues.
- The environmental cadres have the responsibilities to share information and techniques of waste treatment to those who are in need.
- Facilities 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 distributes cleaning tools to help communities in managing their own waste, such as:
  - Tact pen
  - Inorganic waste from the source into Transfer Station
  - Windsor printer
  - Automated waste reduction processors in compost center
  - Computer (Sekupur a Sewa), Computer (Sewa) is given for free to communities who want to separate and process their waste
- City Government also built compost center using Government Budget. The proposal for built compost center can either come from City Government or communities with open initiative.

WASTE TREATMENT AND COLLECTION SCHEME

COMMUNITY WASTE SORTING

Recycled Product village

Gundih Sub-Dist, Babatan Dist
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 collected and processed into compost
   b. Composting conducted in household and city scale
   c. In household scale composting using household scale compost mixer
   d. In city scale composting using compost center, Surabaya has 16 compost centers

B. ACTIVITIES
   a. Distribute household scale compost to Tukulab community
   b. Conduct composting center through community proposal or city government initiative

Waste Recycling Business Distribution

<table>
<thead>
<tr>
<th>AREA</th>
<th>NUMBER</th>
<th>AREA</th>
</tr>
</thead>
<tbody>
<tr>
<td>Waste</td>
<td>12,345</td>
<td>Central Business</td>
</tr>
<tr>
<td>Plastic</td>
<td>9,876</td>
<td>Industrial Area</td>
</tr>
<tr>
<td>Glass</td>
<td>7,654</td>
<td>Residential Areas</td>
</tr>
<tr>
<td>Food Scrap</td>
<td>5,432</td>
<td>Natural Resources</td>
</tr>
<tr>
<td>Batteries</td>
<td>3,210</td>
<td>Agricultural Land</td>
</tr>
<tr>
<td>Tires</td>
<td>2,105</td>
<td>Rural Areas</td>
</tr>
</tbody>
</table>

COMPOST CENTER TRADITIONAL MARKET: KEPUTRAN

COMPOST CENTER SETTLEMENT: TENGGILIS UTARA

COMPOST CENTER BENOWO LANDFILL
**Waste Management Base on Community**

- Composting Process in each household
- Pick up compost in community
- Change with new native microorganisms
- Composting Center
- Transportation to the composting center
- Data input (weight and the quality of the compost)

User of TAMAKURA Home Method in RUNGKUT LOR Kampung 130 user

---

**Several Area Succeeded in Reducing Waste**

<table>
<thead>
<tr>
<th>NO</th>
<th>AREA</th>
<th>HOUSEHOLD</th>
<th>WASTE VOLUME [KG/BLD]</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Margalat Lor RW IV</td>
<td>1,145</td>
<td>256</td>
</tr>
<tr>
<td>2</td>
<td>Bego RW III</td>
<td>1,154</td>
<td>242</td>
</tr>
<tr>
<td>3</td>
<td>Kambangan RW V</td>
<td>1,286</td>
<td>317</td>
</tr>
<tr>
<td>4</td>
<td>Kalibata RW IV</td>
<td>565</td>
<td>46.33</td>
</tr>
<tr>
<td>5</td>
<td>Ngayangan Kampung RW IV</td>
<td>360</td>
<td>96</td>
</tr>
<tr>
<td>6</td>
<td>Pare RW IV</td>
<td>1,290</td>
<td>287.6</td>
</tr>
<tr>
<td>7</td>
<td>Tarat RW V</td>
<td>660</td>
<td>35.2</td>
</tr>
<tr>
<td>8</td>
<td>Margarejo RW III</td>
<td>681</td>
<td>178</td>
</tr>
<tr>
<td>9</td>
<td>Kambangan RW V</td>
<td>510</td>
<td>35</td>
</tr>
<tr>
<td>10</td>
<td>Kedung Dandé RW IV</td>
<td>350</td>
<td>14.8</td>
</tr>
<tr>
<td>11</td>
<td>Ngayangan Kampung RW IV</td>
<td>791</td>
<td>42.7</td>
</tr>
<tr>
<td>12</td>
<td>Kalibata RW V</td>
<td>717</td>
<td>87.2</td>
</tr>
<tr>
<td>13</td>
<td>Margalat Lor RW III</td>
<td>617</td>
<td>185.94</td>
</tr>
</tbody>
</table>

---

**Surabaya Green and Clean 2005-2010**

- Trees
- Vegetation
- Pathways
- Public areas

---

**Creative Recycling**

---

**Several Area Succeeded in Reducing Waste (Top 5 Surabaya Green and Clean 2010)**

<table>
<thead>
<tr>
<th>NO</th>
<th>AREA</th>
<th>HOUSEHOLD</th>
<th>WASTE VOLUME [KG/BLD]</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
**SEVERAL AREA SUCCEEDED IN REDUCING WASTE**  
(TOP 50 SURABAYA GREEN AND CLEAN 2010)

**SURABAYA ACHIEVEMENT IN ENVIRONMENT**

1. ASEAN Environment Sustainable City Award 2011
3. "Dubai International Award for Best Practices to Improves The Living Environment 2008" for Green and Clean Initiative Indonesia
4. "The Green Apple Award 2007" for Environmental Best Practice
5. Energy globe 2005
7. Adiwiyata
8. Wisma Tata Negara

Thank
1. What is waste?

2. History of Japan’s waste administration

3. Waste administration of Kitakyushu City

- Kitakyushu City’s view on the waste treatment
- Waste treated by Kitakyushu City
- Handling of waste other than the waste collected by the administration
- Toward further reduction of the household-related waste
- The latest situation and the challenges of Kitakyushu City

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
- Soot and dusts
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

[Diagram showing laws and regulations related to recycling]

The role assignment between parties

- **The role of the municipality**
  - To promote recycling and reducing waste within the jurisdiction.
  - To take necessary measures for proper treatment of waste.
  - To work closely with the citizens and the businesses for the implementation of waste management, such as development of waste management strategies and waste reduction initiatives.

- **The role of the citizens**
  - To reduce their consumption of unnecessary goods and services.
  - To promote reusability of goods and services.
  - To cooperate with the municipality for the reduction of waste and proper treatment.

- **The role of the businesses**
  - To carry out responsible business practices.
  - To promote recycling and waste reduction within their organizations.
  - To cooperate with the municipality and the citizens for the reduction of waste and proper treatment.

- **The role of the national government**
  - To set national standards and regulations for waste management.
  - To cooperate with the municipalities, citizens, and businesses for the reduction of waste and proper treatment.

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

   **Transition of the view**

   - Disposal-oriented process (Before 1995): Focus on waste disposal
   - Reduction of waste in the society
   - Increase in the recycling rate:
     - Development of comprehensive policies based on reducing, reusing, and recycling waste, including the purchase and use of recycled products (Green Purchasing)

   Environmentally-sound process (From 1995): Focus on recycling materials

   - Introduction of the system of recycling, such as the collection of used products and the recycling of materials
   - 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 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”
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/15 liter bag)
  → Garbage, waste paper, plastic products, etc.
- Bulky waste (once a month) (200-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) (1.2-yen charge/2.5 liter bag)
- Cartons, food trays, small metallic articles, fluorescent tubes (from time to time)
  (from the collection boxes placed in the supermarkets etc. in the city)
- Brought-in waste (100-yen charge/10 kg)
  → Waste brought into the facilities of the city by enterprises or collection and transportation businesses
  (700-yen charge/10 kg before October, 2006)

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)

Take recyclable resources and garbage to designated stations by 8:30 AM on collection days in specified methods.
Specified bags are used at supermarkets and convenience stores.

Twice a week
Every Wednesday
Recycling Station
Large: 500
Medium: 300
Small: 200

Every Wednesday
Recycling Station
Large: 20
Medium: 10
Small: 5

Once a week
Recycling Station
Large: 100
Medium: 50
Small: 25

"The Recycling Station accepts waste, bottles, and garbage"

Waste-collection point (Gomi station)
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

Plastic Containers/Packaging

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

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

* By weight ratio: 23% "Containers" and "packaging" account for about 60% of the waste.

Containers and packaging
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

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 tube
A collection box of small metallic articles

(3) Local Efforts for Recycling Domestic Garbage

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

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

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

④ Waste 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)

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

To aim at the reduction of waste by 20%

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.

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, 1,500 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)

<table>
<thead>
<tr>
<th>From July to December, 2006</th>
<th>(For comparison) From July to December, 2003</th>
</tr>
</thead>
<tbody>
<tr>
<td>93,484 tons</td>
<td>126,815 tons</td>
</tr>
</tbody>
</table>

Reduction of about 33,300 tons, with the reduction rate of 24%

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

<table>
<thead>
<tr>
<th>FY 2003</th>
<th>FY 2008</th>
</tr>
</thead>
<tbody>
<tr>
<td>Newspapers, magazines, postcards 37%</td>
<td>Recyclable materials: About 15%</td>
</tr>
<tr>
<td>Garbage 31%</td>
<td>Others 33%</td>
</tr>
<tr>
<td>Recyclable materials: About 15%</td>
<td>Others 33%</td>
</tr>
</tbody>
</table>

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 CO₂ to Protect the Environment
- To achieve Happiness and Health & Comfortable and Convenient Life
- To Promote Safety, Effective, Sustainable Economic Development
- Toward Becoming the World’s No. 1 Environmental Energy Power

CO₂ Reduction Target with 40% of Economic Growth in 2050
- City Area: 50%
- Asian Region: equivalent to 160% the Kitakyushu’s Emission

6 Strategies for sustainable development:
- Urban Development
- Industrial Development
- Human Development
- Social Development
- Sustainable Development in Asia

Japan’s New Growth
Green innovation
New market of over 60 trillion yen
New jobs for 1.4 million workers

Kitakyushu City’s 2020 target (in GDP equivalent)
New market of 350 billion yen, new jobs for 10,000 workers
Replication of Surabaya’s Composting Practices: A main activity of the Kitakyushu Initiative

Waste Composition in Surabaya

- Organic: 55%
- Woods/bamboo: 10%
- Street sweeping: 13%
- Paper: 6%
- Plastic: 8%
- Others: 8%

Prioritize reduction of organic waste
Promote composting A1 at each household B1 at composting centres

Inputs by the city

15 composting centres in Surabaya City

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

20% reduction in 4 years!
30% reduction in 5 years!
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),

**Social and environmental benefits**
- Employment
- Production of herbs and vegetables using compost
- Waste segregation and promotion of recycling
- Income by selling compost

**Main Stakeholders**
- Surabaya City
- Jepara
- NGO community groups
- Surabaya City, Jepara, Pusdakota

**Starting a model project**
- Waste composition survey
- shredding of waste
- mixing with seed compost
- temperature measurement
- Fermentation and pH tests
- Explaining how to use biodair to residents

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

**Social and environmental benefits**
- Better household environment
- Greener and cleaner streets
- Environmental education tools

**Composting at each household:**
- 17,012 units distributed for free by Surabaya City
- 17,012 units free + 3 household units = 1,000 households
- 1,000 units of a commercial type distributed by Surabaya City
- Which serves for about 5 households each = 6,000 households
- → 100,000 households in 1 day/household → 100x/day

**Composting at 15 composting centres:**
- Community: 14 composting centres, 500x/day 1,000m²/day
- PUSDAKOTA (NGO) 1 composting centre, 1,400x/day

**100x/day reduction by household composting:**
- 350x/day reduction at composting centres,
- Composting capacity 150x/day

**Remaining:**
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示ends using compost

PLUSDAKOTA’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

- Parks become greener using compost
- Streets become greener using compost
- Brundeng Composting Centre
- Jangkatanrari Composting Centre
- Rapunzel Composting Centre

Activities of PPK (a women’s group) and Environmental Cadres

- Waste segregation training
- Exploring how to use compost baskets
- Manufacturing bags from waste
- Meeting of Environmental Cadres
- Activities of Environmental Cadres
- Environmental Event

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

- Location of composting
  - Household composting (37,000 baskets distributed)
  - Community composting centre (28 centres under Commonwealth)
  - Market waste composting centre (14 centres under Commonwealth)

Types of composting options in Surabaya

Financial Analysis of Composting Practices

- Is composting financially sustainable?
**Costs of composting promotion**

<table>
<thead>
<tr>
<th>Expenditure of Composting Department Surabaya, 2006-2008</th>
</tr>
</thead>
<tbody>
<tr>
<td>Promotion of composting and waste segregation (only 2-3% of the total solid waste management expenditure)</td>
</tr>
<tr>
<td>Land management for new bin/area site, management of the compost site, placement and maintenance of waste management equipment and structures</td>
</tr>
<tr>
<td>Annual solid waste management costs: USD10 million per year</td>
</tr>
<tr>
<td>Waste collection and transportation</td>
</tr>
<tr>
<td>Park management</td>
</tr>
<tr>
<td>Administrative expenses</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Year</th>
<th>Expenditure (USD million)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2006</td>
<td>120.00</td>
</tr>
<tr>
<td>2007</td>
<td>100.00</td>
</tr>
<tr>
<td>2008</td>
<td>80.00</td>
</tr>
</tbody>
</table>

**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 1,300/ton/day x 365days: USD21/ton
  - Landfill construction cost (2%): USD6.5 million
  - Divided by 1,500/ton/day x 365days x 2yrs
  - USD2/ton (not including cover soil)
- Waste management cost: USD23/ton or more

**Is operation of a composting centre financially sustainable?**

- **PUSDAMOITA (NGO)'s composting centre:**
  - 14/30/day collection ➔ 40/million/month ➔ 10/million of compact production
  - Sales of compost: 106/month ➔ USD300/ton ➔ Income USD1,000/month
  - Expenditure: USD650/month (incl. labor and utility costs)
  - Profit: USD350/month ➔ USD4,200/year ➔ Can purchase a new shredder!
  - Hidden profit: 40/month ➔ USD1,000/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?**

- 14 composting centres in Surabaya City: Composting 5/ton/day ➔ 1,500/ton/month
- Compost production: 300/month (20% of input) ➔ Replacing the purchase of soil conditioners 300/ton ➔ USD100/ton ➔ USD10,000/month
- PLUS, cost saved from waste reduction: 1,500/ton/month ➔ USD23/ton ➔ USD34,300/month
- Profit: USD40,000/month ➔ USD548,000/year

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

- **Necessary space for a composting centre (incl. the office space):**
  - 15/day (300/metre) of waste input: 100/metre
  - 30/day (300/metre) of waste input: 200/metre ➔ 180/metre (USD1,800/metre)
  - 50/day (150/metre) of waste input: 300/metre ➔ 30/meter (USD3,000/metre)

**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 ➔ USD170,000
  - Campaign cost: USD10/basket ➔ USD170,000
  - Total cost: USD140,000

**Benefit:**
- Waste reduction: 17/ton/day ➔ 17,000 households ➔ 1 kg/day/household
- Cost saved from waste reduction: 17/ton/day x 365days x USD23/ton ➔ USD140,000/year

**Enlarged benefit:**
- Waste reduction: 40/day (2009)
- Cost saved from waste reduction: 40/ton/day x 365days x USD23/ton ➔ USD530,000/year

**Cost recovery in 2.5 years!!**
Why people practice composting at home?

*Household financial analysis:*
- Organic waste: 1kg/day/household → 30kg/month
- Compost: 8kg/month (20% of input)

*Purchasing price:* USD0.07/kg (≈ USD1/ton)
- 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)

---

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

*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 (proposals):**
- 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**

1. Market-waste composting centres
   - Process 2 t/day (= producing 0.4 t/day)

2. Composting centres in communities and schools
   - Process 0.3 t/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**

- Philippines: Baguio, Puerto Princesa, Cebu, Davao, Manila
- Brunei: Bandar Seri Begawan
- Nepal: Pokhara, Kathmandu
- Thailand: Bangkok, Chiang Mai, Surat Thani, Phuket
- Malaysia: Kuala Lumpur, Penang
- Indonesia: Jakarta, Surabaya, Medan, Makassar, Palembang, Semarang, Surakarta

**Model 1: Replication by NGOs**

- Roles of intermediaries are essential for replicating and scaling up good practices.
- NGOs facilitate replication of good practices to other NGOs and community groups within and outside the city.
- They face 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**

- Support from the community, private companies, and NGOs.
- Local governments and NGOs work together to scale up good practices.

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

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

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

- A programme of UN/ESCAP supported by Kitakyushu City, MOE, MOFA, and IGES.
- Information sharing of good practices.
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 MCEC 6th, Astana, in Sep/Oct 2010
Capacity Development in Solid Waste Management

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

Economic Growth vs. Waste Final Disposal in SWM

Cross-country Analysis, Yoshida(2011)

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.

- 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.
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/sector by taking into account the factors at the individual, organizational, and societal levels.
- Endogenous: Defining capacity as the ability of a country to solve problems on its 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.

Components of Capacity at Each Level

Societal/Institutional Level
- Law, Bylaws, Guideline, Regulation
- Public Awareness, Private Sector
- Education, Social Capital

Organizational Level
- Organization structure, Management, Fund
- Intellectual asset
- Physical asset, Equipment
- Human asset

Individual Level
- Knowledge, Skill
- Technique, Proficiency
- Intention, Responsibility
- Motivation, Willingness

Comprehensive feature of Capacity

(An Example for Composting Organization)

- Coordination with compost user
- Scientific, technical, and societal information
- Proper management, financing and equipment of composting facility
- Knowledge and skill of staff
A Flowchart of Composting in Solid Waste Management

- Household composting
- Community composting
- Commercial composting

Collection Transportation
- Service Providers for collection and transportation

Composting Process
- Compost Facility
- Management
- Compost users

Product Utilization

Necessary Factors
- Knowledge and Cooperation
- Human Resources
- Coordination in SWM
- Technology
- Marketing & Economy
- Community-based Approach
- Organization capacity
- Rule/Institution
- Public Awareness, Information

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)

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

Technology Transfer and Capacity Development

Progress of Technology Transfer

Developing capacities at institutional/society level at organizational level at individual level

Adaptation of transferred Technology and Securing Sustainability

Practical

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

(1) Stakeholder Matrix in Waste Composting

<table>
<thead>
<tr>
<th></th>
<th>Waste Generation &amp; Discharging</th>
<th>Waste Collection &amp; Transportation</th>
<th>Composting Process</th>
<th>Utilization of Compost Products</th>
</tr>
</thead>
<tbody>
<tr>
<td>Public Sector</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Private Sector (Formal)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Private Sector (Informal)</td>
<td></td>
<td></td>
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</tr>
</tbody>
</table>

(2) Problem Analysis Matrix in SWM

<table>
<thead>
<tr>
<th>Problem(s) to be solved</th>
<th>Waste Generation &amp; Discharging</th>
<th>Waste Collection &amp; Transportation</th>
<th>Composting Process</th>
<th>Utilization of Compost Products</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
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</tbody>
</table>

(3) Capacity Assessment Matrix in SWM

<table>
<thead>
<tr>
<th>Level</th>
<th>Waste Generation &amp; Discharging</th>
<th>Waste Collection &amp; Transportation</th>
<th>Composting Process</th>
<th>Utilization of Compost Products</th>
</tr>
</thead>
<tbody>
<tr>
<td>Individual level</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Organizational level</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Institutional level</td>
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<tr>
<td>Societal level</td>
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</tbody>
</table>
SWOT Analysis

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

<table>
<thead>
<tr>
<th>Strengths</th>
<th>Weaknesses</th>
</tr>
</thead>
<tbody>
<tr>
<td>characteristics of the organization that give it an advantage over others in the sector.</td>
<td>characteristics that place the organization at a disadvantage relative to others.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Opportunities</th>
<th>Threats</th>
</tr>
</thead>
<tbody>
<tr>
<td>external chances to make greater profits in the environment.</td>
<td>external elements in the environment that could cause trouble for the business.</td>
</tr>
</tbody>
</table>

Organization Scanning Diagram

- Infrastructure
- Equipment
- Technology
- Culture and Society
- Financial Basis
- Policy and Institution
- Human Resource

Name of Organization
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:

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

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.

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

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.
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International Village Center 2F, 1-1-1, Hirano,
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