

*“Green Sister City” Cooperation  
between DAVAO and KITAKYUSHU*

Kitakyushu Asian Center for Low Carbon Society  
,Kitakyushu City

2022. 3. 3





# Commitment of net zero carbon emissions by 2050

## 「Zero Carbon City」 (October, 2020)

～ Commitment of net zero carbon emissions by 2050, Kitakyushu ～

「Kitakyushu Asian Center for Low Carbon Society」  
(Established 2010)

Kitakyushu SDGs Future City (June, 2018)

- Development & Promotion of “Eco Future City”
- Initiatives of SDGs

“Eco-future City” (December, 2011)

- (1) Evaluation of activities as a “Eco-model City”
- (2) Evaluation of Program as a “Eco-future City”  
(①Vision ②Action Plan ③Project Structure)

“Eco-model City” (August, 2008)

- ①Reduction of GHG ②Leadership & Leading model
- ③Local adaptation ④Feasibility ⑤Sustainability

Nationwide municipalities


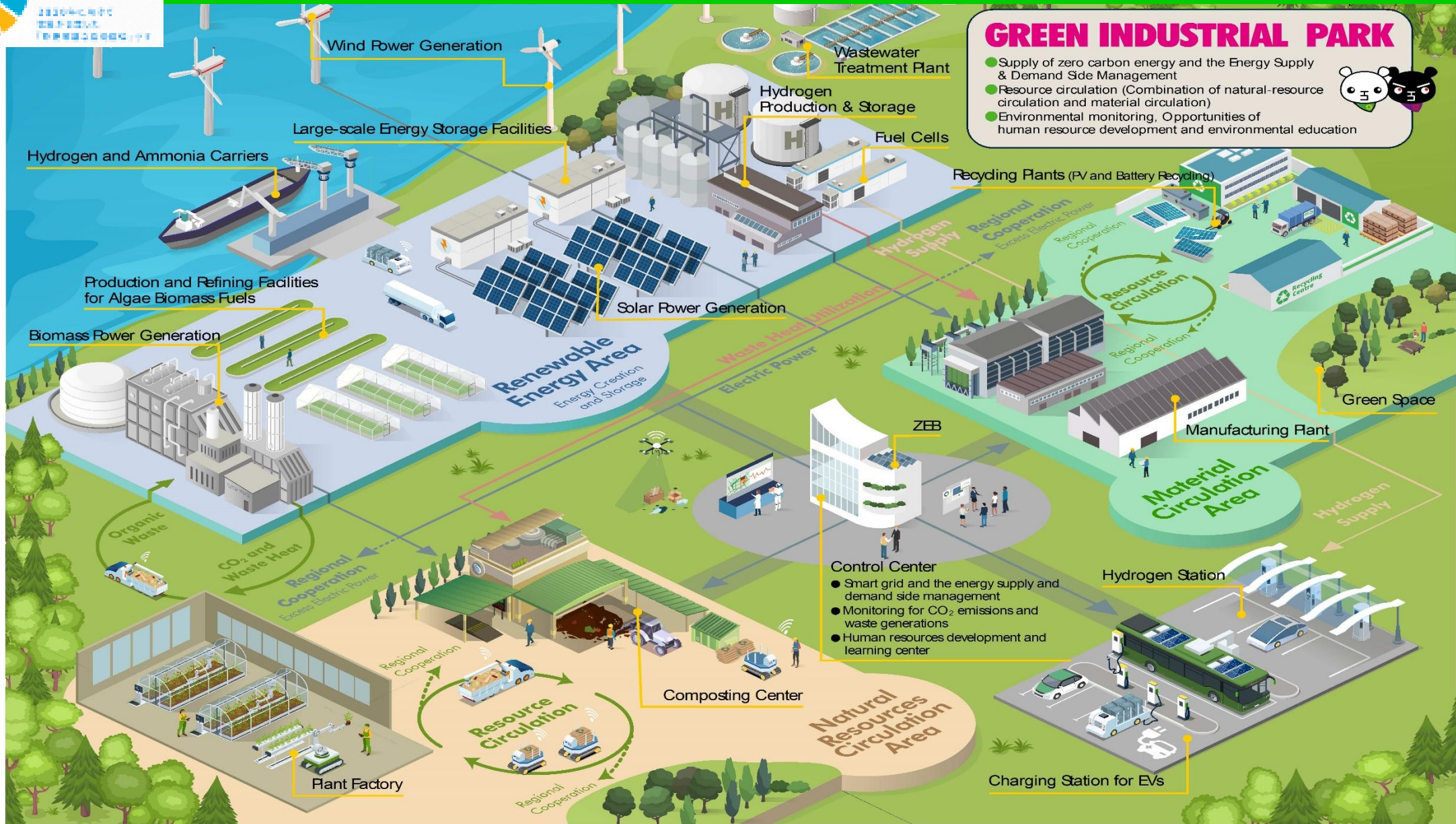




# Green City / Green Industrial Park

## GREEN INDUSTRIAL PARK

- Supply of zero carbon energy and the Energy Supply & Demand Side Management
- Resource circulation (Combination of natural-resource circulation and material circulation)
- Environmental monitoring, Opportunities of human resource development and environmental education

**Control Center**

- Smart grid and the energy supply and demand side management
- Monitoring for CO<sub>2</sub> emissions and waste generations
- Human resources development and learning center

**Plant Factory**

**Hydrogen Station**

**Charging Station for EVs**

**Composting Center**

**Manufacturing Plant**

**ZEB**

**Green Space**

**Solar Power Generation**

**Production and Refining Facilities for Algae Biomass Fuels**

**Biomass Power Generation**

**Hydrogen and Ammonia Carriers**

**Large-scale Energy Storage Facilities**

**Wastewater Treatment Plant**

**Hydrogen Production & Storage**

**Fuel Cells**

**Wind Power Generation**

**Recycling Plants (PV and Battery Recycling)**

**Renewable Energy Area**  
Energy Creation and Storage

**Material Circulation Area**

**Natural Resources Circulation Area**

**Resource Circulation**

**Regional Cooperation**  
Excess Electric Power

**Regional Cooperation**  
Excess Electric Power

**Resource Circulation**

**Regional Cooperation**

**Electric Power**

**Waste Heat Utilization**

**Hydrogen Supply**

**Hydrogen Supply**

**CO<sub>2</sub> and Waste Heat**

**Regional Cooperation**

**Organic Waste**





# Green Sister City Agreement with DAVAO



Signing of the Memorandum of Understanding by Mayor Sara Duterte of Davao and Mayor Kenji Kitahashi of Kitakyushu (November 28<sup>th</sup>, 2017)

## Official Development Assistance, JAPAN (March, 2018)

### Construction Plan of Waste to Energy Facility in DAVAO



### Staff Training for SWM in Kitakyushu



### Waste Segregation Awareness in Davao





# Development of LCCAP of DAVAO

Project to realize low carbon society in Davao City through a support for a development of Local Climate Change Action Plan (2018- 2020)



- A development of GHG inventory (supported by IGES)
  - A development of adaptation measures (supported by Ateneo De Davao Uni.)
  - A development of mitigation measures (supported by Kitakyushu City and IGES)





# Development of LCCAP of DAVAO

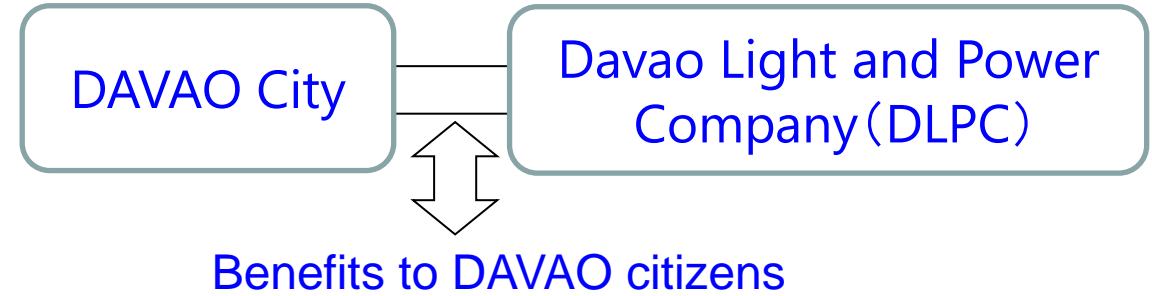
## LCCAP workshop - Stakeholder meeting

Potential mitigation options for Davao City were identified through the group work



## Feasibility Study of LED Installment

Proposal of JCM Model Project for Adaptation measures and reduction of installation costs of LED





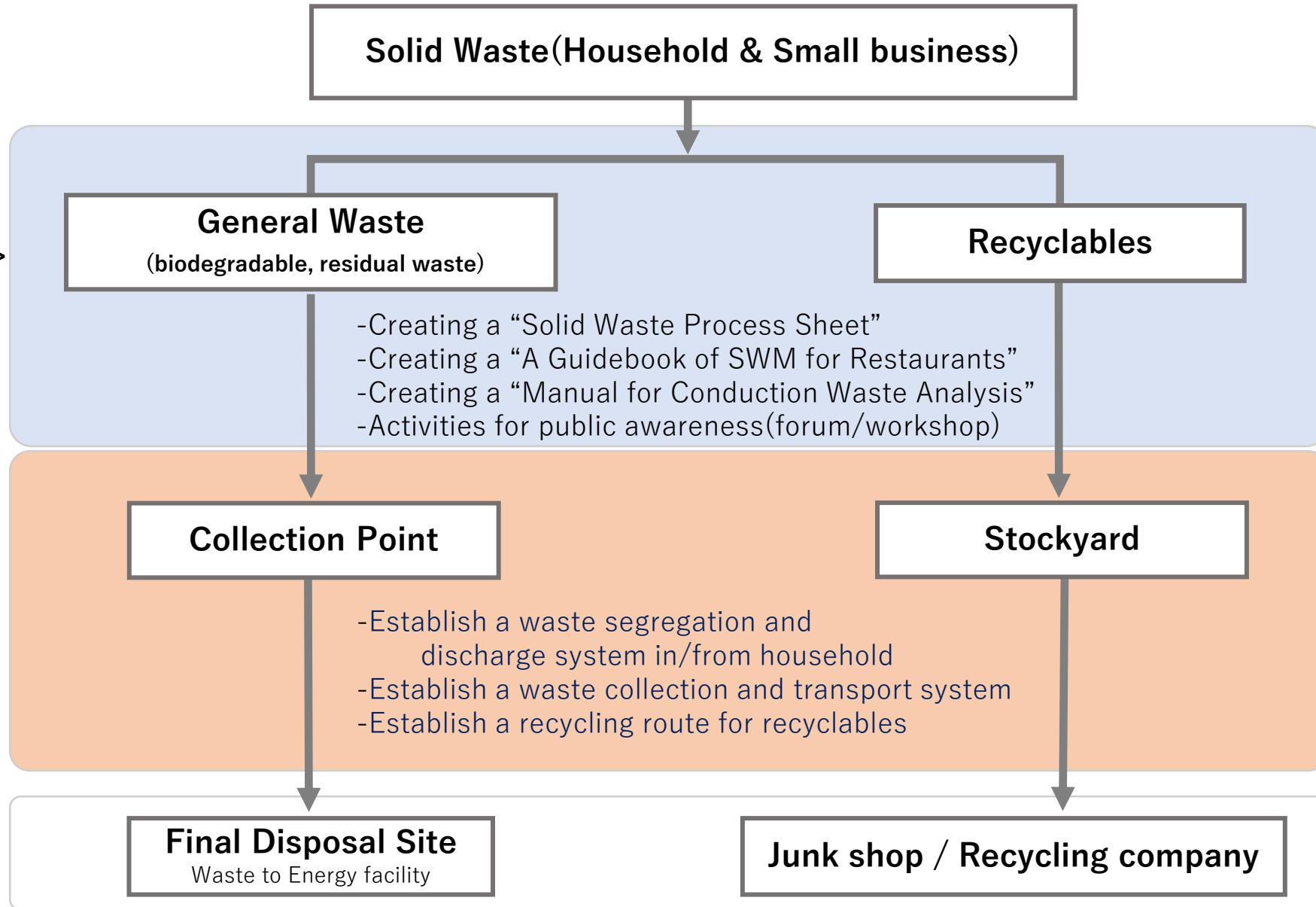
# JICA Grassroots Project – Phase 1 and 2 –

PHASE 1 : 2017-2019  
< Promote waste reduction and segregation at source >



PHASE 2 : 2022-2024  
< Collection and Transport >

OTHER BUSINESS  
(ODA etc.)





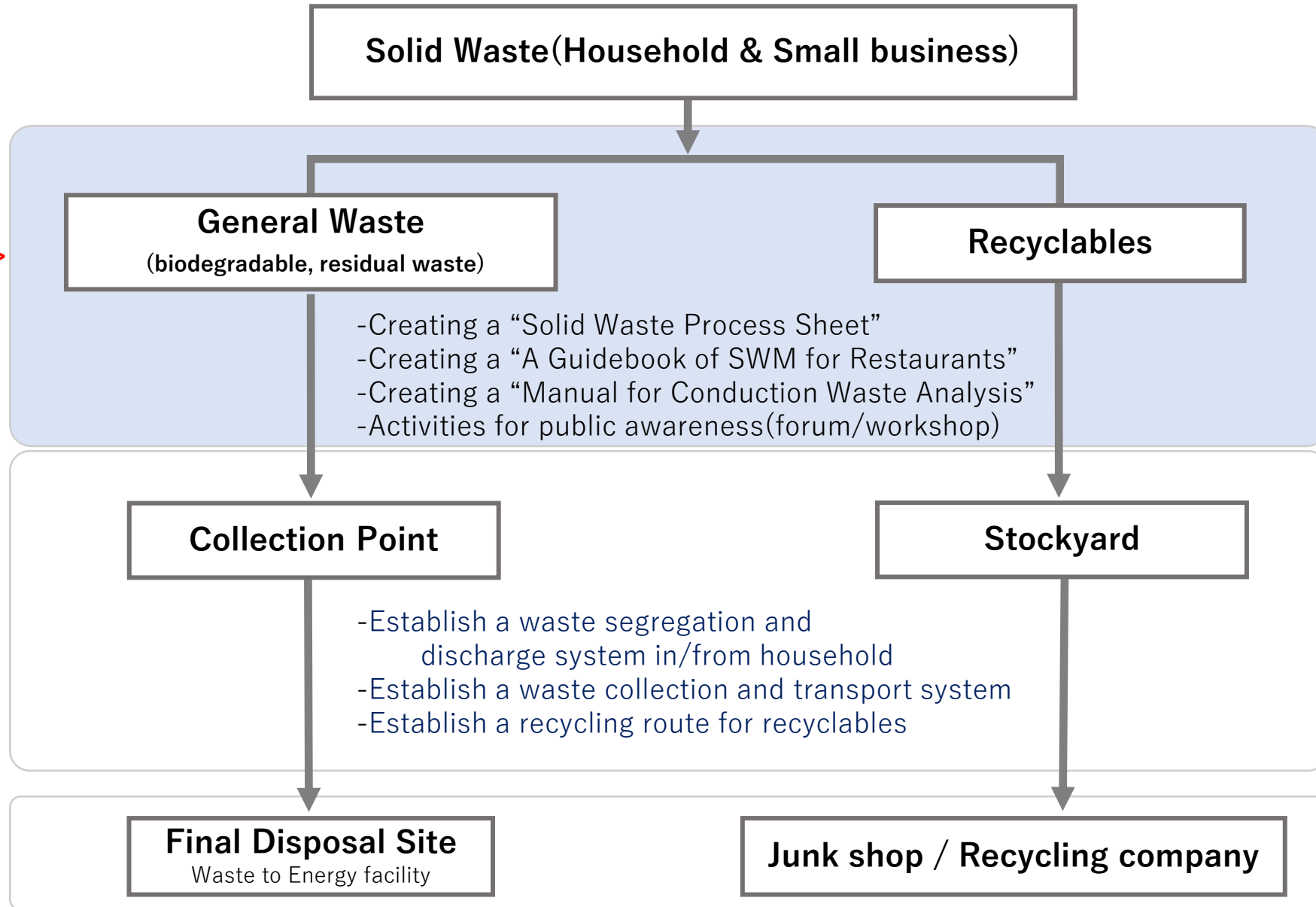
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# JICA Grassroots Project — Phase 1 —

## Solid Waste Process Sheet

Barangay Name <b>Duterte</b>									
Kategoriya	Malata nga Basura	Papel ug Carton	Lata ug Botelya	PET nga Botelya	Plastik na sudlanan ug pakete	Walay pulos nga Basura	Makahilo nga Basura	Ginamit nga Mantika	
Mga Klase sa Basura	Kitchen waste Grass /patny Gowing Compost Backyard Backyard compost	Paper, newspaper Magazines, brochures Carton	After quick wash, not so much dirty Glass bottles, Jars- garapa/garapon Aluminum cans Tin cans	After quick wash, not so much dirty Mineral water containers	After quick wash, not dirty one Plastic trays/cups Shampoo bottles Sauce bottles Cooking oil bottles Toothpaste tubes Egg trays	Diapers Sanitary Napkins Plastic food & candy wrappers, Worn-out shoes/ slippers Toy	Busted lamps Containers of disinfectants Expired medicines Electronic wastes Worn-out appliances Batteries	Cooking oil	
Paggamit og Sako o plastik bag para sudlanan sa basura		Sack	Sack	Sack	Sack	Sack			
Adlaw sa Pag kolekta sa Basura		For Brgy. On Tuesday or Junk shop	For Brgy. On Tuesday	For Brgy. On Tuesday	For Brgy. On Tuesday	For CENRO, On Monday	For CENRO, On Monday		
Gitakda nga tapakanan sa Basura		Collection point	Collection point	Collection point	Collection point	Collection point			
Pamaagi sa pagkolekta sa Basura		Collection	Collection	Collection	Collection	CENRO collection point	CENRO collection point	CENRO collection point	
Pagbaligya sa mapuslan nga Basura sa Junkshop		Junk shop	Junk shop	Junk shop	Junk shop				
Katapusang parma/padalingan sa Basura	Returning to Soil	Paper and others	New Bottle and Glass	Garment and Textile	Plastic products	Waste to Energy Facilities or Sanitary landfill	Waste to Energy Facilities or Sanitary landfill	Waste to Energy Facilities or Sanitary landfill	



# JICA Grassroots Project – Phase1 –

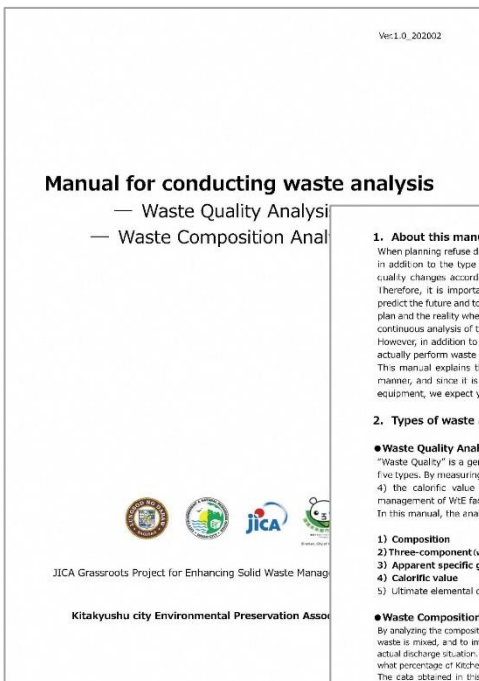
## A Guidebook for Restaurants



## Manual for conducting waste analysis

### Manual for conducting waste analysis

- Waste Quality Analysis
- Waste Composition Analysis



#### 1. About this manual

When planning refuse disposal facilities, it is one important factor to know the waste quantity in addition to the type of the facilities and the amount to be treated. However, the waste quality changes according to the regional properties and changes in the social economy. Therefore, it is important to grasp the waste quality of the pertinent region correctly, to predict the future and to make a long range plan so that differences do not occur between the plan and the reality when the facilities are completed and start operation. For this reason, the continuous analysis of the waste quality is indispensable. However, in addition to specialized knowledge, various equipment and tools are required to actually perform waste analysis. This manual explains the two types of waste analysis methods in an easy-to-understand manner, and since it is summarized so that it can be practiced even if there is no special equipment, we expect you to use this manual when carrying out waste analysis.

#### 2. Types of waste analysis

##### ●Waste Quality Analysis

“Waste Quality” is a general term for physical properties and mainly refers to the following five types. By measuring these, the characteristics of the garbage become clear. In particular, 4) the calorific value is very important data for the planning, design and operation management of WtE facilities. In this manual, the analysis method is described for those excluding 5).

- 1) Composition
- 2) Three-component (water content, combustible content and ash content)
- 3) Apparent specific gravity
- 4) Calorific value
- 5) Ultimate elemental composition

##### ●Waste Composition Analysis

By analyzing the composition of discharged waste, it is possible to check waste is mixed, and to investigate the possibility of waste reduction at actual discharge situation. For example, this analysis examines what per what percentage of kitchen garbage is, and how much they are contain. The data obtained in this analysis becomes basic information for waste recycling, and it is effectively used for waste reduction plan. This analysis has the following characteristics.

- **Very easy!**  
 → No need special technology
- **No need special equipment!**  
 → Car, inexpensive equipment and manpower
- **Useful data!**  
 → Necessary for waste management plan

#### 3. About Waste Quality Analysis

##### 3.1. Items of Waste Quality Analysis and their meanings

- **Composition of waste**  
 →It is the classification of matters included in waste such as papers, metals and kitchen garbage according to their components. It will be data for collection and transportation, disposal method, reutilization, etc.
- **Apparent specific gravity**  
 →It will be data for the operating plan of vehicles, the size of the pit and the design of the crane.
- **Three-component**  
 →The three-component of refuse means the water content, combustible content and ash content of waste, it roughly tells about the properties and combustibility of waste. It will be data for considering incineration facilities.
- **Calorific value**  
 →The calorific value will be design data for the incinerator. The following methods are used for measuring the calorific value.  
 ① Measurement with a bomb calorimeter  
 ② Estimation with the values of three component.  
 ※This manual introduces the method of ②.

##### 3.2. Method of Waste Quality Analysis

###### 3.2.1. Necessary equipment

- **Scale** (Platform scale: 1g-5,000g, Precision balance: 0.01-300g)  
 - Purpose : Weight measurement of various things



- **Dryer** (Electric heating dryer: 30-70 ℓ, Max around 200℃)  
 - Purpose : Measurement of water content, drying of samples and instruments, etc.







# JICA Grassroots Project — Phase 1 —

## Proposal for enhancing SWM to Mayor of DAVAO



The Honorable Sara Duterte,  
Mayor, City of Davao,  
Republic of the Philippines

First of all, allow me to express my heartfelt gratitude on your continued commitment to a smooth implementation of the JICA Grassroots Project, "Project for enhancing Solid Waste Management in Davao city".

We have been conducting the project in Davao city since 2016. This proposal was developed in order for us to convey our frank suggestions to Davao city from these experiences.

We hope that this proposal will be a good reference for Davao city to realize a sound material-cycle society by reducing solid waste and promoting recycling, and also to firmly proceed the 10-year ecological solid waste management plan.

February 19, 2020  
JICA Project kitakyushu Team

*Kenji Kitahashi*  
Kenji Kitahashi  
Mayor, City of Kitakyushu  
Japan

### Proposal on the Project for Enhancing Solid Waste Management in Davao City

JICA Project Kitakyushu Team  
(Kitakyushu City, KEPA, IGES and KITA)

#### I Introduction

For about three years, we made every effort in proceeding this project with the staffs of CENRO Solid Waste Management Section (SWMS), staffs of barangays, business operators and other people while visiting the fields of solid waste management, having discussions, and searching solutions for the future direction of Davao City. This proposal was developed in order for us to convey our frank suggestions to Davao City from these experiences. We hope that this proposal will be a good reference for Davao City to realize a sound material-cycle society by reducing solid waste and promoting recycling, and also to firmly proceed the 10-year ecological solid waste management plan.

#### II Proposal

##### 1 Strengthening solid waste management planning section

This project was proceeded having SWMS as a counterpart. Particularly, together with IEC members, we worked on the themes of transferring waste analytical techniques, reduction and recycling of domestic/business waste. With regard to the business waste, we had a field survey by interviewing establishments including shopping malls and recycling industries in order to identify the current situation of waste management. As for the activities for citizens, we visited several barangays, specifically junk shops and recyclers. We identified the current flow of waste and recyclables, and mainly on barangay level, we exchanged ideas, gave improvement advices and even practical instruction how to reduce/segregate waste. Through these activities we prepared materials that were useful for practical guidance, namely, brochures for business operators for effective waste reduction and education; solid waste treatment process sheet for household use.

The above-mentioned activities were conducted with IEC members. What we discovered through the project is that the SWM Sub-section members were well-familiar with the problems and the issues related to solid waste in Davao City. They also understand well how those issues should be addressed for practical achievement: that the problems can be solved if the process is clarified, implemented and budgeted. IEC staffs are the indispensable players in the administration of solid waste management in 182



barangays, the captains  
to enact barangay  
to come from grass-  
roots measures. It  
to bring all barangays

Different sectors are  
fields of solid waste  
project planning

It is accelerated by  
the 10-year plan and  
it is necessary to  
continue. To this end, we  
aim at sustaining the  
solid administrative  
function in CENRO's



It is important to  
the implementation

maintain  
that the  
analytical  
city.

ment

restaurants

Information based  
to focus,  
fields of the  
to be used  
while, there  
is closely  
recycling

the mentioned  
waste:

such as Green  
the board of

1

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# JICA Grassroots Project — Phase 1 —







# JICA Grassroots Project — Phase 1 —

Training Program on SWM in Kitakyushu  
11-21 November, 2019





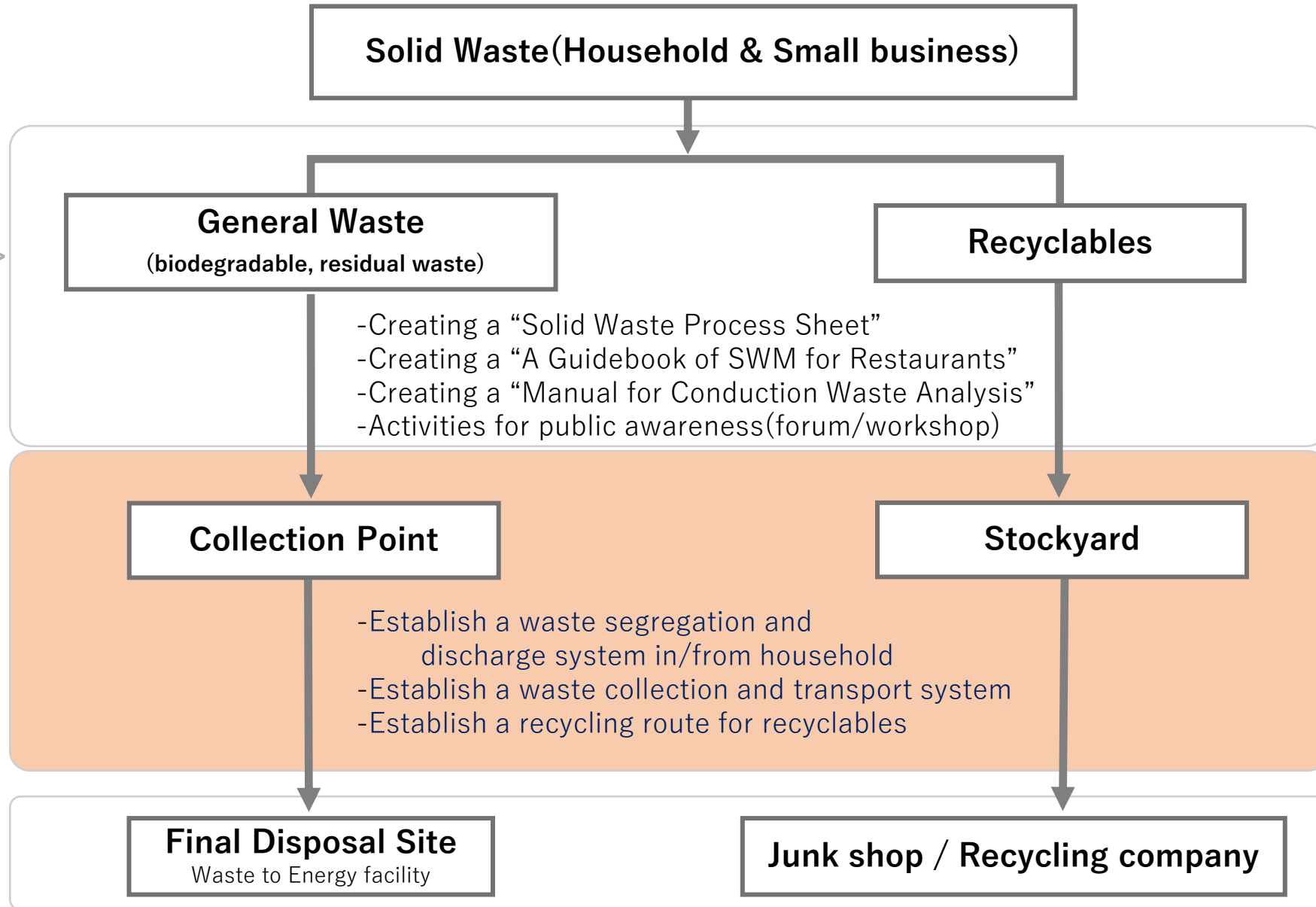
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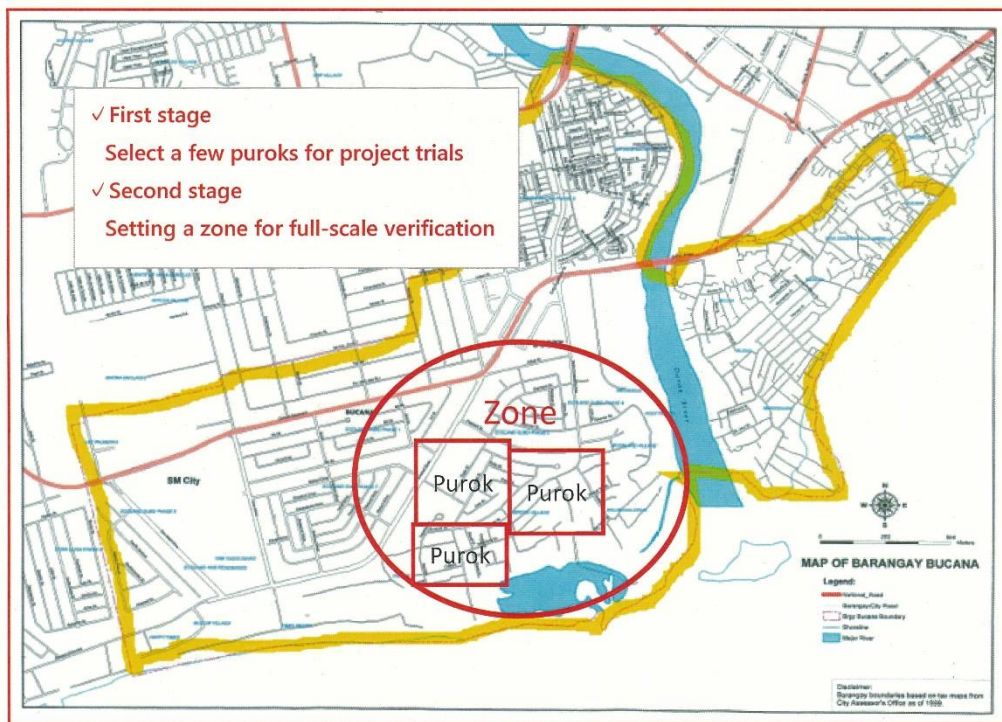




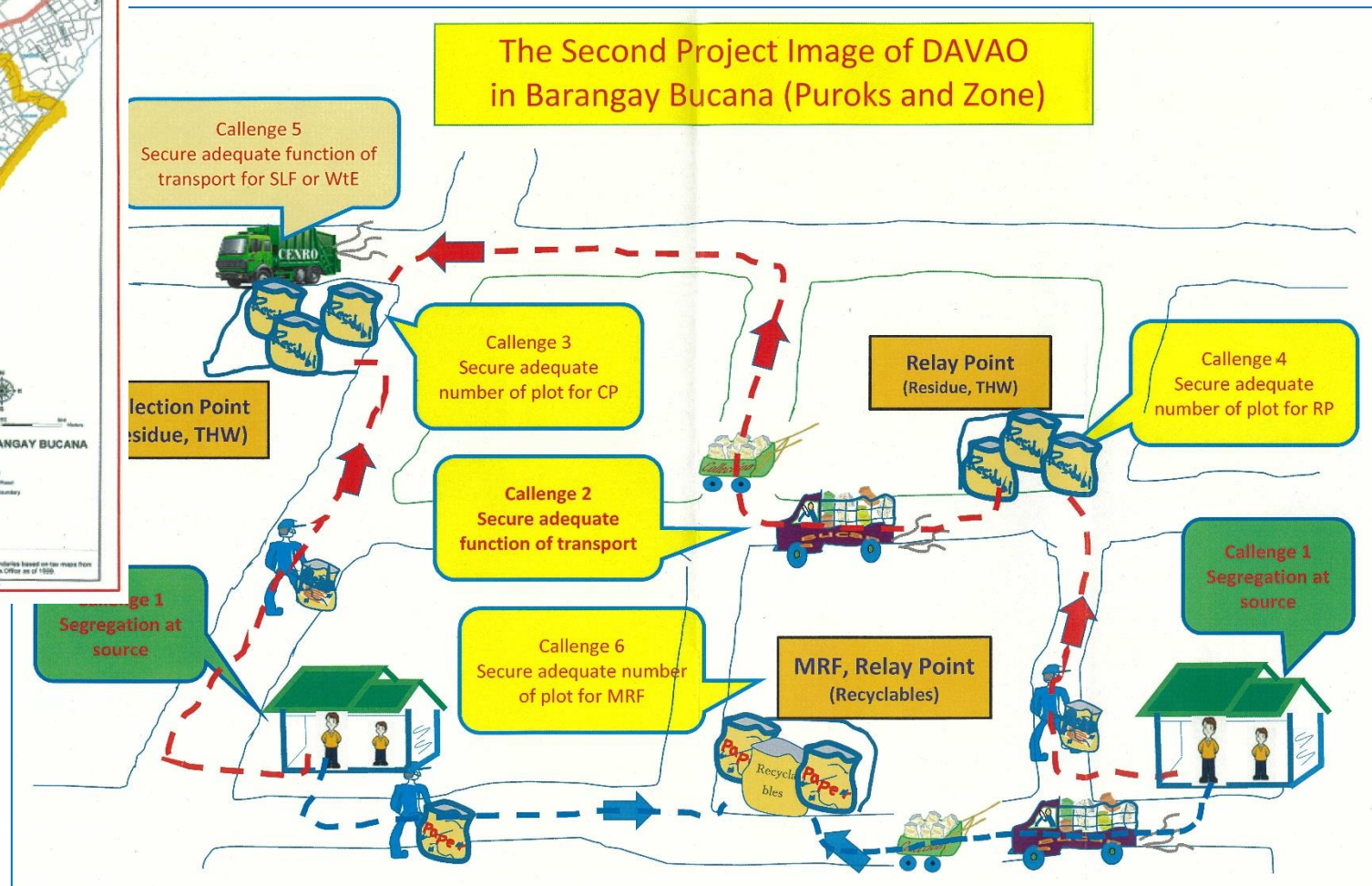


# JICA Grassroots Project — Phase2 —

## “Phase2” Project of Image of Davao < Collection and Transport >



- First stage : Select a few Puroks for project trial
- Second stage : Setting a Zone for Full-scale verification







# 5<sup>th</sup> Anniversary of “Green Sister City”

\*Tentative schedule

## Davao Coastal Clean Ups



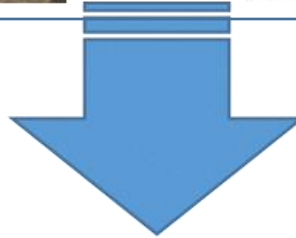
ASU  
Coastal Barangays  
Volunteers  
University students

## Kitakyushu Coastal Clean Ups



Communities  
Volunteers  
University students  
NPO

May 29th



June 19th



Workshop





# Finding Solutions to Common Global Issues

**Kitakyushu's environmental technologies**



**Decarbonization**

**Waste plastic measures**



**Solving common global issues**



**Economic growth**



**and helping the world achieve the SDGs!!**





# "Green Sister City" Cooperation between DAVAO and KITAKYUSHU

