Establishment of the Community-Based Solid Waste Management System in Metro Cebu, the Philippines*

1. Introduction

Since 2010, a Community-Based Solid Waste Management (CBSWM) System Development Project has been implemented by Cebu City with the technical assistance of the Kitakyushu International Techno-Cooperative Association (KITA), the Institute for Global Environmental Strategies (IGES) and the JPOWER Group/Jpec in Kitakyushu City, Japan. It was funded by the Japan Fund for Global Environment (JFGE) and aims to improve the solid waste management system in Cebu City, with an emphasis on applying source separation and organic waste recycling through promotion of decentralized composting to reduce the amount of waste placed in landfills. It is further attempted on achieving 10% waste reduction target in the Metro Cebu Area by sharing the successful experiences of Cebu City with other municipalities. This brief note therefore summarises the key activities carried out under the project and major achievements so far and also gives some future plans.

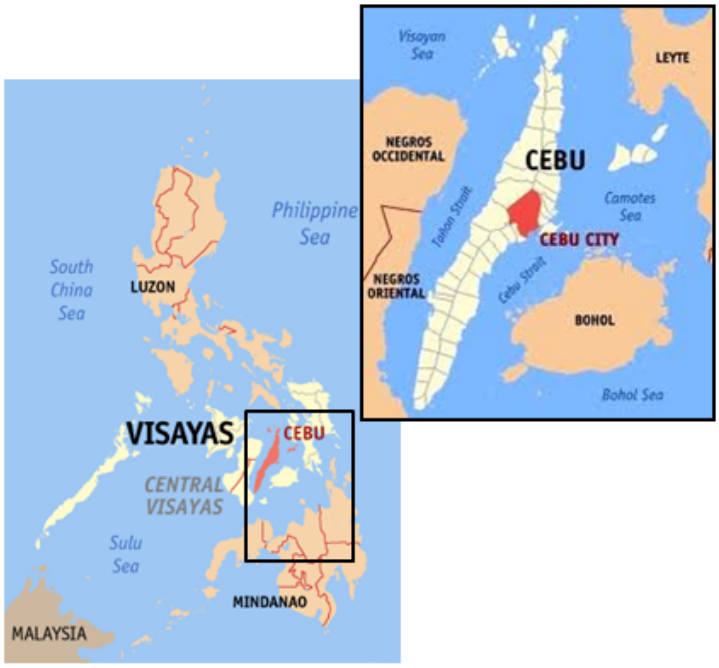


Figure 1: Location of Cebu City in the Cebu Province

2. Before the project implementation: collection and disposal oriented municipal waste management system

Cebu city is one of the historical cities in the central part of the Philippines. It is bounded by Mandaue City in the North and Talisay City in the South. On the East is Mactan Channel and on its West are the Municipality of Balamban and the City of Toledo. Historically, it was a small fishing village. Later in 1521, Cebu City was developed into a port city and since, then it has been grown into a highly urbanized metropolitan area. At present, Cebu is the second largest growth centre in the Philippines, next to Manila. The economic activities in the city are dominated by the trade and service sectors. Due to its strategic location and easy accessibility by air and sea transport, the information and communication technology (ICT) and tourism industries are leading the economic growth in the city.

* This brief note is prepared by D.G.J.Premakumara, a Policy Researcher of Kitakyushu Urban Center (KUC) of the Institute for Global Environmental Strategies (IGES), February 2012

The city is governed by the Council elected by the citizens and empowered within its jurisdiction. The Council is headed by the Mayor. Under the Mayor, all other departments and offices as required under the Local Government Code are established to implement its policies, plans and priority programmes. The Department of Public Services (DPS) is responsible for solid waste management and disposal in the city.

For the effective governance of the city services, the municipal functions are decentralized into a barangay, a smallest local government unite, which is headed by a baranagay caption. Cebu City has a total land area of 326.10 aq. km and is divided into 80 barangays. About 50 of the 80 barangays in the city are located in the urban areas, which are occupied 20% of total lands, while the balance 30 barangays are scattered in the rural areas, which are accommodated 80% of total lands in the city. A domestic waste collection and transportation is the main responsibility of the barangays.

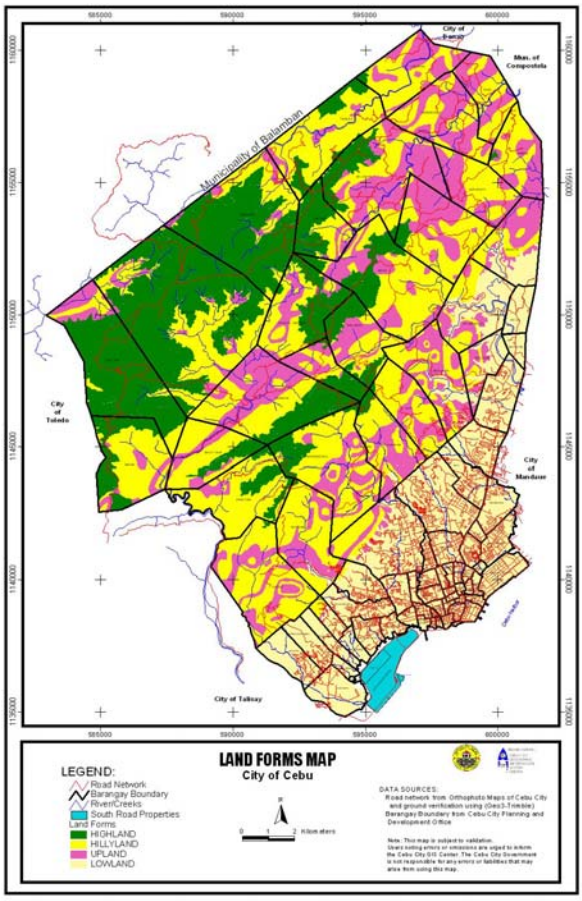


Figure 2: Land Use Map of Cebu City. Source: Cebu City, 2011

As Table 1 shows, the total population of Cebu City was 718,821 people and 137,864 households in 2000, which was equivalent to 42% of the total population of the Metro Cebu and 30% of the entire population of the province. Although trend shows a slightly decline in growth rate, it has recorded highest population density and also biggest floating population (the population, who are visiting the city from outside for jobs or getting its services) in the province.

Table 1: Total Population and Annual Growth Rate of Cebu City, Metro Cebu, Province and the Philippines

	Total Population in 2000	**Population Density per Sq. Km in 2000**	**Annual Growth Rate, 1995-2000 (%)**
Cebu City	718,821	2,204	1.77
Metro Cebu	1,693,881	1,990	2.26
Province	2,377,588	603	3.07
Philippines	76,498,735	229	2.36

Source: City Planning and Development Office, Cebu City, 2007

Solid waste management is considered to be one of the most serious environmental issues in Cebu City. Rapid urbanization and economic growth has resulted in a corresponding growth

of solid waste, which is found difficult to manage by both barangays and municipal government. In 1982, the city generated only 212 tons/day of municipal waste. However, this volume had risen to 420 tons/day by 2010. Further, the capacity of the Inayawan landfill site,

Figure 3: The Cebu City's Landfill Site in Inayawan. Photo: Premakumara, 2010/2011

which was constructed under the financial and technical assistance of the Japan International Cooperation Agency (JICA) in 1998, reached it maximum capacity and finding new sites is becoming an increasingly difficult task, due to the scarcity of suitable land within the municipal boundaries.

Since the enactment of the Republic Act (RA) 9003 or the Ecological Solid Waste Management Act of 2000, Cebu City has taken some efforts to manage waste based on the concept of 3Rs (Reduce, Reuse and Recycling). A Solid Waste Management Board (SWMB) was established in 2003 under the leadership of the Mayor to take necessary policy, legal and institutional recommendations. A 10 year Plan for Solid Waste Reduction in Cebu City was drafted in 2005 with the technical assistance of Fort Collins, Colorado, USA, under the Resource Cities Programme of the International City/County Management Association. Under the Kitakyushu Initiative Network for a Clean Environment (2000/2010), which was initiated by Kitakyushu City and the IGES with the assistance of the United Nations Economic and Social Commission for Asia and the Pacific (UNESCAP), Cebu City had also set target to reduce waste to be land filled by 50% by 2015. Though Cebu City government committed considerable efforts and investment to improving its solid waste management system based on the 3Rs, lack of public responsiveness and awareness, as well as not having an integrated and strategic approach or an appropriate institutional understanding of technical, managerial and ideological issues prevents opportunities from being fully realized.

3. Alternative waste management system: implementation of decentralized composting and resource recovery system at source

As an alternative for the growing issue, a new waste management system was developed based on the experiences of Surabaya's successful community-based solid waste management model, which is one of the main outputs of the Kitakyushu Initiative Network for a Clean Environment. Surabaya's achievement exemplifies how a city can reduce a large amount of waste in a short period of time by integrating composting into municipal solid waste management. After realizing the benefits of the Surabaya's model, Cebu City scaled-up the

decentralized composting activities city-wide adopting the following supportive policy instruments.

3.1. City Resolution

The city adopted a *No Segregation and No Collection Policy* in April 2011 and started to educate citizens to separate waste at source into biodegradable, non-biodegradable, recyclables and residual aiming to meet the goals of RA 9003. Not only adopted, but also the policy is strictly enforced and those who are violated, they will be fined or imprisoned under the City Ordinance No.1361 and No.2031.

3.2. Creation of new carder

A system of Barangay Environmental Officers (BEOs) was established, recruiting five staff from each barangay based on the community leader elements. The BEOs were trained to play an effective role of information providers in their respective barangays and also have a responsibility to enforce the municipal policies, monitor proper waste collection, assist in establishing Material Recovery Facility (MRF) and manage the composting schemes. For the coordination of the activities of BEOs, a Cebu Environmental Sanitation Enforcement Team (CESET) was established.

3.3. Support for establishing material recovery facility (MRF) at barangay level

The city has taken efforts to allocate both financial and technical assistance for establishing MRF at barangay level. The annual municipal budget (20,000 Peso (40,000 yen) for each barangay) was allocated to support the efforts of barangays in establishing composting centres, which can be used for covering the construction costs and buying required tools and equipments. In addition, city has provided necessary trainings for the barangay staff too. Further, a number of competitions, including the best environmental barangay, were started in partnership with the private sector and the media to motivate and strengthen community participation, and encourage them to improve their neighbourhood environment.

3.4. Partnership with other stakeholders

Cebu City also strengthened partnerships with other stakeholders such as the Women's Network, home owners associations, local NGOs, waste pickers, academic institutions, private ventures and the media. In addition, a series of awareness raising campaigns was organized with these different stakeholders covering all municipal districts.

4. Promotion of composting at city-wide

The above enabling policy resulted in establishing model composting schemes at different scale at different level, such as household, neighbourhood initiatives or barangay composting schemes, small-scale private sector composting enterprises, and initiatives of companies and institutions composting on their premises.

4.1. Distribution of compost baskets to individual households

Figure 4: Training and distribution of compost baskets to the residents. Photo: Premakumara, 2010/2011

Cebu City distributed composting baskets as a simple way to treat organic waste at households. The BEOs share information on the household composting and educate residents in their neighbourhoods with the assistance of the women's organization, home owners associations and NGOs about the benefits of keeping the environment clean and green. After households have gained sufficient knowledge of the functions of the compost basket and also have interested to use it, those who were selected to receive the free baskets from the city. People were educated about the way to cut their kitchen waste into small piece and put them into the compost basket. In two to three weeks, the organic waste is converted into compost that is commonly used to grow vegetables and herbal plants in their home gardens using their own household compost.

Table 2: The distribution list of Composting Basket in Cebu City

Barangay Punta Princesa	71
Barangay Inayawan	51
Barangay Quiot	134
Barangay T. Padilla	4
Barangay Capital Site	13
Barangay Ermita	29
Barangay Guadalupe	136
Barangay Labangon	183
Barangay Sambag 11	20
Barangay Tisa	30
Barangay Tag Bao	40
Barangay Mambaling	71
Barangay Luz	25
Barangay Carrita	25
Cebu Environmental Sanitation Enforcement Team (CESET)	465
Others	1053
Total	**2,350**

Source: Cebu City. Compiled by Premakumara, 2010/2011

The recyclable materials are collected separately and sold to the junk shops. According to the Table 2, the city officials have already distributed about 2,350 baskets within the city limit. However, it was identified that this approach could be very effective in the neighbourhoods

where residents have a good education on the environment, basic knowledge on how to make composting, commitment to use the basket and availability of effective follow-up and monitoring system. At present, BOEs are involved in following up with monitoring household baskets and troubleshooting by helping households with their composting activities.

4.2. Construction and operation of model composting schemes at barangays

Figure 5: Composting facilities in barangay Talamban and Luz. Photo: Premakumara, 2010/2011

With the technical and financial assistance of Cebu City, some barangays have established their own composting schemes. These composting schemes are small in scale (less than one ton/day) and largely rely on segregated waste from nearby residents and/or market waste. The residents are educated to separate waste at source. Separated organic waste is then collected by the BEOs and transported to the composting facility. In some cases the waste collectors also sort mixed waste into different factions during the collection process, as not all households in the collection area can be persuaded to segregate the biodegradable fraction. At the composting facility, biodegradable waste is treated by using vermin composting (this system has existed in Cebu City, when the project was started. A special types of worms, such as the redworm, African nightcrawler and the European crawler produce compost and also multiply fast and can be sold at a high price) and/or windrow method with native microorganism (this method was introduced by Koji Takakura, an expert from Kitakyushu City and is now widely popular as the “Takakura Method”). The compost product is mainly used for the greenery of the neighbourhood or sold in the neighbourhood, where marketing strategies are limited to personal contact among the collectors or core members of the associations. Compost prices have range from 8 Peso to 20 Peso (16-40 yen) per 1kg, which also reflects the middle and high income users targeted in the areas where these schemes are often located. The main challenges for these schemes are cooperation of residents, finding lands in suitable locations, odour complaints by the nearby residents, especially for vermin compost facilities and the lack of capacity, interest and willingness of the barangay staff.

4.3. Medium-scale business oriented enterprises

These composting schemes are run by individual entrepreneurs, NGOs and cooperatives at barangays, who have identified the organic waste treatment and recycling as a business

opportunity and found a market for the end products. Entrepreneurs have invested private money in the business or taken loans. The cooperatives on the other hand got financial assistance from their barangays and private ventures to cover the initial capital costs. They all focus on pure organic waste streams such as waste from vegetable, fruits or flower markets as well as residuals from business premises rather than household collections. The scale of the composting facilities is varied from one to two tons/day and the composting methods are usually similar to the ones already mentioned. After the compost is matured, it will be packed and ready to market. Each composting facility has its own marketing strategies and most commonly the compost product is sold through a fertilizer distribution company. For additional income, some entrepreneurs act as consultants for associations or companies wanting to start composting activities or cross-subsidize the composting activities with the revenues from waste collection fees and selling of the recyclable materials. These composting facilities with a business approach provide job opportunities to low income groups. Both male and female workers profit from the business, they are employed for waste collection, sorting, composting or as drivers. The key challenges faced by these composting facilities are finding a suitable land, initial capital for covering the cost, difficulties in covering the cost only through the sale of composting, sometimes complains from nearby residents, and lack of support from barangays and a city government. It was also identified that these small business composting facilities are often lack regular book-keeping and data management. The scarcity of data and unclear financial figures bring barangay and city officials difficult in taking any decision for financial support.

Figure 6: Composting and material recovery facility is managed by the Home Owners Association in baranagay Apas. Photo: Premakumara, 2010/2011

4.4. Composting at institution and company premises

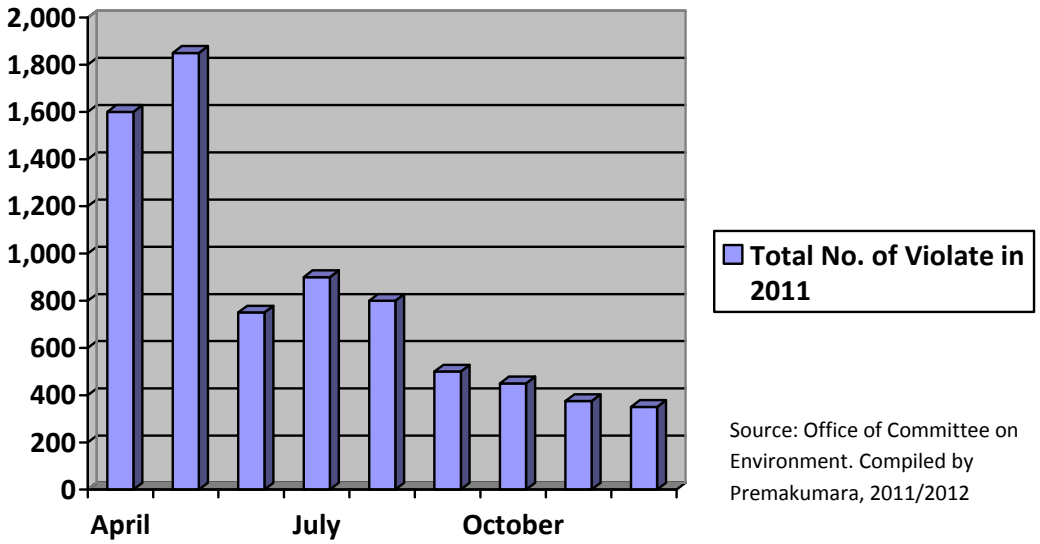
These composting schemes are set in different organizational setup. They are initiated and operated by the institution or company to treat the organic waste generated within their own premises. The decision to start the composting facility results an unreliable waste collection service from the barangay, cost savings aspects or environmental consciousness. The employees of the institution operate the facilities themselves. The composting methods and scales of operation that are chosen in these schemes are usually similar to the ones already mentioned. The methods mostly observed was bin or box composting in combination with windrow/native microorganism method. The compost produced is mostly used on the premises and some for marketing. While a company or institution has to pay the barangay for transport of waste from their premises to the landfill, savings of collection and transport fees

can be achieved by recycling and composting. The advantage of this type of composting scheme is relatively ease and speed of decision making as well as tight monitoring of a scheme. Decisions are usually taken by the in-charge of environmental department of the organization and less dependent on municipal collaboration. However, by offering incentives and technical assistance to companies, municipality can facilitate the process of initiating composting programmes at institution level.

Figure 7: Composting facilities at SunPride Company (left) and Handuraw Pizza Restaurant (right). Photo: Premakumara, 2010/2011

5. Achievements so far

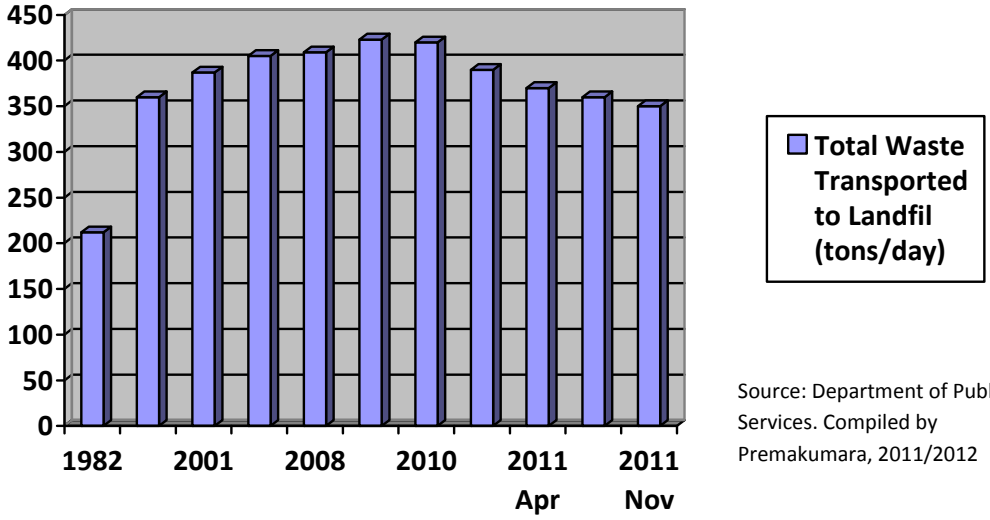
The experiences of Cebu City reveal some of the advantages of decentralized composting, such as the improved environmental conditions in residential areas through establishing appropriate waste collection and treatment at the neighbourhoods and also increasing environmental awareness among residents. According to the city estimation, about 60% of residents are involved in waste separation at source. The number of violators of No Segregation and No Collection Policy has also been decreased as shown by the Figure8.



Source: Office of Committee on Environment. Compiled by Premakumara, 2011/2012

Figure 8: The Number of Violators of No Segregation and No Collection Policy, Apr-Dec, 2011

Further, by treating solid waste near to the source, it minimizes transportation costs, reduces the amount of wastes for landfills, prolongs the life of landfills, and saves municipal costs for landfill management.



Source: Department of Public Services. Compiled by Premakumara, 2011/2012

Figure 9: The Total Waste Transported to Landfill, 1982-2011

According to the Figure 9, about 16% waste reduction of waste deposited at the landfill was achieved by 2011, saving the municipality tipping fees for landfills, which can be estimated as 17 million Pesos (34 million yen) annually. There has also been a reduction of greenhouse gases generated in landfills through composting in Cebu City.

Table 3: The creation of job opportunities through composting and material recovery facility in barangay Luz in 2011

	No of new job opportunities are created	**Average monthly income in Peso**	**Total monthly income generated in Peso**
Direct job opportunities at the composting facility and the material recovery facility			
Waste separation, collection and transport to the facility	15	6,000 (12,000 yen)	90,000 (180,000 yen)
Composting facility	6	6,000 (12,000 yen)	36,000 (72,000 yen)
Eco centre assistant	2	3,000 (6,000 yen)	6,000 (12,000 yen)
In-direct job opportunities created with the programme			
Collection of recyclable materials	40	1,500 (3,000 yen)	60,000 (120,000 yen)
Production of handicrafts from the recyclable materials	75	1,500 – 3,000 (3,000-6,000 yen)	112,500 (225,000)
Household composting and making worms for selling	200	500 – 1,000 (1,000-2,000 yen)	100,000 (200,000 yen)
Total	338		404,500 (809,000 yen)

Source: Barangay Luz. Compiled by Premakumara and St. Teresas College, 2012

The experiences of Cebu City further recognized the potential of decentralized composting in creating new job opportunities and extra incomes for the urban poor and waste pickers. As barangay Luz, a successful model barangay in Cebu City shows, it's composting and

recycling activities resulted in creating about 338 new job opportunities for the poor residents giving them additional income which is equivalent to 404,500 Pesos (0.8 million yen) per month (see Table 3).

The experiences of barangay Luz further highlighted that such an approach not only creates economic opportunities within the neighbourhoods, but also facilitates spaces for community involvement, building partnerships and social capital for achieving sustainable development at the neighbourhood level.

Figure10: Composting creates new partnership and awareness to keep neighbourhoods clean and green. Photos: Premakumara, 2010/2011

6. Conclusion and future expectations

In order to overcome the growing environmental problem of waste disposal, it is critical to find new approaches that promote recycling of not only inorganic wastes but also organic wastes, which are often the larger portion of municipal wastes in developing countries. The experiences of Cebu City shows that how a city can reduce a large amount of waste in a short period of time, achieving environmental and social benefits with strong economic benefits, by integrating decentralized composting into municipal solid waste management. Experience further shows that the successful implementation of decentralized composting requires to consider a holistic approach, integrating all the elements of the composting process (waste separation, collection, transport, treatment and product utilization), and key stakeholders, who have different interests, skills and resources to participate in composting. A clear vision, strong political commitment and change in attitudes as well as technical, financial, legal and institutional capacity of the municipality enabled the necessary environment for it to happen.

Figure 11: A one-day seminar was held for barangay representatives at city hall. Photos: Premakumara, 2012

In this year, Cebu City is expecting to expand the pilot experiences further within the city. As shown by Figure 10, a one-day seminar was organized in January 2012 inviting representatives from all barangays in the city to share the lessons learned from the pilot barangays and to

discuss the future strategies for the replication. As a follow-up to this seminar, Cebu City is now calling proposals from barangays which are interested to adopt the decentralized composting.

The KITA and IGES aim to share the experiences of Cebu City with other cities in the Metro Cebu and the Philippines this year. As a first attempt, an experience of Cebu city was shared with Mandaue City. An expert meeting was organized in January 2012 inviting members of urban poor federation, a largest network of community-based organizations in Mandaue City and the staff of the solid waste management section of the city government. The participants discussed how to adopt the Cebu Model within their existing municipal solid waste management system and agreed to start in implementing a model project in a selected barangay.

Figure12: Some participants attended to the expert meeting in Mandaue City. Photo: Premakumara, 2012

Further, as a request of the College of Education, University of the Philippines, Diliman and the Ayala Foundation, a discussion was held in January 2012 at the Diliman campus about how to share the experiences with the cities of Queszon and Makati. It also aims to share the experiences of Cebu city with the Department of Environment and Natural Resources (DENR) and the National Solid Waste Management Commission (NSWMC) for national policy application. In addition, Cebu City was invited to attend the 3rd High Level Seminar on Sustainable Cities under the framework of the East Asia Summit Environment Ministers meeting will be held in Siem Reap, Cambodia in the early March 2012 to share its experience with other cities from East Asia.

Figure13: A meeting at the University of Philippines. Photo: Premakumara, 2012

Inquiries and Further Information

Mr. Masaya Nagaishi
Kitakyushu International Techno-Cooperative Association (KITA), Kitakyushu Asian Center for Low Carbon Society, International Village Center, 2F, 1-1-1, Hirano, Yahata-Higashiku, Kitakyushu City, 805-0062, Japan

Dr. D.G.J.Premakumara
Kitakyushu Urban Center, Institute for Global Environmental Strategies (IGES)
International Village Center, 2F, 1-1-1, Hirano, Yahata-Higashiku, Kitakyushu City, 805-0062, Japan
Tel:81-93-681-1563
E-mail:premakumara2iges.or.jp

Ms. Nida C. Cabrera
Chair of Committee on Parks & Playground, Wildlife, Ecology & Environment, Cebu City
City Hall Bldg, City Hall Lane, Cebu City 6000, Philippines