

# Kitakyushu Model for Sustainable City

Kitakyushu Asian Center for Low Carbon Society, City of Kitakyushu



## Exporting Green City Frameworks Utilizing "Kitakyushu Model"

### What is the "Kitakyushu Model" ?

A systematically organized manual textbook about know-how (technology and knowledge) of urban development and urban management based on Kitakyushu's experience, in order to contribute to formulate of the basic plan and management plan of cities in developing countries

### Model's framework





Master plans can be proposed to create sustainable cities and the concept of "green cities" (eco-friendly cities) can be exported overseas.

## Green Growth Promotion Plan in Hai Phong, Vietnam

#### Sister City Agreement (April in 2014)



"Green Growth Promotion Plan" of the City of Hai Phong



The Chairman of Hai Phong City received this plan from the Mayor of Kitakyushu in May 2015

#### **15 Pilot Projects**

(1) Separation and composting of household waste (2) Waste heat recovery power generation Waste system in cement factory and production of raw materials for cement from waste (3) E-Waste recycling (4) Promotion of energy savings for factories Energy and buildings etc. (5) Introduction of low-emission buses Transportation (6) Promote use of public transportation (7) Development of comprehensive resource recycling system Cat Ba island (8) Energy savings, introduction of renewable energy and introduction of EV buses in remote island (9) U-BCF expansion Water, sewage, and storm (10) Handicraft village wastewater measures water drainage (11) Introduction of sewerage registry system (12) Restoration of Tay Nam canal Environmental (13) Development of air and noise monitoring conservation systems (14) Installation of high-efficiency electric furnaces in foundries Green Production (15) Promotion of green agriculture



Composting from organic waste



Solar power generation system



EV bus

## Demonstration run of EV bus in conjunction with solar power in Cat Ba Island



Energy savings and introduction of renewable energy and EV buses in Cat Ba Island where Hai Phuong City Is trying to register as World Heritage !!

## Achieving CO2 Zero Emission Transportation !!



Low-carbon technical innovation creation project for developing countries by Ministry of Environmant, Japan (Feb. 2017 - Feb 2020)



Introduction of Co2 zero emission transportation with EV bus and solar power system

## **Collaborative projects with International Organizations**









MOU with WORLD BANK under City partnership Program (Mar. 22,2017) (Theme: Green Growth and Waste management) Conduct joint research, identify good practice, facility knowledge exchange and link Japanese expertise with project-level World Bank engagement





Kitakyushu Model Subsector:

Kitakyushu Model Subsector: Interplay between Solid Waste and Urban Flood Risk Kitakyushu Model "Interplay between Solid Waste and Urban Flood Risk" May, 2018

## Background the Relationship between Solid Waste and Urban Flood



- In recent years, risks for disasters and public health are concerned in urban areas of developing countries, that is, because of rapid population inflow, increase and accumulation of solid waste will block drainage canals and induce flooding during rainfall.
- Delay in responding to these problems leads to recession or a vicious circle
- $\rightarrow$  Recession of capacity to prepare for disasters, and to rebuild after disasters
- → Vicious circle of poverty caused by prolonged influence on urban growth, residents' health, and community dignity

# Model Scope and Interrelated 3 Sectors

The World Bank and the City of Kitakyushu focus on the interplay between solid waste and urban flood risk, and systematically organize the textbook based on the revitalization of Murasaki River and the experience of citizen's participation toward town beautification in Kitakyushu.



After

# **1. Public Involvement and Education**

- The fact that waste is not collected and not managed is causing solid clogging of drainage canals etc.
- Awareness raising through participation by residents and education for residents is very important, such as preventing garbage littering, accumulation and removal of fallen leaves.

## **\*** Actions to Enhance Public Involvement

 Relationship Building: Establishing means of communication (Community based organizations, women's group etc.), Setting common goals/slogans, Organizing public/stakeholder meetings

- •Resident Involvement in Providing Services: Developing a policy to support resident involvement, Sending government staff to the field
- Education in Schools: Preparing teaching and learning materials such as "Ecology Notebook" etc.
   Education of the Public: Informing residents of city activities and progress, Establishing Environmental Certification Program, Establishing learning facilities



Community based organization: "Jichikai"



Public Meeting



"Ecology Notebook"



Environmental

Certification



Environmental Museum

# 2. Solid Waste Management

- Present a clear way to handle waste generated for all citizens, not for specific areas
- Necessary to provide fundamental services for establishing a path from waste collection, transportation, to final disposal

#### \* Actions to Establish Basic Waste Management Services

- Waste Storage for Collection : Bins and containers at household, Using standard bags, Setting collection stations for groups of households
- •Waste Transport: Collection vehicles, Compaction collection vehicles
- •Waste Treatment(Incineration)
- •Final Disposal (Sanitary Landfills)
- •Waste Reduction : Separate waste, Collaborating with manufacturers, Charge fees for waste disposal

•Maintaining a Waste-Free City Environment: Identifying illegal waste accumulation/dump sites, Collecting bulk waste periodically, Installing waste

bins in public areas



Waste Storage, Reduction, and Separation at Household



Waste Collection and Transport



Waste Incineration Plant

## 2-1. Solid Waste Management

#### List of Actions and Programs

	-
E1. Relationsh	ip Building
E1-1	Establish Means of Communication
E1-2	Set Common Goals/Slogans
E2. Resident I	volvement in Providing Services
E2-1	Organize Public/Stakeholder Meetings
E2-2	Develop a Policy to Support Resident Involvement
E2-3	Send Government Staff to the Field
Actions to Edu	cate Residents
E3. Education	in Schools
E3-1	Teach Students about the Local Society and Environmental Citizenship
E3-2 E4 Education	af the Dublic
E4. EUUCAUOII	Inform Pacidants of City Activities and Progress
E4-1 F4-2	Organize Public Events and Programs
F4-3	Fstablish Museums and Learning Facilities
Solid Waste M	Ianagement
Actions to Esta	blish Basic Waste Management Services
W1. Waste Sto	rage for Collection
W1-1	Fix Waste Bins at Each Household
W1-2	2. Use Portable Containers at Each Household
W1-3	8. Use Standard Plastic Bags
W1-4	I. Set Collection Stations for Groups of Households
W2. Waste Tra	insport
W2-1	I. Use Collection Vehicles
W2-2	2. Use Compaction Collection Vehicles
W3. Waste Tre	eatment (Incineration)
W4. Final Disp	osal
Actions to Imp	rove Waste Management
W5. Waste Re	luction
W5-1	L. Separate Waste
W5-4	Change Change Contractor Contract
W5-3	S. Charge Fees for Waste Disposal
W6. Maintaini	Ig a Waste-Free City Environment
W6-	Collect Bulk Waste Accumulation/ Dump Sites
W6-2	Install Waste Rins in Public Areas
W6-4	Encourage Residents to Maintain a Clean Environment
Urban Draina	Pe
Actions to Mai	ntain Drainaae Capacity
D1. Local Adar	otations to Capture Debris
D1-1	. Cover Open Drains (wood or any other locally available material)
D1-2	. Cover Open Drains (concrete/metal grating)
D1-3	. Install Intermediary Screens within Drainage Channels
D2. Waste Clea	an-Up, Drain Cleaning, and Maintenance
D2-1	. Perform Scheduled System Cleaning and Maintenance
D2-2	. Perform Ad Hoc Local Drain Cleanings
D2-3	. Inspect the System Prior to Rain Events
D2-4	. Establish a Hotline and Respond to Debris Accumulation/Backup Reports
D2-5	. Hold Clean-Up Events
Actions to Exp	and/Improve the Drainage System
D3. Systemwic	le Drainage Planning Considerations
D3-1	. Plan Using Sustainable Urban Drainage System/Low Impact Development Principles
D3-2	. Convert to Partial Separate Sewer Systems
D3-3	. Utilize Open Spaces, Ponds, and Detention Basins
D3-4	. Relocate Informal Settlements around Waterbodies
D4. Design Lev	/el Considerations
D4-1	Secure Discharge Points/Points of Interest
D4-2	Create or Revisit Design Storms and Runoir Assumptions
D4-3	. Reuevelop of Manufacture New Materials and Designs
D4-4	. Expand Dramage system in Coordination with Other Construction

#### Detailed Information on Implementation of each Action

#### iption

Portable containers are an alternative to fixed waste bins. Portable containers can make waste collection more efficient, as the containers can be moved to suit household preferences and then carried to convenient locations to assist waste collection. Portable containers can be of various sizes and materials, such as

- Small plastic containers with covers
- Steel drums (no cover)

#### **Necessary Existing Conditions:**

- Willingness to pay for waste containers by each household
- Resident understanding and trust that waste will be collected if placed in these bins. Consider holding a resident meeting (E2-1, E4-1)

#### Important Considerations:

- Consider whether it is more feasible to have each household purchase a
  waste bin from nearby stores or manufacturers or whether it makes more
  sense for the city government to design standardized, effective portable
  waste containers.
- <u>Affordability</u>: Determine how much it costs households to purchase waste bins. Can households afford this cost? Does the government need to provide assistance? How long can the bins be used?
- Size: Each household could determine the size they need, according to the amount and type of waste generated, planned collection frequency, and ease of lifting and transporting.
- <u>Material</u>: Choose materials according to cost, durability, and weight. Plastic tends to be the cheapest and lightest but perhaps the least durable to weather and use.
- <u>Design</u>: A bin that is easy to transport and clean would be the most effective. If a city government is to design its own portable waste containers, consider adding wheels or covers attached by hinges so that the top does not blow away. Heavier plastics can be used to improve durability but keep the container light.
- <u>Collection Method</u>: Determine how to collect waste from portable bins. Do residents need to bring it out when the waste collection service comes? Alternately where should residents leave bins near the street, so that it does not interfere with traffic?
- Ensure planned systems are culturally and socially acceptable
- Consider whether residents in informal settlements require different needs and adjust accordingly

#### Financing and Resources:

- Budget to purchase containers, whether by the government or households
- Resident time and effort to clean waste containers
- Cost to disseminate information (e.g. websites, brochures, commercials)

#### **Operation and Maintenance:**

- Periodic cleaning to maintain a hygienic environment
- Outreach to residents if disposal methods are not being followed





The Kitakyushu Experience

Improved hygiene

by the wind

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needed.

Kitakyushu used light, portable, plastic containers

Minimized waste from interfering with traffic

Empty containers were easily blown around

up until about 1970. Use of bins made collection

Improved aesthetics of the neighborhood

Increased work efficiency and hygienic

Plastic was easily damaged by sunlight

Hence, each household had to keep an eye out for their containers or invest in new containers when

efficient and had the following benefits.

condition of waste collection.

Containers were easily stolen

However, there were some issues, such as

# 3. Urban Drainage

- Maintain and expand sewage infrastructure collecting rainwater and household wastewater in urban areas and carrying them to river, in order to prevent urban flood damage, regardless of illegal dumping of waste
- Require appropriate management to maintain drain capacity
- \* Actions to Maintain Drainage Capacity
- Local Adaptation to Capture Debris: Covering open drains and installing screens within drainage channels
- Waste Clean-Up, Drain Cleaning, and Maintenance: Scheduled maintenance, Ad Hoc drain cleanings
   System-wide Drainage Planning Considerations: Planning sustainable drainage systems (Separate sewer systems, Combined systems), Utilizing open

ponds etc., Relocating informal settlements around waterbodies

•Design Level Considerations: Securing discharge points/Points of interest, Creating design storms and runoff assumptions, Redeveloping or manufacturing new materials and designs, Expanding drainage system in coordination with other construction



**Covering Drains** 



Drain Cleaning



Utilizing Open Ponds



Expand/Improve Drainage Systems

# Conclusion

- Governmental entities conduct basic services and improve infrastructures for residents such as education, waste management, sewerage, etc. However, in the early stages of development, lack and shortage of services and infrastructures tend to become large, for example, leave of garbage resulting in clogging drainage canals in urban areas.
- Suitable actions filling these lacks depend heavily on participation by residents, communities, and industry. From Kitakyushu's experience, the important actions are active participation of residents, awareness of solidarity, interdependence, maintenance of moderate duty of the parties etc.
- Efforts by each residents are truly indispensable to create a beautiful, easy-to-live, and vibrant city that everyone dreams.

## We appreciate your continued cooperation.

# Thank you for your attention!!



My name is **Teitan**.

I came from North Pole.

Global warming causes melting ice there, and we have less and less places to live every day. So I came to Environmental model city, Kitakyushu to protect my family and North Pole. I am hoping that we all learn the importance of Environmental and ecology more, so that we will be able to stop the global warming together!

Kitakyushu City Environmental Mascot Character Teitan

