Republic of Indonesia
KLHK
PUPR
Palembang city：BAPPEDA/DLHK
Balikpapan city：BAPPEDA/DLH

The Project for Capacity Development of Central and Local Governments for 3R and Solid Waste Management in The Republic of Indonesia

Project Completion Report

November 2017

Japan International Cooperation Agency
(JICA)

Yachiyo Engineering Co., Ltd.
Kokusai Kogyo Co., Ltd.

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The exchange rate in Octorber, 2017

1Rp (Indonesia Rupiah) = JPY0.008418

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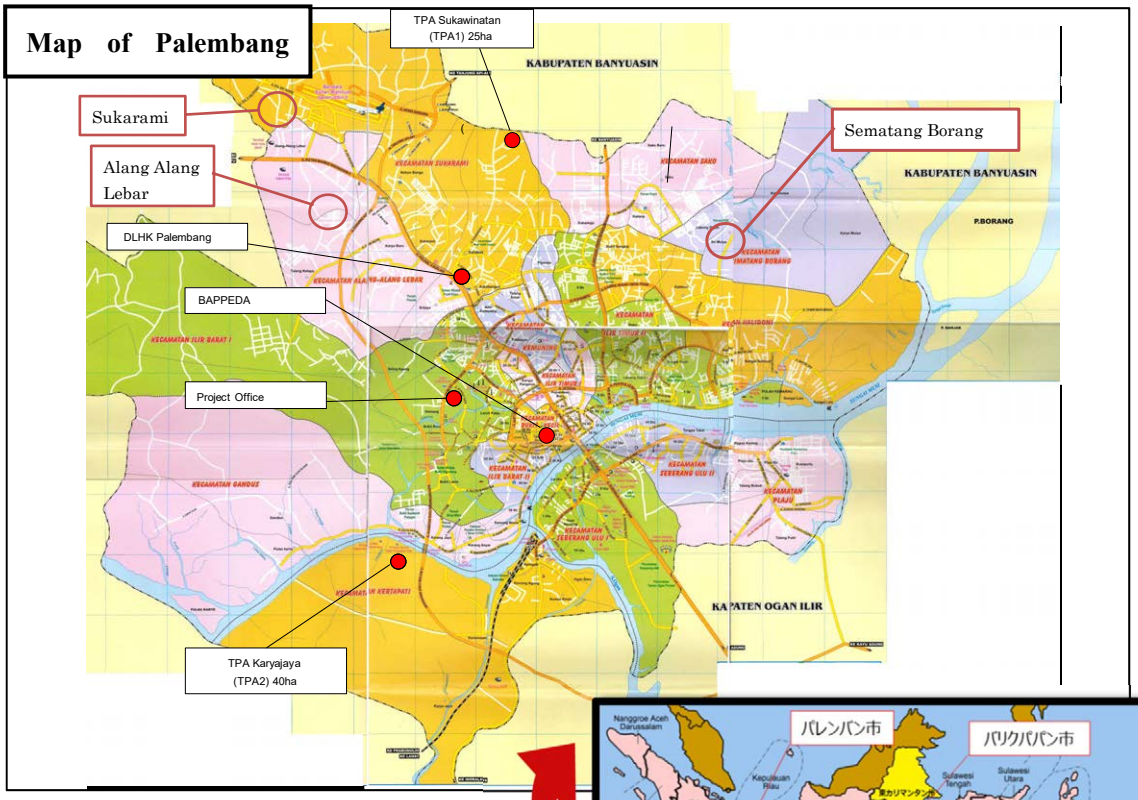
Abbreviations

ADIPURA	: Environmental ranking system
BAPPEDA	: Badan Perencanaan Pembangunan Daerah（Regional Development and Planning Agency）
BAPPENAS	: Badan Perencanaan Pembangunan Nasional（National Development and Planning Agency）
BLH	: Badan Lingkungan Hidup（Environmental Agency）
BLUD	: Badan Layanan Umum Daerah
B3	: Bahan Berbahaya Beracun (Hazardous Waste)
CD	: Capacity Development
C/P	: Counterpart
Com-PP	: Composting Pilot Project
CSR	: Corporate Social Responsibility
DLHK	: Dinas Lingkungan Hidup Kebersihan
DLH	: Dinas Lingkungan Hidup
DKK	: Dinas Kebersihan Kota（City Cleansing Department, Palembang City）
DKPP	: Dinas Kebersihan, Pertamanan dan Pemakanan （Department of Cleansing, Parks and Cemetery, Balikpapan City）
EPR	: Expanded Producer Responsibility
IGES	: Institute for Global Environmental Strategies
InSWA	: Indonesia Solid Waste Association
JAKSTRADA	: Kebijakan dan Strategi Daerah（Kebijakan dan Strategi Daerah ）
JCC	: Joint Coordinating Committee
JICA	: Japan International Cooperation Agency
KDN	: Kementerian Dalam Negeri（Ministry of Home Affairs）
KLHK	: Kementerian Lingkungan Hidup dan Kehutanan（Ministry of Environment）
KSM	: Kelompok Swadaya Masyarakat（People's Self Help Group）
M/M	: Minutes of Meeting
MRF	: Material Recovery Facility
MSWM	: Municipal Solid Waste Management
NGO	: Non-governmental Organizaion
PDM	: Project Design Matrix
PC	: Primary Collector
PP	: Pilot Project
PP	: Peraturan Pemerintah
PUPR	: Kementerian Pekerjaan Umum dan Perumahan Rakyat（Ministry of Public Works）
R/D	: Record of Discussion
RT	: Rukun Tetangga （Neighborhood Block）
RW	: Rukun Warga （Neighborhood Block Association）
SS-PP	: Source Separation and Separate Collection Pilot Projec

T/D	: Transfer Depot
TPA	: Tempat Pembuangan Akhir （Final Disposal Site）
TPS	: Tempat Pembuangan Sementara （Temporary dumping station）
TPST	: Tempat Pengelolaan Sampah Terpadu（Integrated Waste Processing Facility）
TPS-3R	: Tempat Pengelolaan Sampah 3R
UPTD	: Unit Pelaksana Teknis Dinas（Department Technical Implementation Unit）
WACS	: Waste Amount and Composition Survey
WB	: Waste Bank
3R-WG	: 3R Working Group
3R	: Reduce, Reuse, Recycle

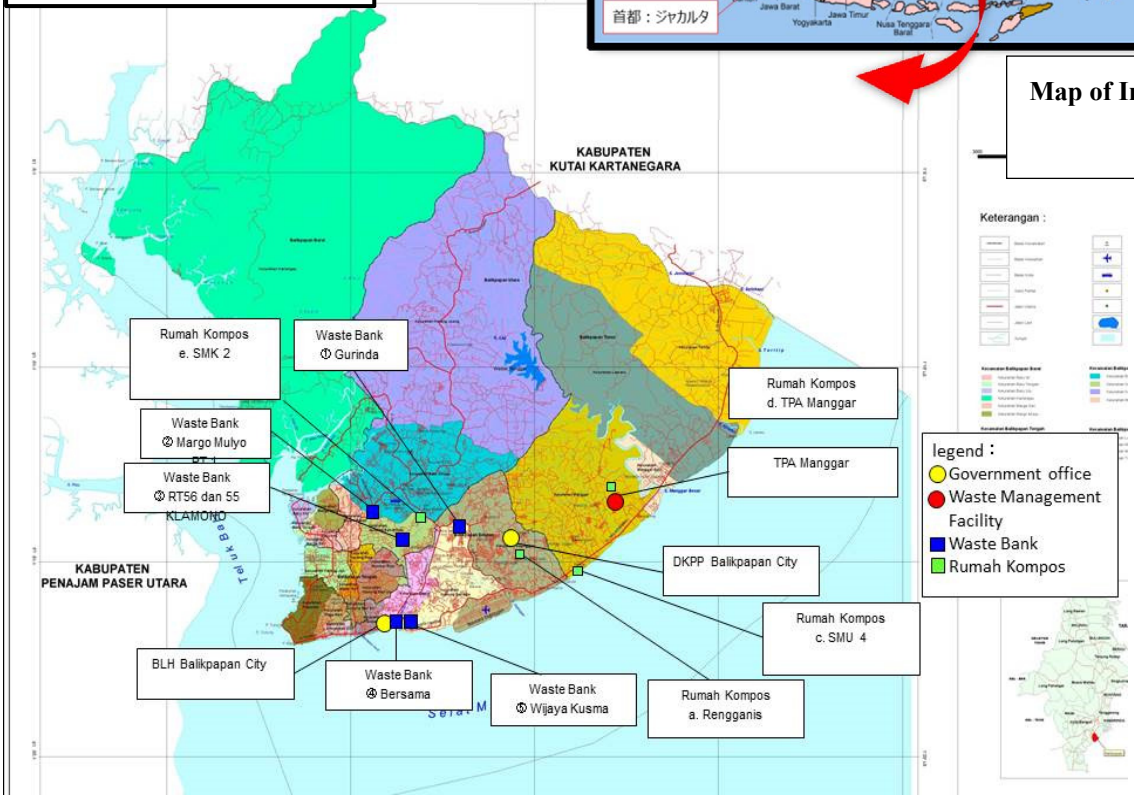
Map of Target Cities

Map of Palembang



Map of Indonesia

Map of Balikpapan City



Chapter 1. Outline of the Project

1-1 Project Background and Objective

In the Republic of Indonesia (referred to as Indonesia), waste amount have increased rapidly along with economic growth, and many cities are relying on open-dumps to dispose their waste because the sanitary landfill sites are undeveloped. In addition, since the lack of capacity for waste management, the rate of collection and transportation of waste is low, illegal dumping of waste by citizens are often seen, and environment and sanitation problem are arising. While the capacity of existing final disposal site (TPA) is approaching the limit, and securing land for new waste disposal site is getting difficult because of the opposition of local residents and urbanization, waste reduction has become an important issue. Therefore, In Indonesia, the Ministry of the Environment and Forestry (KLHK) and the Ministry of Public Works and Public Housing (PUPR) take the lead in establishing a legal system and public policy for waste reduction and appropriate waste management, which have been applied in the local cities. The KLHK has implemented 3R promotion program since 2007, while the PUPR has conducted community-based pilot projects (PP) after initiation of 3R (Reduce, Reuse, Recycle) promotion in the ministerial regulation (No. 21/2006, The National Policy and Strategies for the Development of Waste Management System) in 2006.

Under such circumstances, the Government of Indonesia enacted the Act on Solid Waste Management (No. 18/2008, hereinafter referred to as "SWM Act") in May 2008 to promote 3R. The Act categorizes solid waste into three (3): 'household waste,' 'household-like waste' and 'specific waste,' and provides that waste management consists of 'Waste Reduction (3R)' and 'Waste Handling (segregation/ collection/ transportation/ intermediate treatment/ final disposal).' Furthermore, Governmental Regulation regarding Household Waste Management and Household-like Solid Waste Management (No. 81 YEAR 2012) was enacted in 2010 as well as Ministerial Regulation of State Ministry of Environment No. 13 Year 2012 on Implementation of Guidelines for Reduce, Reuse and Recycle through Waste Bank in 2012. Those related regulations are being prepared by Government of Indonesia. However, currently the local governmental agencies in charge of waste management (City Cleansing Department, City Environment Agency) have only a limited capacity to develop public policy and strategies (including regulation and basic plan) and lack the technical knowledge required in waste reduction. Hence, the capacity development of the local governments is also necessary in addition to the preparation of related regulations based on the SWM Act.

This project aims at preparing related regulations in order to appropriately implement 3R and solid waste management (for household waste and household-like waste); as well as formulating a Mid-Term Action Plan for Waste Reduction and carrying out PPs to introduce 3R activities and sound waste management in line with the SWM Act in the target cities, namely, Palembang City, South Sumatera and Balikpapan, East Kalimantan (hereinafter, target cities); and contributing to future dissemination of 3R to the other cities.

1-2 Project Outline

1-2-1 Overall Goal and Project Purpose

Overall goal and purpose of the project are shown as below.

Overall Goal	3R and solid waste management (household and household-like wastes) is appropriately implemented successively in representative local governments of the country in accordance with the Act on Solid Waste management (No.18/2008), the related government regulations, ministerial regulations and local regulations.
Project Purpose	3R and solid waste management (household and household-like wastes) is appropriately implemented in target cities based on the Act on Solid Waste Management (No.18/2008), the related government regulations, ministerial regulations and as well as local regulations.

1-2-2 Project Site and Target Wastes

The project sites are as described below:

Output 1: Jakarta (Central Government: Ministry of Environment and Forestry /
Ministry of Public Works and Public Housing)

Output 2 &3: Palembang City, South Sumatera Province; Balikpapan City, East Kalimantan Province

The target wastes in this project are as follows:

-Household waste

-Household-like waste

1-2-3 Implementation Structure and Agencies of Indonesian Side

The structure of implementation agencies (CP/) and 3R Working Group (3R-WG) is shown below.

< Implementation Agencies (C/P) >

- Ministry of Environment and Forestry: Waste Management Department (KLHK)
- Ministry of Public Works and Public Housing: Department of Environmental Sanitation (PUPR)
- Palembang City: BAPPEDA, Department of Environment and Cleansing (DLHK)
  Balikpapan City: BAPPEDA, Department of Environment (DLH)

＜3R-WG Agencies ＞

3R-WG	Member Agencies
National 3R-WG	Ministry of Environment and Forestry, Ministry of Public Works and Public Housing, Ministry of Home Affairs, BAPPENAS
3R-WG（Palembang）	Assistance II (as a coordination agency), BAPPEDA, Department of Environment and Cleansing, DPU CK (Department of Public Works, Human Settlements and Housing), DPU BM (Department of Public Works, Highways and Water Resources), Board of Community Development
3R-WG（Balikpapan）	BAPPEDA (as a coordination agency), Department of Environment, Cleansing, Parks, and Cemetery (DLH), Department of Health、Department of Home Affairs, Head of Kelurahan

The figure below is the project implementation structure. C/P agencies will implement practical activities, and 3R-WG will play a role as decision making body at activity level. Besides, 3R Stars was established as forum which is consisted from residents, private sectors, and government, it is regarded as place for discussion among multi-stakeholders as well as making policy recommendation towards government.

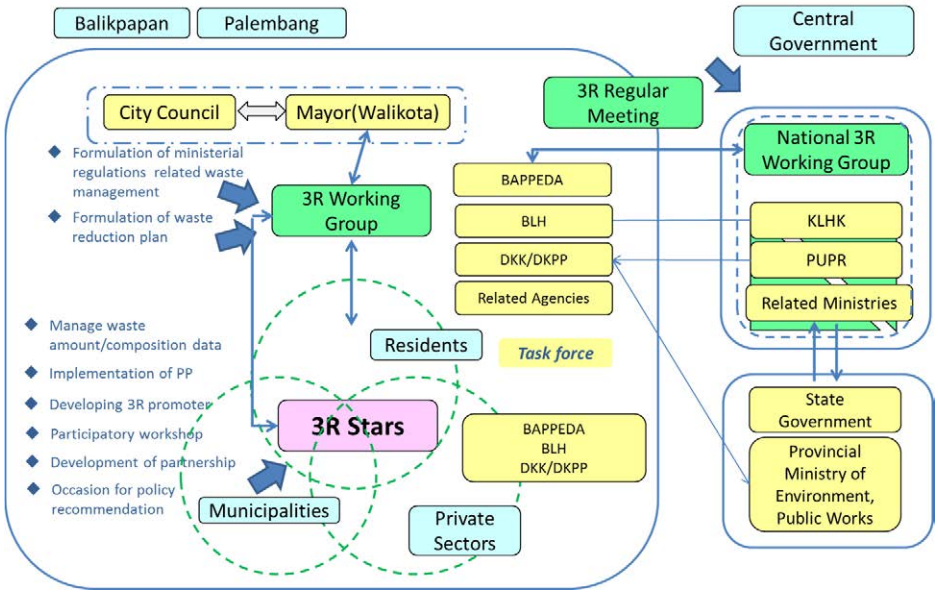


Figure 1-1 Position of 3R Stars in related Agencies

1-3 Achievement of the Activities

1-3-1 Joint Coordinating Committee and Project Design Matrix

In this project, Joint Coordinating Committee (JCC) was carried out three times, record of JCC is shown in the table below.

Table 1-1 Record of Joint Coordinating Committee (JCC)

	Schedule	Subject
1st	2013/11/20	Confirmation on the PDM modification and explanation on the Work Plan
2nd	2015/11/9	Reporting on the Project's progress and confirmation on the PDM modification
3rd	2017/3/20	Reporting on the Project's progress and Explanation of Work Plan

In this project, Project Design Matrix (PDM) was revised twice. The first revision that clarified the numerical targets etc. was approved by the first JCC. In the second JCC, the index was revised and got approval. (refer to Appendix)

1-3-2 Activity Record of 3R Stars

3R Stars were held four times in each target city. Related stakeholders discussed each subject, which lead the Project to the next step based on the discussed common understanding (the stakeholders mentioned are: city administrative officials (BAPPEDA, BLH, DKK, etc.), WBs, representative residents (representatives of Kulurahan and RT), private companies (implementing CSR), Environmental Cadre, NGOs, women's groups, elementary/junior high schools, universities).

Table 1-2 Activity Record of 3R Stars

3R Stars	Palembang City	Balikpapan City
1st 3R Stars	November 2013	December 2013
	Subject: Common understanding on the present status and issues of SWM, and 3R Sharing the idea of necessity of waste reduction	
2nd 3R Stars	May 2014	May 2014
	Subject: Explanation and sharing of main points of A/P Discussion on activities on each item	
3rd 3R Stars	December 2014	November 2014
	Subject: Explanation to representative residents in PP target areas Reaching a consensus of PP implementation	
4rd 3R Stars	January 2017	June 2017
	Subject: Sharing the problem and improvement point of the activity in PP area	

1-3-3 National Workshop on Dissemination of 3R Project in Indonesia

National Workshop on Dissemination of 3R Project in Indonesia was held, outline of National Workshop is shown in the table below.

Table 1-3 National Workshop on Dissemination of 3R Project in Indonesia

Date	2017/10/18
Place	Grand Hyatt Jakarta
participants	180 people
Contents	● Suggestion of dissemination mechanism ● Presentation for PP by Palembang city and Balikpapan city

1-3-4 Training in Japan

During the period of implementation of this project, training was carried out a total of 3 times in Kitakyushu City, to which managerial staff and working level staff from organizations involved in waste management in the Indonesian central government and local governments were invited. In this training, the trainees learned an overview of the administration of waste treatment and the legal system relating to waste in Japan, and visited 3R projects (waste reduction, recycling, reuse).

The contents of the training consisted mainly of classroom lectures on the administration of waste treatment and the relevant legal system, etc., from the Kitakyushu Asian Center for Low Carbon Society, which is a waste treatment organization in Kitakyushu City, witnessing actual waste collection operations in Japan, and actual experience of methods of analyzing waste quantities and types of waste, etc. In addition, lectures and visits to organizations related to Kitakyushu City were included. In particular, lectures on the importance of waste data management from the Institute for Global Environmental Strategy (IGES), which supports the overseas dissemination of environmental technologies from Kitakyushu City, lectures on the selection of appropriate waste treatment methods from an economical point of view, and lectures and practical guidance on direct composting from Mr. Takakura, the founder of the Takakura Composting Method, were highly evaluated. Furthermore, in the program that only Kitakyushu City could offer, facilities and organizations were visited that provided explanations of the history of overcoming pollution through strong cooperation between Kitakyushu residents, government, and private companies, the history of waste reduction and environmental conservation, and activities that are continuing on at present.

Table 1-4 Record of the Training in Japan①

	Project term	Training period	Breakdown of Participants
1st Training	1st Year	2014/04/13～ 2014/04/25	Central Government: 3 persons (KLHK: 2、PUPR: 1) Palembang City : 5 persons (BAPPEDA: 1, BLH:2, DKK: 2) Balikpapan City : 5persons (BAPPEDA: 2, BLH: 1, DKK: 2)
2nd Training	1st Year	2014/11/09～ 2014/11/22	Central Government: 2 persons（KLHK: 1, PUPR: 1） Palembang City : 5 persons (Assistant 2 : 1, BAPPEDA: 1, BLH: 1, DKK: 1)） Balikpapan City : 4 persons (BAPPEDA:2, BLH: 1, DKK: 1)
3rd Training	2nd Year	2016/04/10 ～ 2016/04/23	Central Government: 2 persons (KLHK: 1, PUPR: 1) Palembang City : 4persons (BAPPEDA: 1, BLH: 2, DKK: 1) Balikpapan City : 4 persons (BAPPEDA: 1, BLH: 1, DKK: 2)

Table 1-5 Record of the Training in Japan②

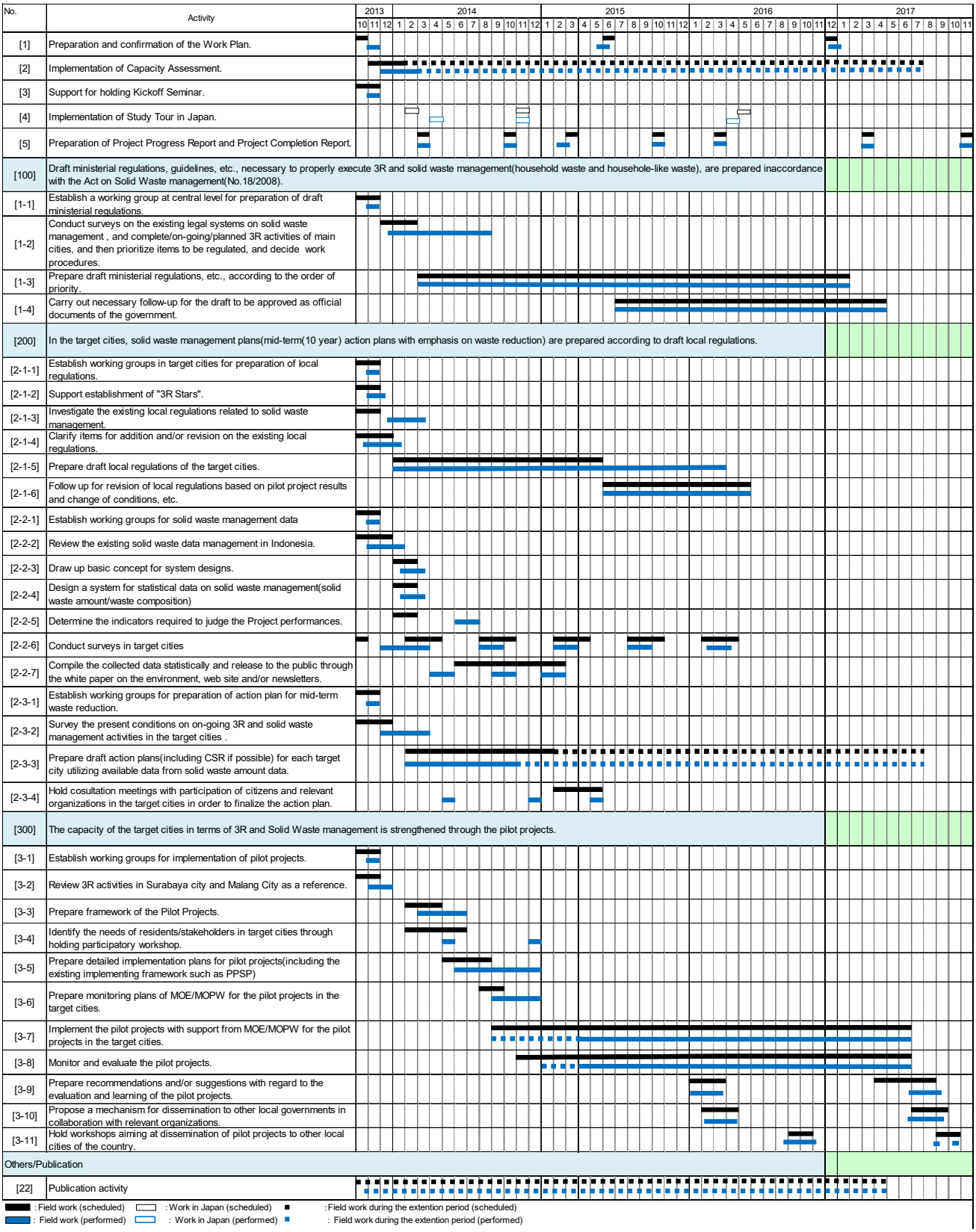
	Name of Participants	Training place
1st Training	Mr. Shaifuddin Akbar Mr. Mohammad Noor Andi Kusumah Ms.Widyasari Yustika Aristya Ms. Tuti Alawiyah Ms. Heni Kurniawati Mr. Hardian	JICA Kyushu International Center Kitakyushu City Hall, etc.

	Name of Participants	Training place
	Ms. Hazairin Neni Trisia Mr. Saparudin Yarog Abubakar Mr. Freddy Octavianus Ms. Bertha Tekko Ms. Rosmarini Mr. Astani Abdul Manap Mr. Syukur Effendi	
2nd Training	Ms. Vir Katrin Ms. Sirait Nand Lasro elisabet Mr. Noegroho Agoeng Ms. Kabjl Hardayani Haroeno Mr. Tabrani Muhamad Mr. Nungcik Muhammad Sapri Mr. Hartono Toni Mr. Ichwani Muhammad Ali Ms. Salmawati Ms. Hermanu Ema Ismianingarum	JICA Kyushu International Center Kitakyushu City Hall, etc.
3rd Training	Mr. Aditya Nugraha Ms. Anantya Widya Ms. Sefriany Reni Ms. Elvianti Desy Mr. Abuhasan Armansyah Ms. Korlena Ms. Andinar Zuraidah Lomongga Mr. Supriyanto Jen Mr. Wastono Susarno Sipon Mr. Prayudha Ade	JICA Kyushu International Center Kitakyushu City Hall JICA Tokyo International Center, etc.

1-3-5 Output, Indicators and Achievement of the Activities

The activity record of this project is shown in the table below.

Table 1-6 Achievement of the Activities



Chapter 2. **Project Performance**

2-1 Project Performance for Outputs

Project performance for outputs is shown in the table below.

Table 2-1 Project Performance for Outputs

Output	Indicators	Project performance
1. Draft governmental and ministerial regulations necessary to properly enhance the technical substance and to execute 3R and solid waste management (household waste and household-like waste) are prepared in accordance with the Act on Solid Waste Management (No.18/2008).	1-1 Draft governmental and ministerial regulations will be prepared by October 2016.	Of five regulations whose preparation the Project initially planned to assist, the drafting of three are complete by June 2017. As for the remaining two regulations, discussion among Indonesian government stakeholders is still on-going and project members are agreed that they will be finalized by the KLHK themselves.
2. In the target cities, solid waste management plans (mid-term (10 year) action plans with emphasis on waste reduction) are prepared according to draft local regulations.	2-1 Local regulations will be drafted by the end of 2014.	Drafting of the local decree for the implementation of WMA is complete in both cities. In Palembang, it was officially issued in June 2015 as "the city decree No.3（2015）on the management of household waste and waste similar to household waste", and in Balikpapan, in December 2015 as the city decree No.13（2015）on domestic and domestic- like waste management". Currently, several Mayer's decrees are being drafted in the two cities to define the details of the local decrees above, and the Project provides assistance in the preparation of some of them. In Palembang, it was focused to 1st source separation & collection, 2nd licensing for waste treatment, 3rd waste bank. Meanwhile, in Balikpapan, it was focused to 1st source separation, collection and transportation, 2nd licensing for waste treatment. Mayer's decree will be finalized by each target city themselves.
	2-2 Solid waste data is organized and updated in the target cities.	Solid Waste Management Data System (SWMDS) was completed by end of 2015 and it was transferred to C/P agencies. However, it is not as utilized as it was initially expected. What was expected under this indicator was for the C/Ps to establish a culture where available data/information from field level – if not all the data for the whole city - are periodically accumulated and shared within the organization. C/P should compile and analyze the data collected by KSM in Palembang and data collected by MRF in Balikpapan.

Output	Indicators	Project performance
	2-3 Mid-term action plans for waste reduction will be prepared by the middle of 2014.	Preparation of the A/Ps through 3R Stars meetings is complete in both cities by end of 2014, however, not all the C/Ps are aware of the existence of the A/Ps. Therefore, A/Ps were compiled as a booklet and recommended to utilize as a higher plan on SWM sector.
3. The capacity of the target cities in terms of 3R and Solid Waste Management is strengthened through the pilot projects.	3-1 Capacity of the target city governments meets the set-up criteria.	The capacity of the C/Ps in administering pilot activities in Balikpapan was strengthened to a certain degree, owing mainly to the strong ownership of the government to oversee the entire process from primary collection to landfill. In Palembang, the capacity development through the pilot activities was somewhat limited, because the nature of the "community-based" waste management, which is a common form of waste management adopted in most cities in Indonesia, limits the participation of the C/Ps in the pilot activities. However, support by the city government is inevitable for the "community-based" waste management, such a support was recommended to the C/Ps.
	3-2 Solid waste hauled to the final disposal site from the Pilot Project area will be reduced by 20% (reduction ratio) in target cities.	The formula to work out the waste reduction rate for this indicator, as agreed with the C/Ps, is: Waste reduction ratio= $\frac{Amount\ of\ recyclables\ collected\ + Amount\ of\ organic\ waste\ recycled}{Amount\ of\ waste\ generated} \times 100$ In Palembang, the estimated rate of waste reduction in the 16 target RTs is 12.2% (as of May 2017). It was clarified that 20% reduction rate is an ambitious goal, and even though, it can be achieved if the number of households are increased. In Balikpapan, the waste reduction rate in the 54 RTs purely through the project activities is 1.3%. While there is a room for improving the rate, following explanations may help understand the reasons behind this result. ● Although the construction of MRF in Balikpapan itself was finished by late 2015, it was not until early 2017 that the facilities became fully operational. Insufficient source separation deterred the progress, because mixed organic waste causes damage on the belt conveyers at MRF. And therefore, it was confirmed that source separation should be introduced properly. ● The organic waste comprises more than 50% of the total waste generated, although the focus of the pilot project in Balikpapan does not include the

Output	Indicators	Project performance
		recycling of organic waste. The recycling of the organics will obviously have an impact on the waste reduction, and for this reason, PUPR agreed to complete the construction of TPST by end of 2016, so that a large amount of organic waste can be composted there. However, the opening of the TPST has been postponed to the end of 2017. And therefore, it was confirmed that the TPST should start operation on schedule.

2-2 Project Performance for Project Purpose

Project Purpose: "3R and solid waste management (household and household-like waste) is appropriately implemented in the target cities based on the act on solid waste management (no.18/2008), the related government regulations, ministerial regulations as well as local regulations"

Project performance for Project Purpose is shown in the table below.

Table 2-2 Project Performance for Project Purpose

Indicators	Project performance
1. Implementation of Pilot Project is disseminated to other regions in accordance with the related government regulations, ministerial regulations and local regulation"	In both Palembang and Balikpapan, the dissemination of the pilot activities is by and large completed. In Palembang, waste bank activities in AAL are disseminated to Sematang Borang (Kel. Srimulya) and to Sukarami (Kel. Sukodadi) by mid-2016. The waste bank operation in Sukarami is already a business; the activities in Sematang Borang on the contrary are dormant, due to limited interest of the residents. More monitoring and supervision supported by the city government is necessary if the activities should continue. In Balikpapan, the expansion of activities from 13 RT to 54 out of 57RTs is complete in February 2016. From 13 to 54 was rather a rush expansion, and the activities are proceeding with trial and error especially in gaining cooperation from residents in source separation. It was confirmed with C/Ps that proper source separation is inevitable.
2. Solid waste hauled to the final disposal site will be reduced"	The definition of the indicator is not clear. If interpreted as it is in the PDM, the indicator requires the reduction of waste brought to final disposal site (TPA) from entire city. The amount of waste from pilot area constituting no more than 2 % of the total waste at the TPA, direct relationship between the rate of waste reduction only at the TPA and the effort of this Project is unclear. To note, the rate of reduction in the waste from pilot area to the TPA shows gradual decrease from end 2016, as a result that the MRF properly started functioning. Revision of PDM should be done during the project implementation period.

Chapter 3. Drafting Governmental and Ministerial Regulations

3-1 Outline of Drafting Ministerial Regulations

Waste Management Act No.18/2008 is the first basic waste management act in Indonesia aiming to reduce the amount of wastes (household and household-like wastes as well as specific wastes) which are deemed to be disposed of at landfill sites through 3R-related activities and to manage waste appropriately. In this act are prescribed fundamental principle and strategy of waste management, and details necessary for implementation of this act and interpretation of articles in the Act are further prescribed and explained by corresponding governmental and ministerial regulations and/or local ordinances. This act asks the Ministry of the Environment and Forestry (KLHK) to set forth or to lead in setting forth related 12 governmental and ministerial regulations. The Ministry put priority on these regulations and has drafted one by one. Among those the project is asked to support drafting following 1 governmental regulation (peraturan pemerintah, PP), 1 presidential regulation (peraturan presiden） and 3 ministerial regulations (peraturan menteri):

i. Governmental regulation on specific wastes management,
ii. Presidential regulation on national waste management policy and strategy,
iii. Ministerial regulation on emergency response system at TPA,
iv. Ministerial regulation on effluent standards of leachate,
v. Ministerial regulation on road map of extended producer responsibility (EPR).

3-2 Progress and Outcomes

Table 3-1 summarizes the progress of drafting and finalization of the governmental and ministerial regulations which were requested to give advice and support from the Project.

Table 3-1 Progress and Further Plan of the Development of Governmental and Ministerial Regulations which are Expected to be Supported by the Project

Project-supported regulations	Progress	Further plan
Government regulation on specific waste management	The draft is being scrutinized in the law department of the Ministry of the Environment and Forestry	Support by the Project was terminated.
Presidential regulation on national waste management policy and strategy	The draft is being finalized by cabinet secretariat and relevant ministries. According to KLHK this will be promulgated soon.	Support by the Project was terminated.
Ministerial regulation on effluent standards of leachate	This regulation was issued on July 2016 as the Ministerial Regulation No.59 (2016) on leachate quality standard for landfill business and activity.	Support by the Project was terminated.
Ministerial regulation on emergency response system at TPA	The draft regulation is re-examined. Academic paper (opinion and comments on this regulation) on this regulation was prepared by university people and InSWA (Indonesian Solid Waste Association). This academic paper was submitted to KLHK.	Support by the Project was] terminated when academic paper was submitted to KLHK

Ministerial regulation on road map of extended producer responsibility (EPR)	Necessary survey such as public attitude survey on usage of plastic bag/eco-bag was carried out and some consultation meetings were held with private companies on EPR.	The Project supports the meeting to facilitate opinion exchange between private companies and the government. Currently the draft is being discussed with experts to formulate basic direction and contents of this regulation.

As shown in Table 3-1 except for the Ministerial Regulation on Roadmap of Extended Producer Responsibility (EPR), drafting support from the Project was over. Followings are current status of drafting the Ministerial Regulation on Roadmap of Extended Producer Responsibility (EPR).

Article 13 of the Waste Management Act No.18/2008 regulates to place waste segregation facilities, and Article 14 requires manufactures to put labels or symbols on their products and packages/containers to facilitate segregation easily, and Article 15 urges manufactures' liability for management of their products and packages/containers that are unable or are difficult to be degraded naturally once they are disposed of.

The Project has supported necessary survey to draft a roadmap (e.g., social survey for a usage of plastic bag/eco-bag) and holding a consultation meeting inviting private firms to discuss EPR. However, collection and exchange of information have not been yet enough to draft this regulation. It is planned to formulate basic structure and content of this regulation through a full negotiation between private firms and the government.

3-3 Relationship between Law and Regulations on Waste Management

Following regulations have been already promulgated in connection with the Waste Management Act No.18/2008:

- Government Regulation Number 81 Year 2012 on Waste Management of Household Waste and Household-like Waste,
- Regulation of the Ministry of Home Affairs of Republic of Indonesia Number 33 Year 2010 on Guidelines of Waste Management,
- Regulation of the Ministry of Public Works of Republic of Indonesia Number 03/PRT/M/2013 on Implementation of Waste Infrastructure in Household and Household-like Waste Management,
- Regulation of Ministry of Environment Number16 Year 2011 on Manual for Content Material of Draft Regional Regulation on Management of Household Wastes and Household-like Wastes, and
- Regulation of the Ministry of Environment of Republic of Indonesia Number 13 Year 2012 on Guidelines for Implementation of Reduce, Reuse and Recycle through Waste Bank.

Amongst, the Government Regulation Number 81 Year 2012 on Waste Management of Household Waste and Household-like Waste (Governmental regulation No.81/2012) is considered to be a kind of decree that promulgates necessary technical and administrative process to implement the Waste Management Act No.18/2008. However this regulation is not supplementary regulation for all articles in the Act, but is directed to prescribe following seven provisions by Article 3 of Chapter I of this governmental regulation:

- Waste management policy and strategy,
- Waste management implementation,

- Compensation,
- Technology development and application,
- Information system,
- Community participation, and
- Support.

The Regulation of the Ministry of Home Affairs of Republic of Indonesia Number 33 Year 2010 on Guidelines of Waste Management is a guideline for duty, responsibility and roles of local government in waste management administration within the vision of the Waste Management Act No.18/2008, and thus its provisions are not more than those of the Act. Especially the Article 44 of this regulation stipulates that mayor should, as a minimum requirement, include following provisions in the local ordinance according to the direction of this regulation (manual) within two years of promulgation of this regulation:

- Waste reduction and handling,
- Waste management institution,
- Rights and obligations,
- Licensing,
- Incentive and disincentive,
- Cooperation and partnership,
- Retribution,
- Financing and compensation,
- Community role,
- Filing complaints and dispute settlement,
- Supervision and control, and
- Prohibitions and sanctions.

On the other hand the Regulation of the Ministry of Public Works of Republic of Indonesia Number 03/PRT/M/2013 on Implementation of Waste Infrastructure in Household and Household-like Waste Management regulates technical requirements including equipment and facilities necessary to implement the Waste Management Act No.18/2008 and the Governmental regulation No.81/2012.

Furthermore, the Regulation of Ministry of Environment Number16 Year 2011 on Manual for Content Material of Draft Regional Regulation on Management of Household Wastes and Household-like Wastes and Regulation of the Ministry of Environment of Republic of Indonesia Number 13 Year 2012 on Guidelines for Implementation of Reduce, Reuse and Recycle through Waste Bank are, as indicated in the titles, not compulsory regulations, but manual or guideline and thus the contents are regarded as administrative documents or references although they are issued as ministerial regulations.

Chapter 4. Development of Local Ordinance at Target Cities

4-1 Status of Drafting Ordinance at Target Cities

The ordinance of Palembang was promulgated on June 13, 2015 as city ordinance No.3 (2015) concerning management of household waste and waste similar to household waste. Enforcement of this ordinance is prescribed at least one year after promulgation. This ordinance includes 21 Chapters and 62 Articles as shown in Table 4-1.

Table 4-1 Contents of Ordinance of the City of Palembang

Chapter	Article	Remark
I. General	1	Definition of term
II. Scope	2	Wastes regulated by ordinance
III. Principles and Objectives	3～4	Principles and objectives of waste management
IV. Duties and Authority of the Regional Government	5～6	Rights and authorities of city
V. Waste Management Policy	7～8	Waste management policy and strategy
VI. Administration of Waste Management	9～15	Waste reduction
	16～28	Waste handling
VII. Managing and Transporting Agencies	29～32	Waste management institution
	33	Waste transportation
VII. Rights and Obligations	34～35	Rights and obligations of citizen and business entities
VIII. Licensing	36	Licensing for waste management business
IX. Incentive and Disincentive	37~42	Incentive and disincentive for citizen and business entities
X. Mitigation of Disaster	43	Disaster response at TPA
XI. Cooperation and Partnership	44～45	Cooperation with other local government
	46～47	Partnership with waste management business
XII. Financing and Compensation	48～50	Waste management financing and compensation
XIII. Community Role	51~52	Public role
IVX. Mechanism of Complaints and Dispute Settlement	53～54	Settlement of complains
XV. Prohibitions	55	Prohibited deeds
XVI. Supervision and Control	56	Monitoring of waste management by mayor
XVII. Administrative Sanction	57	Sanction for waste management business
XVIII. Investigation	58	Investigation for law violators
XIX. Criminal Provisions	59	Fine provisions
XX. Transitional Provisions	60~61	Transitional measures
XXI Closing	62	Closing remark

On the other hand the ordinance of Balikpapan was promulgated on December 31, 2015 as city ordinance No.13 (2015) concerning household and household-like waste management. The ordinance went into effect upon promulgation and several regulations or directions necessary for implementation of the ordinance will be issued within one year after promulgation of the ordinance. This ordinance includes 16 Chapters and 34 Articles as shown in Table 4-2.

Table 4-2 Contents of Ordinance of the City of Balikpapan

Chapter	Article	Remarks
I. General	1	Definition of terminology
II. Scope, Principle, and Objective	2~4	Target wastes and principle and objectives of waste management
III. Waste management	5~8	Waste management (reduction, sorting and handling)
	9~11	Responsibility (waste discharge, collection/transportation, handling and final disposal)
	12	Organization of waste management
IV. Incentive and Disincentive	13~14	Contents of incentive and disincentive
V. Cooperation and Partnership	15~16	Cooperation among other municipality and partnership with waste management business
VI. Right and Obligation	16~17	Right to receive waste management service and responsibility
VII. Licensing	18~19	Business type necessary for license and process to obtain license
VIII. Compensation	20	Compensation for damage at TPA
IX. Public participation	21~22	Promotion of public participation and type of participation
X. Control and Guidance	23~25	Control and guidance by the mayor
XI. Prohibition	26	Prohibited deed
XII. Administrative sanction	27~28	Administrative sanction for waste management business
XIII. Financing	29	Sources of waste management budget
XIV. Investigation	30	Investigation for law violation
XV. Criminal provision	31	Fine and criminal provision
XVI. Closing provision	32~34	

4-2 Drafting Mayor's Regulation

4-2-1 Mayor's Regulation of the City of Palembang

The ordinance of the City of Palembang urges to set up fifteen (15) Mayor's Regulations. However to meet a date of enforcement of the ordinance, fifteen (15) Mayor's Regulations were grouped into four (4) supposed relevant Mayor's Regulations as shown in Table 4-3 since it was considered to take time to set forth all of fifteen (15) Mayor's Regulations in time for enforcement of the ordinance. Among them the Project supported to draft three (3) Mayor's Regulations that are deemed to relate strongly with the activities of the pilot projects, i.e., Mayor Regulations that may include waste segregation and collection, waste management licensing and waste bank activity. These are included in the new Mayor's Regulation of Waste Reduction, License and Registration, and Waste Management in Table 4-3 in this order. Corresponding Article numbers in the City ordinance for Mayor's Regulations on Waste Reduction, Licensing and Waste Management are also shown in Table 4-3.

Table 4-3 New Mayor's Regulations Grouped from Mayor's Regulations Prescribed in the Ordinance of Palembang

	New Mayor Regulation	Mayor Regulation prescribed in the Ordinance	Corresponding Article	Lead agency
1	Waste management policy and strategy (JAKSTRADA)	Policy and strategy	Article 8(4)	BAPPEDA
		Waste management plan and implementation.	Article 28	
		Details for disaster response	Article 43(2)	
		Policy and strategy (EPR related provisions)	Article 8(1), a(9)	
		Policy and strategy (prohibition of hazardous packaging and container)	Article 8(1), a(10)	
2	Waste reduction	Waste reduction plan	Article 15	BLH
		Public right	Article 34(2)	
		Community role	Article 51(3)	
3	Waste management	Waste transport regulation	Article 19(3)	DKK
		Waste management institution and BLUD	Article 32	
		Waste transportation plan and rout	Article 33(3)	
		Compensation provisions	Article 50(2)	
		complains and dispute settlement	Article 53(3)	
4	License and registration	Licensing procedure	Article 36(3)	BLH
		Application and method of administrative sanction	Article 37(3)	

(1) Mayor's Regulation on Waste Management License

Waste management business that requires license includes waste collection, waste transportation and waste treatment (Article 36 of the city ordinance). However, most waste collection is carried out, like in other cities in Indonesia, by so-called informal primary waste collectors in Palembang and mostly they directly contract with residents for waste collection. In comply with the city ordinance, they also need license for waste collection. However it seems excessive obligation for them to get business license under present circumstance and thus it was decided through discussions with counterparts to manage them by introducing registration system instead of license. This registration system is newly included in some articles in this Mayor's Regulation.

On the other hand a community-run waste bank is not obliged for business license but registration system in the same manner as a primary waste collector. Only waste trader and waste bank run by private companies are obliged to hold waste management business license. Table 4-4 shows articles included in the Mayor's Regulation on Waste Management License.

Table 4-4 Mayor's Regulation on Waste Management License of the City of Palembang

Chapter	Contents
General	Definition of term
Target business	Collection, Transportation, Treatment (including waste bank and waste trader)
Process of license application	Process of application and place
Application documents	Application form and necessary documents

Chapter	Contents
Appraisal and announcement	Appraisal and approval process (and announcement of the results)
License issuing and revocation	Publicizing name of license holder, Announcement of the reason of license revocation
Expiration of license	Validation term, License renewal, License alteration
Management and administration of license holder	Responsibility of the mayor, Role of OPD
Duty and responsibility of license holder	Performance reporting, Reporting (application) of alteration of license
Registration system	Target business (primary collector, KSM, community-run waste bank), Registration method, Responsibility of business and management by the city
Attachments	Application form, List of necessary documents for application, Registration form, Reporting form

(2) Mayor's Regulation on Waste Management

Regulations on waste segregation and collection are not included in this Mayor's Regulation, but regulations on waste transportation are included as shown in Table 4-3. However, since waste segregation and collection are promoted in the pilot project of the Project and counterparts have agreed to regulate waste segregation and collection as a part of this Mayor's Regulation. Table 4-5 summarizes articles concerning waste segregation and collection in this Mayor's Regulation.

Table 4-5 Mayor's Regulation on Waste Segregation and Collection of the City of Palembang (A part of Mayor's Regulation on Waste Management)

Chapter	Contents
General	Definition of term
Waste segregation	Responsibility of waste segregation
Kinds of segregation	Five-type segregation, Three-type segregation at the first phase
Waste container and placement	Technical criteria of container, Placement location
Collection of segregated waste	Collection entity and collection time
Attachments	Specification of waste container, Labelling and color coding

Five-type of waste segregation is regulated by the governmental regulation and three-type of waste segregation such as (i) organic waste, (ii) recyclable and reusable wastes and (iii) other wastes are recommended as a transitional means (Article 38(1) of the Governmental Regulation No.81 (2012)). However, the ordinance of the City of Palembang regulates three-type of waste segregation, i.e., (i) solid waste containing hazardous and toxic substances and hazardous wastes, (ii) degradable wastes and (iii) non-degradable wastes (Article 17(d) of the ordinance No.3 (2015)). Although organic waste in the governmental regulation corresponds to degradable wastes in the ordinance, wastes classification is different between the governmental regulation and the ordinance. Furthermore, three-type of waste segregation such as (i) salable waste, (ii) organic waste, and (iii) others was carried out in the pilot project. The salable waste means wastes that include recyclable and reusable wastes defined in the governmental regulation and

currently have a market value. Anyhow it should be understood that non-degradable wastes defined in the city ordinance may include recyclable and reusable wastes and other wastes defined in the governmental regulation.

(3) Mayor's Regulation on Waste Reduction

Activity of waste bank is one of ways to reduce waste amount and a part of community's role. This is why regulation on waste bank is included in Mayor's Regulation on Waste Reduction. Table 4-6 shows summary of chapters related to waste bank in this Mayor's Regulation (as of December 2016). Titles of necessary articles have been listed up but not fully developed due to some duplication and insufficient description.

Table 4-6 Mayor's Regulation on Waste Bank of the City of Palembang

(A part of Mayor's Regulation on Waste Reduction)

Chapter	Contents
Target waste bank	Operator of waste bank
Activities of waste bank	Collection and segregation, Pick-up service, Deposit, Measurement and record, Baling, Transportation and sale
Foundation of waste bank	Registration, Organization, Management board
Duty and responsibility	Duty and responsibility of the city, Duty and responsibility of waste bank
Control and administration	Mayor's responsibility, Responsibility of regulator and sub-district

4-2-2 Mayor's Regulation of the City of Balikpapan

The ordinance of the City of Balikpapan urges to set up seven (7) Mayor's Regulations as shown in Table 4-7. Among them the Project supports to draft Mayor's Regulations that are deemed to relate strongly with the activities of the pilot projects, i.e., Mayor's Regulation on Waste Segregation, Collection and Transportation that are prescribed in Article 8(4), Article 9(3) and Article 9(5) of the ordinance and Mayor's Regulation on Waste Management Licensing that is prescribed in Article 19(3) of the ordinance.

Table 4-7 Mayor's Regulations required to be set up by the Ordinance of Balikpapan.

Contents	Articles of the ordinance	Remarks
Details of waste sorting of Article 8 (2)	Article 8 (4)	At least 5 types
Regulation for waste discharge	Article 9 (3)	Regulation of waste discharge at various sources
Regulation of waste collection and transportation	Article 9 (5)	Clarification of responsibility
Provision for incentive	Article 13 (3)	
Provision for disincentive	Article 14 (3)	
Process to obtain license	Article 19 (3)	
Process for application of compensation	Article 21 (4)	

(1) Mayor's Regulation on Waste Segregation, Collection and Transportation

Provisions of transportation required by this Mayor's Regulation is to clarify the transportation entities (Article 9 (5) of the city ordinance). However, since Article 9 (1) of the city ordinance clearly prescribes the entities of waste transportation by waste sources, only time of transportation that is carried out by the city is regulated in this Mayor's Regulation. Table 4-8 summarizes structures of the Mayor Regulation on Waste Segregation, Collection and Transportation. Basic rules are regulated for segregation type at sources, containing and discharge method for segregated wastes, discharge (collection) equipment, discharge place, discharge time, collection frequency (day of week, time), collection and transportation time. Although the ordinance requires a five-kind segregation basically, a three-kind segregation is introduced at the first phase of waste segregation program in line with the segregation plan of the pilot project. Implementation of waste segregation and collection program requires city budget, and thereby starting date of waste segregation program is not regulated definitely in Mayor's Regulation. These may be separately regulated by implementation plan set by DKPP together with prioritizing implementation area.

Table 4-8 Contents of Draft Mayor's Regulation on Waste Segregation, Collection and Transportation of the City of Balikpapan

Chapter	Contents
General	Definition of terms
Segregation	Segregation type, Phased implementation of waste segregation program
Waste bin/container	Waste bin/container (for household and other generation sources), Technical requirement for bin/container, Labelling and color coding system.
Waste collection	Responsible entity for waste collection, Waste collection time
Attachments	Segregation type, Color coding system, Labelling

(2) Mayor's Regulation on Waste Management License

In the city ordinance requires it is prescribed that waste management business that require license includes waste transportation, waste treatment and waste disposal. However, since Article 11(2) of the city ordinance prescribes that final disposal of waste is carried out by the city, it is considered there is no waste management business for final disposal for a time being. Meanwhile it was decided thorough discussions with counterparts that waste trader requires license irrespective of the size of business and waste bank is managed thorough a registration system. Table 4-9 summarizes contents of this draft Mayor's Regulation.

Various documents are also required to submit in license application as guided in the Ministerial Regulation of the Ministry of the Environment No.16 (2011). These are Certificate of Competence and Certificate of Training. However it is not clearly mentioned what these certificates are. On the other hand, Article 30 of the governmental regulation No.81 (2012) prescribes that details of Certificate of Confidence required for waste treatment and disposal facilities are regulated by relevant ministerial regulations. Furthermore Article 73 of the Ministerial Regulation of the Ministry Public Works No.3 (2013) prescribes that waste handling (facility) and disposal (facility) are required for Technical Confidence besides Certificate of Confidence.

Table 4-9 Contents of Draft Mayor's Regulation on Licensing of the City of Balikpapan

Chapter	Contents
General	Definition of terminology
Scope of business	Waste transportation, Waste handling, Final disposal and all waste trader
Submission of application	Application form, Submission place
Necessary documents	Application, Certificate of eligibility, Waste trader's eligibility
Evaluation and appraisal	Appraisal process and issuing process, Publicizing of application holders
Valid period of license	Validity of license, Renewal of license, Change of license
Registration of waste bank	Registration methods, Notification of termination of activity
Duty and responsibility	Reporting
Administrative sanction	Revocation and invalidity of license
Attachments	Application form (including for waste trader), Registration form of waste bank, Reporting form (for waste management business, waste trader and waste bank)

Chapter 5. Solid Waste Data Management

5-1 Overview of Solid Waste Data Management

5-1-1 Objective

The objective of this activity is to support local governments on analyzing waste amount data, evaluating current conditions and identifying future perspectives of their solid waste management systems by providing them with a Solid Waste Data Management System as a tool for quantitative analysis of solid waste management.

5-1-2 Conducted Activities

Based on the objective, the first draft of the Solid Waste Data Management System (SWDMS) was developed until October 2015 and transferred to the project offices in the target municipalities. The system was revised and finalized throughout November 2015 based on the results of examination by project staffs on system performances and functionality of its programs.

In early December, an operation manual was prepared and necessary arrangements for operator trainings were conducted. The actual trainings were organized in both of the municipalities targeting the operators of the SWDMS in the middle of December. After the trainings, the outputs of the activity (system file, operation manual, training materials and other relevant documents) were handed over to the C/P organizations.

On 21 December, the contents and results of the overall activity were reported to the long-term expert and the data management staffs of the KLHK, and the outputs were handed over.

The detailed schedule for each of the relevant activities is as follows.

Table 5-1 Implementation Schedule of SWDMS-related Activities

No	Activities	November, 2015		December, 2015				Place of Activity
		16-22	23-29	30-6	7-13	14-20	21-27	
1	Development of SWDMS							Balikpapan
2	Verification of System Operations and Finalization							Balikpapan
3	Preparation of Operation Mannual							Balikpapan
4	Preparation of Orientation Program and Materials							Balikpapan
5	Implementation of Orientation for System Operators and Instruction of Data Input and Data Analysis							Balikpapan
6	Movement: Balikpapan⇒Palembang							
7	Organization of C/P Meeting for SWDMS							Palembang
8	Implementation of Orientation for System Operators and Instruction of Data Input and Data Analysis							Palembang
9	Movement: Palembang⇒Jakarta							
10	Reporting to Jakarta project office and KLKH							Jakarta

Previous activity (by local staff) -Activities during the last assignment

5-1-3 Overview of the SWDMS

(1) Overview

SWDMS was required to be simple for disseminating the system to other municipalities. Therefore, the system was built on Microsoft Excel application and programmed with Visual Basic for Applications (VBA). The language of its user-interface was designed to be switchable between English and Indonesian.

The functions established in the SWDMS are as follows:

- Inputting solid waste management data (SWM facility information, and types and amount of waste treated at these facilities) into a database-format;
- Editing and deleting data inputted into the system;
- Searching SWM facility information by their types, located kecamatan, facility names and combination of these conditions, and generating facility lists;
- Searching amounts of treated waste by certain period, kecamatan, types of facilities, names of treated facilities, types of waste and combination of these conditions, and generating the search results into a format that allows flexible data processing and analysis.
- Estimating and generating waste flow for monitoring of SWM performance in the user municipality.

The waste amount data will be inputted into the system by each type of waste for each SWM facility. Therefore, the system allows user municipalities to identify amounts of recyclables, organic waste and other waste by kecamatans, types of facilities and even each facility. In other words, the user municipalities will be able to identify amounts of waste treated at each stage of its SWM system. (either by each kecamatan or by each facility).

Therefore, municipalities that introduce the SWDMS will be able to grasp the current conditions of their SWM and use most recent data in planning and decision making processes by inputting quantitative data of SWM activities into the system and updating the inputted data frequently.

The system was developed based on the concept that it would be disseminated to other municipalities; and therefore, its scope was planned initially to cover whole area of jurisdiction of a user municipality. Although the system has been developed for the whole municipal area, introducing the system for limited small areas such as target areas of pilot projects is also possible provided that necessary data including population, waste generation rate, amount of recycled waste (recyclables and composted organic waste) and disposal amount in the area can be measured.

(2) Constructs of the SWDMS

The components of the system are presented in the table below:

Table 5-2 Constructs of the SWDMS

System Components	Details
Database	Worksheets that store basic data of the municipality (population and households by each kecamatan and results of WACS), lists of SWM facilities by types and waste amount data inputted for each facility.
System Functions	5 groups of VBA codes for the following functions: Data Input (for inputting data into the databases), Data Edit (for changing or deleting inputted data), Search (for searching data from the databases), Output (for generating the waste flow and the waste summary table) and Basic Setting (for changing system settings).
User forms	Dialogue boxes prepared for inputting and searching data, and selection of options when generating outputs and changing system settings.

System Components	Details
System Data	Inputted values for the system itself to process selections and judgements. Most of these data are hidden since users do not need to know when operating the system.
Program codes	Individual programs written for executing predetermined commands to be selected by users.

(3) Main Screen

The Main Screen is the page to be displayed after launching the system file and inputting the system operation password. It functions as a control panel of the SWDMS. All operations will be initiated and system monitoring will be implemented on this page. The image of the main screen is shown in the figure below.

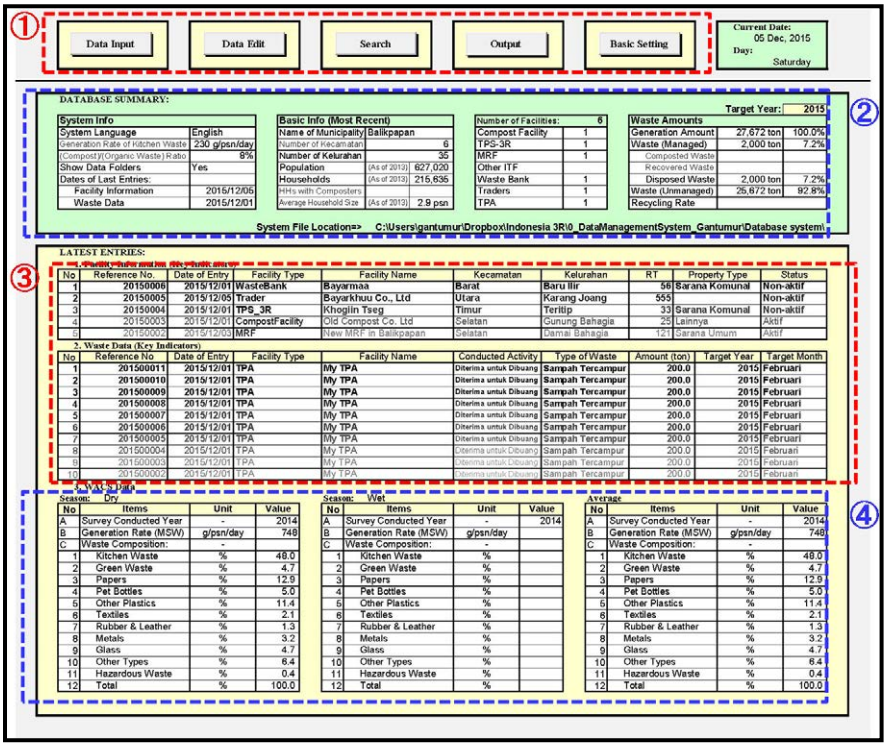


Figure 5-1 Main Screen of SWDMS

On top of the page, there is a command pane with 5 buttons: DATA INPUT for inputting data into the system, DATA EDIT for altering or deleting the inputted data, SEARCH, OUTPUT for displaying waste flow chart and BASIC SETTING for changing values of system settings (the red frame numbered 1). System functions and operations are initiated by clicking relevant buttons.

Under the command pane, there is a system monitoring section with four tables (the blue frame numbered 2). The tables show the most recent information about the system and the databases such as current values of system settings, general information about user municipality, number of registered facilities by types and amounts of waste to be estimated for the year selected in the cell "Target Year" on the upper right corner of the table.

The groups of tables numbered 3 and 4 area are the tables to provide brief information about the most recent entries inputted into the system. The upper 2 tables in the red frame are for showing major information of the last inputted facility (latest five records) and waste amount data (latest 10 records), respectively. From these tables, users can verify correctness of the entries immediately after each input. However, the tables do not show all fields of each entry,

but only those to be used for verification of the input and those to be used as search conditions when searching the entries for alteration and deletion.

The lower 3 tables (with the frame numbered 4) show the last inputted data of waste generation rate and waste composition by seasons along with the annual average.

(4) Input Data

Three types of data are inputted into the SWDMS: Basic Data, Facility Information and Waste Data. The detailed information about each of them is as follows.

(a) Basic Data

Basic data consists of a) Population and number of households of the user municipality, b) Number of households that use composters and d) Generation rate of MSW and waste composition.

The purposes of inputting each of the data are explained in the table below.

Table 5-3 Unit of Input and Purpose of Input

No	Type of Data	Unit of Input	Purpose of Input
1	Population	For each Kecamatan	For estimating generation amount of MSW
2	Number of households	For each Kecamatan	For estimating the average family size that is necessary for estimation of organic waste composted at households.
3	Number of households with Home Composters	For each Kecamatan	For estimating amount of organic waste composted at households
4	Waste amount and composition data	For each municipality	For estimating generation amount of MSW

(b) Facility Information

Facility data consist of major characteristics of SWM facilities operating in the user municipality.

Considering the current condition in Indonesia, 7 types of facilities were preset in the SWDMS. These are 1) Compost facilities, 2) Material recovery facilities (MRF), 3) TPS-3Rs, 4) Other intermediate treatment facilities (Other ITF), 5) Waste banks, 6) Traders and 7) Final disposal sites (TPA).

The facility information to be inputted into the system by each type of facilities is compiled in the table below. Facility information should be inputted whenever changes occur.

Table 5-4 Facility Information by Facility Types

No	Waste Bank	Compost Facility	TPS-3R	MRF	Other Facility	Trader	TPA
1	Waste Bank Name	Facility Name	Facility Name	Facility Name	Facility Name	Name of the Trader	Facility Name
2	Located Kecamatan	Located Kecamatan	Located Kecamatan	Located Kecamatan	Located Kecamatan	Located Kecamatan	Located Kecamatan
3	Located Kelurahan	Located Kelurahan	Located Kelurahan	Located Kelurahan	Located Kelurahan	Located Kelurahan	Located Kelurahan
4	Located RT	Located RT	Located RT	Located RT	Located RT	Located RT	Located RT
5		Type of Operation*4	Type of Operation*4	Type of Operation*4	Type of Operation*4	Type of Business	Type of Operation*4
6	Established Year	Constructed Year	Constructed Year	Constructed Year	Constructed Year		Constructed Year
7	Operation Started Year	Operation Started Year	Operation Started Year	Operation Started Year	Operation Started Year		Operation Started Year
8	Number of Workers	Number of Workers	Number of Workers	Number of Workers	Number of Workers	Number of Workers	Number of Workers
9		Processing Capacity of Recyclables, ton/year	Processing Capacity of Recyclables, ton/year	Processing Capacity of Recyclables, ton/year	Processing Capacity of Recyclables, ton/year		Landfill Capacity, m3
10		Processing Capacity of Organic Waste, ton/year	Processing Capacity of Organic Waste, ton/year	Processing Capacity of Organic Waste, ton/year	Processing Capacity of Organic Waste, ton/year		Remaining Lifetime, years
11	Property Type*1	Property Type	Property Type	Property Type	Property Type		Property Type
12	Operational Status*2	Operational Status	Operational Status	Operational Status	Operational Status	Operational Status	
13	Operator Name	Operator Name	Operator Name	Operator Name	Operator Name		Operator Name
14	Operator Type*3	Operator Type	Operator Type	Operator Type	Operator Type		Operator Type
15	Contact Person	Contact Person	Contact Person	Contact Person	Contact Person	Contact Person	Contact Person
16	Telephone Number	Telephone Number	Telephone Number	Telephone Number	Telephone Number	Telephone Number	Telephone Number
Count	13	16	16	16	16	9	15

Note: *1- Property types: *Public, Communal, Private* and *Other*. *2- Operational status: *Active* and *Inactive*. *3- Operator types: *Governmental, Municipal, Private, NGO, Community, Household, Individual* and *Other*. *4- Operation types: (For Compost facilities) *Windrow, Vermicomposting, Anaerobic digestion* and *Other;* (For Other Facilities) *With compost unit* and *Without compost unit*

The input form for facility information is the following:

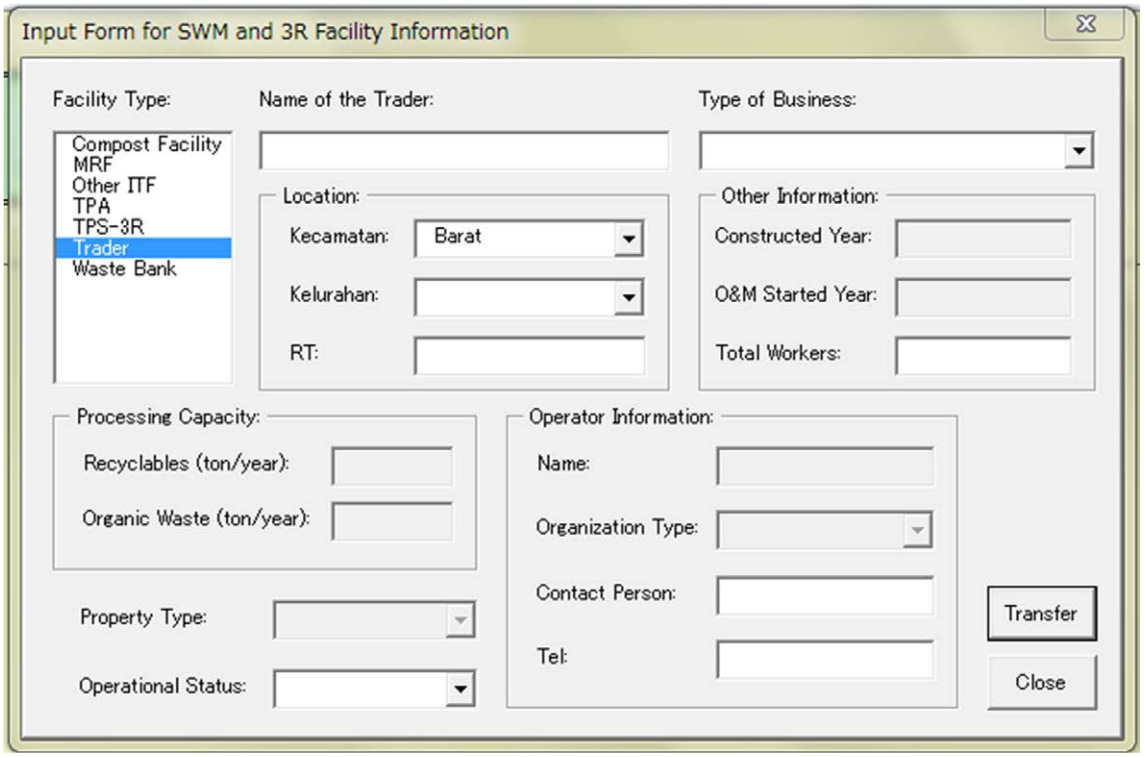


Figure 5-2 Input Form for Facility Information

(c) **Waste Data**

Waste data are the weight data of waste to be collected from each SWM facility. There are three major types of waste: 1) Recyclables, 2) Organic waste and 3) Mixed waste. Recyclables, in turn, are divided into 5 types depending on the material: Paper, Plastics, Metal, Glass and Other.

The organic waste is the waste used for compost production while the mixed waste is all other waste received at final disposal sites (TPAs). As the mixed waste includes residues generated and discharged by all other types of facilities, the system does not allow inputting data of mixed waste for facilities other than TPA.

On the other hand, residue to be discharged from intermediate treatment facilities such as compost facilities and TPS-3Rs is considered as "mixed waste" in the system. However, most of intermediate treatment facilities do not or cannot measure their residue; instead, the residue is measured at TPAs together with all other waste incoming to the TPAs after its transportation from the facilities of origin. Considering the circumstance, the system was designed that "mixed waste" can only be registered to TPA, but not to other types of SWM facilities predetermined in the SWDMS. The table below describes the types of waste to be inputted for each facility type.

Table 5-5 Types of Waste to be inputted for Each Facility Type

No	Facility Types	Target Waste
1	Waste banks	● Recyclables collected and resold.
2	TPS-3R / MRF	● Recyclables sold
		● Organic waste used for composting
3	Trader	● Recyclables purchased.

No	Facility Types	Target Waste
4	Compost facilities	● Organic waste used for composting.
5	TPA	● Received waste.
		● Recyclables picked and transported out of the TPA by waste pickers/recyclers.
		● Organic waste used for composting.

Note: *-Organic waste transported to the compost facility of the TPA (such organic waste as those discharged from markets) will have been identified as waste for composting before measuring them at the TPA weighbridge. Therefore, this waste is registered under a separate category.

Both of the municipalities were requested to input data into the system for each registered facility once a month. However, some of the data can only be updated once in several months; and thus, there is also high possibility that the data will be inputted into the system less frequently. Considering the circumstance, the system was designed to allow flexible data inputting.

Waste data should be inputted once per month for each facility. However, it is also possible to input them less frequently. If the user wants to input several months' data at a time, the "Target month" in the data input form should be the last month of the concerned period (For instance, in order to input 3 months data starting from January, the target month on the data input form must be "March").

The data input form for waste data is shown below.

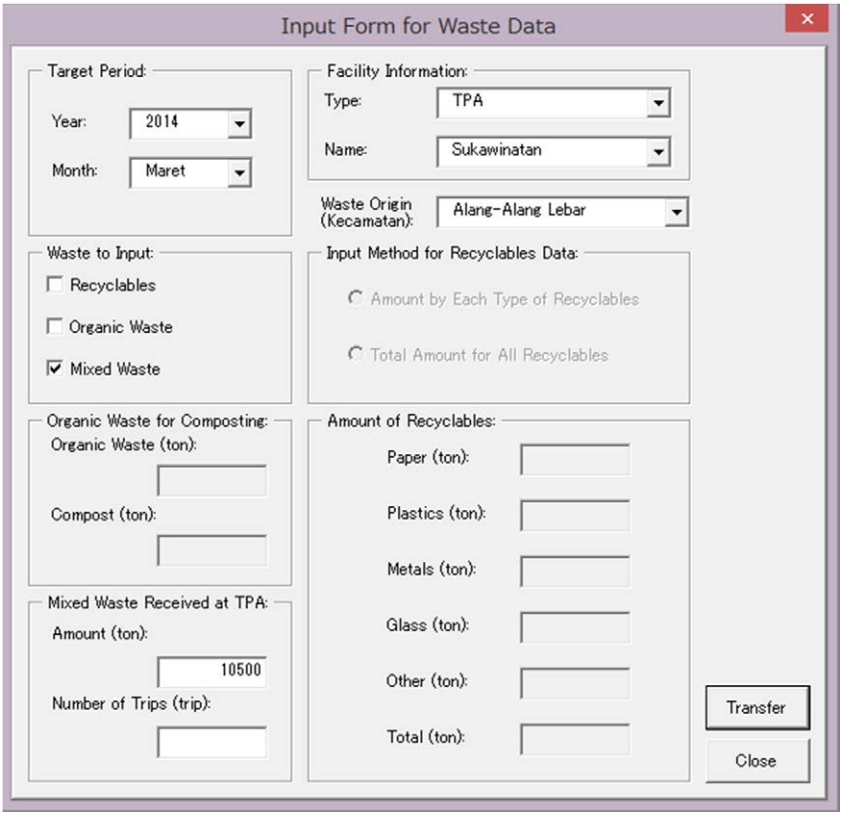


Figure 5-3 Input Form for Waste Data

(5) Output Data

The following output can be generated from the data inputted into the system.

(a) Waste Flowchart

The amounts of waste treated at each stage of SWM system will be compiled into a flowchart. The format of the chart is the following.

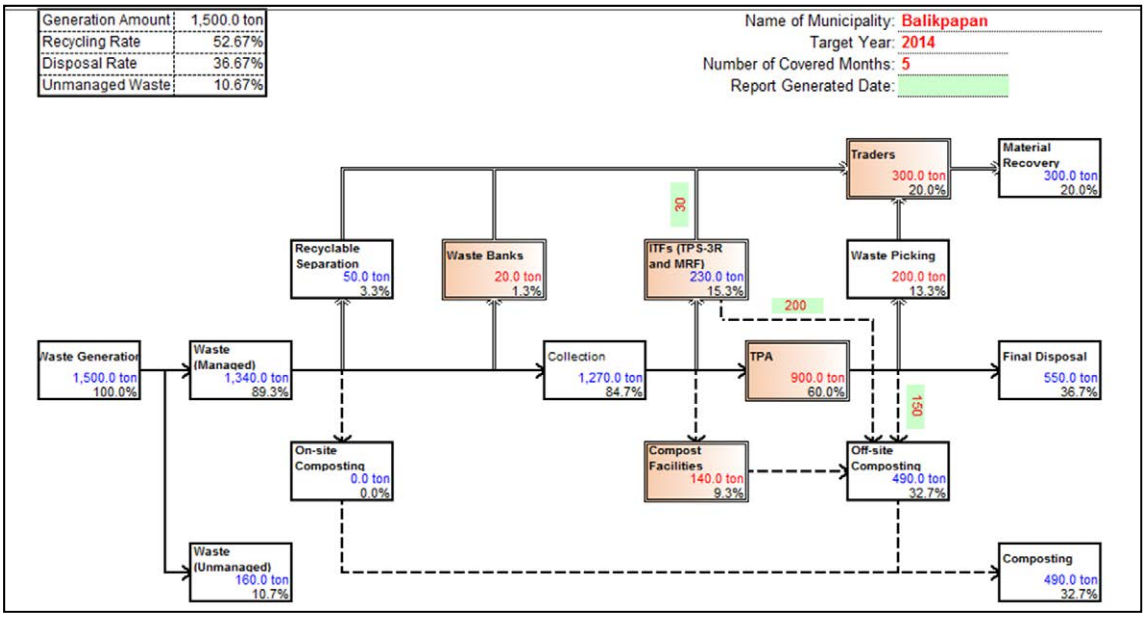


Figure 5-4 Format of the Waste Flowchart (data presented are samples)

(b) Waste Summary Table

The waste summary table is a table that compiles all the waste amount data presented in the waste flowchart into a table format. The format of the table is as follows.

Amount of Waste Estimated at Each Stages of Solid Waste Management System

Name of Municipality: **Balikpapan**
Covered Year: **2014**
Number of Covered Months: **5**
Report Generated Date:

Unit: ton

No	Waste Category	Unit	Months												Total
			Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
1	**Generation Amount**	**ton**													
2	**Managed Waste**	**ton**													
a	Waste Recycling before Collection	ton													
	Recyclables sold directly to Traders	ton													
	Recyclables delivered to Waste Banks	ton													
	Organic waste composted at Generation Sources (On-site composting)	ton													
b	Collected Waste	ton													
c	Waste recycling before disposal	ton													
	Recyclables segregated at ITF Facilities	ton													
	Recyclables picked at TPA	ton													
	Organic waste composted at TPA	ton													
d	Amount of final disposal (Landfill)	ton													
3	**Unmanaged Waste**	**ton**													

1	Generation Amount	ton													
2	Recovered Materials	ton													
3	Composted Organic Waste	ton													
4	Final Disposal Amount	ton													
5	Unmanaged Waste	ton													

Figure 5-5 Format of the Waste Summary Table

(c) **User-indicated Data**

These data are those extracted from the system based on search conditions indicated by the user. Either facility information or waste amount data can be extracted from the system and are shown in a new workbook whenever the search function is executed. Format of extracted data will be the format of the data sheet where the searched data is stored.

5-1-4 Relevance with the Central Government

In relation with development of the SWDMS, the short-term expert explained the overview of the SWDMS to officials of KLHK who are in charge of solid waste data management and obtained their consensus on the system concept.

Based on the KLKH's needs identified during the above meeting, the SWDMS was programed to mark all data records with names of user municipalities when inputting any data into the system. Therefore, it is possible to grasp current conditions of national or regional SWM sectors timely if the central government (KLKH) disseminates the SWDMS to other municipalities and combines data extracted from the system of each municipality.

After completion of the SWDMS, the system possibility mentioned above and the results of the overall activities were reported to the KLHK (Mr. Noor Andikusumah, Mr. Okto Mulyana, Mr. Ariefand and Mr. Agrivickona Ario) and all system related files and materials such as the system file, operation manual and training materials to be used for dissemination of the system were handed over to the KLHK.

5-2 Utilization of the SWDMS

From 7 to 18 December 2015, the short-term expert conducted trainings for data management staffs appointed by BLHs of the target municipalities as system operators. During the trainings, the system operators inputted the data of 2014 into the SWDMS under supervision by the short-term expert.

The staffs appointed for data management are presented in the table below.

Table 5-6 Staffs appointed for Operation of the SWDMS

No	Municipality	Role in System Operation	Name of Staff	Organization	Position
1	Palembang	Main operator	Ms. Dita Puji Safitri	BLH	Staff
2	Palembang	Sub operator	Ms. Wurie Syliane	BLH	Staff
3	Palembang	Data submission	Mr. Jaffri Hidayat	DKK	Dept. chief
4	Balikpapan	Main operator	Ms. Leli Kurnia	BLH	Staff
5	Balikpapan	Sub operator	Ms. Nur Hafizah	BLH	Staff
6	Balikpapan	Data submission	Ms. Lailatul Nukmah	DKPP	Staff

The trainings for the system operators of the target municipalities consisted of an orientation conducted in a way of lecturing and discussions, and practical trainings based on actual utilization of the SWDMS.

The schedule of the training is the following.

● Balikpapan City:	（1）	Orientation: 7 December 2015
	（2）	System utilization / Data input: 10 December 2015
	（3）	Data analysis: 11 December 2015
● Palembang City:	（1）	Orientation: 15 December 2015
	（2）	System utilization / Data input: 16 December 2015
	（3）	Data analysis: 17 December 2015

5-3 Conclusion

Through the activities reported above, the Solid Waste Data Management System was developed and handed over to the Indonesian side together with the operation manual and other relevant materials.

At the same time, the project team trained the staffs appointed by BLHs of both municipalities on system operation and data analysis. During the trainings, it was verified that the system operators of the target municipalities had gained sufficient knowledge and skills to operate the SWDMS and analyze data extracted from the system.

Chapter 6. Waste Management Plan (Mid-term Action Plan)

6-1 Strategy and Present Situation on 3R and SWM in 2 Cities

6-1-1 Present Situation on 3R and Solid Waste Management in 2 Cities

Comparing present situation on 3R and solid waste management of 2 cities, Balikpapan is generally better than Palembang. There are more unmanaged solid waste in Palembang and 3R activities in Palembang such as waste bank has just started. On the other hand, Balikpapan has more budgets for solid waste management per population and there are 81 waste banks supported by NGO in Balikpapan. In consequence, it is analyzed that solid waste management in Palembang is phase to aim to proper waste treatment, and one in Balikpapan is transition phase from proper waste treatment to 3R.

Table 6-1 Present Situation on 3R and Solid Waste Management in the Both Cities

	Palembang	Balikpapan
Population in2014	1,589,780	648,869
Waste amount in 2014	Generation:998 ton/day, Disposal: 600 ton /day	Generation: 485 ton/day, Disposal: 356 ton/day
Unmanaged waste amount	242 ton/day (24% of the generation)	63 ton/day (13% of the generation)
Waste bank	5 units of Waste Bank which collect few amount of recyclables	81 units of Waste Bank which collect 0.78 ton/day. New waste bank will be established with the support from NGO
Budget related to SWM in 2012	Rp. 57.0 billion (Rp 35,854/person)	Rp. 32. 7 billion (Rp. 54,487/person)
SWM fee collection	Door to door collection	Collection with portable waste fee since 2012
Summary	There are more unmanaged solid waste in Palembang and 3R activities such as waste bank has just started. Although 3R is important issue, proper solid waste management is more important than 3R.	The city government recognizes that ownership of the government is necessary to enhance the recycling rate. The city government will construct and operate intermediate treatment facility by themselves. Priority of 3R is very high.

6-1-2 Strategy on 3R and SWM in 2 Cities

Strategies on 3R and solid waste management in the both cities are shown in table below. Palembang city prioritizes proper solid waste management rather than 3R due to limited financial and human resource for 3R. Palembang city aims to develop ‘Communal 3R Model’ which is conventional model depending on voluntary of the community. Balikpapan city aims to develop ‘Institutional 3R Model’ which means that the city government collects recyclables, constructs and operates intermediate treatment facility by themselves besides the conventional ways such as waste bank. In consideration of disseminating the models to other cities, ‘Institutional 3R Model’ of Balikpapan is assumed to apply to cities with sufficient capacity for solid waste management. And ‘Communal 3R Model’ of Palembang is assumed to apply to the other ordinary cities. In line with this idea, Action Plan and Pilot Project have been prepared.

Table 6-2 Strategy on 3R and SWM in 2 Cities

			Palembang	Balikpapan
Model	Name		Communal 3R Model	Institutional 3R Model
	Feature		This model aim to strengthen conventional 3R activities, Waste Bank and TPS-3R. Although this model has lower impact and sustainability, input from the city government is also smaller.	Beside the conventional ways, the city government constructs and operates the intermediate facility for collect the recyclables. Although this model has higher impact and sustainability, input from the city government is also bigger.
SWM System	Action Plan	Collection	To continue conventional TPS (TPS-3R) collection system with primary collectors (PC)	To expand station collection system beside the TPS collection system
		Treatment and disposal	Recyclables: Waste Bank, Recyclables Collector (PC etc.)	Recyclables: Waste Bank etc.
			Organic waste: Composting (home, market and TPS-3R)	Organic waste: Composting (home, market), Energy recovery (Anaerobic treatment facility)
			Other waste: Final disposal, Intermediate treatment facility will be considered in future	Other waste: Material recovery by sorting facility (MRF), Final disposal of the residual.
	Pilot Project	Feature	To expand recycling of recyclables and organic waste through integrating waste bank and TPS-3R	To introduce source separation, collection and operating intermediate facility by the city government
		Role of community	Source separation and discharge, operation of waste bank and TPS-3R (as result, involvement of RT head and Cadre PP is essential)	Source separation and discharge
		Collection	To continue conventional TPS (TPS-3R) collection system with primary collectors (PC)	To introduce the station collection system (There are no PCs)
		Treatment and disposal	Recyclables: Waste Bank, Recyclables collector (PC etc)	Recyclables: Waste Bank etc.
			Organic waste: Composting (home, market and TPS-3R)	Organic waste: Composting (home, market), Energy recovery (Anaerobic treatment facility) To collect Landfill Gas from the special cell to which organic waste dispose
			Other waste: Final disposal,	Other waste: Material recovery by sorting facility (MRF), final disposal of the residual.

6-2 Development Policy

6-2-1 Basic Strategy

Basic strategies of the action plans in both target cities are described below.

1. Sharing awareness and establishment of the need for 3R in Indonesian society
2. Development of government's involvement and public participation mechanism to promote 3R activities by relevant proponents
3. Development of management system for household and similar wastes associated with 3R implementation

6-1-2 Goals of Activities

Goals of activities for the action plans in both cities are set as shown below.

1. Implement 3R (Reduce, Reuse, and recycle), aiming to reduce the amount of final disposal of urban solid wastes
2. Reduce the amount of final disposal of household and similar wastes, taking measures at each stages such as source points, collection and transport, intermediate treatment, and final disposal

3. Implement waste separation and sorting at the stage of intermediate treatment, presupposing 5-type separation in the future
4. Improve waste collection in response to the waste separation, including the existing TPS improvement
5. For Saleable item, improve and strengthen intermediate treatment facilities together with vitalizing Waste Banks, collect the valuable to the full extent possible, and promote recycling with development of recycle chain with private sector
6. Promote recycling and reduction of organic waste to the full extent possible with introducing home composting and intermediate treatment
7. Implement and release an information management system to the public
8. Promote public awareness regarding 3R through a variety of activities
9. Establish "3R Stars Forum" to encourage various stakeholders' communication
10. Strengthen organization/institution, and financial mechanism

6-3 Palembang City

6-3-1 Objectives and Outline of the Mid-term Action Plan

(1) Objectives of the Action Plan

Objectives of the Action plan for Palembang City are as shown below.

- As of 2024, the amount of the final disposal be 20% reduced.
- 2-phase waste source separation be introduced (3-source separation in 2019 to 5-source separation in 2024) and expanded throughout the city.
- Waste collection system be improved (e.g. fixed-time waste collection, weekly-scheduled waste collection), including improvement of the existing TPSs, and implementation of SPAs.
- Salable item be collected in utilization with BS-NET to the extent possible, and treated in a recycling chain.
- Organic wastes be reduced at the source points by introduction of home composting, and the large-scale treatment facility be implemented by 2019.
- As of 2024, unmanaged wastes be reduced to 10%.
- 3R education activities be implemented extensively for residents, business entity and schools.
- Waste data management be implemented.
- Local regulations be revised and enforced.
- The existing organizations be strengthened and 3R stars forum be stabilized.
- Aiming at private sector's active involvement, CSR expansion and pilot EPR be implemented.
- Finance shall be strengthened with support to public and private sectors.

(2) Outline of the plan

The action plan consists of 10 actions as shown below. This section explains about them in order.

Action 1: Expansion of Source Separation
Action 2: Development of Waste Bank Network
Action 3: Strengthening of TPS / TPS-3R
Action 4: Development of SPA
Action 5: Development of ITF
Action 6: Establishment of Recycling Chain
Action 7: Broadening of Citizen's Awareness & Environmental Education & PR
Action 8: Information Management of 3R & SWM
Action 9: Strengthening of Legal and Institutional Mechanism
Action 10: Strengthening of Financial Mechanism

Table 6-3 Summary of Action Plan in Palembang City

Actions		Activities	Target/ Output	Performance Indicator	Responsible Agencies	Supporting Agencies/Parties	Schedule									
							2015	2016	2017	2018	2019	2020	2021	2022	2023	2024
Action 1	Expansion of Source separation (SS)	A1-1: Preparation of SS expansion plan	5 categories separation by 2024.	SS expansion plan	DLHK	BAPPEDA										
		A1-2: Introduction & expansion of SS at households		Coverage ratio of SS	DLHK, RT/RW, Sub-District, District											
		A1-3: Introduction & expansion of SS at business entities														
		A1-4: Introduction & expansion of home compost		Coverage ratio of HC	DLHK											
Action 2	Development of WB-NET (Waste Bank networking)	A2-1: Preparation of development plan of WB-NET (Network of waste banks)	10 nos of regional waste banks and 1 central waste banks will be established by 2018. Regional waste bank increases at same pace until 2024.	BS-NET plan	DLHK	BAPPEDA										
		A2-2: Implementation & operation of regional waste banks		Collecting recyclables of xx ton/day	Community, NGO, Unions, Private sector	DLHK, RT/RW, Dinas-PU, Sub-District, District										
		A2-3: Implementation & operation of central waste banks														
Action 3	Strengthening of TPS/TPS-3R	A3-1: Preparation of development plan of TPS/TPS-3R	270 nos of TPS-3R by 2018 and 310 TPS-3R by 2024.	TPS-3R plan	DLHK	BAPPEDA										
		A3-2: Implementation & operation of TPS/TPS-3R		Collect and transport segregated waste	DLHK, RT/RW	Sub-District, District										
		A3-3: Encouragement of composting at TPS-3R		Compost amount	DLHK											
Action 4	Development of SPA	A4-1: Preparation of development plan of SPA	Maximum 3 nos of SPA: 10-20 ton/day each	Improvement of collection efficiency	DLHK	BAPPEDA, Dinas-PU, Sub-District, District										
		A4-2: Detail design and construction of SPA														
		A4-3: Operation of SPA														
Action 5	Development of ITF	A5-1: Consideration for introducing ITF	1 nos of ITF	Recycling and/or reduction of municipal waste	DLHK	BAPPEDA, Dinas-PU										
		A5-2: Detail design & construction of ITF														
		A5-3: Operation of ITF														
Action 6	Development of Recycling Chain	A6-1: Preparation of Inventory of recyclers/ traders/ end-users	Operation of recycling chain	Inventory sheet	DLHK											
		A6-2: Establishment of licensing system of recycle related entities		Licensing system												
		A6-3: Establishment and operation of recycling chain		Selling recyclables of 30 ton/day	DLHK, Waste Banks, Recycling agencies											
Action 7	Broadening of Citizen's Awareness & Environmental Education & PR	A7-1: Establishment of 3RCadre System (Environment Cadre)	3R awareness at community	13,000 personnel of Environment Cadre	DLHK	Community, NGO, Unions, Private sector										
		A7-2: Implementation of Citizen's awareness on 3R by Environment Cadre														
		A7-3: Development and implementation of current environmental/ 3R education program at school	3R education at school	All schools (elementary, junior- high and high school)	Education Dept.	DLHK										
		A7-4: Preparation of PR program on 3R through social networking etc.														
Action 8	Information Management of 3R & SWM	A8-1: Collection and analysis of SWM & 3R related data periodically	Data management on SWM & 3R	once a year	DLHK	BAPPEDA										
		A8-2: Compilation and publishing of SWM & 3R related information		once a year	DLHK	BAPPEDA										
Action 9	Strengthning of Legal and Regulatory Mechanism	A9-1: Approval and Enactment of new ordinance on SWM	Management of 3R by government sector initiative	enactment	BAPPEDA	Assistant II, 3R-WG members (DLHK etc.)										
Action 10	Strengthning of Financial Mechanism	A10-1: Study of current cost and financial condition on SWM	Improvement of financial mechanism of SWM with 3R	Modification of financial mechanism	DLHK	Assistant II, Finance Dept., DLHK										
		A10-2: Revision of current retribution system on SWM														
		A10-3: Strengthening of the City Government Support/ Incentives														

6-4 Balikpapan City

6-4-1 Objectives and Outline of the Mid-term Action Plan

(1) Objectives of the Action Plan

Based on the abovementioned understanding of the current SWM situation and significant increase of final disposal amount without particular countermeasures, the counterpart and the JICA expert team developed the following objectives of the action plan.

- The segregate discharge and collection system is extended to the entire city by 2024.
- Waste reduction at source by such means of waste banks and household composting is encouraged. City's segregate collection service only collects waste after such reduction effort.
- Recyclable/reusable materials in the other waste collected by the city are recovered at Material Recovery Facilities.
- Organic waste from park pruning and markets is reduced by composting.
- Reduction rate should be aimed at least 15% in response to the requirement of Adipura.
- Unmanaged waste should be reduced to zero.

(2) Outline of the plan

The action plan consists of the following eight actions. This section explains these actions.

Action 1: Development of Segregate Discharge and Collection System
Action 2: Development of Organic Composting System
Action 3: Improvement of Information Management System
Action 4: Development of Legislation System
Action 5: Citizen Socialization
Action 6: Examination and Development of New Facility
Action 7: Establishment of 3R Forum
Action 8: Reinforcement of the waste bank
Action 9: Development of the recycling industry
Action 10: Financial Management Improvement

Table 6-4 Summary of Action Plan in Balikpapan City

Actions			Detailed Activities	Target/ Output	Performance Indicator	Responsible Agencies (Renamed to DLH)	Supporting Agencies Related Parties	Schedule 2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026
Action 1	Development of Segregate Discharge and Collection System	A1-1	Development of a model, where the following activities are to be carried out	Increase of inorganic waste recovery (Targets in 2026: 17 ton/day material recovery & 15 ton/day organic composting at TPST)	Number of households covered by separate collection service. (100% in the model)	DLH	BAPPEDA, DPU												
		A1-1-1	Development of new discharge and collection system																
		A1-1-2	Development of MRF (material recovery facility)		Material recovered at MRF	DLH	BAPPEDA												
		A1-1-3	Public socialization		Level of residents' understanding about the waste rules	DLH	Kelurahan, NGO, BPMPPKB, Dept. Edu.												
		A1-1-4	Promotion of household composting		Number of households with home composting	DLH	KLH and PUPR												
		A1-1-5	Segregation and isolation of hazardous waste		All the hazardous waste separated at MRF is safely stored in TPA.	DLH, BAPPEDA	Kelurahan office, NGO, Cadres												
		A1-1-6	Monitoring and evaluation		Periodical monitoring report (twice a year)	DLH	Kelurahan office												
		A1-1-7	Operation of TPST		Amount of waste treated by TPST	DLH	BAPPEDA, Kelurahan, BPKAD (Asset dept.)												
		A1-2	Expansion of the model system to other area in the city		Population coverage of separate collection service (32% in 2026)	DLH	BAPPEDA, DPU												
Action 2	Development of Organic Composting System	A2-1	Expansion and/or new development of composting facilities	Reduction of waste volume from markets and parks to TPA (Target in 2026: 18 ton/day composted)	Increased treatment capacity	DLH	BAPPEDA, BPKAD, DPU												
		A2-2	Transport of organic waste from markets and parks to the composting facilities		Volume of organic waste transported (from parks and all the markets in 2024)	DLH, Dept. Market, Market operators													
		A2-3	Operation of those composting facilities		Volume of organic waste processed	DLH	DLH												
Action 3	Improvement of Information Management System	A3-1	Collection of SWM & 3R related information periodically	Waste data sharing and its availability to the public	Data collected according to the Mayor's order	DLH	Other organizations with data, NGO												
		A3-2	Compilation of SWM & 3R related information to the data system		Data compiled once a year	DLH	BAPPEDA												
		A3-3	Analysis of the data and publication		Publication once a year	DLH	Dept of IT												
Action 4	Development of Legislation System	A4-1	Define the mayor's orders necessary to implement the new ordinance	Regulatory establishment of all the necessary rules supporting the new ordinance	A list of mayor's orders	DLH	Dept of Law												
		A4-2	Draft the mayor's orders according to the priority		Draft submitted	DLH	Dept of Law												
		A4-3	Issuance of the mayor's orders		Mayor's orders issued	DLH	Dept of Law, Dept of Organization												
Action 5	Socialization	A5-1	Socialization to citizens	Increased participation of the public into the waste management practices	Compliance with waste regulations and cooperation for home composting	DLH	Kelurahan, DKK, NGO, BPMPPKB, Cadres												
		A5-2	Socialization to the business sector		Compliance with waste regulations and development of waste business.	DLH	Kelurahan, DKK, NGO, BPMPPKB, Cadres												
		A5-3	Socialization at schools		Development of school education programs and its implementation	DLH	Kelurahan, NGO, NGO, BPMPPKB, Cadres, Dept of Edu.												
Action 6	Examination of New Facility	A6-1	Detailed examination of TPA lifetime	Establishment of appropriate waste management facility	Result of lifetime examination	DLH, DPU	DLH, BAPPEDA												
		A6-2	Selection and decision of necessary facility		Decision about new facility	DLH	BAPPEDA												
		A6-3	Detailed engineering planning, procurement, construction		Completion of construction	DLH	BAPPEDA												
		A6-4	Operation of the new facility		Volume of waste received	Facility operator, DLH	DPU												
Action 7	Establishment of 3R Forum	A7-1	Preparation of organizational outline (charter) of the forum	Strong communication ties between city and public for 3R promotion	Prepared charter	DLH	DKPP, BAPPEDA												
		A7-2	Call for the membership		Number of membership (20 from private sector, waste banks, NGOs, etc.)	DLH	DKPP, BAPPEDA												
		A7-3	Holding periodical meetings		Frequency of the meetings (twice a year)	DLH	DKPP, BAPPEDA												
Action 8	Strengthening of Waste Banks and TPS-3R	A8-1	Introduction of registration system of Waste Bank	More than 100 waste banks operating according to the administrative guidance, Total material recovery at 12 ton/day (2026)	Specification of Waste Bank registration rule	DLH	BAPPEDA, DKPP												
		A8-2	Introduction of reporting system of Waste Bank activities		Reception of regular reports from Waste Banks	DLH	BAPPEDA, DKPP, Kelurahan/ RT												
		A8-3	Dissemination of online bank transfer system		Full coverage of bank transfer system to all the Waste Banks	DLH	BRI, BPJS, PLN, PDAM												
		A8-4	Administrative guidance for the introduction of new Waste Bank system		Dissemination of the administrative guidance to all the Waste Banks	DLH	BAPPEDA												
		A8-5	Strengthening of TPS-3R		Activation of all the TPS-3R constructed by PUPR	DLH	BAPPEDA												
Action 9	Development of Recycling Industry	A9-1	Implementation of feasibility study of recycling industry development	Investments in recycling industry	Results of F/S.	DLH	BAPPEDA, BPMP2T												
		A9-2	(Activities depend on the result of F/S.)		-	-													
Action 10	Financial management improvement	A10-1	Compilation of the financial information about O&M expenditure according to the types of activities	Increase of cost recovery rate to the target rate set by Activity A10-6	Results of data compilation	DLH	Dept of Asset												
		A10-2	Development of regular acquisition rule of the information on fee collection		Result of data acquisition	DLH, PDAM	BAPPED and Dept of Tax												
		A10-3	Preparation of financial report of waste management		Report once a year	DLH	BAPPEDA												
		A10-4	Analysis of the cost of model development		Result of analysis	DLH	BAPPEDA												
		A10-5	Estimation of yearly O&M cost for coming years		Estimated figures	DLH	BAPPEDA												
		A10-6	Restructuring of fee collection system (including introduction of landfill tipping fee)		New fee table	DLH, BAPPEDA													

Chapter 7. Pilot Project

7-1 Pilot Project of Palembang

7-1-1 Condition of the Pilot Project Area before Implementation

Palembang commenced a pilot project at Alang Alang Lebar (hereafter, AAL) from June 2015, and then newly expanded the pilot project into the two areas of Sematang Borang (Srimulya administrative urban community) and Sukarami (Sukodadi administrative urban community). The locations of the pilot project areas and related facilities are shown in the following figure.

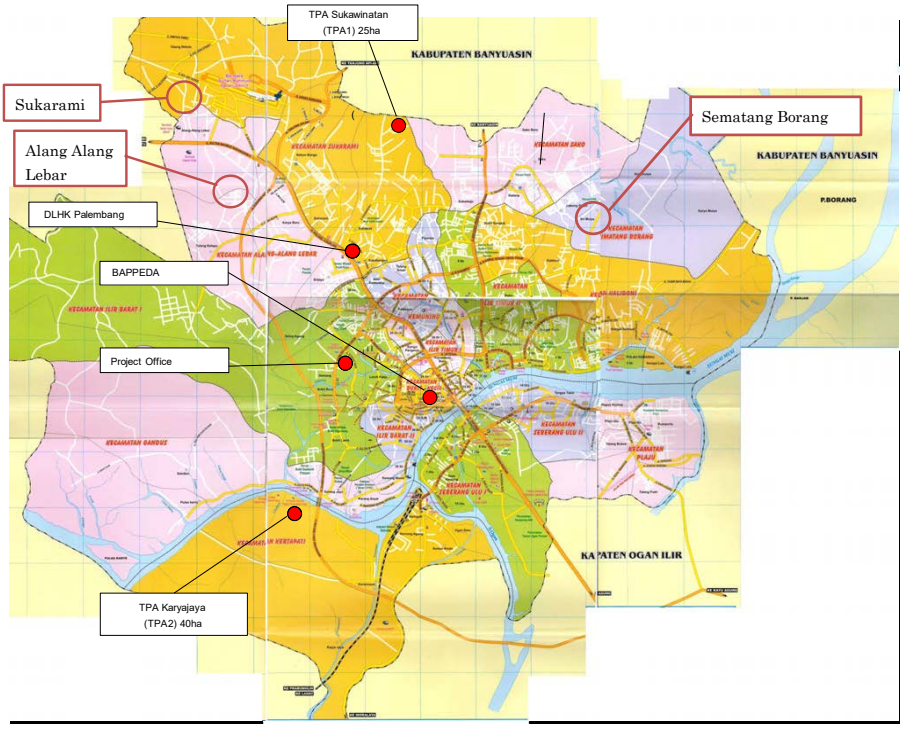


Figure 7-1 PP Area and Related Facilities

The AAL PP is targeted at 16RT, with a target population of 8,210 (1,642 households; calculated at 5 persons per household). The waste collection and transport system prior to implementation of the PP is shown in the following figure.

Prior to commencement of the PP, the situation in AAL was that there was an existing temporary dumping station (TPS) at one location within the administrative urban community and one unofficial waste transshipment location (primary collector→DKK collection vehicle), but each was in an unsanitary condition. In the PP area, primary collection was carried out by private individuals, and there were seven privately operated "Kaisers" (motorized three-wheeled trucks) that carried out primary collection individually. The residents either commissioned the primary collector (PC), or brought the waste by themselves to the TPS. In the interview survey carried out at that time, it was found that approximately 60% of the residents contracted with the PC to transport the waste from their home to the TPS. Within the administrative urban communities, there were no organized recycling activities, but recyclables were recovered by waste pickers or the primary collectors, who sold them to traders.

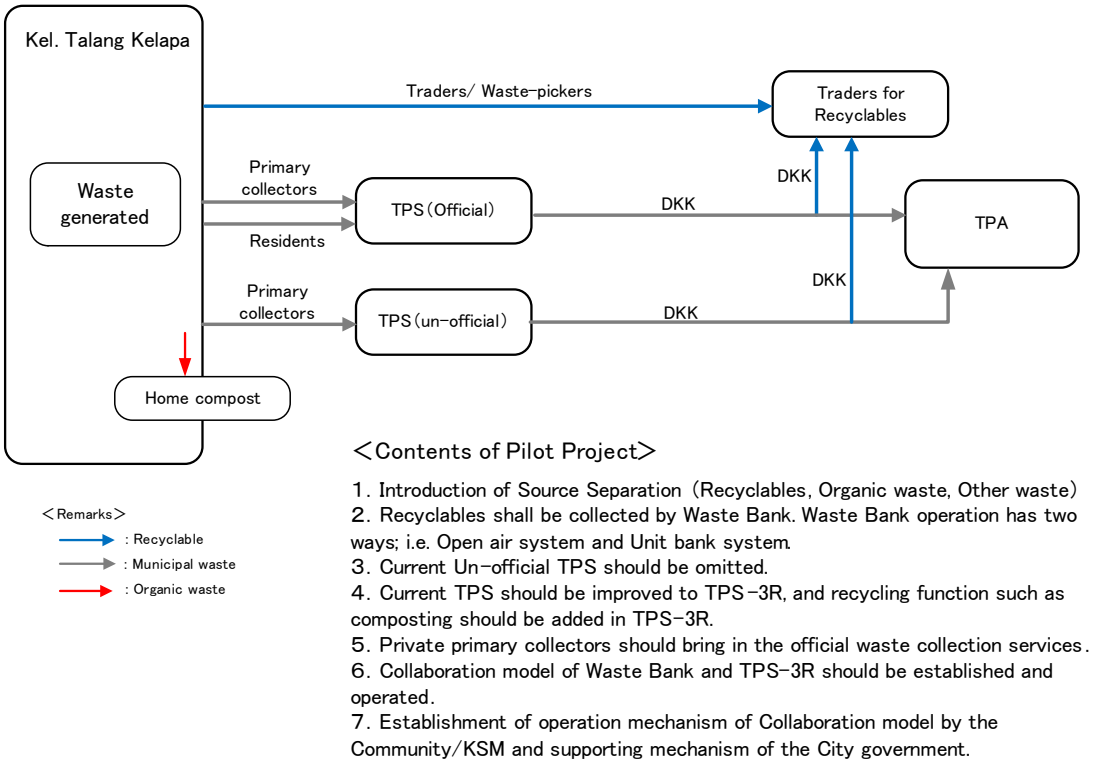


Figure 7-2 Waste Transfer System before Implementation of PP

7-1-2 Action Policy for the Pilot Project.

The action policy for the PP is as follows.

[Action policy for pilot project.]

- Residents carry out segregation at home into three categories of "recyclables", "organic waste" and "other waste" by distributing designated waste bags.
- The community manages Waste Bank and TPS-3R as the management entity, and promotes recyclables collection and recycling of organic waste.
- In Waste Bank, recyclables are collected by circulating the area using own Kaiser (Circulate Collection System (open-air weighing)).
- Under the instruction of the project team, activities of public awareness raising is conducted by the Environmental Cadre and KSM.

Through the above activities, the waste collection and transport system aimed for after the implementation of the PP is shown in the following figure.

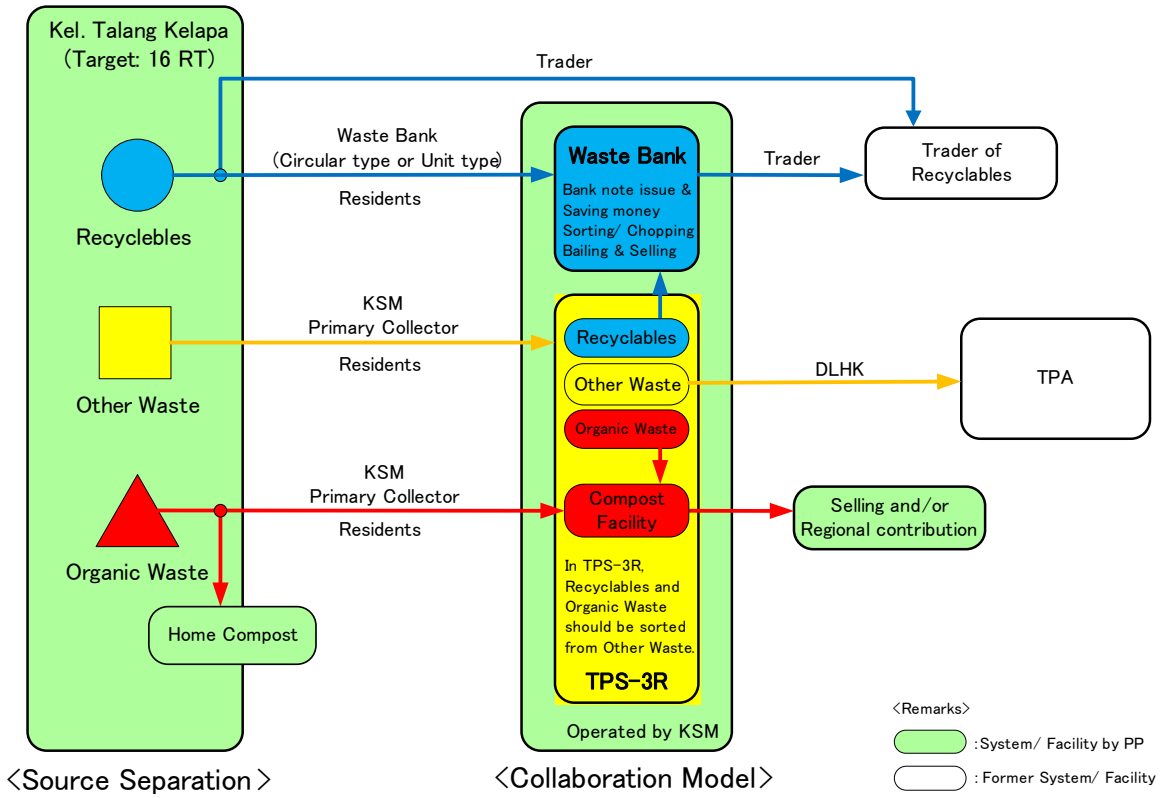


Figure 7-3 Waste Transfer System after Implementation of PP

The PP area is shown below.

Figure 7-4 PP Area of Alang-Alang Lebar（Talang Kelapa District）

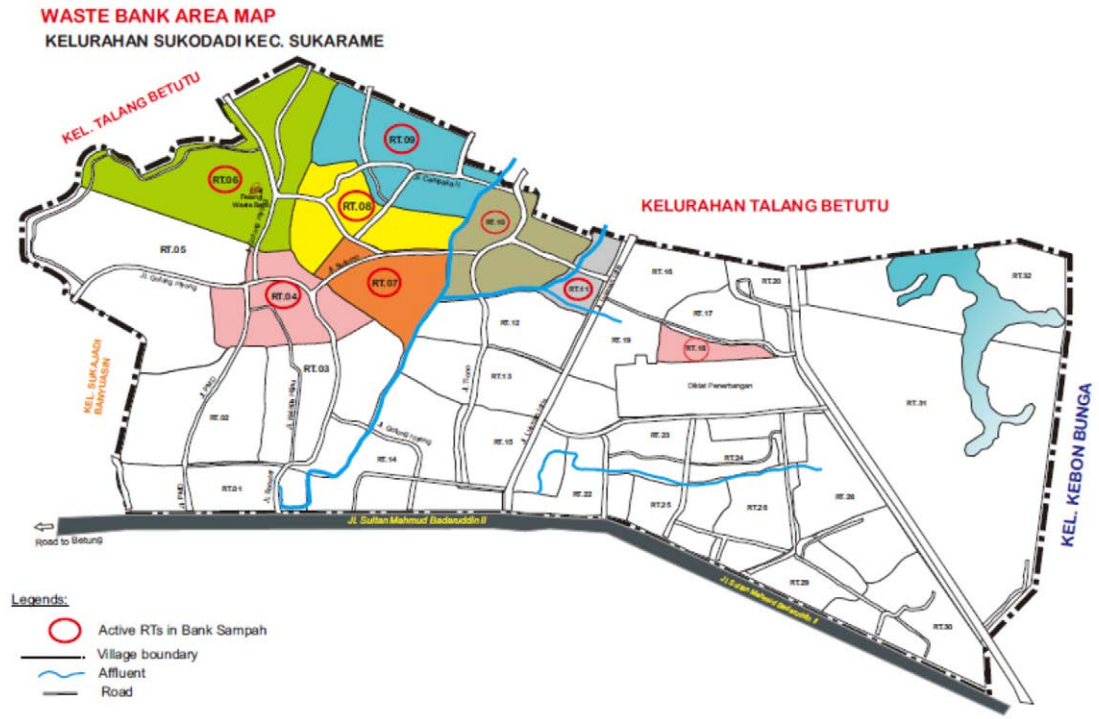


Figure 7-5　PP Area of Sukarami（Sukodadi District）

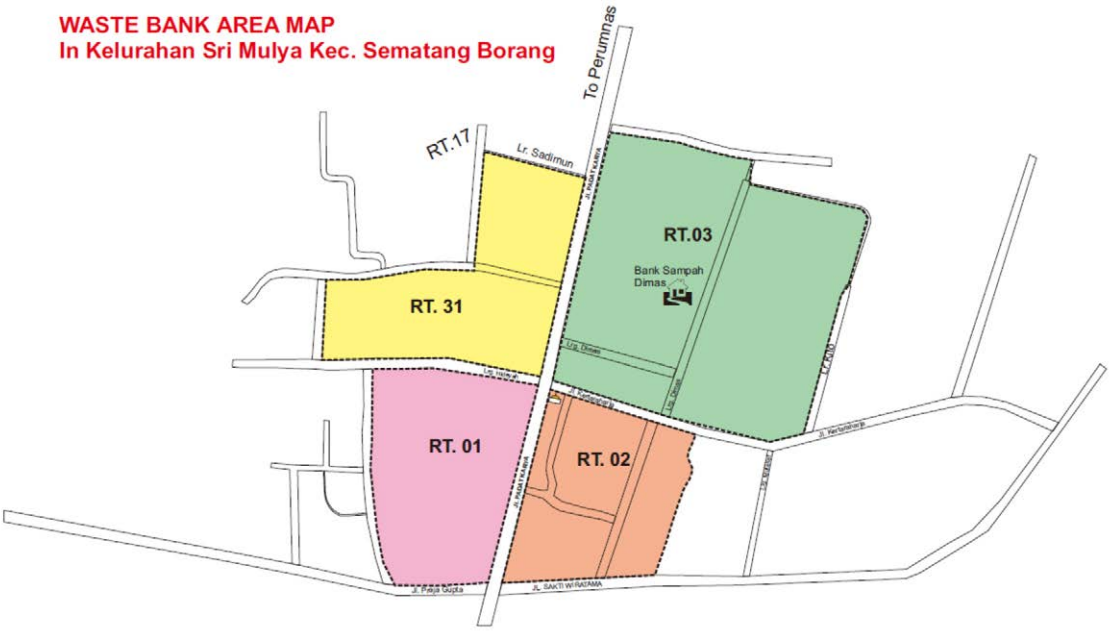


Figure 7-6　PP Area of Sematang Borang（Srimulya District）

7-1-3 Pilot Project Activity Record

The main activities in each PP area are shown below.

(1) Alang-Alang Lebar（Talang Kelapa District）

The main activities carried out at AAL are as follows:

[Main activity record]

- KSM was organized.
- Through the Environmental Cadre and KSM, raising awareness to residents (to separate waste into three types of organic waste, recyclables and other waste) was conducted. This activity is called "Public Awareness Patrol." The Environmental Cadre selected from the residents visits the target districts from door to door to check the status of source separation, to explain the necessity of separating the sources, and instruct the method of source separation.
- Waste Bank (building for storage) was established in the site of TPS-3R (The BLH budget).
- Machinery and equipment necessary for activities of primary collection and Waste Bank (Kaiser, container, passbook of Waste Bank and banner for advertisement) were provided.
- A bag for organic waste and other waste was distributed to residents.
- A bag for recyclables was distributed to Waste Bank customer.
- To promote home compost, compost container for Takakura method was distributed. (The BLH budget)
- Crushing machine for organic waste and plastic were installed.
- Primary collection and Collection of Collection Fee by KSM; Primary collection was conducted by KSM. Also, Collection Fee for primary collection was collected from residents by KSM (there was a reward system to the residents who conduct source separation).
- Sorting organic waste and recyclables by KSM: Organic waste and recyclables were sorted out from primary collected waste at TPS-3R. The recyclables were sold together with those collected at Waste Bank.
- Composting by KSM: In TPS-3R, compost was made from organic waste collected and sorted by KSM, and sold it.

(2) Sukarami（Sukodadi District）

The main activities carried out at Sukarami (Sukodadi District) which is one of the expansion areas are as follows:

[Main activity record]

- Waste Bank (building for storage) was established (The BLH budget).
- Equipment necessary for activity of Waste Bank (passbook of Waste Bank and banner for advertisement) was provided.
- An advice on the operation and management of Waste Bank (checking of activity records, way of bookkeeping etc.) was made.
- The Waste Bank official concerned was invited to Waste Bank in Talang Kelapa and was conducted training.
- Public awareness about Waste Bank was implemented.
- The home compost using non-dedicated container was promoted.

（*Construction site for TPS-3R could not be secured, therefore, mainly activities related to Waste Bank was conducted in this area.）

(3) Sematang Borang（Srimulya District）

The main activities carried out at Sematang Borang (Srimulya District) which is one of the expansion areas are as follows:

[Main activity record]

- Waste Bank (building for storage) was established (The BLH budget).
- The Waste Bank official concerned was invited to Waste Bank in Talang Kelapa and was conducted training.
- Public awareness about Waste Bank was implemented.
- An advice on the operation and management of Waste Bank (checking of activity records, way of bookkeeping etc.) was made.

（*Construction site for TPS-3R could not be secured, therefore, mainly activities related to Waste Bank was conducted in this area.）

7-1-4 Monitoring Results of the Pilot Project

Continuous monitoring was conducted at Waste Bank (SAKURA) and TPS-3R in Alang-Alang Lebar (Talang Kelapa District). The monitoring results of the PP are shown below.

(1) Waste Reduction Ratio

As part of the PP monitoring, the amount of recyclable valuables and recycling amount of organic waste in Waste Bank and TPS-3R were collected and analyzed data. The trend of waste reduction ratio from February 2016 to May 2017 is shown below.

In addition, waste reduction ratio for the future estimated in consideration of the present situation is as follows.

Table 7-1 Waste Reduction Ratio Calculation Results（2016.2~2017.5）

Units: tons/week

Item	Target value	2016.2 WB:227 KSM:70 PC：0	2016.6 WB:243 KSM:121 PC：0	2016.12 WB:243 KSM:160 PC：0	2017.5 WB:255 KSM:357 PC：82
(1) Waste amount generated	14.94	14.94	14.94	14.94	14.94
(2) Collection amount of recyclables	0.20	0.26	0.31	0.27	0.41
Collection amount of recyclables by Waste Bank	0.20	0.24	0.28	0.21	0.36
Collection amount of recyclables by TPS-3R	—	0.02	0.03	0.06	0.05
(3) Recycling amount of organic waste	2.81	0.77	0.88	0.83	1.34
TPS-3R	1.93	0.30	0.41	0.36	0.64
Domestic compost	0.88	0.47	0.47	0.47	0.47
PC	—	—	—	—	0.23
(4) Total reduction quantity = (2) + (3)	3.01	1.03	1.19	1.10	1.75
(5) Waste reduction ratio = (4) ÷ (1)	**20.1%**	**6.9%**	**8.0%**	**7.4%**	**11.7%**

Note 1: WB is the number of Waste Bank registrant. KSM is the number of households contracted for collection.
Note 2: Numbers related to PC are calculated figures of households collected by PC.

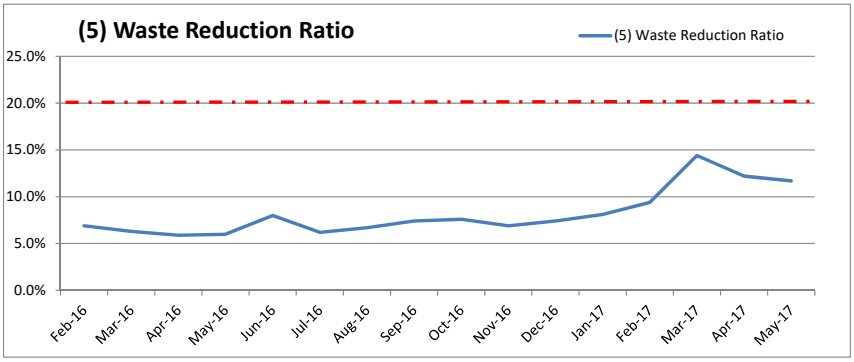


Figure 7-7　Calculation Results of Waste Reduction Ratio（2016.2~2017.5）

Table 7-2　Results of Prediction of Waste Reduction Ratio in the Future

Units: tons/week

Item	Target value	Record	Estimated figures	
		2017.5 WB:255 KSM:357 PC：82	2017.8 WB:278 KSM:437 PC:229	2017.11 WB:300 KSM:500 PC:335
(1) Waste amount generated	14.94	14.94	14.94	14.94
(2) Collection amount of recyclables	0.20	0.41	0.46	0.52
Collection amount of recyclables by Waste Bank	0.20	0.36	0.31	0.34
Collection amount of recyclables by TPS-3R	—	0.05	0.15	0.18
(3) Recycling amount of organic waste	2.81	1.34	2.09	2.57
TPS-3R	1.93	0.64	0.97	1.15
Domestic compost	0.88	0.47	0.47	0.47
PC	—	0.23	0.65	0.95
(4) Total reduction quantity = (2) + (3)	3.01	1.75	2.55	3.09
(5) Waste reduction ratio = (4) ÷ (1)	20.1%	11.7%	17.1%	20.7%

Note 1: WB is the number of Waste Bank registrant. KSM is the number of households contracted for collection.
Note 2: Numbers related to PC are calculated figures of households collected by PC.

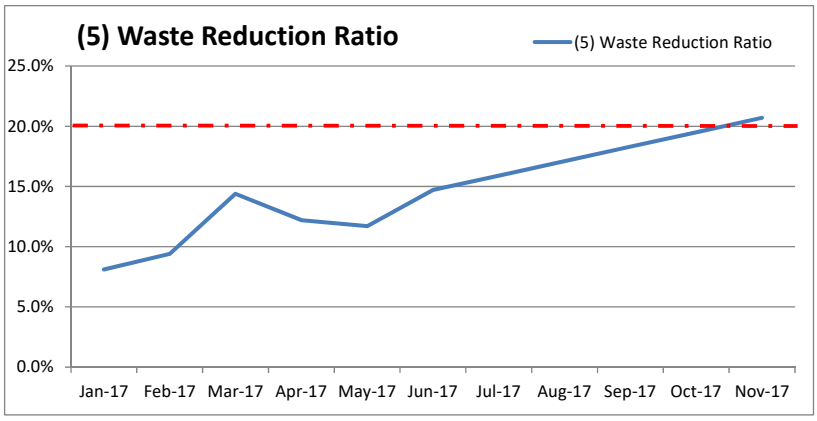


Figure 7-8　Results of Simulation of Waste Reduction Ratio in the Future

The solicitation activities to residents conducted in February and March 2017 were very effective, and the number of contracted households of TPS-3R increased significantly. As of May 2017, the number of contracted households is 357 households, an increase of 197 households compared with December 2016. In addition, the amount of recyclables recovered has increased steadily, by increasing the number of contracted households of TPS-3R and doing active recycling activities within the PP area. Particularly, in cooperation with the primary collector, purchasing organic waste from the primary collector (PC) has been able to start, that leads to an improvement in waste reduction ratio.

(2) Financial Situation of TPS-3R and Waste Bank

The financial situation of TPS-3R until May 2017 (as of 2017.5.31) was as follows.

The balance of income and expenditure was a surplus of Rp. 13,494,225. The balance of income and expenditure at January 2017 was a surplus of Rp. 5,981,910. Compared with this, it can be said that the surplus amount is increasing steadily. An increase in the number of contracted households will be the main factor of the surplus increase.

Table 7-3 Income and Expenditure of TPS-3R (record until May 2017)

Summary

Category	Amount (Rp)
Income	55,219,775
Expenditure	41,725,550
Balance (Income - Expenditure)	**13,494,225**

Income

Category of Income	Amount (Rp)	
Retribution fee	47,615,000	86%
Compost sales	3,245,000	6%
Recyclables and handcraft sales	4,206,775	8%
Others	73,000	0.1%
Selling seeds of plants or plants	80,000	0.1%
Total	55,219,775	100%

Expenditure

Category of Expenditure	Expenditure(Rp)	Monthly expenditure(Rp)	
Allowance for operators	17,768,800	1,184,587	47%
Additional payment for operators	2,218,200	147,880	6%
Fuel	1,806,500	120,433	5%
Maintenance of facility and equipment	2,479,050	165,270	7%
Consumable goods	1,107,500	73,833	3%
Water and electricity	1,315,250	87,683	3%
Refreshment and food	6,516,500	434,433	17%
Retribution to City Government	1,988,000	132,533	5%
Others	2,603,000	173,533	7%
Buying organic from PC	401,400	26,760	1%
Stationary	459,350	30,623	1%
Allowance for members	3,062,000	204,133	8%
Total	41,725,550	2,520,185	100%

The balance of income and expenditure of Waste Bank as of December 2016 is a surplus of Rp. 5,208,966, as shown below. A Sale of recyclables in 2017 exceeds Rp 10,000,000 as of May. Compared with past results so far, it can be said that the activities of Waste Bank are being carried out smoothly.

Table 7-4 Income and Expenditure of Waste Bank as of May 2017

Units: Rp.

Item	2015	2016	2017 (Jan - May)	Cumulative
a. Revenue from sale of recyclables	5,371,940	11,373,605	10,541,770	27,287,315
b. Activity costs	1,270,000	4,758,000	3,139,000	9,167,000
c. Amount owned waste bank; a – b	4,101,940	6,615,605	7,402,770	18,120,315
d. Account balance		5,432,256		12,911,349
e. Activity profit (balance); c – d		5,222,289		5,208,966

Source: KSM data

TPS-3R and Waste Bank are actively activities, therefore expenditures of TPS-3R and Waste Bank also increase. However it has been able to remain a surplus in financial and stable operation is being carried out. This is because the number of contracted households with TPS-3R is 356 households, and stable revenue is stably secured. In the future, in order to further stabilize waste management, it is important to increase the number of contracted households with target of about 500 households.

(3) Home Compost

270 home compost containers have provided by BLH (current DLHK); 48 for Environmental cadre and 270 for residents. In the follow-up and monitoring which is done on January 22nd 2016, 55% of residents were implementing home compost. Then in the 2nd monitoring on November 18th 2016, 42% of residents were continueing.

3rd monitoring for home compost was implemented for 4RT (RT22, RT66, RT67 and RT74) on March 8th 2017. Since it is carried out in the weekday morning, there were many absent households and 11 households were interviewed. As the results of the survey, 46% of households (5 households out of 11 households) were continueing home compost. The collected major reasons to stop composting are as follows.

Table 7-5 Results of Monitoring for Home Compost

Date of interview	Interviewed RTs	Percentage of continuation
2016/1/22	5RT（RT20,RT22,RT71,RT70,RT74）	55%
2016/11/18	5RT（RT25,RT52,RT66,RT67, RT91）	42%
2017/3/8	4RT（RT22,RT66,RT67,RT74）	46% (5HH)

7-1-5 Future Issues / Improvement Points

(a) Management of Waste Transportation Vehicles of DLHK

The transporting vehicles used by DLHK are not adequately managed and periodic transporting work in the area has not been implemented, so the collection activities by TPS-3R are also affected. Lots of issues such as driver's management are raised to improve the transport vehicle management of DLHK, but in order to stabilize the collection activity by TPS-3R, it is required to transport waste by DLHK periodically and in a planned way.

Particularly, in order to start source separation, it is essential to establish transportation structure to TPS, that DLHK vehicles can transport with keeping separated state.

(b) Illegal Dumping around TPS-3R

Currently, the waste container is installed on the access road of TPS-3R, not within the site of TPS-3R. DLHK is not periodically carried out waste transportation, so waste is overflowing from waste container.

Also, even at night it can be thrown away, nobody is there to monitor, so waste including construction waste is thrown around the TPS and situation of TPS and surroundings is like an illegal dumping site.

When installing TPS on the road, nobody can monitor, waste is continuously throwing away at container and surroundings, which is one cause of induction of illegal dumping of construction waste.

For TPS, it is necessary to have a mechanism to manage and monitor TPS on the site like TPS - 3R.

(c) Management of KSM Operator/ Staff

Since KSM is an organization by community, it is impossible to always manage the workers' activities, and it is inevitable to leave them to the voluntary of the employees.

In order to maintain the motivation of workers, measures such as profits sharing are also made, but it has not obtained sufficient effect.

For stable operation of KSM, it is necessary to establish a method of continuous management of workers, which is less economic burden, such as arranging KSM and DLHK (UPTD) staff in TPS-3R.

(d) Support for Operation and Management of TPS-3R

It is important to promptly transfer proprietary right from the city to DLHK to make DLHK fully recognize the responsibilities of management and supervision of TPS-3R.

Also, as support to TPS-3R from local government, it is necessary for sustainability of TPS-3R to provide not only construction cost of facilities but also continuation of assistance of operation expenses (such as compensation for personnel expenses, electric and water costs).

In addition, even when the community is carried out activities by itself, it is necessary for local government to conduct periodic monitoring, and give advice and instruction.

(e) Improvement of TPS-3R Guideline

From the experience of operating the TPS-3R in PP, some unpractical contents is shown in TPS-3R guideline. For example, the UPPR facilitator does not provide any instruction for TPS-3R

management of KSM. In most cases, it is only involved in the construction work of TPS-3R. It is unclear of the role of local government in operation, it means concrete method for local government support.

Therefore, in managing the TPS-3R, it is necessary to improve TPS-3R guidelines to ensure that local government can be involved in the support on capacity development of KSM by clarifying the mechanism of confirming the activities of the facilitator and the description of the role of local government.

(f) Improvement of Waste Reduction Ratio

In order to achieve 20% waste reduction, the following activities are required.

① Increase of the number of registrants of Waste Bank and the number of households contracted with TPS-3R

Regarding the registration of Waste Bank and the contract of households with TPS-3R, various activities to acquire new registrants and contractors are carried out. Solicitation activities by community itself is conducted continuously by using Environmental Cadre, based on the results and experience of recruitment activities to residents in February and April 2017. In particular, regarding the contract of households with TPS-3R, the better services, such as daily, properly and surely collection, compared with primary collectors should be provided to increase the number of contracted households.

② Waste separation and sorting

Waste separation by residents in generation point has a very high contribution in weight reduction, but since it is not easy to obtain residents' understanding at present, it is necessary to raise residents' awareness continuously based on a long-term point. On the other hand, efficient waste reduction by collecting recyclables and organic waste at TPS-3R are required.

③ Cooperation with Primary Collector (PC)

Reduction of organic waste is indispensable to achieve 20% waste reduction. Collection of organic waste coordinated with Primary Collector (PC) has a great impact on weight reduction and can be said to be a very efficient method. From now on, in order to promote the recycling of valuable waste including organic waste, cooperation with Primary Collectors (PC) should be expanded.

7-2 Pilot Project of Balikpapan

7-2-1 Background and Objectives

The waste reduction action plan, developed in the JICA project, proposes "Action 1: Development of Segregate Discharge and Collection System". The objectives of Action 1 are to carry out waste collection, transportation and disposal according to the types of waste separated at generation sources, waste banks and material recovery facilities (MRFs), to comply with the law stipulating waste separation and waste reduction and to reduce the final disposal amount at TPA. First, a model (source separation pilot project or SS-PP) is to be developed in part of the city and next, the model will be extended to the whole city in a long term.

This pilot project was carried out with an aim to develop a model of the source separation and separate collection system.

7-2-2 Basic Policy of the Pilot Project

A model area is determined and the model of the source separation and separate collection system is introduced in that area. The system introduction contains the following activities.

(1) Development of New Waste Discharge and Collection System

Each waste generators are encouraged to bring salable and recyclable waste to waste banks and to treat organic waste by composters.

Waste, which do not go to waste banks nor home composters, will be segregated at source into two categories, organic waste and other waste, and put into different waste bags. Organic waste is then collected five days a week, while other waste once a week, according to the predetermined weekly schedule.

The conventional way to discharge waste to the TPS is not suitable to develop a mindset of waste segregation and the TPS often remains unsanitary with accumulated waste. Therefore, waste stations will be newly set near houses as waste discharge points. The collection vehicles will be motored three-wheeled carts and/or small trucks, which are suitable for the local road condition.

(2) Development and Operation of MRF

Waste reduction through material recovery in Balikpapan mostly depends on informal sectors, with very scarce contribution of waste banks and private entities. On the occasion of the introduction of source separation and separate collection, the city considered that it was necessary to prepare a facility with enough capacity to receive large amount of inorganic waste. Consequently, the city decided to initiate a material recovery facility (MRF) as a pilot project. In the model development, because of the time limitation for site selection, a MRF will be developed by transferring the usage of existing building.

(3) Awareness Raising

All the activities associated with the model development needs the understanding and cooperation of local residents. People are required to conduct home composting, bring recyclable items to the waste banks and waste discharge under the instruction of DLH.

(4) Promotion of Household Composting

Organic waste composting can be most effective at generation sources when daily care including careful segregation is ensured by the motivation of the generators for better final output. In this light, household composting will be promoted in the model area together with awareness raising activities of (3).

(5) Segregation and Isolation of Hazardous/Toxic Waste

Hazardous and/or toxic items will be specified and those will be segregated at the MRF. They will be delivered to the TPA in an isolated manner, and stored in a predetermined container.

(6) Monitoring and Evaluation

Monitoring should take data of the following items.

- Amount of segregated items at MRF according to their types per month
- Sales of recyclable/reusable items per month
- O&M cost at MRF per month
- Performance of collection (qualitative evaluation)
- Performance of discharge (qualitative evaluation)
- Number of households which keep practicing household composting
- Amount and sales of recyclable/reusable materials collected at waste banks
- Final disposal amount from the model area and amount of organic waste composted at TPA

The model system will be evaluated from these indicators and the system will be improved and optimized by reviewing such aspects as collection methods, MRF operation procedures and awareness raising approaches.

(7) TPST (Additional)

PUPR selected Balikpapan as one of the pilot cities to construct TPST, integrated waste treatment facility and Kota Hijau was determined as a site in 2015. Further, the city and PUPR decided that the organic waste which is separately collected in the separate collection system in the model area and the organic waste which is separated in Sepinggan market would be treated at the TPST.

(8) Responsibilities of Key Players for Implementation

The responsibilities of related agencies are as shown below.

Table 7-6 Role Allocation of Implementing Agency

Activities	Responsible Agencies	Supporting Agencies
A1-1: Development of a model		
A1-1-1: Development of new discharge and collection system	DLH	BAPPEDA, DPU
A1-1-2: Development and Operation of MRF	DLH	BAPPEDA
A1-1-3: Awareness Raising	DLH	Kelurahan, NGO, BPMPPKB, Dept Edu.
A1-1-4: Promotion of household composting	DLH	KLH and PUPR

Activities	Responsible Agencies	Supporting Agencies
A1-1-5: Segregation and isolation of hazardous/toxic waste	DLH, BAPPEDA	Kelurahan office, NGO, Environmental Cadres
A1-1-6: Monitoring and Evaluation	DLH	Kelurahan office
A1-1-7: Operation of TPST	DLH	BAPPEDA, Kelurahan, BPKAD (Asset dept.)
A1-2: Expansion of the model system to other area in the city (Also refer to A1-1)	DLH	BAPPEDA, DPU

DPU: Dinas PU (Department of public works) , BPMPPKB : Agency for Community Empowerment, Women Empowerment and Family Planning), BPKAD: Department of Asset

7-2-3 Site Selection of the Pilot Project and Its Implementation Steps

(1) Site Selection

Considering future expansion, the city considered that the pilot project to develop the model should be carried out in a scale of Kelurahan. In order to promote waste reduction effectively with co-exist community-based 3R activities, a site where waste banks, compost houses and/or TPS-3R[1] were located was looked for.

The following four candidate sites with the facilities mentioned above were nominated.

Table 7-7 Candidate Sites for SS-PP

Kecamatan	Kelurahan	Population 2014*	TPS-3R (DKPP)	Waste Bank	Compost house
Balikpapan Barat	Baru Ilir	21,895	1	1	
Balikpapan Barat	Baru Tengah	23,703		3	1
Balikpapan Utra	Gunung Samarinda	23,342		1	2
Balikpapan Selatan	Gunung Bahagia	22,148	1	2	2

* Population data of 2014 from BAPPEDA

For the segregation of waste collected from an area at the Kelurahan scale, a material recovery facility (MRF) with a certain size of capacity is necessary. The JICA short-term experts, DKPP, BLH and BAPPEDA visited all the sites above and searched for an existing building that could be converted to the MRF in a short time. As a result, it was found that Kelurahan Gunung Bahagia has a building of city property that used to be a market. The JICA short-term expert studied the building and concluded that its conversion to the MRF was possible. Finally, the city decided to select Kelurahan Gunung Bahagia as a pilot project site.

(2) Implementation Steps

The source separation and separate discharge system proposed in the SS-PP is a very new attempt and its implementation in a whole Kelurahan at a time can be risky. Therefore, it was decided to implement it in a step-wise manner. It would start in part of area of Kelurahan to see its practicability and then it would extend to the whole Kelurahan.

[1] This is not the TPS-3R promoted by PUPR but the one built by DKPP. It is the place where waste collection workers extract salable items from collected waste.

7-2-4 Implementation

(1) SS-PP Concept

The system to be achieved in the SS-PP is shown below, in comparison with the current waste collection system.

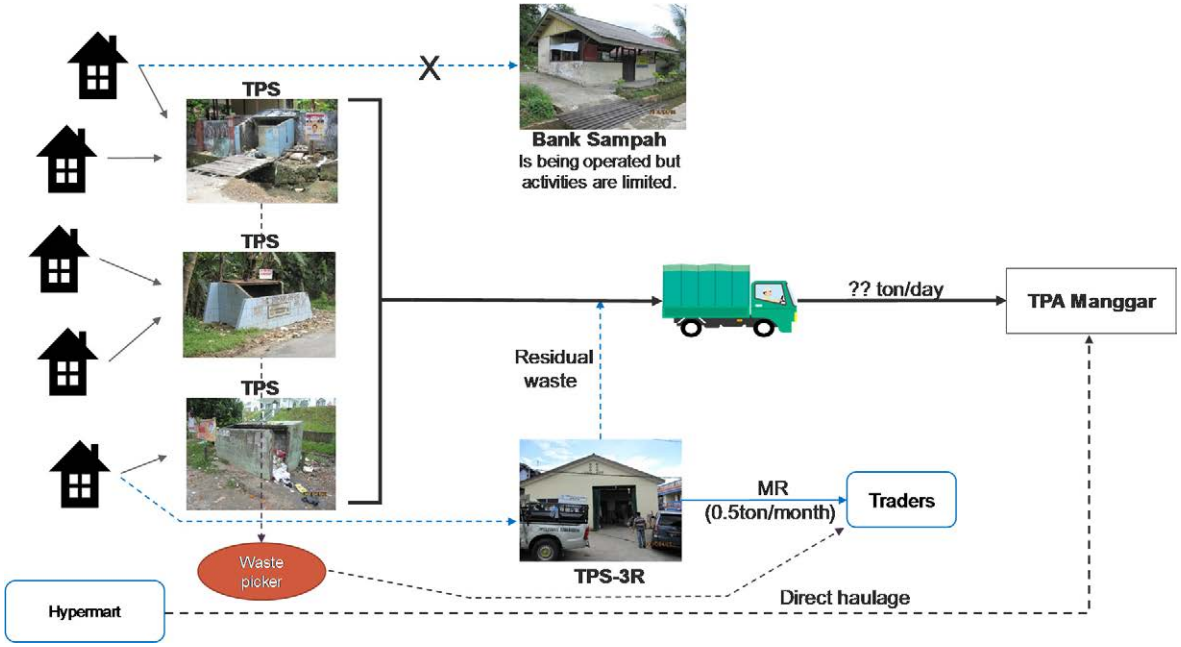


Figure 7-9 Waste Collection System in Kel. GB before SS-PP

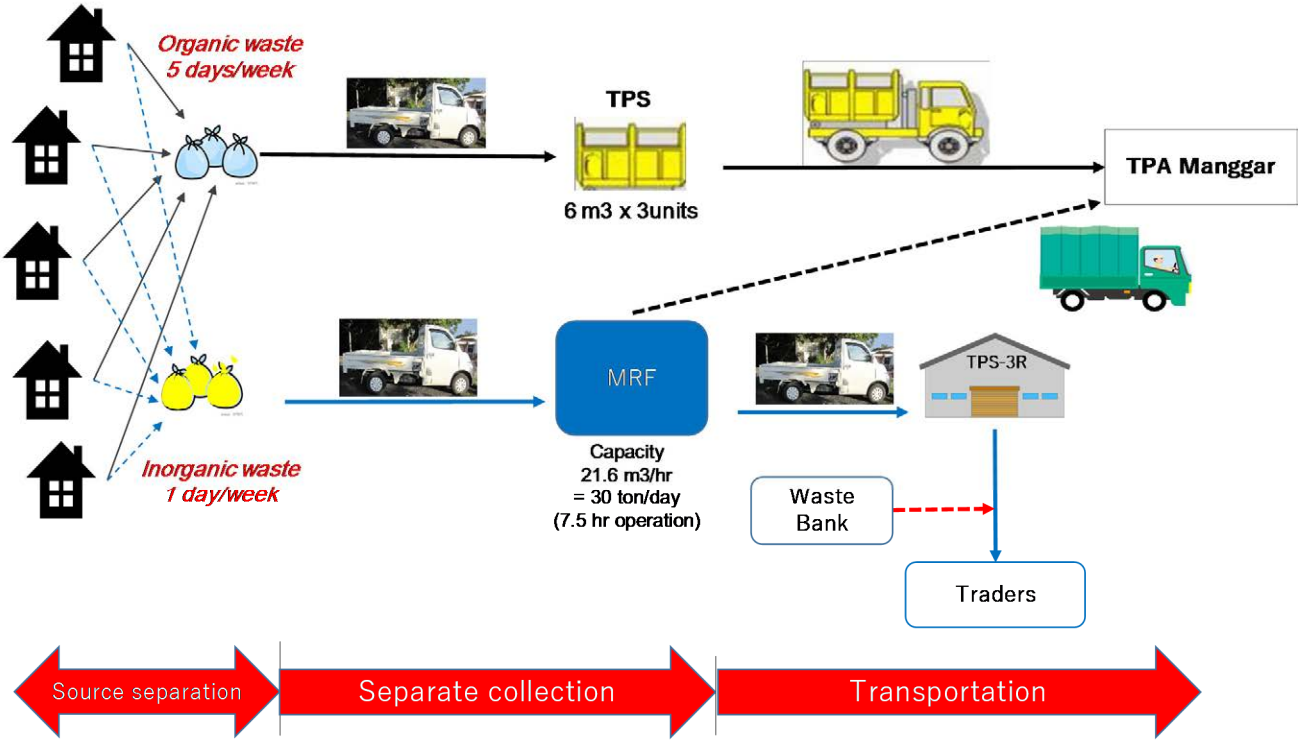


Figure 7-10 Separate Collection System in Kel. GB

(2) SS-PP in 13RTs (13RT SS-PP)

(a) Outline of 13RT SS-PP

13RT SS-PP is the project in a limited area of Kelurahan Gunugn Bahagia (Kel. GB) for the first step of the SS-PP in the Kelurahan. Its implementation was from April 2015 to the end of January 2016. In February 2016, it became part of the SS-PP.

For the implementation of the SS-PP of the Kelurahan, the area would be divided into six zones, each of which would have different weekly collection schedule. For the first stage, one of the six zones, called Zone 1 where other waste is collected on Thursday while organic waste on days other than Thursday and Sunday, was selected as the site of the 13RT SS-PP.

Basic data of the site of 13RT SS-PP (statistics of 2014 from the Kelurahan office)

Population: 4,763

Number of households: 1,597 (source: City Population Department, 2014)

Number of RTs: 13

The East and West borders of Kel. GB are trunk roads running from South to North. The south and north borders are also major roads and these four roads define its area of 368.64ha. Another trunk road runs from west to east in the middle of Kelurahan, along which are commercial developments. There are relatively newly developed residential areas where roads with 4-6 m width were built on a grid.

Zone 1 was on the southeast corner of Kel. GB with an area of about 30 ha. It was mostly residential area, in its north part in particular. There was a non-active waste bank and a TPS-3R.

Figure 7-11 Location of 13RT SS-PP

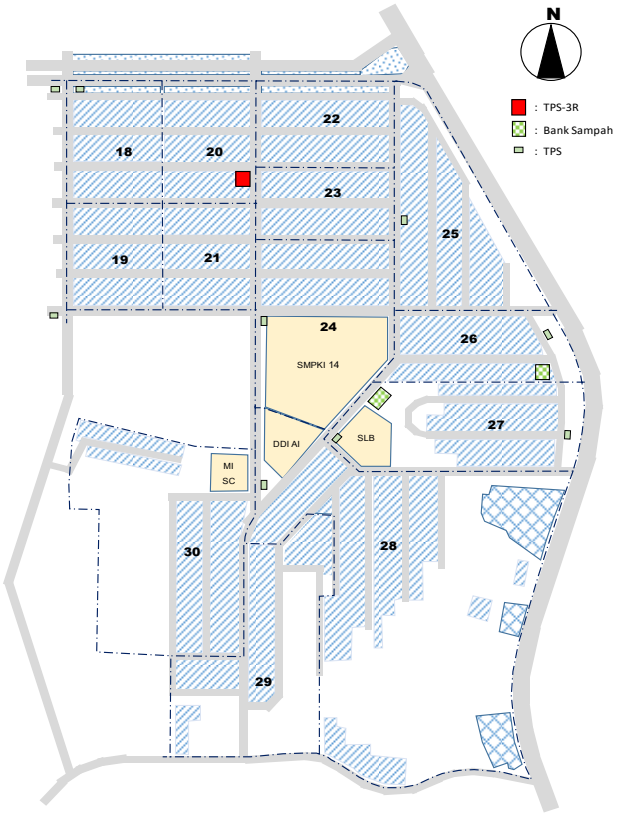


Figure 7-12 Roads in the Site of 13RT SS-PP

The waste collection system before the implementation of 13RT SS-PP was that each household should bring waste to TPS at about 20 locations in the Kelurahan from 6 pm to 6 am, and waste should be collected by DKPP from TPS. In practice, the residents did not necessarily brought waste to TPS during the determined time period. Therefore, waste could be seen in the TPS at any time or even outside of the TPS.

Figure 7-13 Existing TPS in the PP Site

The activity of the waste bank was very limited because it had few customers as a result of unclear accounting. Some residents living near the TPS-3R had brought their waste to TPS-3R and the staff of DKPP had segregated salable materials. However, its amount was small as 0.5 ton/month.

	
TPS-3R in the 13RT SS-PP Site	Waste Bank in the 13RT SS-PP Site

The waste management system of the 13RT SS-PP is illusrtrated below. As the MRF and the Transfer Depo (TD) , which would be developed for the Kelurahan-scale SS-PP, were out of Zone 1, TPS-3R would be used as a temporal MRF and TD.

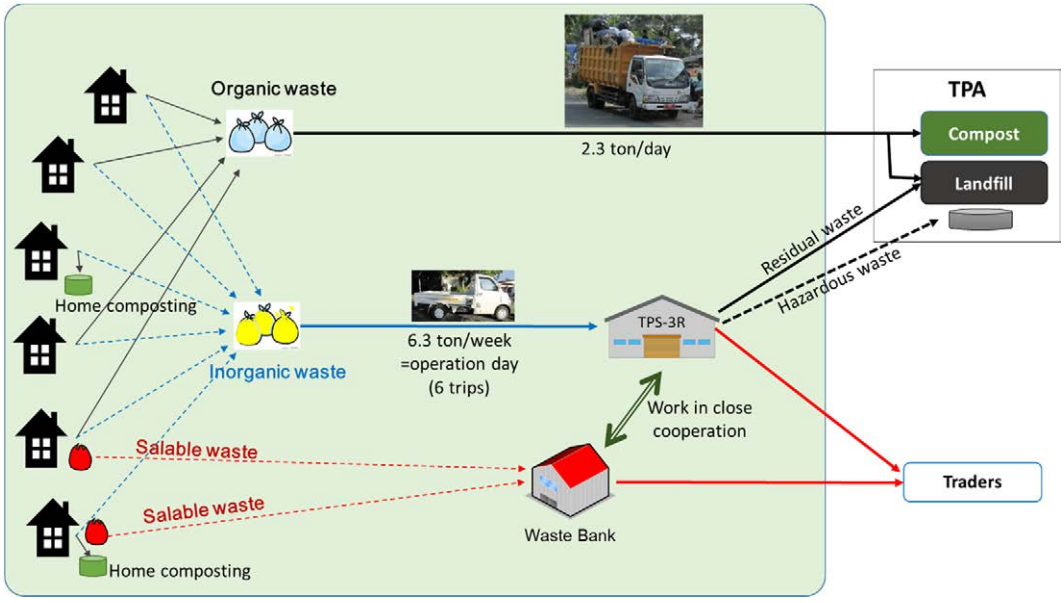


Figure 7-14 Schematic Illustration of 13RT SS-PP

(b) Development of Source Separation and Separate Collection

a. Source Separation

At waste generation sources, waste separation into organic waste, recyclable waste and others were instructed and the use of the waste banks for recyclable waste and home composting for organic waste were promoted. After these reduction efforts at home, other inorganic waste should be put into rice bags and organic waste into plastic bags then

these bags should be discharged according to the collction schedule of DKPP (once a week for other inorganics and five times a week for organic waste).

The city procured and distributed waste discharge rice bags and plastic bags for the use of the starting period of the PP in order to raise waste separation awareness. Shopping bags were allowed to use after using up all the distributed waste bags.

The place of waste discharge was changed from TPS to waste discharge points (waste station, or Halte Sampah), whose location had been determined by the community. The use of the TPS was prohibited.

b. Separate Collection

The planned amount of waste collection was calculated using data of 2015. The waste generation rate at 558 g/person/day, obtained from the waste amount and composition survey, and the population of the site (4,763 people) gave 2.66 ton/day of waste generation amount. In calculating the waste collection amount, it was assumed that 10 % of inorganic waste would be collected with organic waste.

Table 7-8 Planned Waste Amount

Items	Unit	Quantity		Notes
Gunung Bahagia	Person	22,768		
Target population	Person	4,763	= A	2015
Generation rate	g/person/day	558	= B	
Waste generation amount	ton/day	2.66	= A*B=C	
Organic waste	ton/day	1.51	= C*56.9% = D	
Inorganic waste	ton/day	1.15	= C-D = E	
Wet waste	ton/day	1.63	= C+E*0.1 = F	Incl. 10% of inorganic waste
	ton/operation	2.28	= F*7/5	5 days a week
Dry waste	ton/day	1.04	=E*90%=G	
	ton/operation	7.25	= G*7	

The width of most of internal roads of the pilot area was 4-6 m and it was confirmed that the small truck same as one owned by DKPP (1ton/5.3m3 of loading capacity) could run through, and such small trucks were selected as collection equipment. Assuming the specific gravity of organic waste (0.5 ton/m3) and other inorganic waste (0.2 ton/m3), it was calculated that organic waste collection would need three trips (1.5 hours) while other inorganic waste seven trips (3.5 hours).

Organic waste collected by the small trucks were transferred to a big dump truck at the TPS-3R, while other inorganic waste were delivered to the TPS-3R for material recovery.

Waste collection time was scheduled in the morning and adjusted so as to collect waste within one hour after waste discharge.

(c) Support for the Reactivation of Waste Banks

In the site, there were one waste banks in RT27 and also in RT26 later on. The former was built by DKPP and operated by the community, but its activity was stagnant due to the poor transparency of accounting and operation rules. It was necessary to re-build the trustful relation between the communities and to activate it as part of community-based 3R. To begin with, the operation manager of the waste bank and the Keluraha chief had meetings, but it was still difficult to recover residents' confidence, and the price slump of used plastics further made it hard to activate the bank.

The latter one in RT 26 was newly established with a support of NGO Walibar at the end of December 2014. This waste bank has been also influenced by the price decline, but it kept its activity only intermittently, though.

(d) Waste Separation at the TPS-3R

From the other inorganic waste delivered to the TPS-3R, salable items such as plastics and cardboard were extracted and sold to traders. The residue was transported to the TPA.

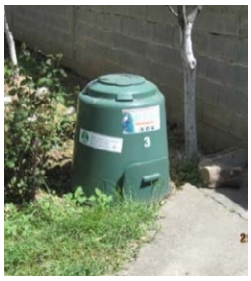
As stated in (7), specific hazardous items were also separated.

(e) Promotion of Home Composting

In the PP area, detached houses with gardens were popular. Because of this, ground-type composters, which are placed on the ground directly, were planned to be promoted as one of the options, in addition to Takakura type, which had been popular in Indonesia.

The number of households in the area was 1,597. Aiming at 5% of households utilizing home composters, the city procured 50 Takakura-type and 50 ground-type composters by the budget of fiscal year 2015. By the end of the 13RT SS-PP (end of January, 2016), however, no composters were distributed.






Takakura Type Composter	Ground Type Composter

(f) Awareness Raising

BLH trained at least five environmental cadres for each RT in the site which has 13RT in total, and the cadres instructed to the neighbors to separate and store waste at home, to follow the discharge schedules and to encourage the use of home composters.

(g) Separation of Hazardous/Toxic Waste

KLHK is preparing the regulation on specific hazardous and/or toxic waste and will list up various hazardous and toxic waste. As it is not finally issued, the SS-PP specified dry batteries, fluorescent lamps, and thermometers using

mercury as hazardous waste, and stored them in a plastic drum at the TPS-3R. When the drum became full with these waste, it will be conveyed to the TPA, and DLH will manage it in the isolated compartment to avoid contamination to other waste at TPA.

Figure 7-15 Three Types of Hazardous/Toxic Waste Specified

(h) Monitoring and Evaluation

The baseline of the SS-PP was studied as shown in the table below. The PP monitoring is also outlined in the same table.

Data collection for the monitoring was done, during the 13RT SS-PP, by the local project staff hired by JICA by contacting with TPS-3R workers and the waste bank operators.

Table 7-9 Baseline Survey and Monitoring Plan

Items	Baseline survey	Monitoring
Timing	• By the end of March, 2015	• After commencement of PP (April, 2015 – March, 2016)
1. Basic data	• Population, Number of households • Number of waste generation sources to estimate waste generation amount in the pilot site	
2. Final disposal amount	• Final disposal amount transported from the PP site during one week before commencement of PP (weighbridge data at TPA)	• Waste amount to be transported from PP site to TPA (TPA's weighbridge data)
3. Salable items collection amount	• Amount of salable items which Waste bank sold • Amount of salable items collected at TPS-3R (sale amount obtained by the records)	• Amount of salable items sold by Waste Bank • Amount of salable items sorted and sold at TPS-3R
4. Compost amount	• To be estimated from the number of households using home composter.	• Same as the left
5. Separation manners	• None	• Observation at waste stations to see to what extent waste is properly separated
6. B3 collection amount	• None	• Amount of B3 waste collected at TPS-3R

7-2-5 SS-PP in Whole Kelurahan Gunung Bahagia

In parallel with the PP in 13RT, the C/P prepared for the expansion of the PP to whole Kelurahan Gunung Bahagia, which had 57 RTs.

The main features of the source separation and collection system to be implemented in 57 RT are as described below and illustrated in Figure 7-16.

- As in 13RT, waste collection stations are located in the residential area and household waste and household-

like waste from business activities are discharged at the waste collection stations.

- Waste discharge at the waste collection stations should be from 7:00 to 9:00 on designated days of the week of each zone. The collection of organic waste is 5 days of a week and that of other waste once a week. DKPP's waste collection starts at 9:00 with a small truck.
- Collected organic waste is transferred to a waste container from the small trucks at the TD in the PP area and transported to the TPA.
- Collected other waste is brought to the MRF in the PP area and recyclable items in the other waste are recovered. The residue goes to the TPA using waste containers and arm-roll trucks.
- Household-like waste generated by the relatively small business entities along the main streets are collected according to the collection rules applied to each zone where those entities are located.
- Business entities which produce large amount of waste (more than 1 m^3 per day) should bring waste to the TPA by themselves or by entrusted third parties instead of using the communal TPS according to the city ordinance. With an intention of transportation cost saving and an economic incentive, it is assumed that the source separation and recyclable waste trade have been taking place at maximum extent. Accordingly, the expansion of the PP do not interfere the waste flow of such large waste generators.

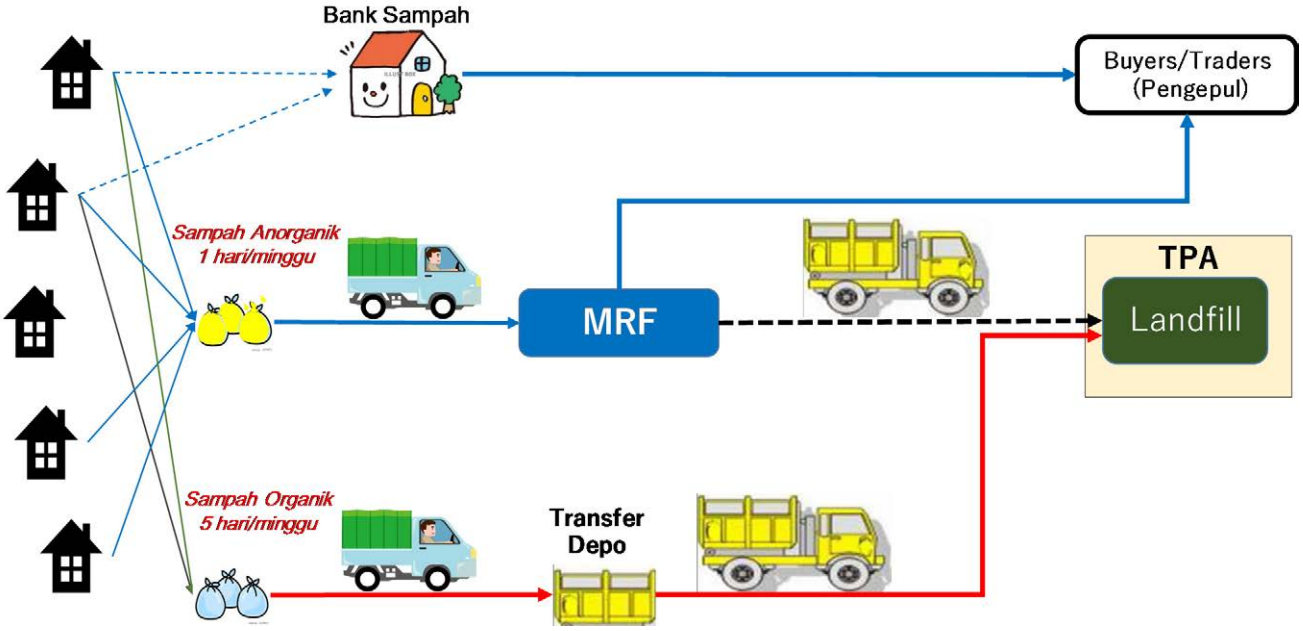


Figure 7-16 Source Separation and Separate Collection System in Kel. GB

(1) MRF Development and Equipment Procurement

MRF was constructed with the city budget by renovating the former traditional market and a belt conveyor was installed in the center. As it was built of wood, some of the pillars needed reinforcement.

The area was 750m2 (25m x 30m) and the facility layout plan was developed by the JICA short-term expert from the on-site observation as shown below. The city, based on this plan, secured the budget from the budget of fiscal year 2015 and started renovation in April. The renovation work was carried out by Department of Public Works (Dinas PU) of the city and equipment such as wired containers and a belt conveyor were procured by DKPP as scheduled by December 2015.

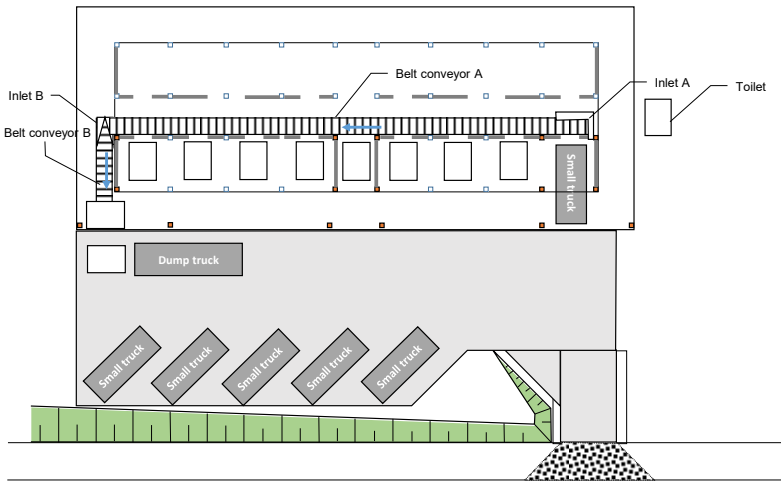


Figure 7-17 Layout Plan of MRF

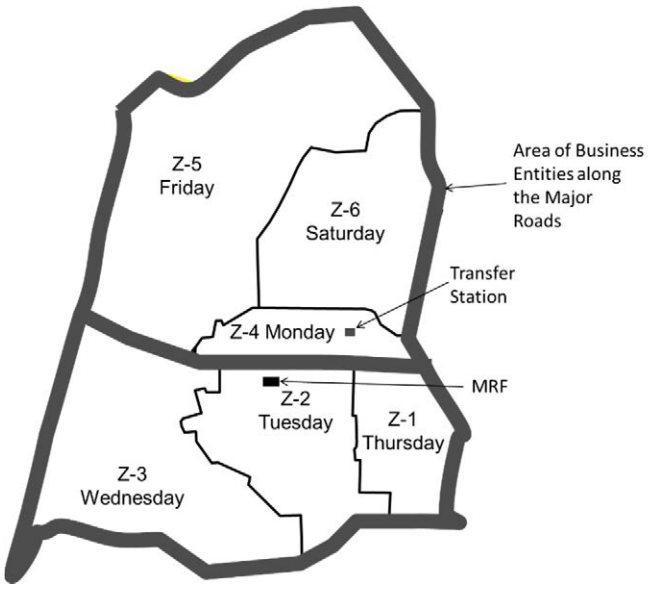
MRF after the Renovation

Belt Conveyor Installed in MRF

(2) Waste Collection Zoning, Public Awareness Raising and Determination of Waste Station Location

To collect two types of waste on different days of week, 57RTs were divided into 6 zones. The zoning and waste collection schedule of each zone are shown in Figure 7-18.

Further, BLH trained five environmental cadres for each RT, or about 250 cadres in total, and informed the new waste collection system to the residents through the cadres and/or by having RT meetings. Each RT determined the location of waste stations, while the city closed the existing TPS in the Kelurahan.



Z-1 is the area of 13RT SS-PP, and its collection schedule did not changed after PP expansion.。

Figure 7-18 Six Collection Zones in 57RT and the Days of Other Waste Collection

(3) MRF Operation Structure

The figure below is the organization chart for MRF operation (as well as waste collection within the PP area and waste haulage to TPA).

An officer of DKPP works as a MRF coordinator, who takes care of its whole operation. Most manpower including sorting workers and security is hired by DKPP on a contract basis. BAPPEDA, DKPP and BLH will act as advisors to the MRF coordinator.

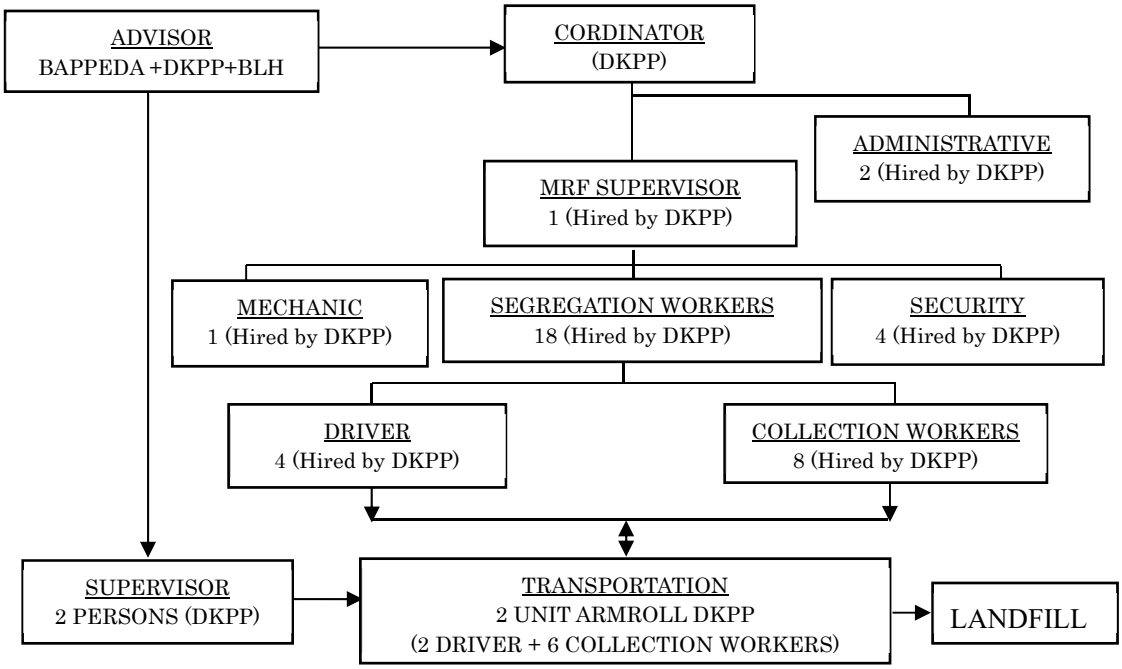


Figure 7-19 Organization Chart to Operate MRF and its Affiliating Waste Collection

Newly employed sorting workers and waste collection workers attended trainings by DKPP on 27 and 28 January 2016, where they leaned the waste collection system in the extended PP and operation procedure at MRF.

	
MRF workers unloading “Other waste” in rice sacks at MRF	Recovered materials to be bound according to the types

(4) Material Recovery at MRF

In the MRF, nine types of waste were extracted from the delivered waste (paper 1, paper 2, plastic cups, plastic bottles, other plastics, can, glass, hazardous items and others), and these were further segregated into 39 items.

Table 7-10 Waste Classification at MRF

Category	Sub-category	Category	Sub-category
Paper I	Carton	Can/Steel	Can
	Duplex		Iron (porous)
Paper II	Magazine		Iron (super)
	White paper (HVS)		Soft drink can (aluminium)
	Blur paper	Glass Bottle	Big glass bottle (soy sauce)
	Newspaper		Big glass bottle (bintang beer)
	Mix paper		Small glass bottle (bintang beer)
Plastic non Bottle	Emberan (thick plastic)		Glass bottle
	Kerasan (Hard plastic)		Glass bottle (guinness)
	Blowing (thick plastic)		Red wine glass bottle
	Ps Bening	Others	Aluminum
	DVD Cassette		Aluminum Super
	Wrapping oil (plastic)		Copper (Clean)
Plastic Cup	Soft drink cup		Copper (Dirty)
	Cup (clean)		Gallon bottle
	Cup (dirty)		Egg plate
	Bottle cap (Blue)	B3	Battery, Fluorescent lamp, Clinical thermometer containing. mercury
	bottle cap (Mix color)		
Plastic Bottle	Plastic bottle (clean)		
	Plastic bottle (dirty)		
	Plastic bottle (colored)		
	Jerry can (White)		
	Jerry can (colored)		

(5) Monitoring System

The monitoring system in the expanded PP was almost the same with the PP in 13RT, but the persons in charge were re-assigned in order to ensure the data collection by the C/P. The data collected by each assigned persons were integrated by DLH.

Table 7-11 Monitoring System of Expanded PP

Types of Data	Collected by	How to Collect Data
Final disposal amount of organic waste from the transfer station	DLH	From the truck scale record, the vehicle registration number of the trucks assigned for the PP should be identified. (Frequency: every day (but data collected monthly)
Final disposal amount of residue from MRF	DLH	Ditto (Frequency: every day)
Material recovery amount at MRF	MRF Director (DLH)	From the sales record of recyclable trade (Frequency: every time of trade)
Material recovered at waste banks	DLH	Data of trade at the waste banks are collected. (Frequency: every

Types of Data	Collected by	How to Collect Data
in the PP area		month)
The number of households who is composting organic waste at home	DLH	Information will be occasionally collected from RT leaders, environmental cadres and/or Kelurahan leader. Home composters provided by the city will be monitored after distribution. (Frequency: every month)

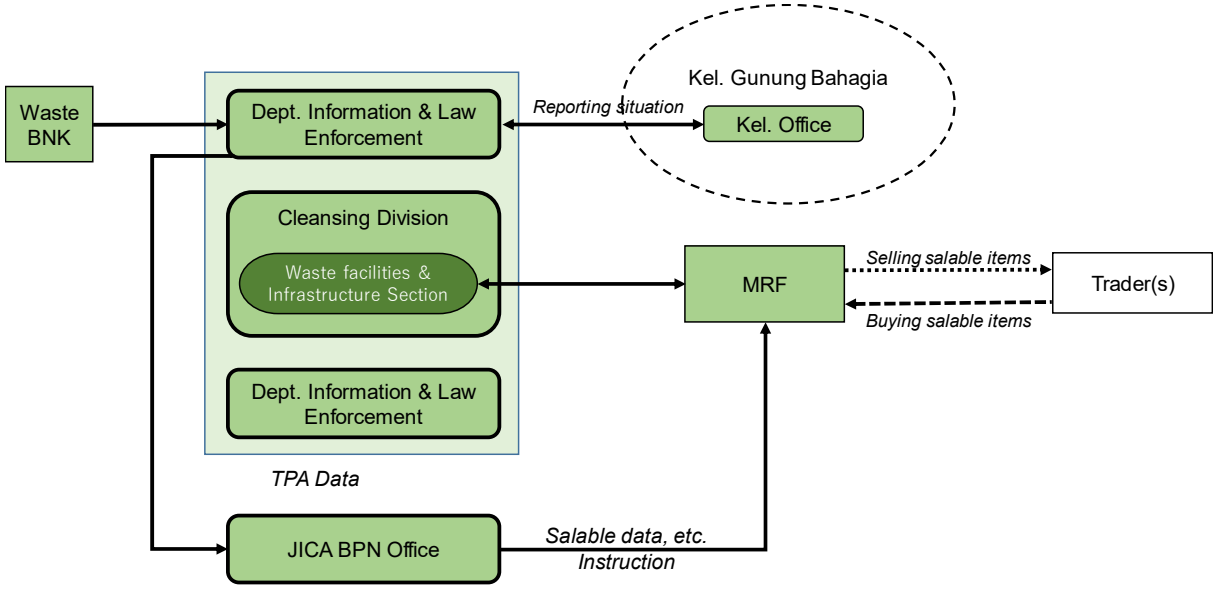


Figure 7-20 SS-PP Monitoring System of Balikpapan City

(6) Separate Collection and Start of MRF Operation

Following the implementation plan, Balikpapan City procured three small trucks for waste collection (4 trucks in total). The city, by the end of January 2016, employed collection workers (four drivers and eight collection crews) and MRF workers (one chief, one administrator, one O&M technician, 13 segregation workers, two guards and 10 other staff) for a limited term. The city also appointed transportation staff (belonging to DKPP, three for arm roll trucks) and established the SS-PP implementation system with 43 personnel. The training to the MRF workers was given on 27 and 28 January 2016, with attendance of the JICA short-term expert.

DKPP started separate collection and material sorting at MRF on February 1, 2016. However, the use of the belt conveyor at MRF started on February 6 because of the necessity of adjustment of the conveyor and the physical modification of the inlet and outlet. DKPP also tried to have the electricity connected to PLN (power company), but its work was supposed to take 4 weeks.

Balikpapan city hold an inauguration ceremony of the MRF with attendant of City Mayor on February 21, which is the “Waste Day” of Indonesia. This ceremony was part of Waste Day Event organized by KLHK, and the waste management activities in Balikpapan was introduced to the event site in Jakarta through TV connection between the Balikpapan City Mayor and the Minister of KLHK in Jakarta.

	
Inauguration Ceremony	Waste sorting on the belt conveyor

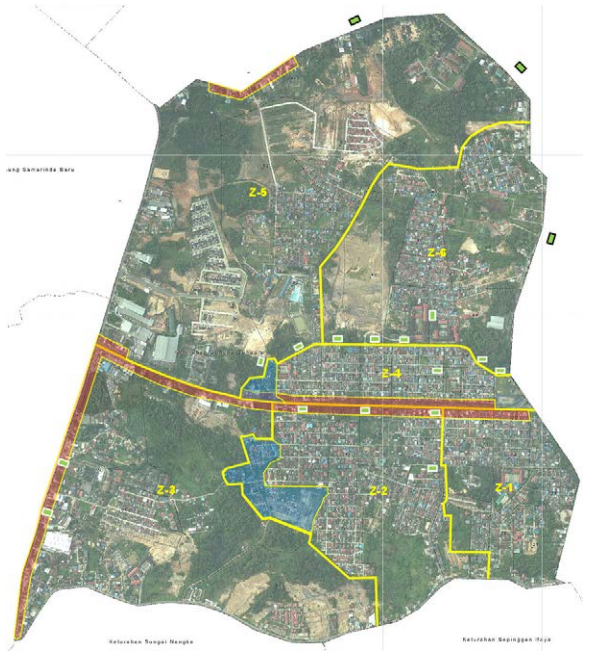
Although once started in this way, the operation using the belt conveyor was suspended due to several reasons; the delay of electricity works, malfunction of the belt conveyor, and the high composition of organic waste in the delivered waste collected as other inorganics. The recovery works were carried out not on the belt conveyor but on the trucks when the waste was transferred from the small truck to the waste container with the capacity of 6m3. The material recovery using the belt conveyor practically started when the curbside collection system was introduced and waste sorting manner was improved.

(7) Change of Waste Collection Zone

Based on the experience in the 13 RTs (RT18-RT30), separate collection in the whole Kelurahan started on 1 February 2016 with an aim to develop the skillful workers, and the SS-PP in Kel. GB was officially launched on 21 February with a witness of the City Mayor. The area was divided into six zones, and one of the four small trucks should collect only other inorganic waste from Monday to Saturday in different zones every day throughout the week, and the remaining three trucks should only collect organic waste in the organic waste collection zones of the day. It was found, however, that the four trucks did not follow such collection plan but divided the Kelurahan into four with roughly same waste amount. Each truck did waste collection in the one same area every day. The area assigned to each truck included two or more waste collection zones and this caused the situation where one truck collected organic waste and other inorganic waste together. Accordingly, source separation turned to be vain.

As a result of series of discussion with collection workers and DKPP officers, it was concluded that six zone collection should be changed to four zone collection. In six zone collection the drivers had to change the collection routes every day, while the four zone collection was very simple as one truck served for one same area. The former was considered more realistic than the latter.

Table 7-12 Comparison between Four Zone Collection and Six Zone Collection

<table>
<tr><th>Six Zone Collection</th><th>Four Zone Collection</th></tr>
<tr><td> 
</td><td> 
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<tr><td>Collection schedule
O: Organic waste,
R: Other inorganics including recyclable waste
<table>
<tr><th>Zone</th><th>Mon</th><th>Tue</th><th>Wed</th><th>Thu</th><th>Fri</th><th>Sat</th><th>Sun</th></tr>
<tr><td>1</td><td>O</td><td>O</td><td>O</td><td>R</td><td>O</td><td>O</td><td></td></tr>
<tr><td>2</td><td>R</td><td>O</td><td>O</td><td>O</td><td>O</td><td>O</td><td></td></tr>
<tr><td>3</td><td>O</td><td>R</td><td>O</td><td>O</td><td>O</td><td>O</td><td></td></tr>
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<tr><td>Commercial</td><td>O</td><td>O</td><td>O</td><td>O</td><td>O</td><td>O</td><td>O</td></tr>
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<table>
<tr><th></th><th>Mon</th><th>Tue</th><th>Wed</th><th>Thu</th><th>Fri</th><th>Sat</th><th>Sun</th></tr>
<tr><td>Zone 1</td><td>O</td><td>O</td><td>O</td><td>R</td><td>O</td><td>O</td><td></td></tr>
<tr><td>Zone 2</td><td>O</td><td>R</td><td>O</td><td>O</td><td>O</td><td>O</td><td></td></tr>
<tr><td>Zone 3</td><td>O</td><td>O</td><td>O</td><td>O</td><td>R</td><td>O</td><td></td></tr>
<tr><td>Zone 4</td><td>O</td><td>O</td><td>R</td><td>O</td><td>O</td><td>O</td><td></td></tr>
<tr><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr>
</table></td></tr>
<tr><td>MRF Operation Days: Monday-Saturday</td><td>MRF Operation Days: Tuesday-Friday</td></tr>
</table>

(8) Ensuring the Discharge Rule

Prior to the expansion of the SS-PP to the whole Kelurahan, BLH trained the 232 environmental cadres of Kel. GB by giving lectures about waste items, discharge rules and waste collection rules from October 2015 to January 2016. But only a few environmental cadre conducted awareness raising activities to the residents, so the waste discharge rule did not disseminate thoroughly. The waste discharge behavior of the residents was not adequate and waste were mostly mixed. The rule of waste discharge time was not obeyed either, and some of the waste stations became similar to TPS, where waste was found at any time.

To combat to this unsatisfactory condition, JICA procured waste bags in different colors for four zones at the time of system change. The JICA expert also proposed the introduction of the bell collection system, were waste collection trucks play music during the collection work, and the city agreed. Two melodies were prepared, one being for other inorganic waste collection and the other for organic waste collection. In practice only the melody for other inorganic waste collection was used to avoid confusion.

Waste Discharge Bags with Different Colors According to the Zone
JICA provided 6,000 bags in December 2016, and did so another two times in February and March 2017.

(9) Introduction of Curbside Collection

In order to avoid the organic waste from being brought to the MRF, the JICA expert, collection workers and drivers together chose 12 RTs to start the curb-side collection system. In this system, the waste generators discharge their waste according to the discharge rule in front of their houses and the collection workers collect waste along the curb-side. When organic waste is mixed in recyclable waste, such mixed waste will remain not collected but only recyclable waste without organic portion will be collected and brought to the MRF, where the belt conveyor can be operated as expected. In this system, it is also effective to enforce the proper discharge rule by rejecting the mixed waste.

(10) Implementation of Four Zone Collection and Curbside Collection in 12RT

The four zone collection system in (8) and the curbside collection system in (10) started on December 8, 2016.
The JICA short-term expert observed the project activities from January 9 to February 4, 2017, and found the following.

(a) The better source separation, the more recyclable recovery.

In SS-PP which expanded to the whole Kel. GB, source separation and separate discharge were not thorough and most of the recyclable waste was discharged as mixed waste. For this reason, salable item extraction had been done by collection workers when they were transferring mixed waste to containers at MRF.
JICA experts compared the two data of material recovery amount by converting them into recovery amount per person per day. One was the recyclables amount sorted from the mixed waste during waste transferring to the container, and the other was that the recyclables amount sorted from the recyclable waste forcibly separated by curb collection in 12 RTs by using belt conveyer, in addition to the conventional way. The recyclables amount from mixed waste adopts the average value from June to November 2016, when the workers involved in SS-PP became accustomed to work and the sorting volume stabilized. The other recyclables amount data was from the value in December 2016.

Table 7-13 Increase in Material Recovery

Material recovery amount at MRF		Material recovery amount per person per day	Note
1. June – November (183 days)	6,337.4 kg/month	2. 12.659 g/person/day	Whole Kel. GB (16,687 persons)
3. December	7,576.5 kg/month		Separate discharge is forced in 12 RTs
4. Increase (3 - 1)	1,239.1 kg/month	5. 12.242 g/person/day	Increased amount in 12RT (3,265 persons)
6. = 2 + 5		24.901 g/person/day	Recovery amount per resident in 12RT

Material recovery amount per person per day in the PP site from June to November was 12.659 g. Assuming that the increase of 1,239.1 kg (= 7,576.5 - 6,337.4) in December is due to improved waste separation practices in 12 RTs, the increase of material recovery amount per person per day in 12 RTs (3,265 persons) becomes 12.242 g. In other words, the amount of material recovery per person per day in 12 RTs is 24.901 g, which is about twice as large as in November. Clearly the material recovery amount will increase as a result of practice of appropriate separate discharge.

(b) Source separation still needs improvement.

In the 12 RTs where curb collection being provided, the generation amount of salable items was estimated to be 0.3 ton / day, therefore, it was expected that 2.1 tons (643 g / person / day) of salable items accumulated for one week was recovered on the other waste collection day. On the other hand, the material recovered amount in December was 24.9 g / person / day, only about 4% of material was recovered. This meant that the residents of 12 RTs were separating recyclable waste and discharging it only on the other waste collection day, but it was also incomplete. It seems that recyclable waste is also discharged together with organic waste. Source separation and separate discharge of the residents in SS-PP site were still at a very low level, so further public enlightenment seemed necessary.

(c) Curbside collection from the viewpoint of drivers and collection crew

The drivers and collection crew considered the curbside collection as follows.

(Advantages)

- Collection work is easy.
- It is clean and sanitary.

(Disadvantages)

- The collection crew have to work long distance.
- Fuel consumption is higher than station collection system.
- It takes more time compared to the collection work at the station with properly discharged waste bags.

As shown above, the curbside collection had improved the waste awareness to some extent, but not satisfactorily. This is presumably because of the difficulty to strictly execute the waste return rule (not to collect improperly separated waste), which is further attributed to the facts that the collection workers are often looked down and hesitate to leave improper waste and that the collection workers thinks waste return rule only end up with more waste next day.

The curbside collection system was introduced only for the awareness raising purpose. As its awareness raising effect was not high as expected and it forced had work of collection crew, it was changed back to the station collection system in August 2017.

(11) Development of Transfer Deport (TD)

In the original plan, only inorganic waste should go to MRF and organic waste needed to be moved to containers at the Transfer Deport (TD) and transported to the TPA. However, the planned location of the TD was formerly the place of TPS and the neighboring residents often discharged waste. Therefore, the organic waste transfer to the 6m3 containers was carried out not at the TD but at the MRF. To make the TD functional as supposed, the waste discharge practices of the residents must be stopped, and a gate was considered necessary. As the city budget of 2016 was not available for this purpose, JICA decided to allocate its budget for gate construction.

Based on the outline design prepared by the JICA short-term expert, JICA contracted out the gate construction at the TD to the contractor, which was selected by DKPP. The construction started on 23 November 2016, and the JICA short-term expert inspected to check the work completion on 13 December. The expert instructed the contractor to manage such problems as (i) insufficient wall thickness, (ii) unfixed rails of the gate and (iii) defect of the pillar on the right. The expert inspected again on 24 January 2017, confirmed that those issues were solved, and approved the work completion.

For the TD to be functional adequately, its ground must be flat and paved so that the containers can be smoothly uploaded and downloaded. This work was planned to be done by the city, but the budget for the work was not scheduled in the budget of 2016, and the city put it off until 2017. In the C/P meeting in January 2017, it was confirmed that DLH would complete the paving work by the end of February.

Gate of Transfer Deport

The TD finally started to be used in April 2017. Since then, organic waste has been delivered to the TD and transported to the TPA. Furthermore, after the commencement of TPST operation due in October 2017, organic waste will be transported to the TPST.

(12) Home Composting

The SS-PP also expected waste reduction by the dissemination of home composting activities. The city purchased 100 composting tools (50 Takakura baskets and 50 ground-type bins) in 2015. For home composting dissemination, BLH was expected to select some households with interest in home composting and to give them training, but BLH did not do so, and there was no households to be trained as of the end of 2016. In order to get ready for the future opportunity of giving instructions to interested residents, the JICA short-term expert decided to transfer the methodology of the use of ground-type composting bins to the cleaning staff of DLH and maintenance workers.

On January 24, 2017, the compositing bins stored at TPA were moved to DLH and on January 26 the workers placed two bins in the backyard of DLH. Cooperation was asked for three restaurants nearby for the provision of organic waste. The JICA local staff and the workers are together maintaining the compost bins.

As of September 2017, there are 21 home composters of ground type distributed and each is used by several households.



After preparing the land with round garbles, the ground-type composting bins we placed. The composting bins are made from waste bins.

(13) TPST

The PUPR's construction work of TPST started in 2015 and its operation was planned to start by the end of 2016. The work was, however, delayed due to financial shortage. According to what the Balikpapan city has been informed, the construction work will finish by the end of September 2017, test operation and worker training will be carried out from October to December with a support of PUPR, and the full operation by the city start in January 2018. Accordingly, the city has been transporting the organic waste delivered to the TD to the TPA.

7-2-6 Monitoring Results

The result of monitoring from July to December 2015 of the pilot project in 13RT was as shown below.

Table 7-14 Waste Flow Data in 13RT (July-December 2015)

(1)	Waste generation amount	9.56	Average from July to December 2015
(2)	Recyclables collected	0.41	
	(2)-1 By waste banks	0.02	Average from July to December 2015
	(2)-2 Recovery at TPS-3R		
	(i) At TPS-3R	0.13	Average from July to December 2015
	(ii) from waste collected on "organic waste collection days"	0.12	Average from July to December 2015
	(2)-3 Sold to traders	0.05	4.9% of households sell recyclables to traders.
	(2)-4 Given to Waste pickers	0.05	5.0% of households give recyclables to waste pickers.
	(2)-5 By communities	0.02	Average from July to December 2015
	(2)-6 Recyclables stored	0.01	Some recyclables are stored in the area.
(3)	Organic waste recycling		
	(3)-1 Home composting	0.02	0.00171 ton/person/week x 4.66 person/household x 2 households
	(3)-2 TPST		
(4)	Others		
	(4)-1 Waste reduction effect by the introduction of source separation	0.96	
(5)	Waste reduction total	1.39	
(6)	Waste reduction rate = (5) / (1)	14.5%	
(7)	Waste taken out from the 13RT	0.83	61.0% of households in the area discharge waste even on Sunday.
(8)	Final disposal amount	7.34	Average from July to December 2015

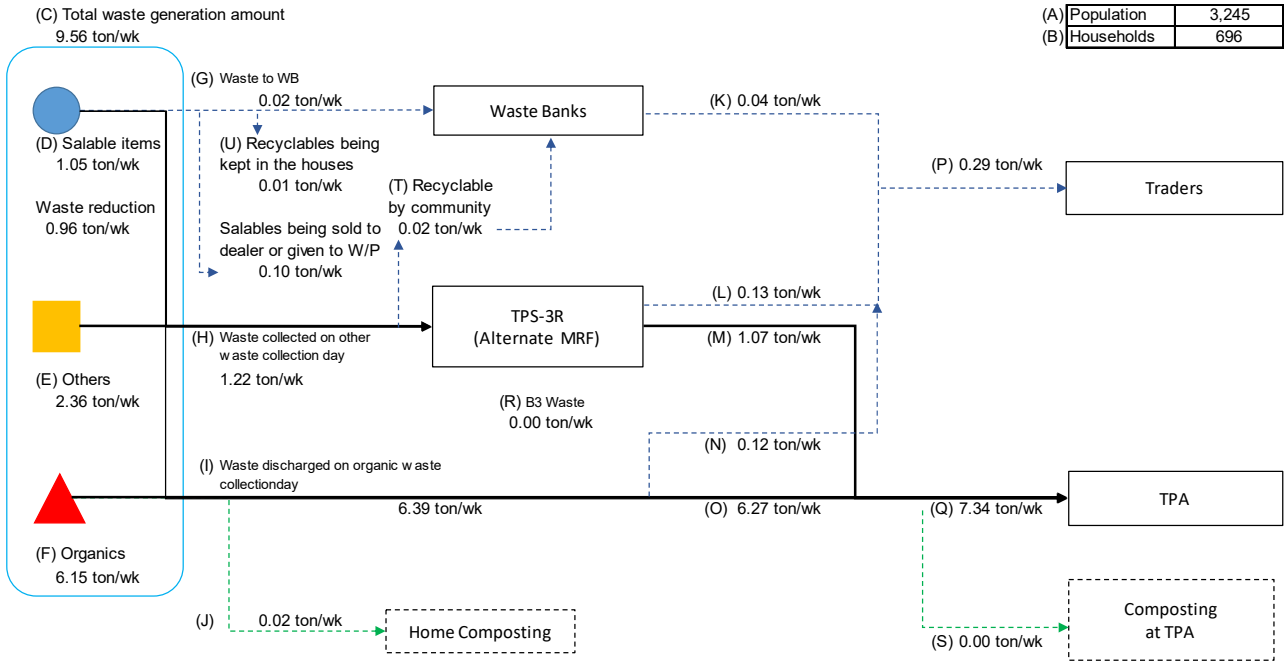


Figure 7-21 Waste Flow Data in 13RT (July-December 2015)

a. Calculation using the result of Questionnaire Survey

On the table above, "(2)-4 Sold to traders", "(2)-5 Given to waste pickers" and "(7) Waste taken out from the 13RT" are the figures calculated from the following result obtained from the questionnaire survey carried out in October 2015.

- 61% of households answered that they discharge waste every day. Since the PP does not provide collection service on Sundays, those households are supposed to discharge waste outside of the PP area on Sundays. Therefore, 61% of waste generated on Sundays (waste generation amount / 7 days x 61%), i.e. 0.83 ton/week, is considered to be taken out from the area ((7) of the table above).
- 2-7.7% of households (depending on types of waste items) sell recyclables to traders by themselves, and about 5% of households give recyclables to waste pickers. Salable items account for 11.3% from the results of WACS in 2015. Therefore, salable items traded or given by the households were calculated as below.

  Waste to traders: Waste generation amount x 11.3% x 4.9% (average of 2% and 7.7%)

  Waste to waste pickers: Waste generation amount x 11.3% x 5%

b. Result of Monitoring

The PP has been monitored since 13 April 2015. However, data taken during the first three months were not considered reliable enough due to improper data collection. Data taken since July were used for the drawing of waste flow and the calculation of waste reduction rate.

The amount of recyclables collected at TPS-3R, recyclables traded at waste banks and final disposal amount from the PP area are all measured by scales.

c. Examination of waste unidentified

Using the data of (1), (2)-1, (2)-2, (2)-3, (2)-4, (2)-5, (3), (7) and (8), the waste flow in the PP area was calculated, but the destination of 0.97 ton/week of waste could not be identified. Since illegal dumping was not observed in the PP area, the existence of unidentified waste was considered to be attributed to waste storage or waste generation reduction due to the promoted waste reuse and/or waste dewatering as a result of instruction of source separation.

The JICA experts visited an RT where is a waste bank and another where recyclables are separated by the community, and asked the environmental cadres about the situation. It was found as shown in the following photos that some salable items had been stored until they reached to a certain volume or their price rose to an expected level due to the fact that the oil price, hence recyclables' price, had remained low. Therefore, it was concluded that part of unidentified waste was the waste stored in this manner. The amount of stored waste was estimated at the half of waste amount traded by the waste banks, i.e. 0.01 ton/week ((2)-6).

	
The community in RT24 is storing recyclables, which were taken from waste discharged on "other waste collection days". They sell it to NGO Walibar, which are leading waste banks, when the volume of recyclables is large enough.	The waste bank in RT25 is storing recyclables in storage due to low price of recyclables.

Remaining 0.96 ton/week of unidentified waste was considered to be caused by the waste generation reduction effect brought by the introduction of source separation, which has been also experienced in some municipalities in Japan. This amount is about 10.1 % of waste generation amount.

For verification, the case in Yokohama City in Japan was taken as reference.

Yokohama City introduced source separation and separate collection in 2003 for waste reduction. The amount of household waste (including recyclable items) from April to August 2005 was 344,000 ton, which is less than that in 2001 by 60,000 ton, or 14.9%. Therefore, unidentified waste, which is 10% of waste generation, will be reasonably considered to be the waste generation reduction.

In case of Yokohama City, it is also reported that source separation activity has encouraged the communication among families and communities as a secondary effect. This may also appear in the PP area.

As a result, the waste reduction rate in 13RT through the PP-SS was 14.5%. The waste reduction activities in 13RT have the following points for improvement.

- According to the city-scale WACS carried out in 2014, the proportion of recyclable waste (paper, PET, metal and glass) in household waste was 26.03%. On the other hand, in the WACS in 2015 carried out only in the 13RT, only waste items which were recyclable in terms of material and salable in terms of condition

were categorized as "Salable Items" (indicated as D in Figure 7-21), and its proportion was about 11%. These imply that not a small proportion of waste, which are recyclable in terms of material, are too poor in condition due to the contamination with foreign or organic fraction to be cauterized as "other waste". This further suggests that it is important to improve the source separation behavior.

- Among the arrows shown in Figure 7-21, Arrow L is the recyclable amount recovered on "other waste collection days" and Arrow N on "organic waste collection days". According the monitoring results from July to December 2015, those two show close figures. This means, half of recyclable and salable waste is found in "organic waste".
- In the WACS in 13RT, recyclable and salable waste accounted for 24.8% of waste discharged on "other waste collection day". This figure and Arrow H in Figure 7-21 suggest that recyclable and salable waste that could be recovered from waste delivered to TPS-3R on "other waste collection day" is 1.22 ton/week x 24.8%＝0.32 ton/week. Further, this figure and Arrow L tells that the recyclable recovery rate at TPS-3R is 0.13/0.31＝42%. This is not very high probably because recyclable recovery work is done from a pile of waste and all the recyclable items are not visible.

7-2-7 Monitoring Results of Extended SS-PP

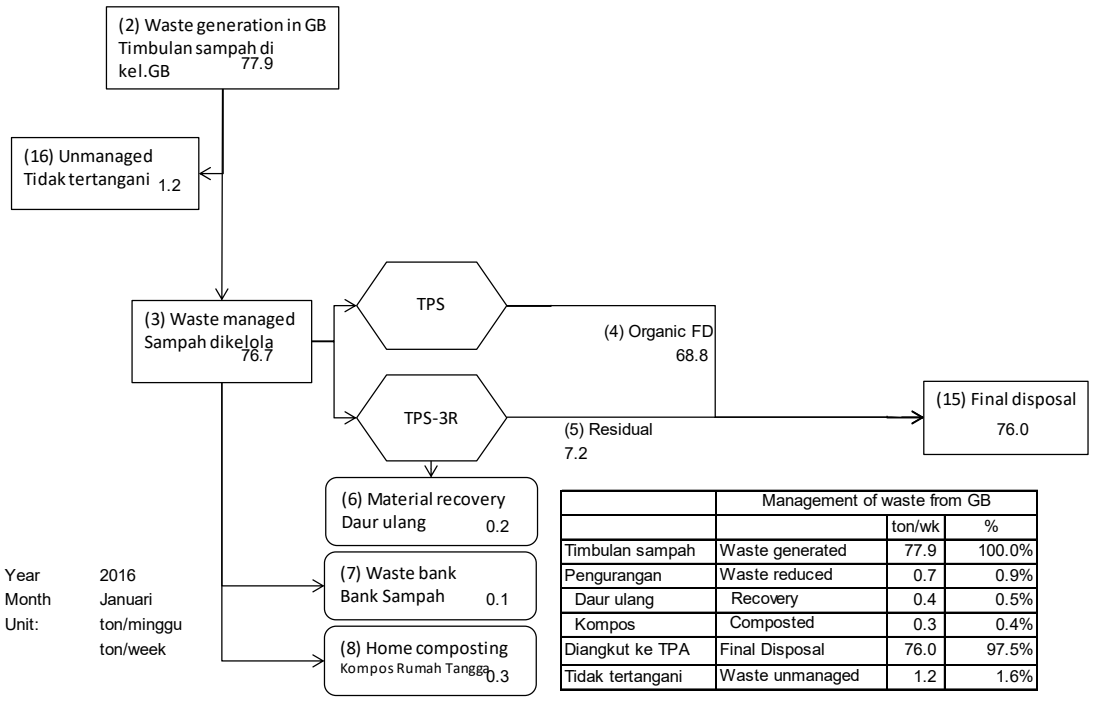
(1) Baseline Survey

During a week from 25 to 31 January 2016, DKKK carried out a baseline study whereby the disposal amount of waste from TPS in the extended PP area excluding 13RT was recorded. As a result, it was calculated to be 9.83 ton/day on average (or 68.8 ton/week). In January 2016, the amount of final disposal of waste from TPS-3R was 7.2 ton/week. Therefore, the total amount of final disposal from the extended PP area was 76.0 ton/week.

The average weekly amount of recyclable recovered at TPS-3R and the waste banks was also calculated from monitoring record.

To estimate the amount of waste generation, the waste generation rate of 2016 was first estimated using the figure 468 g/person/day obtained from WACS at the commencement and at the end of impact study in 13RT. This was multiplied with population to obtain waste amount from household. It should be noted that the expanded system includes household like waste from business entities unlike the case in 13RT. The ratio of household waste and household like waste was obtained from the result of WACS in 2014, and this ratio was used to estimate the total waste generation amount including household and household-like waste. It turned to be 77.9 ton/week.

As a result, the waste flow just before the PP expansion to 57RT (or baseline flow) is estimated as below.



	Management of waste from GB		
		ton/wk	%
Timbulan sampah	Waste generated	77.9	100.0%
Pengurangan	Waste reduced	0.7	0.9%
Daur ulang	Recovery	0.4	0.5%
Kompos	Composted	0.3	0.4%
Diangkut ke TPA	Final Disposal	76.0	97.5%
Tidak tertangani	Waste unmanaged	1.2	1.6%

Figure 7-22 Baseline Waste Flow of Whole Kelurahan Gunung Bahagia

(2) Monitoring Results from February 2016 to May 2017

(a) Material Recovery Amount at MRF

At the MRF, nine categories of waste (which was eight in the first six month as “other waste” and “hazardous/toxic waste” was a same category) have been segregated and they are further classified into 39 kinds. Each waste group is measured by the scale installed by JICA.

As mentioned earlier, waste separation work at the MRF took place during waste transfer from the small collection trucks to the containers from February to the beginning of December. Since December 8, recyclable waste collected by curbside collection in the 12 RTs has undergone waste separation on the belt conveyor, while recyclable items mixed in organic waste has been separated in the same way as before. All the salable waste segregation processes were at the MRF and measured there. Since April 2017, when the TD started operation, salable items segregated at the TD has not been recorded.

Table 7-15 Amount of Each Separated Items at MRF (kg/month)

Year	Month	Paper I	Paper II	Plastic Cup	Plastic Bottle	Plastic non Bottle	Can/ Steel	Glass Bottle	B3 (Hazardous/ Toxic)	Others	Total*
2016	2	492	1,264	140	872	932	620	0		154	
	3	505	1,458	93	848	993	486	0		206	
	4	341	1,093	55	569	658	234	19		235	
	5	434	1,180	51	573	686	297	60		160	3,440
	6	981	2,262	114	855	1,031	286	167		322	6,018
	7	1,159	2,801	161	929	911	411	138		231	6,740
	8	692	2,283	163	1,419	831	451	199	16	282	6,335
	9	555	2,183	199	1,481	775	460	206	5	255	6,117
	10	665	2,140	234	1,513	844	609	200	9	258	6,470
	11	608	2,409	235	1,363	807	562	110	5	247	6,345
	12	814	3,271	214	1,172	1,002	581	208	6	310	7,577
2017	1	832	3,373	249	1,429	1,142	698	249	7	330	8,308
	2	532	2,941	175	1,180	923	651	177	23	314	6,915
	3	298	2,076	129	733	750	411	108	8	169	4,682
	4	271	1,422	116	488	513	320	59	4	142	3,334
	5	333	1,551	166	551	673	340	65	11	106	3,795

*Note: The total amount was not available as some of the waste items only had data of "number of units" instead of weight in kg.

(b) Recyclables Collection at Waste Banks

There were four waste banks in Kel. GB. The amount of recyclables collection at those waste banks is as shown below. After May 2016, three of them, except for the one in RT26, has stopped operation.

Table 7-16 Recyclables Collection at Waste Banks in Kel. GB (kg/month)

Year	Month	Berkan Jaya Bersama (RT26)	Bank Sampah RT25	Bank Sampah Beriman	Bank Sampah RT36	Total
2016	1	4.52	0.00	10.04	6.77	21.33
	2	2.10	0.00	0.00	0.00	2.10
	3	5.81	0.00	7.10	0.00	12.91
	4	11.23	0.00	2.83	0.00	14.06
	5	0.00	0.00	0.00	0.00	0.00
	6	0.00	0.00	0.00	0.00	0.00
	7	0.00	0.00	0.00	0.00	0.00
	8	7.10	0.00	0.00	0.00	7.10
	9	4.83	0.00	0.00	0.00	4.83
	10	0.00	0.00	0.00	0.00	0.00
	11	0.00	0.00	0.00	0.00	0.00
	12	4.55	0.00	0.00	0.00	4.55
2017	1	0.00	0.00	0.00	0.00	0.00
	2	0.00	0.00	0.00	0.00	0.00
	3	4.81	0.00	0.00	0.00	4.81
	4	0.00	0.00	0.00	0.00	0.00
	5	0.00	0.00	0.00	0.00	0.00

(c) Home Composting

Five composters were distributed in the SS-PP area as of May 2017.

(d) Final Disposal Amount (TPA data)

The final disposal amount of waste from the SS-PP area has been measured at the TPA as shown below.

Table 7-17 Final Disposal Amount of Waste from SS-PP(2016)

Year	Month	Disposal amount (kg/day)	Note
2016	1	9,829*1	Baseline: Average disposal amount from January 25 to 31
	2	3,938	
	3	7,851	
	4	6,428	
	5	7,036	
	6	7,743	
	7	7,136	
	8	7,679	
	9	7,573	
	10	7,004	
	11	7,304	
	12	6,633	Maintenance of Weighbridge from 24th (average disposal amount for 23 days)
2017	1	6,812	Maintenance of Weighbridge until 16th (average disposal amount for 15 days)
	2	6,371	
	3	6,197	
	4	9,289	DKPP started using transfer depo.
	5	6,555	

*1: Waste from the large shopping malls is excluded (as in the same condition of SS-PP).

(3) Waste Reduction Rate

Waste reduction rate was calculated as below and reported at the final evaluation in June 2017.

Table 7-18 Calculation of Waste Reduction Rate (as of April 2017)

	Unit	Figures	Notes
Population	Person	18,094	Using the population growth data of the city, population of the kelurahan of 2017 is estimated.
Number of households	House-holds	5,303	Average family size (3.4 people/family) is assumed to be stable.

	Unit	Figures	Notes
Waste amount generated	ton/day	9.40	
Recyclable waste amount	ton/day	1.22	
Other inorganic waste	ton/day	2.35	
Organic waste	ton/day	5.83	
Recyclables collected	ton/day		
Collected by Waste Banks	ton/day	0.00	
Collected at the MRF	ton/day	0.11	TD started in April. Since then, waste collected on organic waste collection days has been transported to the TPA via TD and material recovery from organic waste has not been recorded.
Total of recyclables collected	ton/day	0.11	
Residue from MRF	ton/day	1.73	* 1
Organic waste composted	ton/day		
Home composting	ton/day	0.01	
Composted at TPST	ton/day	0.00	TPST is not yet operated.
Total organic waste composted	ton/day	0.01	
Residue of TPST	ton/day	4.48	* 2
Waste reduction amount	ton/day	0.12	
Final disposal amount	ton/day	6.20	Weighbridge data at TPA
Reduction rate (waste reduction / waste generation)		1.3%	
(waste generation – final disposal amount) / waste generation		34.0%	

*1 Residue from MRF is remained waste after segregation at MRF.

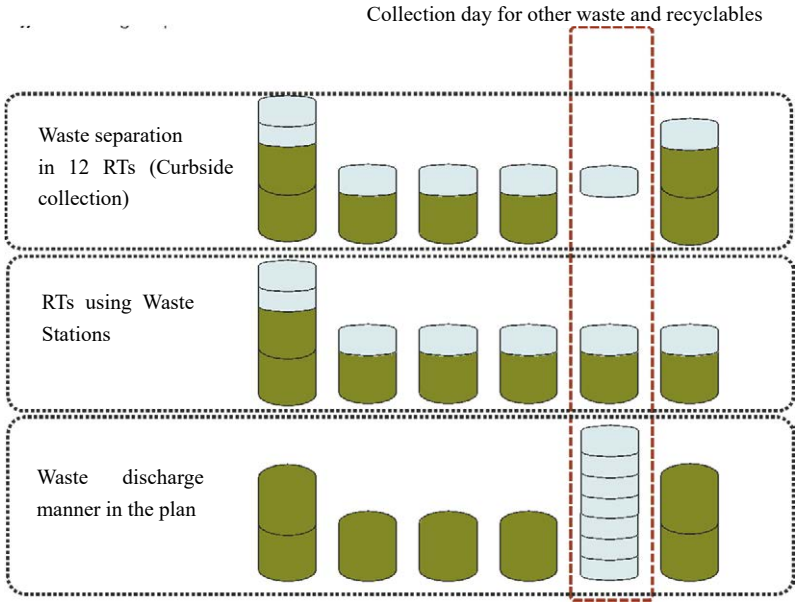
*2 As of April 2017, TPST is not yet operated. This is, in reality at present, waste that is collected on organic waste collection day and transported to the TPA.

(a) Examinations

The results of the monitoring up to December 2016 of the SS-PP in the whole Kel. GB were examined, providing the following conclusions.

- The curb-side collection is effective to avoid organic waste from being mixed into the inorganic waste and to collect only recyclable waste.
- The separation work efficiency at MRF improves drastically with the use of the belt conveyor. The working hours of the belt conveyor as of January 2017 is about a half to one hour per day (from Tuesday to Friday).
- Even in the 12 RTs with the curb-side collection system, it seems that the residents discharge mixed waste

on the organic waste collection day. For the awareness raising activities in future, it is recommended that the real situation should be understood through a questionnaire survey.



Note: It is only schematic and the size of figures is not proportional to the waste amount.

Figure 7-1 Separate Waste Discharge (in Practice and in a Plan)

- As of April 2017, the rate of waste reduction to the total waste generation (reduction rate) was 1.3%. Salable items segregated from organic waste is not included in waste reduction afte the commencement of TD operation. This affected the reduction rate.
- If the equation "(waste generation – final disposal amount) / waste generation" is applied, this gives 34.0 %.
- The operation of TPST will largely improve the reduction rate. After its operation, the target figure of reduction rate, i.e. 20%, will be achieved.
- Even after the TPST starts, it is important to improve waste separation manner for the increased material recovery amount at the MRF and for the effective composting work at the TPST.
- To ensure proper waste separation at source, it is also important to encourage home composting.

(b) Further Improvement of the SS-PP

With understanding of the current situation of the SS-PP as explained above, the JICA expert and the C/P understood the following activities are needed for further improvement.

- The majority of the residents in the SS-PP area do not follow the rule of source separation and separate discharge. The awareness raising activities must be strengthened. Awareness raising will be more effective when it is done to the residents directly than through the environmental cadres.
- It is desired that the area with curb-side collection be extended even with the consideration of work load of the workers, time requirement, fuel consumption and other factors.
- After the completion of the TD (in the middle of February), the transfer of waste collected on the

organic waste collection day will be done at the TD. For the efficient waste transfer, it should not be allowed to take out the salable items from waste at the TD. This may reduce the amount of recyclable waste collection, but this can be raised by improving the waste separation rate at source.

- Waste source separation is important not only for the recyclable waste collection at the MRF but also the compost production at the TPST.
- Public mindset and behavior takes time to change, but still DLH needs to continue its awareness raising activities with perseverance.

(4) Financial analysis of MRF Operation

The JICA short-term expert analyzed the cost spent for the SS-PP from February to December 2016.

The table below shows the summary of implementation cost for the SS-PP. Since there were expenditure for procurement of recyclable waste discharging bags, etc. in the first 4 months after the start of operation, the unit price was unstable from 316,121 to 901,328 Rp / ton, but since June it has stabilized from 270,000 to 293,000 Rp.

Table 7-19 Summary of Cost for the SS-PP (Feb – Dec, 2016)

Cost Items	Unit	Average Feb-Dec	Average Feb-May	Average June-Dec
Cost for collection	Rp/ton	173,304	292,147	105,393
Cost for transportation	Rp/ton	35,984	41,737	32,696
Cost for MRF operation (intermediate treatment)	Rp/ton	171,339	211,136	148,597
Total Cost for SS-PP	Rp/ton	379,651	543,977	285,750

The cost for salable waste separation was also analyzed. The cost required to separate 1 kg of salable waste dropped from 6,000 Rp/kg to 4,000 Rp/kg in May. In December, when the belt conveyor started to operation, cost to separate salable waste at the value of 1,000 Rp was 4,030 Rp. This means the cost is four times larger than the benefit. At the time of December 2016, most of residents in the Kelurahan do not properly separate waste at source, and cost saving can be expected by the active awareness raising and improved discharge manner.

Table 7-20 Operation Cost for the SS-PP (February to December, 2016)

	Unit	Feb.	Mar.	April	May	June	July	Aug.	Sep.	Oct.	Nov.	Dec.
Amount of recyclables = amount of waste sold *1	kg/月	4,319	4,590	3,204	3,440	6,018	6,740	6,335	6,117	6,470	6,345	7,577
Final disposal amount	ton/月	110.3	243.4	192.8	218.1	232.3	221.2	238.0	227.2	217.1	219.1	205.6
Waste collection cost	1,000Rp	24,612	177,835	24,612	24,612	24,612	24,612	24,612	24,612	24,612	23,037	23,037
Waste transportation cost	1,000Rp	7,275	7,275	7,275	7,275	7,275	7,275	7,275	7,275	7,275	7,275	7,275
MRF operation cost	1,000Rp	37,425	38,393	37,425	38,151	35,004	34,934	37,683	36,454	33,721	30,549	30,550
Total expenditure	1,000Rp	69,312	223,503	69,312	70,038	66,891	66,821	69,570	68,341	65,608	60,861	60,862
Recyclable sales	1,000Rp	425	3,293	3,834	5,624	7,718	7,865	9,796	5,394	6,437	7,550	7,580
Budget allocated by the city	1,000Rp	68,888	220,211	65,478	64,414	59,173	58,956	59,774	62,946	59,172	53,311	53,282
Unit cost of collection *2	Rp/ton	214,796	717,161	125,544	111,087	103,278	107,968	100,710	105,492	110,075	102,176	108,054
Unit cost of transportation *3	Rp/ton	65,978	29,891	37,726	33,354	31,319	32,886	30,561	32,022	33,506	33,201	35,380
Unit cost of MRF Operation *2	Rp/ton	326,618	154,828	190,901	172,198	146,884	153,248	154,195	156,247	150,815	135,495	143,294
Unit cost of SS-PP *2	Rp/ton	604,905	901,328	353,554	316,121	280,690	293,130	284,674	292,921	293,427	269,937	285,471
Cost for 1kg of salable waste	Rp/kg	8,665	8,364	11,682	11,092	5,816	5,183	5,948	5,959	5,212	4,815	4,032
Cost for salable waste at the value of 1,000Rp	Rp/1000Rp	88,163	11,661	9,762	6,783	4,535	4,442	3,847	6,758	5,239	4,046	4,030

*1 : This includes B3 (hazardous/toxic), but it is negligibly small.

*2 : Cost was divided by the sum of final disposal amount and recovered recyclables.

*3 : Cost was divided by the final disposal amount.

7-2-8 Issues for Improvement

(a) Further Awareness Raising

The SS-PP stands on the source separation by citizens. To raise waste awareness, the SS-PP intended to utilize environmental cadres, but the continuation of their activities depended on the continuation of incentives. The city called for cooperation in such occasions as RT leaders gathering at the Kelurahan office or meetings of some active cadres, but city's intervention was only ad-hoc basis. In the station collection and the curbside collection systems, inappropriate waste bags left not collected should have reminded the community of the right rule, but such wrong bags would be simply collected on the following day and the educational effect was limited.

The JICA short-term expert and the CP tried to find resolutions, and decided to carry out school education. One of the primary school in the Kelurahan was selected, and a waste separation was explained to the children. It was found that the waste separation manner that the school had adopted (i.e. dry waste and wet waste) and that of the SS-PP were different. According to the DLH, the waste education at school is under the instruction of Department of Education of the city, and the DLH intends to discuss with Department of Education and to make the school education in consistent with the SS-PP.

Also, DLH expects to acquire cooperation of PKK (Women's Association) as a means of awareness raising among households. PKK is an active society in various themes such as child raising and living environment, and if waste source separation is incorporated into their daily activities, waste awareness can be effectively raised.

(b) Issues of Waste Bag Distribution

When the four zone collection system started, rice bags for other inorganic waste were distributed to all the households. Those bags were printed in different four colors according to the collection zones so as to make it easy for the collection workers to return the bags to their original RTs. The use of the rice bags, however, was not as planned, as many residents use the rice bags for the discharge of organic waste, no names were written on the bags, and others. Some bags have been still returned to the original RTs from the MRF, but it is not known to what extent the bags are surely returned to the original users. There should be further improvement to establish the bag reuse system.

(c) Issues of Home Composting

The city has procured 100 home compost bins (50 of Takakura type and 50 of ground type) by the budget of 2015. BLH, which were responsible to explore the households with interest in home composting, had not started necessary action for long time. The instruction materials for home composters of Takakura type were available as Kitakyushu city provided assistance for compost dissemination before. The home compost bins of ground type were, however, new for the city and no counterpart knew how to use them. The JICA short-term expert had transferred the methodology of ground-type composting to the cleaning staff of DLH and maintenance workers since January 2017 using two bins.

The identification of residents that wanted to use composters and the distribution of home composters finally started in February 2017 and five bins were delivered to different RTs. JICA local staff keep updating the guidance of ground type composting based on their experience of seven bins. Now that the preparation for composting dissemination has

been done either for Takakura type or ground type, DLH should continue identifying the potential users and distributing the compost bins.

(d) Issues of Waste from Business Entities

Large scale business entities have to treat and dispose of their waste by themselves or by their contractors. Other business entities should follow the waste rule of the SS-PP, but they, particularly those in RT40, 41 and 51, do not well follow it.

It is necessary to carry out careful socialization not only for general households but also the business entities.

(e) Financial Issues of MRF Operation

The Balikpapan city approved 1,000 million Rp for 2017 budget to operate the SS-PP. DLH Accounting Department requested the JICA short-term to suggest how to use this amount on January 27, 2017. He and the JICA local staff together collected the financial data from BAPPEDA and examined two options. On February 1, they explained the result of examination to the director of DLH and other two staff.

The JICA short-term expert acknowledged the complaint of the SS-PP workers, who alleges that the lowest salary is 1,825,000 Rp/month even including incentives and this is lower than the minimum wage set by the national government. Therefore, in the examination of expenditure in 2017, the following two options were considered with recognition of the necessity to raise the salary not less than the minimum wage.

- Option 1: Salary as of December 2016 does not change.
- Option 2: Introduction of salary level above the national minimum wage (2,400,000 Rp/month).

The income of the SS-PP is the sales of salable items at MRF. Assuming that the waste separation rate at 21.4% as of December 2016 will increase to 80% in December 2017, the amount of salable items and the income of their trade are estimated as below.

Table 7-21 Estimated Sales of Salable Items at MRF

	Unit	Jan.	Feb.	Mar.	Apr	May	Jun	July	Aug.	Sep.	Oct.	Nov.	Dec.	Total
Separation rate	%	26.3	31.2	36.1	40.9	45.8	50.7	55.6	60.5	65.4	70.2	75.1	80.0	-
Amount of salable items	ton/month	9.1	9.8	12.5	21.7	25.2	26.9	30.5	33.2	34.7	38.6	39.9	43.9	326.0
Sales of salable items	Mil. Rp	11.0	11.8	15.1	26.4	30.5	32.7	37.0	40.2	42.1	46.7	48.4	53.2	395.2

The result shows that the sales of salable amount in 2017 are 395.2 million Rp.

On the other hand, the expenditure to keep operating the SS-PP was estimated as below. It is to be noted that the cost for waste collection and transportation does not include the cost for fuel but only manpower cost, as the fuel cost was not presented from C/P.

Table 7-22 Cost for the SS-PP (Option 1) (unit: mil. Rp)

	Jan.	Feb.	Mar.	Apr	May	Jun	July	Aug.	Sep.	Oct.	Nov.	Dec.	Total
Collection	28.0	28.0	95.2	28.0	28.0	28.0	48.5	28.0	28.0	28.0	28.0	28.0	423.4
Transportation	4.7	4.7	4.7	4.7	4.7	4.7	9.5	4.7	4.7	4.7	4.7	4.7	61.4
MRF operation	34.6	34.6	34.6	171.4	34.6	34.5	59.7	34.5	34.5	34.5	34.5	34.5	576.6
Total cost	67.3	67.3	134.5	204.1	67.3	67.2	117.6	67.2	67.2	67.2	67.2	67.2	1,061.4

The expenditure required for SS-PP in fiscal 2017 will be 1,061.4 million Rp, of which MRF's total operating costs will be 576.6 million Rp.

Table 7-23 Cost for the SS-PP (Option 2) (unit: mil. Rp)

	Jan.	Feb.	Mar.	Apr	May	Jun	July	Aug.	Sep.	Oct.	Nov.	Dec.	Total
Collection	30.0	30.0	97.2	30.0	30.0	30.0	60.0	30.0	30.0	30.0	30.0	30.0	457.2
Transportation	4.7	4.7	4.7	4.7	4.7	4.7	9.5	4.7	4.7	4.7	4.7	4.7	61.4
MRF operation	44.8	44.8	44.8	181.6	44.8	44.8	88.2	44.8	44.8	44.8	44.8	44.8	717.8
Total cost	79.6	79.6	146.7	216.4	79.6	79.5	157.6	79.5	79.5	79.5	79.5	79.5	1,236.5

The expenditure required for SS-PP in fiscal 2017 will be 1,236.5 million Rp, of which MRF's total operating costs for 2017 will be Rp 717.8 million.

Waste collection and transportation is the fundamental public service to be provided by the city regardless of the SS-PP. Therefore, only the cost for MRF operation and income from sales are compared. In Option 1, sales exceeds operation cost in August onwards, while in Option 2, in September.

Table 7-24 Estimated Balance of Payment of MRF Operation (unit: mil. Rp)

	Jan.	Feb.	Mar.	Apr	May	Jun	July	Aug.	Sep.	Oct.	Nov.	Dec.	Total
Option 1	-23.5	-22.8	-19.4	-145.0	-4.1	-1.9	-22.7	5.7	7.6	12.2	13.8	18.7	-181.5
Option 2	-33.8	-33.0	-29.7	-155.3	-14.4	-12.1	-51.2	-4.5	-2.7	2.0	3.6	8.5	-322.7

(f) Issues of SS-PP Expansion to Other Areas

In the action plan, the SS-PP of the Kel. GB is planned to be replicated in other kelurahans. The system, however, needs improvement in the awareness raising about waste discharge rules and has not yet become the system which can be regarded as participatory waste management.

The C/P and the JICA experts acknowledged that the work should be concentrated on the improvement of waste separation and waste reduction in Kel. GB and that the expansion of the project would be the next step after then.

7-2-9 Part 2 Organic Waste Composting System Pilot Project (Com-PP)

(1) Outline of the Pilot Project

(a) Basic Policy of Com-PP

The Balikpapan city has been composting pruning waste although its operation scale is small. Vegetable waste that generate at the traditional market in large quantity is another waste material for composting.

Under such consideration, Action 2 of the Action Plan aims to produce compost from all the pruning waste and market vegetable waste. To develop the receptive facilities for this, the existing composting facilities at TPA and two nursery centers in Kota Hijau and KM2 should be expanded and new facilities should be constructed.

Along with such facility development, a system must be developed to transport vegetable waste separated in the markets. This system consists of acquisition of cooperation at source (vegetable vendors in markets), proper instructions to primary waste collectors in the markets and separate waste transportation starting from TPS of the markets.

(b) Objectives of Com-PP

This pilot project aims to examine the possibility of organic waste composting system using market waste in line with Action 2 of the Action Plan.

To produce compost from market waste needs facility development and it was originally planned to expand the current composting yard of Kota Hijau. In due course of the PP, however, PUPR decided to construct the TPST in Kota Hijau. Consequently, the TPST was planned to be the destination of market waste of the Com-PP instead of expanded composting yard. Since it was PUPR that has responsibility of TPST development, the main focus of the Com-PP was on the development of transportation system of vegetable waste from the market to the TPST.

(2) Implementation

(a) Plan Formulation of Com-PP

The plan of the Com-PP was formulated from September to December 2014 aiming to start the project in April 2015, when the budget of fiscal year 2015 became practically available.

From Sepinggan Market, approximately 4.8 ton of waste has been transported to the TPA. There used to be composting operation in the TPS, which is located next to the market and is the place for waste generated in the market is temporally stored, but it has stopped since the space was not enough for aerobic process and it caused odor.

Besides, Balikpapan city operates two nursery centers (Kota Hijau and KM12) where plants are grown for center dividers of roads and parks. Those centers make compost in their premises to be used by themselves but compost production is not large enough for their operation.

In such circumstances, it was planned that vegetable waste at Sepinggan Market would be separately collected, transported to the composting facility in Kota Hijau nursery center at a distance of 4.0 km from the market and composted together with pruning waste.

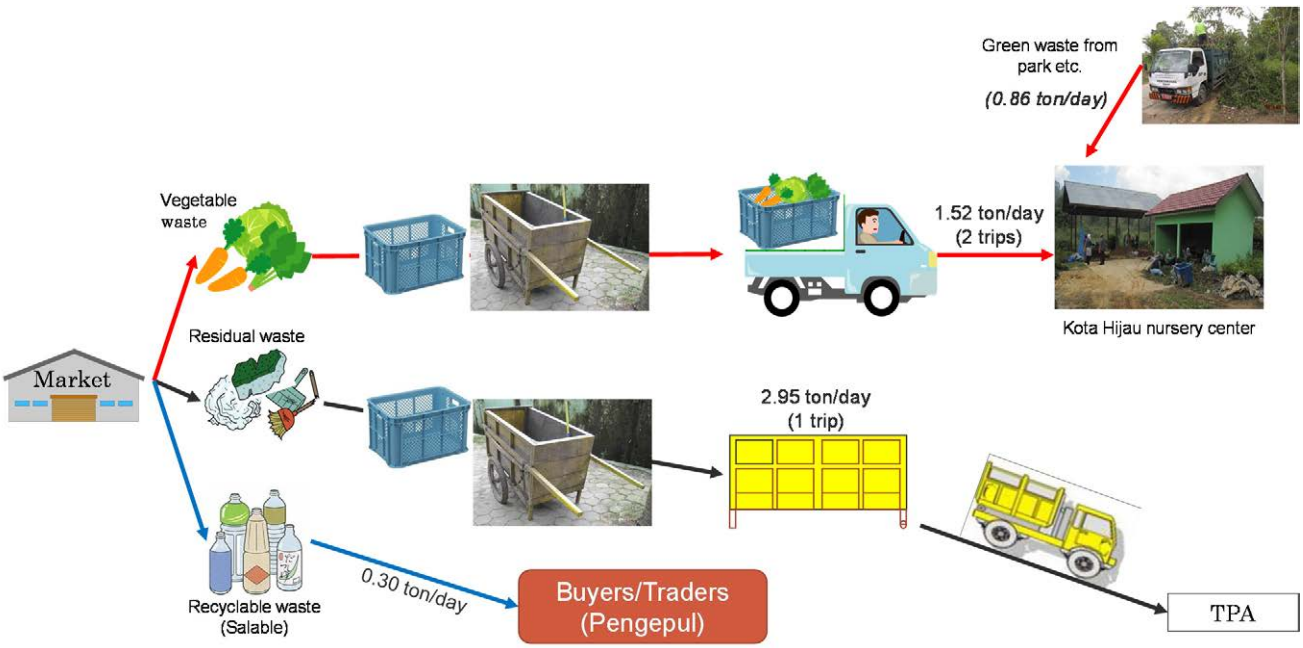


Figure 7-23 Waste Flow Image of Com-PP

Sepinnggan Market is a typical traditional market located near the Balikpapan Sepinggan Airport and it has 433 stalls. The waste generated by the stalls is collected by 11 collection workers trice a day (8:00-15:00 and 17:00-23:00). The collection works are usually done by 4-5 trips a day. The waste is collected at the TPS and transported to the TPA by DKPP three times a day (four times a day on Saturdays and Sundays).

Compost production had once operated at the TPS, but it is no longer carried out due to the area limitation. The waste collection workers extracts salable items during waste collection and store them until traders come to buy.

(b) Estimation of Waste Volume

The waste amount transported from Sepinggan Market to the TPA by DKPP is 4.8 ton/day. Using the waste composition data abtained by the waste amount and composition survey, the waste amount of each component can be calculated as below.

Table 7-25 Waste Composition from Sepinggan Market

Items	Composition	Amount
1. Kitchen waste	57.61%	2.8 ton/day
2. Grass, wood	5.87%	0.3 ton/day
3. Paper	6.36%	0.3 ton/day
4. PET bottle	2.08%	0.1 ton/day
5. Other plastics	6.44%	0.3 ton/day
6. Textiles	6.49%	0.3 ton/day
7. Leather, rubber	2.81%	0.1 ton/day
8. Metals	1.95%	0.1 ton/day
9. Bottles, glass	3.73%	0.2 ton/day
10. Hazardous	0.73%	0.0 ton/day
11. Others	5.95%	0.3 ton/day
Total	100.0%	4.8 ton/day

From the figures above, the planning values were assumed as blow.

- Vegetable waste collection amount: 50% of organic was (Compositions 1 and 2) = 1.52 ton/day
  ==> Vegetable waste will be collected using plastic baskets with capacity of 50 liters. A cart will load four baskets.
  ==> The baskets with vegetable waste inside will be transferred onto small trucks with capacity of 1 ton, which makes two trips a day to the nursery center.
- Salable waste recovery amount: 30% of recyclable waste (Compositions 3, 4, 5, 8, 9) = 3.0 ton/day
  ==> It will be stored at TPS and sold to traders regularly (business as usual).
- Other waste amount: 4.80 – 1.52 – 0.30 = 2.98 ton/day
  ==> Other waste is collected using plastic baskets (50 liters) on carts and emptied to the 6m3 container at the TPS. To make it easier to waste transferring from the basket to the container, a platform should be constructed at the TPS.

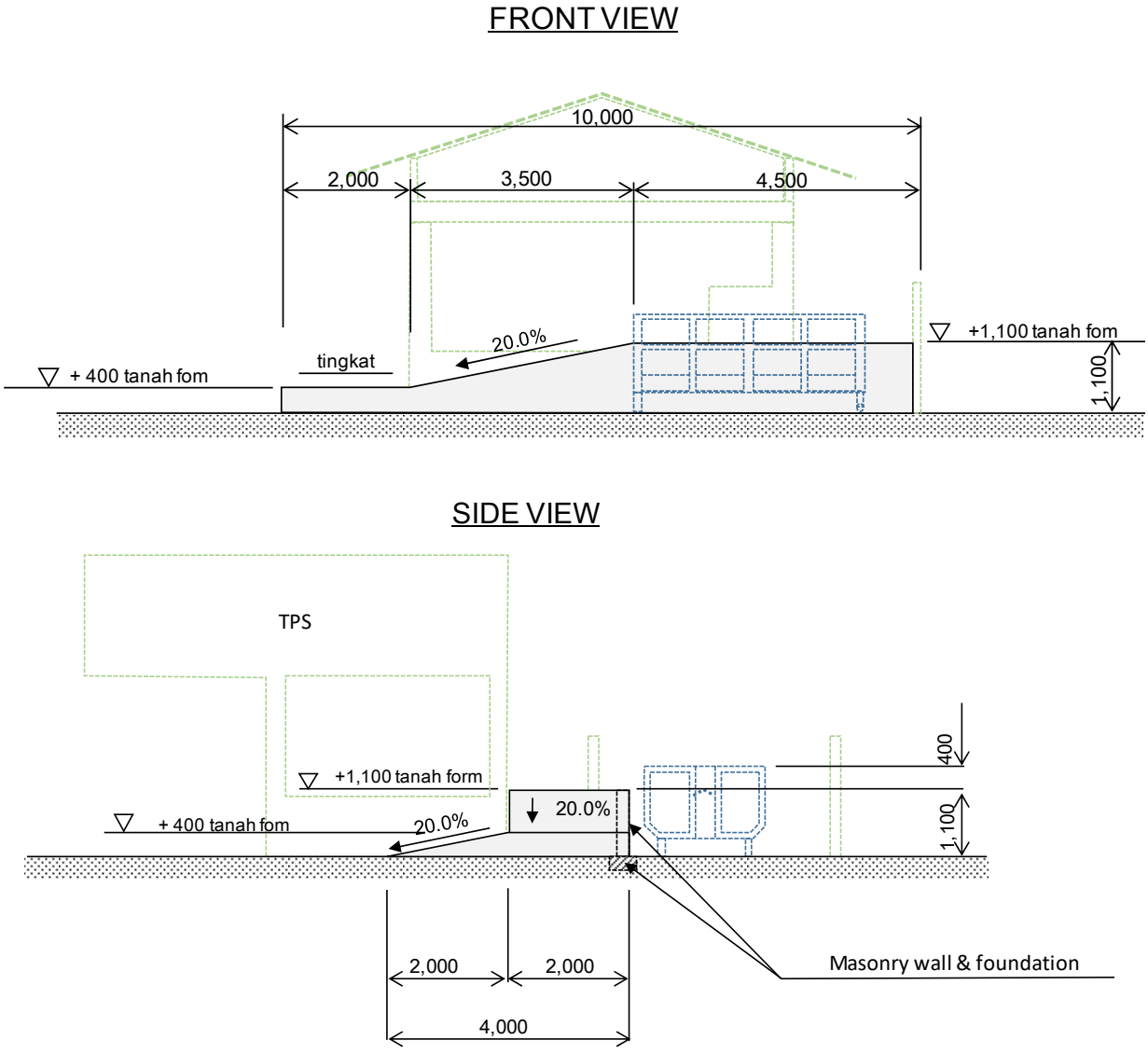


Figure 7-24 Font and Side View of the Platform of Sepinggan Market

(c) Baseline Survey and Monitoring Plan

Items	Baseline survey	Monitoring
Timing	• By end of March, 2015	• After the PP commenced. (April 2015 – March 2016)
Final Disposal Amount	• Waste transport amount (weighbridge data) from the market to the TPA during one week prior to the PP	• Waste transport amount (weighbridge data) from the market to the TPA during one week prior to the PP
Material Recovery Amount	• Amount of waste sold by the waste collectors to the traders (interview)	• Amount of waste sold by the waste collectors to the traders (interview)
Waste composted	• 0 (January 2015)	• Amount of waste delivered to Kota Hijau nursery center and composted

(d) Cost Estimation

Cost was estimated as below for DKPP to propose the budget for 2015.

The small truck with capacity of 1 ton and the arm roll truck for container transportation procured for the implementation of the SS-PP will be used also for the Com-PP. Therefore, no cost for them is necessary.

Miscellaneous cost includes 114 plastic baskets for the collection of vegetable waste and other waste and eight sheets of water-proof sheets for composting operation.

Operation and maintenance cost below is the cost needed from April to June 2015.

Table 7-26 Estimated Cost (Com-PP)

Items		Value (Rp)	Paid by
1	Initial cost for facility and equipment	197,340,000	
1.1	Facility development (platform)	63,440,000	BPN
1.2	Procurement of equipment (2 containers)	100,000,000	BPN
1.3	Miscellaneous (plastic baskets, sheets for composting operation, etc.)	22,200,000	BPN
1.4	Printing of awareness raising materials	11,700,000	JICA
2	Operation and maintenance	66,700,000	BPN
2.1	Manpower	46,200,000	
(1)	Workers for composting operation at Kota Hijau nursery center	46,200,000	
(2)	Workers for waste collection in the market (not shown as it is not additional.)	0	
2.2	Maintenance for equipment	2,500,000	
2.3	Utilities	18,000,000	

(e) Implementation Schedule of Com-PP

Implementation schedule of Com-PP was planned as below.

	2014				2015								
	9	10	11	12	1	2	3	4	5	6	7	8	9
Preparation of Tender					■	■							
Construction works (Sepinggan Market)						■	■						
Construction works (Kota Hijau NC)							■						
Procurement of equipment							■	■					
Collection & transportation plan						■							
Training of workers								■					
Implementation								■	■	■	■	■	■
Monitoring									■	■	■	■	■

(3) Monitoring Results

Balikpapan city procured the plastic baskets by budget of fiscal year 2015, but the cost for the platform to be constructed at TPS and for the containers with capacity of 6m3 were not allocated.

Meanwhile, since PUPR decided to develop the TPST in Kota Hijau nursery center, the plan to expand the composting yard at Kota Hijau and compost the market vegetable was changed to one to compost the market vegetable waste at the TPST. The construction work of the TPST was planned from august 2015 to November 2016, but financial shortage delayed it up to the time of this reporting (August 2017).

Although vegetable waste has been collected separately within the market, this Com-PP has not yet fully implemented. The facility to receive market vegetable waste, i.e. the TPST, must be completed and separate waste transportation system has to be established.

(4) Issues for Improvement

PUPR plans to start test operation of the TPST in October 2017. To supply organic waste to this, the development of vegetable waste transport system is the present urgent issue for DLH. Without the platform, DLH considers not only the use of the small trucks as planned but also waste containers as a transportation means. If the small trucks are to be used, the idle time of them at the TD must be shortened by arranging enough number of containers. Accordingly, in any case either small trucks are used or containers are used for vegetable waste transportation, it is necessary to appropriately arrange all the containers owned by the city and to maximize their use.

Chapter 8. **Capacity Development**

8-1 Flowchart of CD

Measures for implementation of CD are "cooperative work through the Project activities" and "lectures by the JICA Expert and the JICA Expert Team". The whole flowchart of CD is shown in Figure 8-1.

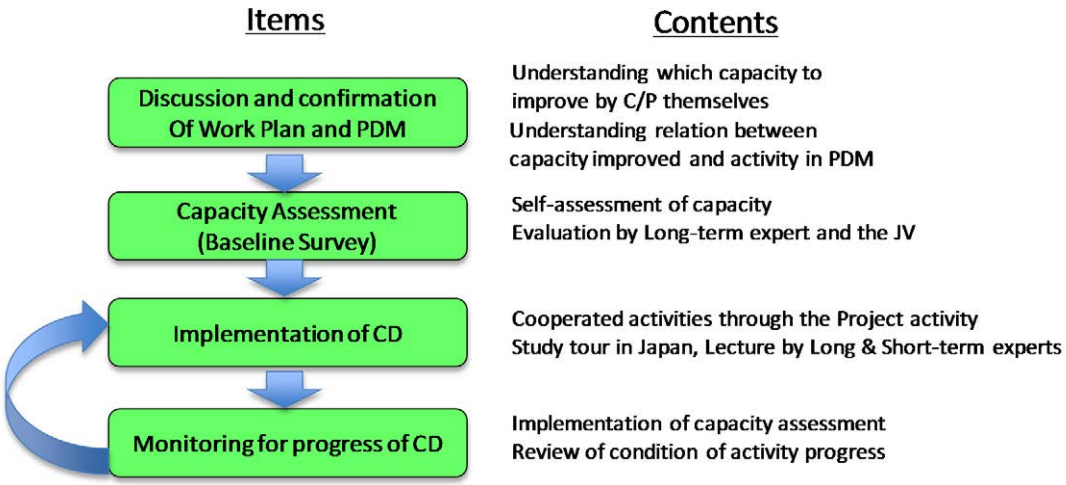


Figure 8-1 The Whole Flowchart Related CD

8-2 Palembang City

Regarding TPS-3R, access road was developed December 2017, and then full operation has been commenced. However, operation of the TPS-3R itself is being carried out by the community organization KSM in accordance with the TPS-3R guidelines of PUPR, and it is not being directly operated by C/P organizations such as DLHK. Therefore, what the C/P can do in the operation of the TPS-3R is limited to financial support, advice, monitoring, etc. By the transfer of the ownership of the TPS-3R to DKK (currently DLHK), financial support is realized by bearing the cost of the wages of the operators, and water and electricity costs for the TPS-3R.

As stated above, the operation of the waste bank and the TPS-3R, which are the main activities of the PP, is carried out by KSM, and the role of the C/P is comparatively small. The main activity within their role is monitoring the status of operation of both facilities. Within this they held the 4th 3R Stars on the 25th January 2017. In this 3R Stars meeting, the C/P managed the discussions as facilitator, shared the issues currently being faced with the organizations in attendance, and held group discussions regarding measures to resolve these issues. Discussions were held with all those involved through a participatory workshop regarding the collection activities of the AAL waste bank (Bank Sampah Sakura) and the TPS-3R to (1) determine what are the issues involved, (2) clarify how to resolve these issues, and (3) determine how to continuously expand the activities into other areas within the city in the future.

On the other hand, for monitoring the PP, a monitoring form was prepared in September 2015 (which was reviewed in August 2016), the monitoring and instruction regarding domestic compost was carried out in January 2016 and monitoring by BAPPEDA and DLHK was carried out once in May 2017. However, after implementation of monitoring, monitoring report has not been issued and not been informed to central government.

Situation of Unsatisfied Items, as of September 2017 is tabulated below.

Table 8-1 Situation of Unsatisfied Items as of September 2017

Unsatisfied Items	Situation in September 2017
2.3 Implement and Improve the Activities of TPS-3R (1) Construct TPS-3R	The transfer of rights of TPS-3R facility from the city to DLHK has not confirmed even in September 2005. Since the transfer to DLHK is not officially completed, DLHK cannot start support for facility expenses such as electricity bills and KSM still covers such facility expenses.
2.3 Implement and Improve the Activities of TPS-3R (2) Support the Operation of TPS-3R	Cooperative relationship between PCs and KSM has not been developed. Since April 2017, purchase of organic waste from cooperative PCs has been started, but continuous discussion with PC is required.
3.Conduct Monitoring (Check) 3.1 Implement and Report the Monitoring	Monitoring was conducted only once (May 2017). However, after implementation of monitoring, monitoring report has not been issued and not been informed to central government.

Table 8-2 Progress of Capacity Development in Palembang City

Items		Verification Indicator: Verification Indicator	Verification Indicator: Means of Verification	Activates Conducted by CP	Implementation status	Person in Charge	Plan, Actual	2014–2017 (8 9 10 11 12 / 1–12 / 1–12 / 1–11)
1. Formulate Plan								
1.1	Formulate PP Implementation Plan	(1)An explanation workshop on draft PP implementation plan will be held. (2)Revised PP implementation plan will be formulated.	(1)Participants list (rate of communities participated to all communities) (2)PP Implementation Plan	CP grasped the present condition and discussed the basic frame of the plan with JET	☑	All CPs	Actual	Completed
				CP held participatory workshop to explain the frame to residents and build the relationship with the community group.	☑	All CPs	Actual	Completed
				CP revised the contents of the plan in accordance with the status of the implementation.	☑	All CPs	Actual	Completed
1.2	Formulate Equipment Procurement Plan	(1)Necessary equipment for PP will be procured in accordance with the plan.	(1)Pictures of equipment procured (Kaiser, container etc.)	CP set the quantity and specification of the necessary equipment in line with the plan	☑	DKK	Actual	Completed
				CP procured bags for organic and other wastes by their own budget after distributing bags procured by JICA	☑	DKK	Plan	
							Actual	Completed
				CP distributed the bags procured by their own budget to the households in the PP target area in accordance with distribution plan.	☐	DKK	Plan	
							Actual	
1.3	Formulate Relevant Facility Plan	(1)Detailed plan on TPS-3R and Waste Bank will be formulated.	(1)Drawing of TPS-3R and Waste Bank	CP supported the community group to design TPS-3R	☑	DKK	Actual	Completed
				CP designed the waste bank through contracted consultant	☑	BLH	Actual	Completed
1.4	Formulate Monitoring Plan	(1)Monitoring system will be established.	(1)Monitoring Plan(part of PP Implementation Plan), Meeting record of the monitoring group	CP finalized the monitoring plan drafted by JET.	☑	All CPs	Actual	Completed
				CP established the monitoring group and develop the monitoring system.	☑	BAPPEDA	Actual	Completed
1.5	Formulate Expansion Plan to Two Area							
2. Implement and Improve the Activities of PP in AAL								
2.1 Implement and Improve the Activities of Socialization								
(1)	Prepare Socialization Tools	(1) Poster, Guidebook and Leaflet	(1)Poster, Guidebooks, Leaflet	CP finalized the tools with their own ideas based on draft prepared by JET.	☑	BLH	Actual	Completed
(2)	Involve the Environmental Cadre PP	(1)2 or 3 Cadres in each RT will be selected. (2)Explanation meetings for Cadre will be held 3 times.	(1)List of existing Environmental Cadre, List of Cadre PP (2)Participant list and program of the meeting	CP confirmed existing Cadre and selected Cadre PP in PP area	☑	BLH	Actual	Completed
				CP requested head of each RT in PP area to appoint three persons as Cadre PP.	☑	BLH	Actual	Completed
				CP fostered Cadre PP through explanation meeting and OJT with the support from the NGO.	☑	BLH	Actual	Completed
(3)	Implement Socialization	(1)At least 3 times of patrol in each RT will be conducted. (2)Feedback meeting will be held at least 6 times. (3)Consultation meeting will be held at least 6 times. (4)Create at least 3 cases of improvement through the socialization	(1)Observation, Interview with head of RT and Cadre PP (2)Meeting record (3)Meeting record (4)Record of improvement	CP supported Cadre PP to implement the patrol with the support from the NGO.	☑	BLH	Plan	
							Actual	Completed / Completed
				CP held the feedback meetings.	☑	BLH	Plan	
							Actual	
				Based on the result of the feedback meetings, CP support RT Head and Cadre PP to hold the consultation meetings.	☑	BLH	Plan	
							Actual	
				CP solved and/or supported to solve problems identified in the feedback and consultation meetings.	☑	BLH	Plan	
							Actual	
(4)	Expand Home Compost	(1)250 compost bins will be procured by BLH's own budget (2)70% of household receiving the bins will conduct home compost.	(1)Record of distributing compost bins (picture etc.) (2)Monitoring report	CP procured home compost bins by their own budget and distributed them to the residents.	☑	BLH	Plan	
							Actual	Completed
				CP guided resident to do home compost.	☑	BLH	Plan	
							Actual	
				Composts were produced by home compost.	☑	BLH	Plan	
							Actual	
2.2 Implement and Improve the Activities of Waste Bank								
(1)	Support the Operation of Open-air Waste Bank (Until completion of waste bank construction)	(1)Community group will be established and authorized by city government. (2)Collection amount: 200kg/month	(1)Official certificate of the community group (2)Monitoring report	CP organized the community group and facilitate the official authorization.	☑	BLH	Plan	Completed
				CP advised the operation	☑	BLH	Plan	
							Actual	Completed / Completed
				CP confirmed recyclables amount collected by open-air WB, regularly.	☐	BLH	Plan	
							Actual	
(2)	Construct Waste Bank	(1)Waste Bank will be constructed	(1)Drawing and picture	CP constructed WB by their own budget.	☑	BLH	Plan	
							Actual	Completed
(3)	Support the Operation of the Waste Bank	(1)Collection amount: 800kg/month	(1)Monitoring report	CP held explanation meeting on operating WB to the community.	☐	BLH	Plan	
							Actual	
				CP supported the community group to prepare the operation plan.	☐	BLH	Plan	
							Actual	
				CP confirmed recyclables amount collected by WB, regularly.	☐	BLH	Plan	
							Actual	

Items		Verification Indicator		Activates Conducted by CP	Implementation status	Person in Charge	Plan, Actual	2014 8 9 10 11 12	2015 1 2 3 4 5 6 7 8 9 10 11 12	2016 1 2 3 4 5 6 7 8 9 10 11 12	2017 1 2 3 4 5 6 7 8 9 10 11
2.3 Implement and Improve the Activities of TPS-3R											
(1)	Construct TPS-3R	(1)TPS-3R will be constructed (2)An explanation meeting on operation of TPS-3R will be held for the community and primary collectors.	(1)Drawing and picture (2)Participant list of the explanation meeting	CP constructed UPTD office.	☑	DKK	Actual		Completed		
				CP constructed the access road.	☑	BAPPEDA	Plan			Additional	
							Actual				Completed
				CP explained and instruct residents and primary collectors.	☐	DKK, BLH	Plan				
							Actual				
				CP constructed TPS-3R in cooperation with PUPR	☑	DKK	Plan				
							Actual			Completed	
(2)	Support the Operation of TPS-3R	(1)Operation plan of TPS-3R will be formulated. (2)Treatment amount: 8ton/month	(1)Operation plan of TPS-3R (2)Monitoring report	CP prepared the operation plan.	☑	DKK	Plan				
							Actual				
				CP managed the separated wastes, properly.	☑	DKK	Plan			Completed	
							Actual				
				CP provided KSM with financial support, worker's salary and cost for waste and electricity.	☑	DKK	Plan				
							Actual				Worker's salary only
2.4 Implement and Improve Other Activities											
(1)	Close Open Dumping Areas	(1)Open dumping areas will be improved.	(1)Location map of closed dumping areas and record of the improvement	CP closed some open dumping areas in PP area.	☑	DKK	Actual			Completed	
				CP set signboards to notice the closed dumping areas.	☑	DKK	Actual			Completed	
(2)	Improve Primary Collection	(1)Primary collection in 3 RTs will be improved.	(1)List of the improvement of primary collection	CP supported the stakeholders among RT25, 52 and 61to have meetings.	☑	DKK	Actual			Completed	
				CP improved primary collection in RT25, 52 and 61.	☐	DKK	Plan				
							Actual				
3. Conduct Monitoring											
3.1	Implement and Report the Monitoring	(1)Monitoring will be implemented every three months	(1)Monitoring report	CP implement the monitoring every three months.	☐	DKK, BLH	Plan				
							Actual				
				CP held 3R stars meetings for analysis of the problem and lessons of the PP	☐	All CPs	Plan				
							Actual				
				CP prepared the monitoring report and submitted the report to the central government.	☐	BAPPEDA	Plan				
							Actual				

8-3 Balikpapan City

The updated situation as of September 2017 of what was not achieved yet is summarized below.

Table 8-3 Situation of What Was Not Achieved Yet

Items that was not Achieved	Situation in September 2017
2. 2. Implement and Improve the activities of PP in Gunung Bahagia(RT18-30) (5) Promotion of home compost	The PP in RT18-30 finished in Febryar 2015 without distribution of compost bins that were procured by the city. (This activity has been continued as part of PP of Gunung Bahagia.)
3. Implement and improve the activities for PP in the whole Kulerahan Guning Bahagia 3.1 Implement and improve the activities of socialization (4) Implement the socilization	There are three indicators for this item. (1) Patrol will be conducted regularly in each RT., (2) Feedback meeting will be held after the patrol was conducted., and (3) Consultation meeting will be held. These were implemented in the original 13 RTs and continued after PP expansion to the whole kelurahan. They, however, faded out without continuous incentives given to the environmental cadres. Awareness raising after that were carried out only ad hoc basis in the occasion of RT leaders' meetings or environmental cadres' meegings, but DLH found it difficult to carry out awareness raising ativities in a constant manner. The curbside collection system had some effect for awareness raising, but it is only for limited area for limited period. In April 2017, school education was attempted. Now DLH is going to acquire cooperation of PKK (Womens' Union). <u>There is a high necessity to develop approachies for continuous awareness raising.</u>
(5) Promotion of home compost	The city procured 100 composting bins. In February and March 2017, DLH identified five RTs with interest in composting and distributed five bins. They are located near the cadres' houses and 2-5 neighboring families are using. In April 2017, DLH hold a training seminar of composting with a help of PT. Pupuk Indonesia and 40 RTs of Gunung Bahagia were present. Some of them showed interest in home compost bins. As a result, DLH has distributed 21 bins in total as of September 2017. All are ground-type. In summary, home compost promotion has been conducted to some extent. It is to be noted, however, that not all the composters distributed earlier are being used properly and <u>aftercare after distribution is necessary. Further, DLH still has 79 bins to be distributed and needs to continue promotion.</u>
3.4 Implement organic waste transfer at T/D (1) Operate the T/D	Organic wasgte transfer started in March 2017. As the number of trips of the armroll truck and the number of containers are limited, small collection trucks have to waste before waste unloading and a container full of waste is left at the T/D until the next day. <u>DLH intends to review the current condition of city-own containers and armroll trucks and allocate necessary equipment for the T/D.</u>
5. Vegetable waste separation at Sepinggan Market	Vegetable waste has been separately collected in Sepinggan market. As the TPST construction repeatedly delayed, the composting facitliy at TPA was once considered an alternative reception facility for vegetable waste. Without platform construction or sufficient transportation equipment, however, vegetable waste ends up in final disposal with other general waste. Meanwhile, accoding to the updated information of PUPR, TPST will start test operation in October 2017. <u>DLH plans to secure transportation equipment in order to separately deliver vegetable waste to the TPST.</u>
6. Integration of organic waste separation and TPST operation	Organic waste transportation from Gunung Bahagia via T/D has no particular issue, even though equipment is not sufficient. Therefore, organic waste transportation from there to TPST will not be difficult. On the other hand, the planned commencement of TPST in October 2017 can be delayed again, as it used to be. As the JICA project is close to its end, <u>the integration of SS-PP and TPST is totally left to the Indonesian side</u>.
7. Project monitoring	The PP is moniroed by collecting final disposal data at TPA, material recovery data of waste banks, the number of home compost bins and material recovery data at MRF. The DLH compile these data on an excel file and produces a waste flow chart every month. These activities were initially carried out by JICA's local staff, and transferred to the DLH in Aprl 2017. Monthly reports are also produced and shared amont the C/P including the C/P of KLHK and PUPR.

The underlined statements in the table above descriptions are those with remaining issues. They are, from the viewpoint of capacity development, further described as below.

<u>3.1 Implement and improve the activities of socialization</u>

(4) Implement the socilization

- DLH has capacity to train environmental cadres. The remaining issue is how to develop a system that ensures continuous activities of environmental cadres.
- DLH has acquired capacity to introduce curbside collection system, which has some educational effect. Its effect is, however, not large enough as it is influenced by the social gap between waste collection crew and general citizens.
- DLH also has capacity to carry out school education. The remaining issue is to integrate the waste categorization at schools under the instruction of Department of Education of Balikpapan and that promoted by the SS-PP.
- DLH understands the necessity of continuous awareness raising and is motivated for it as it now seeks for cooperation with PKK.
- In summary, DLH has developed its capacity to some extent and be ready to utilize what was acquired during the SS-PP and to take next steps.

3.1 Implement and improve the activities of socialization
(5) Promotion of home compost

- DLH has learned basic knowledge as users manuals were developed reflecting the performance of compost bins and monitoring activities were carried out together with the JICA short-term experts.
- As the compost bins had not been distributed for a long time, aftercare activities during the project was only limited and DLH needs to take action and get experiences by themselves.
- Meanwhile, the city recognized the importance of home compost promotion and created opportunities to acquire necessary specialities from PT. Pupuk Indonesia, with which the city signed MOU.
- In summary, the capacity developed through the project is not necessarily abundant, but will work as a base for the C/P to utilize the resources of PT. Pupuk Indonesia and to keep promoting home compost.

3.4 Implement organic waste transfer at T/D
(1) Operate the T/D

- DLH developed its capacity to operate the T/D. It has to be noted, however, that equipment limitation hindered its further effort to improve T/D operation.
- In the later stage of the project, it was found that several city-own containers were not placed as planned. This implies some equipment can be reallocated for the T/D. With such a possible solution, DLH is expected to take a pratical action.
- DLH also expressed its intention to extend the work time of the existing arm roll truck and also will request budget to ptocure arm roll trucks for the next fiscal year. Operation improvement of T/D is highly expected.

5. Vegetable waste separation at Sepinggan Market and 6. Integration of organic waste separation and TPST operation

- Since where and when to receive and treat vegetable waste from the market has not been clearly confirmed, related activities could not take place and nothing can be concluded about capacity development.
- Besides the completion of TPST construction, trnasportatoin equipment must be ensured for separate haulage of vegetable waste. The required action is the same with 3.4 above, and DLH should be able to manage

Table 8-4 Progress of Capacity Development in Balikpapan City

Items		Verification Indicator		Activites Conducted by CP	Implement-ation status	Person in Charge	Plan/ Actual	2014				2015												2016												2017										
		Verification Indicator	Means of Verification					8	9	10	11	12	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3	4	5	6	7	8	9	10	11
1. Formulate plan																																													
1.1	Formulate PP implementation plan	(1) An explanation workshop on draft PP implementation plan will be held. (2) Revised PP implementation plan will be fomulated.	(1) List of RT participated to the workshop (2) Booklet of the plan	C/P grasped the current situation of the PP area and discussed about the planning framework. C/P held a participatory workshop, explained the outline of the plan to residents, and built a relationship with the community.	☑	All CPs	Actual								completed																												
					☑	All CPs	Actual											Completed																										
1.2	Formulate equipment procurement plan	(1) Necessary equipment for PP will be procured in accordance with the plan.	(1) Photos of the equipment procured actually (small truck, container, etc.)	C/P has set the kinds and specifications and quantities of necessary equipment based on the implementation plan. In succession of provision of JICA, C/P secured the budget and procured necessary equipment by themselves.	☑	DKPP	Actual										Completed																										
					☑	DKPP	Actual																																					
				C/P delivered the waste discharge bags purchased by themselves.	☑	BLH	Plan																																				
							Actual																																				
1.3	Formulate relevant facilities plan	(1) Detailed plan on sorting facility (MRF) will be formulated.	(1) Drawings of MRF	C/P prepared the plan in cooperation with the Dept. of PU.	☑	DKPP	Plan																																			
							Actual																																				
1.4	Formulate monitoring plans	(1) Monitoring system is established.	(1) Monitoring plan (included in the PP implementation plan), Meeting record of monitoring groups	C/P finalized the monitoring plan based on the draft plan which had been developed by JET.	☑	All CPs	Actual															Completed																				
				C/P organized the monitoring group and adjusted the monitoring method among the C/P authorities.	☑	BLH	Actual																			Completed																	
1.5	Formulate PP expansion plan to whole Kel. Gunung Bahagia	(1) PP expansion plan will be formulated (2) The explanation workshop which is targeting the expansion area will be held more than once.	(1) PP implementation Plan for expanded area. (2) List of RT participated to the workshop	C/P formulated the PP expansion plan according to the expansion policy of targeting area. (Zoning, collection schedule, etc.)	☑	All CPs	Plan																																			
							Actual																																				
				C/P explained the outline of the PP to the residents living in the target area and built a consensus of the PP.	☑	All CPs	Plan																																			
							Actual																																				
2. Implement and Improve the activities of PP in Gunung Bahagia (RT18-30)																																												
2.1 Implement and Improve the Activities of Socilization																																												
(1)	Prepare socialization tools	(1) Poser, guidebook and leaflet	(1) Sample of poster, guidebook and leaflet	C/P finalized the materials by revising the originals which had been developed by JET and adding their own idea.	☑	BLH	Actual											Completed																								
(2)	Involve the Environmental Cadre PP	(1) 5 Cadres in each RT will be selected. (2) Explanation meetings for Cadre will be held 3 times.	(1) List of cadres (2) Program, list of participants	C/P requested to appoint 3 cadres from each RT to the RT chiefs.	☑	BLH	Actual												Completed																							
				C/P trained cadres by explanation and OJT.	☑	BLH	Actual													Completed																							
(3)	Impelment Socilization	(1) Patrol is conducted regularly. (2) Feedback meeting is held after the patrol was conducted. (3) Consultation meeting is held.	(1) Site inspections, Hearing to the cadres and RT chiefs (2) Record of meetings (3) Record of meetings	C/P supported the implementation of patrols by cadres.	☑	BLH, Kel	Plan																																			
							Actual																																				
				C/P held the feedback meeting of patrols.	☑	Kel. BLH, DKPP	Plan																																			
							Actual																																				
				C/P encouraged the consultation meeting organized by community (RT chief and cadres) based on the results of feedback meetings.	☑	Kelurahan	Plan																																			
							Actual																																				
(4)	Guide the waste discharge manner to waste station	(1) At least one waste station will be set up in each RT. (2) Waste is discharged to only waste station at designated time.	(1) Location of halte sampah (2) Monitoring report	C/P decided the location of halte sampah.	☑	DKPP, BLH	Actual																																			
				C/P installed the signboard at halte sampah, and took measures of discharge prohibition in the former TPS.	☑	DKPP, BLH	Actual																																			
				C/P notified the waste discharge time to the halte sampah to the residents.	☑	DKPP, BLH	Actual																																			
							Plan																																				
				C/P purchased the compost bins by their own budget and delivered it to the residents.	□	DKPP, BLH	Actual																																			
(5)	Promotion of home compost	(1) DKPP will procure 110 compost bins by their own budget. (2) 70% of households, which receive the compost bin, will use it properly.	(1) Delivering record of the compost bins (with photos) (2) Monitoring report	C/P instructed how to produce composter at home.	□	BLH	Plan																																			
							Actual																																				
				Compost was produced at the household in the PP site.	□	BLH	Plan																																			
							Actual																																				
2.2 Implement the separate collection																																												
(1)	Implement separate collection (day of the week collection)	(1) DKPP will collect the waste at designated day and time.	(1) Operation record of TPS-3R, Separate collection of the organic waste is confirmed by the record of weighbridge at TPA	C/P arranged the necessary waste collection vehicles, and carried out collection works on the designated day and time.	☑	DKPP	Plan																																			
							Actual																																				
				C/P transported the collected waste according to the kind of waste. (Other waste was transported to TPS-3R, and organic waste to TPA.)	☑	DKPP	Plan																																			
							Actual																																				
2.3 Implement and improve the operation of TPS-3R																																												
(1)	Operation of TPS-3R	(1) Operation system of TPS-3R will be established. (2) Treated amount: 1.22 ton/week (3) Separation of B3 waste: 6.5 kg/week	(1) List of the persons in charge of the operation of TPS-3R (2) Monitoring report (3) Monitoring report	TPS-3R was operated appropriately.	☑	DKPP	Plan																																			
							Actual																																				
				C/P treated the separated waste properly.	☑	DKPP	Plan																																			
							Actual																																				

Items		Verification Indicator		Activites Conducted by CP	Implement-ation status	Person in Charge	Plan/ Actual	2014				2015												2016												2017											
		Verification Indicator	Means of Verification					8	9	10	11	12	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3	4	5	6	7	8	9	10	11
3. Implement and improve the activities for PP in the whole Kulerahan Guning Bahagia																																														
3.1 Implement and improve the activities of socialization																																														
(1)	Preparation of Socialization tools	(1) Poser, guidebook and leaflet	(1) Sample of poster, guidebook and leaflet	C/P finalized the materials by revising the originals which had been developed by JET and adding their own idea.	☑	BLH	Plan																																								
							Actual																			Completed																						
(2)	Involve the Environmental Cadre PP	(1) ? Cadres in each RT will be selected. (2) An explanation meeting for Cadre will be held.	(1) List of cadre registered (number of persons), List of cadre in the targeting area (2) Program, list of participants, etc.	C/P requested to appoint 3 cadres from each RT to the RT chiefs.	☑	BLH	Plan																																								
							Actual																			Completed																						
				C/P trained cadres by explanation and OJT.	☑	BLH	Plan																																								
							Actual																			Completed																						
(3)	Guide the waste discharge manner to halte sampah	(1) At least one halte sampah will be set up in each RT. (2) Waste is discharged to only halte sampah at designated time.	(1) Location of halte sampah (2) Monitoring report	C/P decided the location of halte sampah.	☑	DKPP, BLH	Plan																																								
							Actual																			Completed																						
				C/P installed the signboard at halte sampah, and took measures of discharge prohibition in the former TPS.	☑	DKPP, BLH	Plan																																								
							Actual																																								
				C/P notified the waste discharge time to the halte sampah to the residents.	☑		Plan																																							
						DKPP, BLH	Actual																			Completed																						
(4)	Implement the socilization (Methodology may be changed based on the result of Impact Study.)	(1) Patrol will be conducted regularly in each RT. (2) Feedback meeting will be held after the patrol was conducted. (3) Consultation meeting will be held. ***Methodology should be determined.***	(1)Confirmation at PP site, interview with environmental cadre and RT chief (2)Meeting record (3)Meeting record	C/P supported the environmental cadre to implement patrol.	☑ Not in all RT s	BLH, Kel	Plan																																								
							Actual						Even after expansion, C/Ps were supporting environmental cader to implement patrols in some RTs.																																		
				C/P held feedback meeting of patrol.	☑ Not in all RT s	Kel, BLH, DKPP	Plan																																								
							Actual																																								
				C/P urged RT chiefs and environmental cadres to hold consultation meeting considering the results of feedback meeting.	☑ Not in all RT s	Kelurahan	Plan																																								
							Actual																																								
(5)	Promotion of home compost	(1) DKPP procures XX units of home composter by their own budget. (2) 70% of households, which receive the compost bin, will use it properly. (Bins were already purchased at Activity 2. I(5).)	(1)Record of distribution of composter (photos, etc.) (2)Monitoring report	C/P procured composters by the municipal budget and distributed it to the residents.	☑	DKPP, BLH	Plan																																								
							Actual																			110 units of composters have been procured but not distributed ye																						
				C / P instructed how to produce household compost.	☑	BLH	Plan																																								
							Actual																			C/P got how to produce home compost.									Under training										
				Compost was produced at the household in the PP site.	☑	BLH	Plan																																								
							Actual																																								
3.2 Implement the separate collection																																														
(1)	Implement separate collection (day of the week collection)	(1) DKPP will collect the waste at designated day and time.	(1) Operation record of the MRF (2) Record of incoming time to TPA for organic waste	C/P arranged the necessary waste collection vehicles, and carried out collection works on the designated day and time.	☑	DKPP	Plan																																								
							Actual																			6 zones to 4 zones									Ongoing										
				C/P transported the collected waste according to the kind of waste. (Other waste was transported to TPS-3R, and organic waste to TPA.)	☑	DKPP	Plan																																								
							Actual																			All waste collected is transferred to MRF.																					
				By introducing curb collection, C / P forced residents to separate recyclable waste from organic waste strictly.	☑	DKPP	Plan																																								
							Actual						Curb collection service is provided to 12 RTs from Dec. 2016 to Feb. 2017.																																	
3.3 Implement and improve the operation of MRF																																														
(1)	Construct the MRF, procure and install the equipment	(1) MRF constructed (2) Equipment procured and installed	(1) Drawings, Photos (2) Layout drawing, photos	C/P constructed MRF.	☑	PU, DKPP	Plan																																								
							Actual																			Completed																						
				C/P procured the equipment and installed it.	☑	PU, DKPP	Plan																																								
							Actual																			Completed																						
(2)	Operate the MRF	(1) Operation system of MRF will be established.	(1) List of the persons in charge of the operation of MRF (2) Monitoring report	MRF is operaed as planned.	☑	~~Kelurahan~~ DKPP	Plan																																								
							Actual																																								
				C/P treated the separated waste properly, but its amount is far less than the target value.	☑	~~Kelurahan~~ DKPP	Plan																																								
							Actual																																								
3.4 Implement organic waste transfer at T/S																																														
(1)	Operate the T/S	Organic waste is transferred from small collection truckes to the waste containers, which are then transported to TPA by arm roll trucks.	(1) Photos	C/P developed the T/S.	☑	DinasPU, DKPP	Plan																																								
							Actual																																								
				C/P procured containers.	☑	DKPP	Plan																																								
							Actual																			Completed DLH prepared two containers, which is not enough.																						
				C/P routinely transferred the bags of organic waste from small trucks to the containers without opening them.	□	DKPP	Plan																																								
							Actual																			Collection workers extract salable items at transfer depo.																						

Items		Verification Indicator: Verification Indicator	Verification Indicator: Means of Verification	Activites Conducted by CP	Implement-ation status	Person in Charge	Plan/ Actual	2014	2015	2016	2017
4. Implement and improve the activities for PP in Kulerahan *Sepinggan Baru*											
4.1 Implement and improve the activities of socialization											
(1)	Preparation of Socialization tools	(1) Poser, guidebook and leaflet	(1) Sample of poster, guidebook and leaflet	C/P finalized the materials by revising those used previously.							
(2)	Involve the Environmental Cadre PP	(1) ? Cadres in each RT will be selected. (2) An explanation meeting for Cadre will be held.	(1) List of cadre registered (number of persons), List of cadre in the targeting area (2) Program, list of participants, etc.	C/P requested to appoint 3 cadres from each RT to the RT chiefs.							
				C/P trained cadres by explanation and OJT.							
(3)	Guide the waste discharge manner to halte sampah	(1) At least one halte sampah will be set up in each RT. (2) Waste is discharged to only halte sampah at designated time.	(1) Location of halte sampah (2) Monitoring report	C/P decided the location of halte sampah.							
				C/P installed the signboard at halte sampah, and took measures of discharge prohibition in the former TPS.							
				C/P notified the waste discharge time to the halte sampah to the residents.							
(4)	Implement the socilization to residents	***Methodology will be determined.***									
(5)	Promotion of home compost	(1) DKPP will procure ??? compost bins by their own budget. (2) 70% of households, which receive the compost bin, will use it properly.	(1) Delivering record of the compost bins (with photos) (2) Monitoring report	C/P purchased the compost bins by their own budget and delivered it to the residents.							
				C/P instructed how to produce composter at home.							
				Compost was produced at the household in the PP site.							
4.2 Implement the separate collection											
(1)	Implement separate collection (day-of-the-week collection)	(1) DKPP will collect the waste at designated day and time.	(1) Operation record of the MRF, Separate collection of the organic waste is confirmed by the record of weighbridge at TPA (date, time and amount)	C/P arranged the necessary waste collection vehicles, and carried out collection works on the designated day and time.							
				C/P transported the collected waste according to the kind of waste.							
4.3 Implement and improve the operation of MRF											
(1)	Operate the MRF	(1) Operation system of MRF will be re-established.	(1) List of the persons in charge of the operation of MRF (2) Monitoring report	MRF is operaed as planned.							
				C/P treated the separated waste properly.							
4.4 Implement organic waste transfer at T/S											
(1)	Operate the T/S	Organic waste is transferred from small collection trucks to the waste containers, which are then transported to TPA by arm roll trucks.	(1) Photos	C/P developed the T/S.							
				C/P procured containers (and arm roll trucks if necessary).							
				C/P routinely transferred the bags of organic waste from small trucks to the containers without opening them.							
5. Vegetable waste separation at Sepinggan Market											
5.1	Transportaion of vegetable waste to TPST	Vegetable waste is separately collected in the market and transported to TPST.	Data of vegetable waste accepted at TPST	C/P procured necessary equipments (containers).	☑	DKPP	Plan				
							Actual		Completed		
				C/P prepared the platform.	☐	DinasPU, DKPP	Plan				
							Actual				
				C/P explained the separation system to the sellers of vegetables in the market.	☐	BLH	Plan				
							Actual			Cpmpleted	
				C/P trained the waste collectors at the market for vegetable waste collection.	☐	DKPP	Plan				
							Actual			Completed	
				C/P routinely transported vegetable waste from the market to the TPST.	☐	DKPP	Plan				
							Actual		Vegetable waste collected separately is landfilled together with other waste.		
5.2	Transportation of vegetable waste to TPST compost facilities.	Vegetable waste is collected separately at the market and transported to TPST.	Data on vegetable waste carried to TPST	C / P always transports vegetable waste from the market to TPST.	☐	DKPP	Plan			Postponed to Aug. 2017	
							Actual			TPST is not completed as of September.	
6. Integration of organic waste separation and TPST operation											
6.1	Production of compost at the TPST using the organic waste separately collected from Kelurahans of the PP and Sepinggan Market.	The TPST produces compost.	Monitoring report	C/P allocated and organized personnel for TPST operation.	☐	DKPP	Plan			Postponed to Aug. 2017	
							Actual				
				C/P operated the TPST.	☐	DKPP	Plan				
							Actual			TPST is not completed as of September.	
7. Project monitoring											
7.1	Conduct monitoring and report the results	(1) Monitoring will be conducted every 3 months.	(1) Monitoring report	C/P conducted monitoring every 3 months.	☐	BLH, Kel	Plan				
							Actual				On going
				C/P prepared monitoring report and reported it to the central government periodically.	☐	BLH, Kel	Plan				
							Actual			KLHK's officials visitied PP site.	

BPN City has a policy to give a priority to achieving SS-PP at Kel GB and the expansion of the PP to other areas is after the project. For this reason, I think that this part is unnecessary.
February 24, 2017 Anai

Chapter 9. **Input of the Project**

9-1 Assignment of long term expert and short term expert

9-1-1 JICA Experts List

List of the JICA Experts is shown as below.

Items	Title	Name
Long-term Expert (JICA Expert)	Chief Advisor / Environment Policy Advisor	Seiji Tsutsui / Genichiro Tsukada *1)
	Waste Management / Project Coordinator	Hitoshi Katayama
	Waste Management	Seiji Takashima
Short-term Expert (JICA Expert Team)	Team Leader / Solid Waste Management Policy	Hisashi Yamauchi
	Deputy Leader / 3R / Citizen's Participation / Environmental Education / Public Awareness 1	Takatoshi Arai
	3R / Citizen's Participation / Environmental Education / Public Awareness 3	Yoshinosuke Hamada *6)
	Legal Systems/ Institution and Finance on Solid Waste Management	Takashi Ikeguchi*3)
	3R / Citizen's Participation / Environmental Education / Public Awareness 2	Junji Anai
	Solid Waste Data Management	Ron Nagai *4)/ Gantumur Burneebaatar
	Institution and Finance on Solid Waste Management	Junkichi Yamazaki
	Institution and Finance on Solid Waste Management 2	Noriko Otstuki
	EPR / CSR	Ryoko Tachibana*5)/
	EPR / CSR /Publication / Project Coordinator	Yume Mori
	Project Coordinator	Ryo Tamaoki*7)/

Note) *1) Mr. Tsutsui returned to Japan in June 2014, and Mr. Tsukada arrived in Indonesia in November 2014.

Note) *2) Mr. Takashima arrived in Indonesia in March 2015.

Note) *3) Assignment of Mr. Yamazaki has been transferred to Mr. Ikeguchi since September 2015.

Note) *4) Assignment of Mr. Nagai has been transferred to Mr. Gantumur since 2nd year of the project.

Note) *5) Assignment of Ms. Tachibana has been transferred to Ms. Mori since 2nd year of the project.

Note) *6) Assignment of Mr. Arai has been transferred to Mr. Hamada since December 2016 (Extention of the project).

Note) *7) Assignment of Ms. Mori has been transferred to Mr. Tamaoki since October 2017 (Extention of the project

9-1-2 Assignment Schedule of Japanese Experts (Long-term Expert ・ Short-term Expert)

Assignment schedule of the Japanese Experts is shown as below.

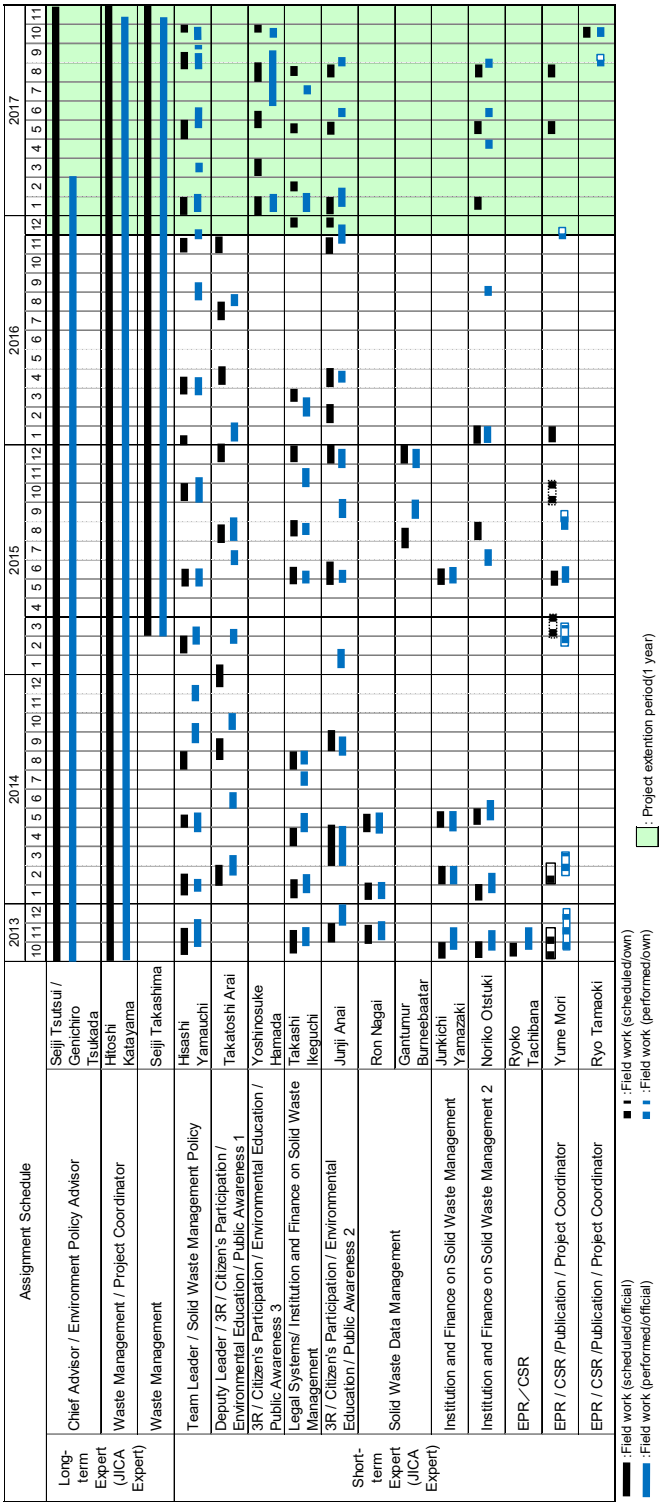


Figure 9-1 Assignment Schedule of Japanese Experts (Long-term Expert ・ Short-term Expert)

9-2 Equipment Procured by the Project

Equipment procured by the Project is listed as follows:

9-2-1 Jakarta

Equipment procured by the Project of Jakarta is shown as below.

Table 9-1 Equipment Procured by the Project of Jakarta

No.	Item	Quantity	Unit Price(IDR)	Total (IDR)	Organization	Date	Remark
1	Booklet "PP No. 81 Year 2012"	1,000	12,000	12,000,000	KLHK	27-Jun-14	
2	Camera Digital Canon sx170	1	2,330,000	2,330,000	PLM	12-Aug-14	
3	Working Desk 160x60x75 (Maple)	1	1,425,000	1,425,000	KLHK	19-Aug-14	
4	Working Desk 120x60x75 (Maple)	1	1,240,000	1,240,000	KLHK	19-Aug-14	
5	Working Desk 100x60x75 (Maple)	2	1,390,000	2,780,000	KLHK	19-Aug-14	
6	Working Chair 828 Black	5	850,000	4,250,000	KLHK	19-Aug-14	
7	Filing Cabinet 183x90x45 Grey	1	2,500,000	2,500,000	KLHK	19-Aug-14	
8	Dispenser Tori Water	1	1,379,900	1,379,900	KLHK	10-Sep-14	
9	LAN Cabel	4	36,500	146,000	KLHK	30-Sep-14	
10	Booklet "Pedoman Tata Cara Perhitungan Timbulan & Komposisi Sampah"	1,000	10,000	10,000,000	KLHK	10-Oct-14	
11	Booklet "Panduan Implementasi 3R"	1,000	5,800	5,800,000	KLHK	10-Oct-14	
12	Booklet "Pengelolaan Sampah" and "Ayo Buat Kompos"	2,000	8,050	16,100,000	KLHK	17-Nov-14	
13	Designing Project Brochure			10,000,000	KLHK	20-Jan-15	
14	Goodie Bag for HPSN 2015	1,000	31,500	31,500,000	KLHK	27-Feb-15	
15	Leaflet for HPSN 2015	2,000	3,750	7,500,000	KLHK	27-Feb-15	
16	T-shirt for HPSN 2015	1,000	72,500	72,500,000	KLHK	27-Feb-15	
17	Project Brochure	500	6,000	3,000,000	KLHK	27-Feb-15	
18	T-shirt for HPSN 2017	500	50,000	25,000,000	KLHK	28-Feb-16	
19	Designing Project Brochure (PLM&BPN)			5,000,000	PLM&BPN	29-May-15	
20	Flashdisks for Workshop	80	35,000	2,800,000	KLHK	07-Aug-15	
21	1 Set Working Desk	1	3,399,000	3,399,000	KLHK	11-Aug-15	
22	1 Set Working Desk	1	1,599,000	1,599,000	KLHK	11-Aug-15	
23	1 Set Working Desk	1	1,599,000	1,599,000	KLHK	11-Aug-15	
24	BlockNote for Workshop	100	36,000	3,600,000	KLHK	01-Sep-15	
25	Goodie Bag for Workshop	100	27,000	2,700,000	KLHK	14-Sep-15	
26	Ballpoint for Workshop	100	40,000	4,000,000	KLHK	14-Sep-15	
27	Goodie Bag for JCC	50	27,000	1,350,000	KLHK	17-Nov-15	
28	Ballpoint for JCC	50	51,000	2,550,000	KLHK	17-Nov-15	
29	Paper Shredder AutoFeed75	1	2,699,000	2,699,000	KLHK	24-Nov-15	
30	1 Unit Modem	1	585,000	585,000	KLHK	26-Nov-15	
31	Home Router	1	999,000	1,599,000	KLHK	15-Dec-15	
32	Meeting Desk	1	3,599,000	3,599,000	KLHK	04-Jan-16	
33	Meeting Chairs	6	399,000	2,394,000	KLHK	04-Jan-16	
34	Infocus IN114a	1	4,999,000	4,999,000	KLHK	04-Jan-16	
35	Ecobag for Bandung Study	1,100	36,000	39,600,000	KLHK	19-Feb-16	
36	Dispenser for HPSN 2016	14	136,400	1,909,600	KLHK	29-Feb-16	
37	T-shirt for HPSN Balikpapan	200	90,000	18,000,000	Balikpapan	02-Mar-16	
38	Poster for HPSN Balikpapan	2,500	6,400	16,000,000	Balikpapan	02-Mar-16	
39	T-shirt for HPSN Makassar	500	65,000	32,500,000	Makassar	04-Mar-16	
40	T-shirt for Java Jazz Event	300	80,000	24,000,000	KLHK	30-Mar-16	
41	Booklet for Environmental Week Event	100	175,000	17,500,000	KLHK	08-Jun-16	
42	Brochures for Environmental Week Event	400	19,500	7,800,000	KLHK	08-Jun-16	
43	Ecobag for Environmental Week Event	100	40,000	4,000,000	KLHK	08-Jun-16	
44	Layout Design for Article	1	2,000,000	2,000,000	KLHK	23-Aug-16	
45	Design & Prototype of Drop Box	1	15,000,000	15,000,000	KLHK	25-Nov-16	
46	Air Cooler	1	1,348,200	1,348,200	KLHK	11-Nov-16	
47	Standing Whiteboard for JKT	1	1,183,700	1,183,700	KLHK	16-Nov-16	
48	T-Shirts for HPSN 2017	500	50,000	25,000,000	KLHK	28-Feb-17	
49	Booklet Pilot Project Component (Bhs)	250	115,000	28,750,000	KLHK	20-Oct-17	
50	Ecobag for Booklet	250	75,000	18,750,000	KLHK	20-Oct-17	
51	Booklet Pilot Project Component (Bhs)	1,250	95,000	118,750,000	KLHK	30-Oct-17	
52	Booklet Pilot Project Component (Eng)	150	115,000	17,250,000	KLHK	30-Oct-17	
			Total	643,264,400			

9-2-2 Palembang City

Equipment procured by the Project of Palembang is shown as below.

Table 9-2 Equipment Procured by the Project of Palembang

	Item	Quantity	Unit Price (IDR)	Total (IDR)	Organization	Date	Remark
1	Plastic bags for Organic	70000	500	35,000,000	BLH/DKPP	30-Mar-15	For 3 months
2	Plastic bags for Inorganic	5000	3,800	19,000,000	BLH/DKPP	30-Mar-15	For 3 months
3	Poster A3	100	10,125	1,012,500	BLH	12-Apr-15	For 13 RTs (Zone 1)
4	Poster (60x90 cm)	50	54,700	2,735,000	BLH	12-Apr-15	For Public Facilities
5	Poster (35x48,3 cm)	850	8,450	7,182,500	BLH	12-Apr-15	For Residence of the 13RTs
6	Banner PP site (1x6 m)	7	243,000	1,701,000	DKPP	12-Apr-15	For the Entrance of Zone 1
7	Banner PP site (1x5m)	2	200,000	400,000	DKPP	12-Apr-15	For the Entrance of Zone 1
8	Banner Halte Sampah (30x40 cm)	35	8,100	283,500	DKPP	12-Apr-15	For 35 Halte Sampah
9	Banner Truck PP Opening (60 cm x 1,5 m)	2	175,000	350,000	DKPP	12-Apr-15	For 2 DKPP's Truck on the PP opening
10	Standing Banner (PP Opening)	2	236,250	472,500	BAPPEDA	12-Apr-15	For PP opening ceremony
11	Signboard (2.0x1.2M)	7	1,822,500	12,757,500	DKPP	12-Apr-15	For TPS in Zone 1
12	Nets for Halte and 2 trucks	40	55,000	2,200,000	DKPP	12-Apr-15	For 13 RTs (Zone 1)
13	T-shirts for Survey (Female)	21	120,000	2,520,000	DKPP/BLH	18-Apr-15	For WAACS
14	T-shirts for Survey (Male)	11	105,000	1,155,000	DKPP/BLH	18-Apr-15	For WAACS
15	Leaflet A4	200	5,400	1,080,000	BLH	29-Apr-15	For Residence/CP
16	Leaflet A4, laminate	500	7,275	3,637,500	BLH	29-Apr-15	For Residence/CP
17	Sticker	1000	4,225	4,225,000	BLH	30-Apr-15	For Residence of the 13RTs
18	Vest	110	225,000	24,750,000		6-Jul-15	For Cadre
19	Additional Waste Bags (Organic)	13250	700	9,275,000	DKPP	12-Oct-15	For 13 RTs (Zone 1)
20	Additional Waste Bags (Inorganic)	800	5,800	4,640,000	DKPP	12-Oct-15	For 13 RTs (Zone 1)
21	T-Shirts for Endline Survey (Female)	50	74,500	7,450,000	DKPP/BLH	30-Oct-15	For WACS
22	T-Shirts for Endline Survey (Male)	50	74,500		DKPP/BLH		For WACS
23	Guidebook	100	55,000	5,500,000	BLH	15-Jul-15	For 13 RTs (Zone 1)
24	Additional Nets for Halte Sampah	18.5	55,000	1,017,500	DKPP/BLH	1-Sep-15	For Halte Sampah in 13 RTs (Zone 1)
25	Hand Gloves	50	27,900	1,395,000		1-Sep-15	For Cadre
26	Additional Posters (32 x 48 cm)	2500	6,400	16,000,000	BLH	6-Feb-15	For PP expansion area
27	Ecobags	750	36,500	27,375,000		19-Feb-16	arranged by JKT
28	T-shirt	200	90,000	18,000,000	BLH	18-Feb-15	for HPSN day
29	Guidebook A5 Hard Cover	180	53,000	9,540,000	BLH	29-Apr-16	For environmental cadre
30	Speaker Set (Amplifier, Microphone, Speaker)	3	1,100,000	3,370,000	DKPP	29-Apr-16	For socialization car
31	Neon Box (2 m x 3 m)	1	18,150,000	18,150,000	DKPP	15-Apr-16	for MRF
32	Signboard (30 x 60 cm)	12	825,000	9,900,000	DKPP	15-Apr-16	for MRF
33	Announcement Board (35 cm x 60 cm)	1	1,100,000	1,100,000	DKPP	15-Apr-16	for MRF
34	Banner	3	385,000	1,155,000	DKPP	15-Apr-16	for MRF
35	Curtain Set	1	1,650,000	1,650,000	DKPP	15-Apr-16	For MRF Opening Ceremony
36	Desktop all in one lenovo	1	4,975,000	4,975,000	DKPP	8-Jun-16	For MRF Office
37	Printer HP epson L220	1	2,350,000	2,350,000	DKPP	8-Jun-16	For MRF Office
38	UPS ICA 628B	1	2,500,000	2,500,000	DKPP	8-Jun-16	For MRF Office
39	Digital Scale (include shipping cost)	1	13,200,000	13,200,000	DKPP	20-Jul-16	For MRF
40	Nets	82	60,000	4,920,000	DKPP/Kelurahan	11-Aug-16	For Halte Sampah
41	Ecobags for Bank sampah	100	35,500	3,550,000		19-Sep-16	
42	Banner Halte Sampah zone 2,3,4 (120 x 80 cm)	57	28,800	1,641,600	Kelurahan	14-Nov-16	For new zones in Kel.GB
43	Design Banner Halte Sampah zone 2,3,4	1	175,000	175,000	Kelurahan	7-Nov-16	For new zones in Kel.GB
44	3R Project Movie	1	65,000,000	65,000,000	BAPPEDA/ BLH/ DKPP	7-Nov-16	Development of Video on Balikpapan PP regarding Solid Waste Management
45	Calculator	1	160,000	160,000	DKPP	29-Dec-16	For MRF
46	Halte sampah signboard(40x60 cm)	1	250,000	250,000	BLH	29-Dec-16	For Sample
47	Big Rice Bag	4		15,000	DKPP	29-Dec-16	For MRF
48	Speaker + USB amplifier	1	1,750,000	1,750,000	DKPP	29-Dec-16	For MRF
49	Compatible	3	375,000	1,125,000	DKPP	29-Dec-16	For MRF
50	SD Card	4	135,000	540,000	DKPP	29-Dec-16	For MRF
51	Gate For Transfer Station	1	47,500,000	47,500,000	DKPP	26-Jan-17	For start operation of transfer station
52	Ricebag 4 colours	18000	5,800	104,400,000		27-Mar-17	
53	Hats	24	70,000	1,680,000	DLH	17-May-17	For MRF Coll. Workers
54	Safety glassess	12	90,000	1,080,000	DLH	17-May-17	For MRF Coll. Workers
55	Safety Vest	12	90,000	1,080,000	DLH	17-May-17	For MRF Coll. Workers
56	Rain coat	12	100,000	1,200,000	DLH	17-May-17	For MRF Coll. Workers
57	Logo embroidery for Hat	24	50,000	1,200,000	DLH	17-May-17	For MRF Coll. Workers
58	Logo printing for Raincoat and Vest	24	40,000	960,000	DLH	17-May-17	For MRF Coll. Workers
			Total	517,231,100			

9-2-3 Balikpapan City

Equipment procured by the Project of Balikpapan is shown as below.

Table 9-3 Equipment Procured by the Project of Balikpapan

	Item	Quantity	Unit Price	Total (IDR)	Organization	Date	Remark
1	Plastic bags for Organic	70000	500	35,000,000	BLH/DKPP	30-Mar-15	For 3 months
2	Plastic bags for Inorganic	5000	3,800	19,000,000	BLH/DKPP	30-Mar-15	For 3 months
3	Poster A3	100	10,125	1,012,500	BLH	12-Apr-15	For 13 RTs (Zone 1)
4	Poster (60x90 cm)	50	54,700	2,735,000	BLH	12-Apr-15	For Public Facilities
5	Poster (35x48,3 cm)	850	8,450	7,182,500	BLH	12-Apr-15	For Residence of the 13RTs
6	Banner PP site (1x6 m)	7	243,000	1,701,000	DKPP	12-Apr-15	For the Entrance of Zone 1
7	Banner PP site (1x5m)	2	200,000	400,000	DKPP	12-Apr-15	For the Entrance of Zone 1
8	Banner Halte Sampah (30x40 cm)	35	8,100	283,500	DKPP	12-Apr-15	For 35 Halte Sampah
9	Banner Truck PP Opening (60 cm x 1,5 m)	2	175,000	350,000	DKPP	12-Apr-15	For 2 DKPP's Truck on the PP opening
10	Standing Banner (PP Opening)	2	236,250	472,500	BAPPEDA	12-Apr-15	For PP opening ceremony
11	Signboard (2.0x1.2M)	7	1,822,500	12,757,500	DKPP	12-Apr-15	For TPS in Zone 1
12	Nets for Halte and 2 trucks	40	55,000	2,200,000	DKPP	12-Apr-15	For 13 RTs (Zone 1)
13	T-shirts for Survey (Female)	21	120,000	2,520,000	DKPP/BLH	18-Apr-15	For WAACS
14	T-shirts for Survey (Male)	11	105,000	1,155,000	DKPP/BLH	18-Apr-15	For WAACS
15	Leaflet A4	200	5,400	1,080,000	BLH	29-Apr-15	For Residence/CP
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17	Sticker	1000	4,225	4,225,000	BLH	30-Apr-15	For Residence of the 13RTs
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19	Additional Waste Bags (Organic)	13250	700	9,275,000	DKPP	12-Oct-15	For 13 RTs (Zone 1)
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21	T-Shirts for Endline Survey (Female)	50	74,500	7,450,000	DKPP/BLH	30-Oct-15	For WACS
22	T-Shirts for Endline Survey (Male)	50	74,500		DKPP/BLH		For WACS
23	Guidebook	100	55,000	5,500,000	BLH	15-Jul-15	For 13 RTs (Zone 1)
24	Additional Nets for Halte Sampah	18.5	55,000	1,017,500	DKPP/BLH	1-Sep-15	For Halte Sampah in 13 RTs (Zone 1)
25	Hand Gloves	50	27,900	1,395,000		1-Sep-15	For Cadre
26	Additional Posters (32 x 48 cm)	2500	6,400	16,000,000	BLH	6-Feb-15	For PP expansion area
27	Ecobags	750	36,500	27,375,000		19-Feb-16	arranged by JKT
28	T-shirt	200	90,000	18,000,000	BLH	18-Feb-15	for HPSN day
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30	Speaker Set (Amplifier, Microphone, Speaker)	3	1,100,000	3,370,000	DKPP	29-Apr-16	For socialization car
31	Neon Box (2 m x 3 m)	1	18,150,000	18,150,000	DKPP	15-Apr-16	for MRF
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36	Desktop all in one lenovo	1	4,975,000	4,975,000	DKPP	8-Jun-16	For MRF Office
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45	Calculator	1	160,000	160,000	DKPP	29-Dec-16	For MRF
46	Halte sampah signboard(40x60 cm)	1	250,000	250,000	BLH	29-Dec-16	For Sample
47	Big Rice Bag	4		15,000	DKPP	29-Dec-16	For MRF
48	Speaker + USB amplifier	1	1,750,000	1,750,000	DKPP	29-Dec-16	For MRF
49	Compatible	3	375,000	1,125,000	DKPP	29-Dec-16	For MRF
50	SD Card	4	135,000	540,000	DKPP	29-Dec-16	For MRF
51	Gate For Transfer Station	1	47,500,000	47,500,000	DKPP	26-Jan-17	For start operation of transfer station
52	Ricebag 4 colours	18000	5,800	104,400,000		27-Mar-17	
53	Hats	24	70,000	1,680,000	DLH	17-May-17	For MRF Coll. Workers
54	Safety glassess	12	90,000	1,080,000	DLH	17-May-17	For MRF Coll. Workers
55	Safety Vest	12	90,000	1,080,000	DLH	17-May-17	For MRF Coll. Workers
56	Rain coat	12	100,000	1,200,000	DLH	17-May-17	For MRF Coll. Workers
57	Logo embroidery for Hat	24	50,000	1,200,000	DLH	17-May-17	For MRF Coll. Workers
58	Logo printing for Raincoat and Vest	24	40,000	960,000	DLH	17-May-17	For MRF Coll. Workers
			Total	517,231,100			

9-3 The Grant Equipment

The Grant Equipment is shown as below

Table 9-4 The Grant Equipment

	List	Acquisition Date
1	Desktop PC	2013/11/9
2	Desktop PC	2013/11/15
3	Desktop PC	2013/11/30

9-4 Local Expenditure

Local expenditure of the Project was summarized as follows:

Table 9-5 Local Expenditure

Item		Cost(JPY)
1	Local staff	700,000
2	Cost related with vehicles	6,760,000
3	Rental fee	3,470,000
4	Consumable goods	5,680,000
5	Trabel and transpotation fee	3,920,000
6	Communication and haulage cost	260,000
7	Material and document cost	360,000
8	Other cost	310,000
Total		21,460,000

Chapter 10. Issues, Ideas, and Lessons from Implementation of Operation, and Activity Plan

10-1 Issues, Ideas, and Lessons from Implementation of Operation

10-1-1 Issues, Ideas, and Lessons for Central Government

(1) Support for formulation of draft ministerial regulations

The following support was provided in this project for cabinet and ministerial regulations.

1) Regulations regarding specific waste
2) Presidential Decree regarding National Policy and Strategy for Waste Management
3) Regulations for emergency response system for handling waste at TPAs (final disposal sites)
4) Regulations regarding standards for wastewater discharged from TPAs
5) Regulations regarding the roadmap for Expanded Producer Responsibility (EPR)

As a basic initiative, a Technical Working Group (WG) was established for KLHK staff members, in view of the importance of the active involvement of KLHK in this project. Also, external personnel were appointed as advisors as appropriate, from the point of view of utilization of local staff. In addition, WG meetings were periodically held, as these meetings tended to be delayed in the past.

One issue that became clear as a result of implementation of this project was that the formulated orders and regulations tended to be set more strictly compared with the current status of waste management in Indonesia, so it is common that many local governments do not comply with the rules, regulations, criteria, etc.

In respect of this situation, regarding "(4) Regulations regarding standards for wastewater discharged from TPAs", it was not a matter of simply formulating draft regulations, but after carrying out a status confirmation survey regarding the wastewater discharged from TPAs at 10 locations throughout the whole country, the draft regulations were formulated. Although how the Central Government will provide technical and budgetary support to enable local governments to comply with these regulations is an issue for the future, it is considered that a certain result was obtained by supporting the formulation of regulations after determining the current situation.

(2) Dissemination of the project results to other cities

In this project, the aim was to construct a model that could be disseminated to other cities throughout the country through the activities of the pilot project. In Palembang City, a "Communal 3R Model" implemented by an organization of the residents and the community was instituted, and in Balikpapan City an "Institutional 3R Model" was established with a high level of public involvement. Based on discussions with the Central Government (KLHK and PUPR), in general the following components were set as the details of the dissemination model.

<Palembang City>

In Palembang City, the complex facility of TPS-3R and WB is introduced, and it can be regarded as a model of complex facility accepting each separated waste. KLHK and PUPR have issues regarding dissemination of waste banks and TPS-3Rs throughout the whole country, and they expect the function and operational form of the Collaboration Model.

<Palembang City: Components of the dissemination model>

- ✓ Improvement in storage, discharge, and collection: Sorting of waste at source, collection by KSM, and incorporation of primary collectors
- ✓ Waste Bank: Recovery of recyclables by the patrol format and unit format
- ✓ TPS-3R: Sorting of other waste and composting
- ✓ Collaboration Model: Integrated management of recyclables, and integrated management of operation, finance, and data

< Balikpapan City>

In Palembang City, collection by the station method and recovery of recyclables by MRF has been introduced under government guidance, and as a new initiative in Indonesia it is a model that can be disseminated.

< Balikpapan City: Components of the dissemination model>

- ✓ Improvement in storage, discharge, and collection: Sorting of waste at source, waste stations, weekly collection at set times and locations
- ✓ MRF: Sorting of recyclables from other waste, and data management
- ✓ Relay depots: Transshipment locations for organic waste
- ✓ TPST: Composting of organic waste

The 3R Stars and the Dissemination Workshop that are scheduled to be held in both cities will be attended by members of the Central Government, with whom information will be shared on site, and based on the results of monitoring and evaluation of the pilot project, adjustment and improvements will be added as necessary, in order to finish the model that can be applied to the whole country.

Note that at the present stage, the direction of the dissemination strategies of KLHK and PUPR are as follows.

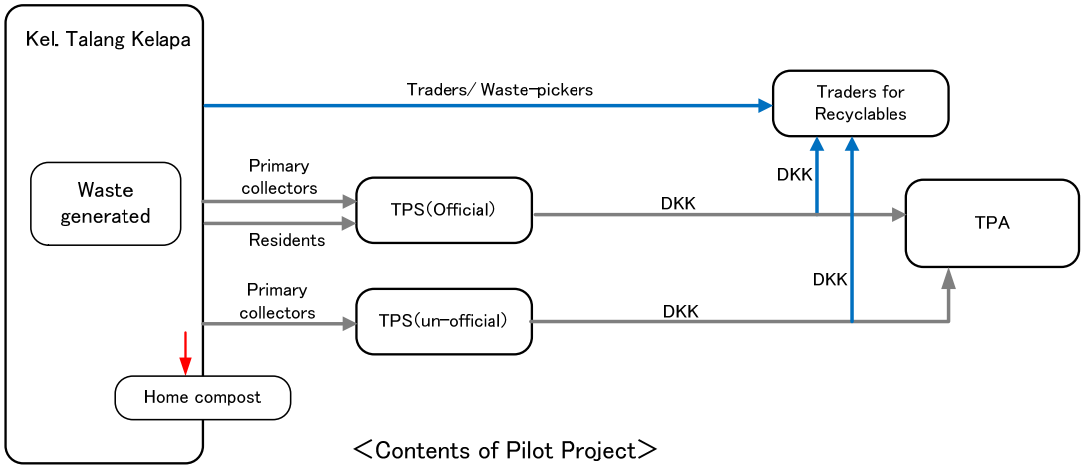
KLHK: 1. To carry out dissemination based on the waste management regulations currently in preparation (can be applied as guidelines); 2. To carry out dissemination using the KLHK existing program (ADIPURA system, dissemination of waste banks, dissemination of recycling centers, provision of equipment, and the smart village concept (applicable to PLM and BPN); and 3. Dissemination by holding waste bank meetings throughout the country (scheduled to be held in Palembang City in March 2017).

PUPR: Dissemination from among the existing TPS-3R promotion projects.

Note that at the local government level, the environmental bureaus and the cleansing bureaus have been integrated throughout the whole country as of January 2017, and it has been confirmed at both ministries that the management and operation of the Collaboration Model in Palembang City has been made easier.

An overview of the dissemination model in both cities and a flow diagram summarizing a comparison with the situation prior to implementation of the pilot program are shown in Figure 10-1 and Figure 10-2.

＜Palembang＞



＜Remarks＞
: Recyclable
: Municipal waste
: Organic waste

＜Contents of Pilot Project＞

1. Introduction of Source Separation (Recyclables, Organic waste, Other waste)
2. Recyclables shall be collected by Waste Bank. Waste Bank operation has two ways; i.e. Open air system and Unit bank system.
3. Current Un-official TPS should be omitted.
4. Current TPS should be improved to TPS-3R, and recycling function such as composting should be added in TPS-3R.
5. Private primary collectors should bring in the official waste collection services.
6. Collaboration model of Waste Bank and TPS-3R should be established and operated.
7. Establishment of operation mechanism of Collaboration model by the Community/KSM and supporting mechanism of the City government.

＜Waste Flow before PP＞

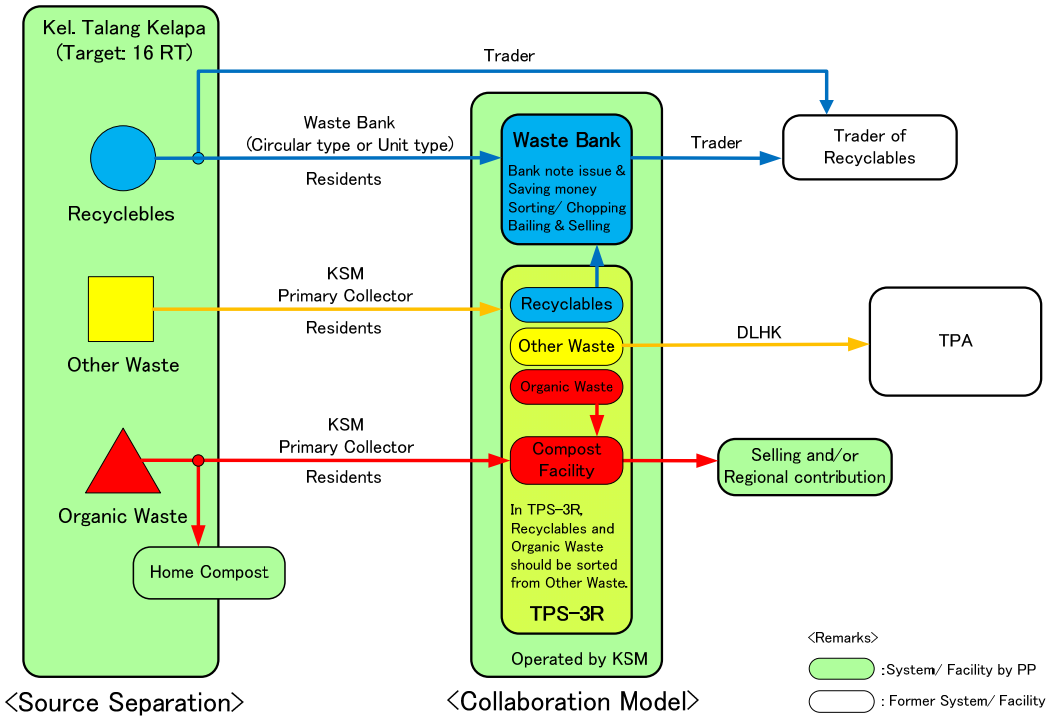


Figure 10-1 Waste Flow of PP in Palembang

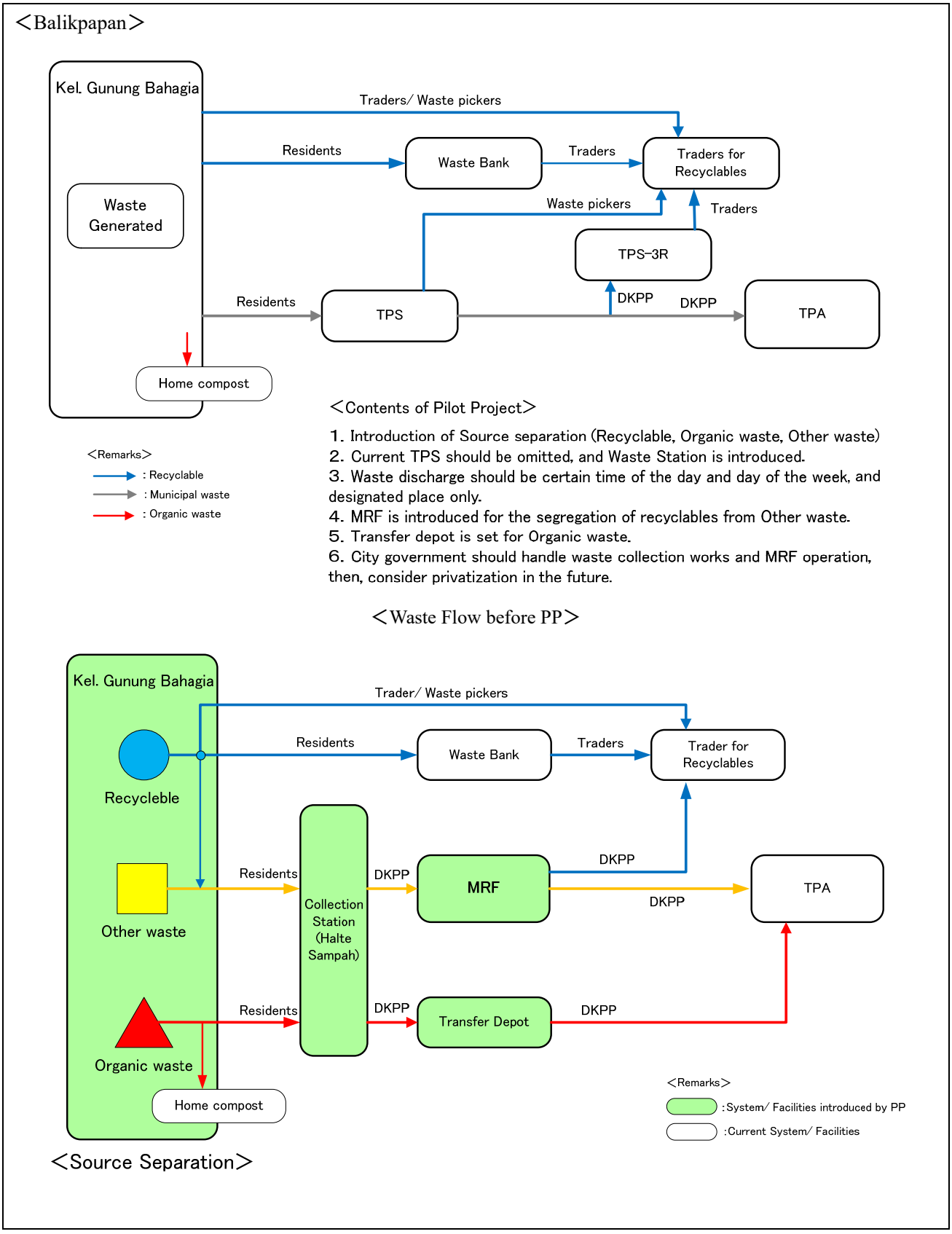


Figure 10-2 Waste Flow of PP in Balikpapan

(3) **Method of calculation of the waste reduction ratio**

There have been numerous discussions between KLHK and PUPR regarding the calculation of the waste reduction ratio, without producing a clear conclusion (the Indonesian side also does not have a clear definition). The waste reduction ratio has also been set as an index of the BDM, so there have been discussions again between the two ministries regarding the method of calculation.

As a result of the discussions it was agreed that the calculation method would be based on the basic measurement values (the quantities processed in the facilities introduced in the PP), on the assumption that after completion of the project the C/P organizations would be able to carry out monitoring by themselves (see the calculation equation below). The denominator is set as the quantity of waste generated, obtained as the value of the basic unit of waste generated (kg/day/capita) derived from the survey of waste quantities and waste types multiplied by the population. The numerator is set as the quantity of waste recycled or processed in the waste bank, TPS-3R, and MRF introduced in the pilot project.

Note that the estimated quantities of home compost and quantity of recyclables recovered by primary collectors and waste pickers are included in the calculation to the extent that they can be estimated. In addition, the situation in each relevant city will differ, so the unique elements in each can be taken into consideration in the calculation. KLHK has expressed the opinion that it is okay to take into consideration these differences resulting from differences in the situation of cities.

$$Waste\ Reduction\ Ratio\ (\%) = \frac{Amount\ of\ recyclables\ collected\ (2) + Amount\ of\ organic\ waste\ recycled(3) + Others\ (if\ any)(4)}{Amount\ of\ waste\ generated\ (1)} \text{ x100}$$

10-1-2Lesson Learned / Ingenuity, Recommendations of Palembang

Lesson learned / ingenuity, future issues / improvement points, and recommendations through pilot project are shown as follows.

(1) **Lesson learned / Ingenuity**

(a) Introduction of Source Separation

In this project, waste separation system has not been established, in particular, cooperative relations with PC cannot be established, and furthermore, waste separation at source has been introduced with unclear process to destination for separated organic waste, it caused mixing organic waste in the collection process. In addition, primary waste collection is not carried out throughout the area (about 50% of contracted households with PC), there are some issues such as not regularly carrying out collection and transportation in the city itself, unofficial loading on the road for a long time.

When introducing source separation, we should have carefully verified existing collection and transportation systems and formulated a plan that fully consider both waste collection and organic waste collection. Also, since PC or a west picker collect valuables spontaneously, it is important of how to manage PC.

(b) Distribution of Designated Bag

Regarding designated bags, some of effects was confirmed in the separation of organic waste. Sack bags for other waste can also be used for waste discharge, sack bags are planned as not disposable, and it means sack bags are used repeatedly. But PC could not return it to residents, therefore lots of residents had shortage of sack bags. Also, in the lots of case, sack bags for other waste were used as bags for valuables more than other waste, so, as one of the possibility of effective use of sack bags, it was considered that sack bags were useful for valuables more than other waste. However, since designated bags were distributed to each resident through the RT leader by local government, when the RT leader was uncooperative, designated bags were not distributed to each resident. In addition to that, some cost is required to buy bags themselves, it was difficult for local government to secure the budget continuously, therefore, local government stopped distributing the designated bags after one year. If considering to secure budget for cost distribution of bags, it is realistic that distribution of bags should be carried out as kind of temporal campaign, not permanent task for local government, or it must be considered charging for waste collection as resident burden, like Japan, it is one of options to have ingenuity, such as putting a print of "Available for plastic bag for organic waste after use" on plastic shopping bag in cooperation with supermarket and/or retail store.

(c) Introduction of Segregation Containers

It was planned to introduce sorting containers for organic waste and other waste to ask residents to separate them in TPS-3R. But sorting containers could not installed because of delay of the construction of TPS-3R, activity for sorted collection could not be started. However, even though construction of TPS-3R is completed on schedule and sorting containers are set, it might be not working well, because lock of consciousness of residents for waste separation, no implementation of periodic waste transportation for containers, and to be mixed with separated wastes in the course of transportation to landfill. In view of the above, it can be said that it is precondition that (1) Having a strong intention of residents to separate waste at source, (2) Securing periodic waste transportation for containers, (3) Establishment of processing flow after sorting.

(d) Utilization of the Environmental Cadre for Public Awareness

In order to thoroughly separate waste and improve discharging manners, continuous grass-root level activities of public awareness is necessity. But DLHK does not have enough staffs and it is not easy for municipal officials themselves to conduct detailed activities of public awareness. For this reason, in this project, we utilized the Environmental Cadre who are registered in the city regarding public awareness for residents. The Environmental Cadre is local resident and have the merit of being able to talk and tell residents about waste separation in the daily life. On the other hand, activities by the Environmental Cadre depends on their autonomy, so there is concern about the stagnation of activities due to individual autonomy. In order to utilize the Environmental Cadre, it is required to provide incentives, such as rewards/products, training/site-visit in other city so that their motivation for activities will maintain.

(e) Implementation of Public Awareness Patrol

As public awareness activities related to source separation, public awareness patrols by the Environmental Cadre

selected from residents were conducted. As a result, at RT where the activities of the selected Environmental Cadre are active, the number of households conducted source separation is increasing, and it found out that the effect was different by depending on the discretion of the Environmental Cadre. Also, at RT with many high-income groups, they work so hard, and in many case, their servants actually handle waste, not themselves, therefore, it is difficult to enhance their consciousness of source separation for waste. It was shown that income as well influences the effect of public awareness.

(f) Introduction of Feedback Meeting and Consultation Meeting

The feedback meeting was planned as reporting and discussing the current situation with city officials, and consultation meeting was planned to inform results of feedback meeting and to consult with questions of residents. In fact, however, the initial plan was excessive to the capacity of residents, so it was a heavy burden for residents to hold these meetings individually, and virtually both meetings were held almost at the same time without distinction. In such community meetings, it was necessary to prepare snacks and drinks in Indonesia, and it was found that a certain amount of budget had to be secured for that. From this finding, in an area of new PP site, by taking free ride on the religious residents 'meeting etc., a meeting for public awareness was carried out with no costs of snacks and drinks.

(g) Encouragement of Community's Motivation

PP in Palembang City, "Communal 3R model" is adopted. Under local government support, main entity of PP is residents, it means community. To establish PP, function well, and to develop sustainably, it is necessary to establish the mechanism to foster and maintain motivation of the community. BLH provided rewards for operation of Waste Bank to the community member as an incentive for the operation. As a result, motivation of community member has improved markedly. Although it seems to be difficult for the city to provide rewards continuously, giving kind of rewards or training/site-visit in other city as incentives at important period such as beginning of activities is very effective.

(h) Support for Establishment of Waste Bank

Circulate Collection System and conventional system of Waste Bank was established, but in any system of Waste Bank, it is absolutely necessary of storage place for the collected recyclables. Also, for operation, bank passbooks, database books, scales, transport vehicles, their fuels etc must be prepared. For this reason, in order to open Waste Bank, it is important to develop Waste Bank (including storage place) and secure necessary initial funds for procuring needed equipment. As it is not easy for residents to secure necessary initial funds independently, economic support is required for residents to open Waste Bank.

(i) Introduction of Circulate Collection System (open-air weighing) in Waste Bank

In this PP, due to the delay of construction of Waste Bank, Circulate Collection System (open-air weighing) which is to collect recyclables by circulating by kaiser was introduced.

In Circulate Collection System, residents do not need to bring recyclables to Waste Bank, so it was a convenient and accessible system for residents. However, not only fuel cost but also driver's wage need to be taken into consideration, and staff is required to long time work to patrol and carry out some works such as kind confirmation, weighing, bookkeeping, etc at several places. Therefore, it is difficult to work voluntary and it is necessary to consider the wages and allowances of staff, especially driver.

(j) Introduction of Unit (group customer) System in Waste Bank

Unit (group customer) System was one of the useful systems for residents as recyclables collection system. Unit (group customer) System is; residents themselves organize group (unit) voluntarily, and select storage place, and keep recyclables at storage temporarily, and then when amount of recyclables is much enough to transport, ask Waste Bank to collect recyclables by kaiser. This system contributed to the efficient collection of Waste Bank as it is possible to collect a lot of recyclables at once. Also, for residents, it contributed to leads to active activities of residents since there is place where residents can store recyclables temporarily.

(k) Distribution of Bag for Valuables (Eco-bag) to Waste Bank Customer

In order to further activate activities of Waste Bank by residents, eco bag was made for recyclables bag and distributed to residents who has more than three activities of Waste Bank. This idea is coming from a result that other waste sacks are used for recyclables. Because the distributed eco bag was well received by the residents, it led to the promotion of motivation for residents' activities. In addition, eco bags was distributed to new customers, it was also contributed to the acquisition of new customers. However, reportedly if the eco bag is too good, some of residents do not want to use it for recyclables and are being used for other purposes. It is better to avoid using the eco bag that is too stylish for the promotion of collection of recyclables.

(l) Installation of Roof for Sorting Place

Although it is not specified in the Waste Bank guidelines, a place for sorting and selecting recyclables is indispensable. Also, considering the climate of Indonesia, working under the scorching sun is extremely difficult in reality. In this PP, a roof for work place was installed from the viewpoint of work environment and work efficiency of sorting and selecting workers. It has been used as a very effective facility.

(m) Development of TPS-3R

Treatment of organic materials in TPS-3R was planned to be as small as necessary to promote compost to residents. In fact, it was not able to treat at the planned composting facility, it had to be changed the plan to treat all incoming organic materials in TPS-3R.

Treatment capacity required for all incoming organic materials could be secured by increasing the number of cells up to 18 cells. On the other hand, it cannot secure enough place for sorting in waste. As a result of this change, the amount of compost treatment of organic materials in TPS-3R, increased significantly compared with the original plan, and the amount of waste transported from TPS-3R to landfill could be drastically reduced.

(n) Introduction of Promotion for Segregation by Setting Different KSM Collection Fee

KSM collects Collection Fee from residents. To promote sources separation, Collection Fee was set two types, one is Rp.10,000 (about 80 Yen) for residents who segregates at home, the other is Rp.20,000 (about 160 Yen) for residents who does not segregate at home. Initially, about 60% of the residents chose to the fee for type with waste segregation, but in fact there was a big difference between situation of participation and implementation of waste segregation, and waste separation was not promoted by setting different Collection Fee. Amount of Collection Fee with waste segregation is set half of with no waste segregation, but since the fee itself is inexpensive, economic incentives did not work. In addition, it can be said that the lack of residents' awareness for necessity of source separation is one of the major factors not to lead to promotion of source separation. For this reason, when differentiation of Collection Fee is introduced for promotion of waste segregation, it is also important to improve the awareness of residents at the same time.

(o) Expansion of Contracted Household of TPS-3R

In this PP, solicitation activities to households was conducted by using the Environmental Cadre. As for the solicitation method, five groups of three persons was made, pamphlet for solicitation and solicitation script were prepared in advance, and then the Environmental Cadre had a practice so that they could solicit in the same way.For solicitation, three teams are set up, key point of first team is to emphasizes only the explanation of KSM and TPS-3R, key point of second team is to emphasizes the future using a pamphlet with photos to associate with the image of the future in addition to the explanation of KSM and TPS-3R, key point of third team is to emphasizes the future using a pamphlet with photos of environmental pollution in addition to the explanation of KSM and TPS-3R, It was verified whether the effect of each key point of solicitation was different. Although the results of the effect are currently being analyzed, it seemed that the success or failure of the solicitation was influenced by the character and atmosphere of solicitors of team (the Environmental Cadre) rather than the difference in explanation.

(p) Introduction of Crushing Machine for Compost and Plastic Chip

In the TPS-3R supported by PUPR, a crushing machine for compost is introduced in order to carry out more efficient treatment of organic waste. By introducing a crushing machine, it is possible to carry out more proper stirring at the initial stage by mechanical crushing, and it is possible to further shorten the fermentation process period of organic waste because it can be made finer.

Regarding crushing machine for plastics, it is possible to make the plastic chips from pet bottle by introducing crushing machine, it can be sold about three times as expensive as usual, so that it can be expected to contribute to stable management of Waste Bank. But fuel cost is required for crushing machine, and maintenance cost is often required as well. Securing these budgets is directly linked to the sustainability of activities. In addition, most of crushing machine for plastics are crushed while flowing water, so budget considering the cost of water as well as the power of the pump is necessary. In this way, it can be said that it is important to fully consider the income plan that can generate the budget for crushing machine.

(q) Cooperation of the Primary Collector (PC)

It is recognized that responsibility of local government is to collect and transport the discharged waste at TPS, and then to dispose in TPA properly and responsibility of residents is to discharge the waste to TSP from household (primary collection). In order to ensure the consistency of waste management, DLHK should manage from primary collection, but actually there is no waste management system. Therefore, PC involved with primary collection to TPS is important stakeholder to establish an appropriate collection and transportation system.

(r) Purchase of Organic Waste from the Primary Collector (PC)

Since PC is important stakeholder to establish an appropriate collection and transportation system, cooperating with PC is one of the major issues. However, KSM competes with PC in primary collection, it is not easy to cooperate with PC in reality. For this reason, as one of the way that can be useful and cooperative for each other, purchase of organic waste from PC has been started. By doing this, compost productivity is improved and waste reduction of organic waste is promoted. Meanwhile, expenses for purchase of organic waste occurred, but it led to the first step of cooperative relationship with PC.

(s) Introduction of Collaboration Management of TPS-3R and Waste Bank

Waste Bank aims to collect separated recyclables, TPS-3R aims to collect recyclables from mixed waste and treat organic waste (composting), therefore, it might be said that there are similar facilities to compete in terms of collection of recyclables. This PP aimed for a synergistic effect by integrally operating the Waste Bank under KLHK and the TPS-3R under PUPR.

The effects (merits) of the integrated collaboration are followings below;

/ To be able to support financially each other,

/ To be able to share profit of facility,

/ To be able to share expenditure of facility including the cost for staff,

/ To be able to share the skilled staff,

/ To be able to sell large amount of recyclables at once by efficiently collecting them from both facilities,

/ To be able to easily supervise the activities of TPS-3R and Waste Bank by local government.

On the other hand, in Malang Province and others, the demerit that TPS-3R competes with Waste Bank has been pointed out. In order to achieve the above effects, this PP was carried out with efficient activities of both facilities utilizing the fact that operating organization of both facilities are the same. However, in reality there are institutional barriers, the members of the management entities of both facilities are the same members, but they are separate organizations. Also, with respect to operation cost, it cannot be interchanged with each other, and it has not created synergistic effects yet. In order to create synergistic effect of the facilities of the different ministries concerned, a strong initiative from the ministries concerned was required but this PP had not been able to explain sufficiently.

(t) Introduction of the Entry Form of Monitoring Results

The report of monitoring results is very important not only for the city but also for central government to grasp the activities of the Project which is conducted by each city. It was planned to introduce an entry form of report of

monitoring results to reduce the burden on city staff and encourage to report results efficiently. However, the report of monitoring results by CP has not been prepared as of July 2017.

(u) Production of Good Quality Compost

In the compost producing process, crushed organic waste is mixed with wood chips generated from furniture shops as debris, and then it is added fermentation accelerator, which is made of fermented food (Tempe, lactobacillus beverage etc.) available at local area, this idea of fermentation accelerator is coming from Takakura method. By doing so, the production period is about two weeks, and it is possible to produce good quality

(v) Introduction of Home Compost

When introducing home compost, it is effective to prepare a plan in consideration with the followings.

・Some of the residents who started home compost are not able to conduct well and need some advice.

・As a regular follow-up, if the producing situation of home compost is checked and consultation regarding producing compost is carried out, it is highly possibility that the motivation of residents will be raised and will lead to continuous activities. (Not only PP but also examples of NGO in Surabaya City.)

・There is a high possibility that residents who is conscious of the environment, such as registrant of Waste Bank, continue home compost.

・Most compost are used for home plantation. For this reason, there is a high possibility that residents who enjoy plantation at home continue home compost.

・Home compost are conducted by housewives or women. Therefore women who cannot spend much time at home due to work has stopped it regardless of their interest in home compost.

(w) Promotion of Home Compost using Non-dedicated Container

In order to start home compost, one of the challenges is to secure home compost containers. It is required for cost to distribute it. In the new site of PP, in order to solve this issue and to promote home compost, the product method of home compost which does not use exclusive containers, only with cardboard boxes, is enlightened. Although it has not been able to verify the continuity, it can be expected to contribute to the promotion of home compost, because the residents who are interested in home compost can start conducting home compost activities with reduction of initial cost.

(2) **Recommendations**

(a) Utilization of the Environmental Cadre for Public Awareness

The Environmental Cadre is not own system adopted by Palembang City, it is widely used in Indonesia and in the future, it becomes human resources to complement the activities of local staff in implementation of public awareness in other cities.

However, there is a limit to the utilization as a volunteer, and it is required to make a mechanism to provide incentives for compensation for activities.

(b) Cooperation of Primary Collector (PC)

PC are important stakeholders for establishing a proper collection and transportation system, but it is not easy to cooperate with PC. As a way of cooperation, it is effective not only to introduce PC registration system by ordinance, but also to purchase organic waste from PC by KSM as well..

(c) Establishment of Waste Bank

In order to open Waste Bank by residents, it is required to prepare not only the buildings but also the equipment necessary for the operation such as bank book. Therefore, local government should support residents to secure initial funding.

In addition, in order to ensure continuous and stable operation, it is required to provide financial assistance such as personnel expenses and utilities costs as well as technical advice on the operation of Waste Bank.

Also from the case of Makassar City, local government stabilize a price of recyclables and establish a central Waste Bank with a function of gathering recyclables on a permanent basis, and then, to buy recyclables which should be higher than the market price and not be fluctuated over a period of time, from residents and other Waste Bank, local government provides subsidies to the central Waste Bank. If it is possible to establish such kind of system, Waste Bank will become rather sustainable.

(d) Introduction of Circulate Collection System (open-air weighing) in Waste Bank

Circulate Collection System is a convenient and accessible system for residents. For this reason, when promoting the collection of recyclables in an area where Waste Bank facilities cannot be installed, Circulate Collection System can be one of useful collection methods.

However, because of long time work to patrol, it is required to secure budget enough to keep fuel cost, drivers and staff.

(e) Utilization of Unit (group customer) System in Waste Bank

For residents who are relatively far away from Waste Bank, the utilization of Waste Bank is not easy in terms of collecting recyclables. Also, even from Waste Bank side, it is difficult to collect recyclables in districts that are away from Waste Bank, because of constraint on collection costs.

In this way, in districts which has a distant from Waste Bank, it is possible to participate in Waste Bank activities by applying Unit (group customer) System for collection of recyclables.

(f) Dissemination of Home Compost

When disseminating home compost, it is effective to prepare a plan in consideration with the followings.

【Correspondences/proposed countermeasures concerning home compost container distribution】

/ When distributing home compost containers, it can be improve efficiency of dissemination by distributing them to only residents who are likely to use it continuously. (It is irrational to distribute randomly or to all residents.)

/ It is one of the idea to reduce the cost of containers by teaching methods that do not use containers.

【Correspondences/proposed countermeasures concerning continuation / retention of home compost】

/ It is very important for sustainability of home compost to continuously practice and explain the method of compost produce process, not only when distributing containers but also following up continuously until the residents are able to conduct it appropriately. It is vital if it is just to distribute them.
/ As in the case of Surabaya City, if home compost can be bought by local government, the possibility is increased that residents will continue to carry out.

【Findings concerning distribution method】

It is helpful to limit residents who it is distributed in the following ways, in order to avoid jealousy among the local residents.

○ Distribution criteria items is set and it distribute to residents who meet criteria.

(Valid draft items: doing a home garden, being a housewife, participating in voluntary activities related to the environment etc.)

○ Before distribution, explanation meetings are hold several times on weekdays during the daytime, and then containers are distributed to residents who have been able to participate continuously.

10-1-3Lesson Learned / Ingenuity, Recommendations of Balikpapan

＜Source Separation and Separate Collection Pilot Project (SS-PP)＞

(1) **Lesson Leaned / Ingenuity**

(a) Modification of Waste Collection Zoning

The collection system of the Kelurahan-scale SS-PP from February 2016 followed the practice of the 13RT SS-PP, where no collection service was given six days a week except Sunday, other waste collection was once a week, and six zones had each own collection schedule. The operation of six zone collection with four collection trucks was, however, found confusing and did not work. The JICA short-term expert, drivers and collection workers had a discussion to modify the system, but it did not function, either. After further discussion, the four zone collection system, in other words one truck-one collection zone system, was adopted and started on December 8, 2016.

The planning of six zone collection and its modification were the results of meetings with collection work members and the C/P, but complex operation was not functional. The four zone collection system has been working smoothly, which proves a simple system is preferable.

(b) Improvement of Waste Separation Rate

The use of the belt conveyor installed at the MRF was expected to drastically improve the material recovery rate. The incoming waste to the MRF was, however, so mixed that the use of the belt conveyor had to be halted for nearly 10 months after the establishment of MRF.

BLH had assumed that the environmental cadres were working on awareness raising as they were paid incentives. It was found, however, that there were not a few residents who did not know about the waste discharge rules and that the activities of some of the environmental cadres were not adequate. Moreover, BLH had not kept sufficiently monitoring their awareness raising activities.

When the six zone collection system was changed to the four zone collection system, the JICA short-term expert proposed the curbside collection method in order to collect well-separated recyclable waste and the C/P agreed its

introduction to 12 RT.

From the MRF's monitoring data, material recovery amount per resident of the 12 RT is calculated as below.

Table 10-1 Change of Material Recovery Amount per Resident of 12RT

	Unit	Before curbside collection	December 2016	January 2017
Material Recovery Amount	g/person/day	12.7	24.9	32.1
Growth since the Introduction of Curbside Collection	%	-	97 %	154 %

Curbside collection was found to have an effect to encourage source separation to a certain extent, it can be considered as one of the approaches of awareness raising.

(2) Conclusions and Recommendations

(a) Conclusions

- The results of waste amount and composition survey in the SS-PP area showed that the composition of recyclable items was 10.97%. Considering the existence of waste from business entities which generally produce more recyclable waste, the composition of recyclable waste could be higher. The SS-PP aimed at the reduction rate close to the recyclable waste composition rate, but the waste reduction was substantially low.
- The MRF is the facility that extracts salable items from, and only from, the waste that is delivered to the MRF. The reduction effect given by the MRF is mostly controlled, therefore, by the condition of incoming waste, which is in turn influenced by the waste separation manner of the residents. In other words, source separation is the prerequisite for the MRF to be functional as a waste reduction facility.
- It is to be noted, however, drastic waste reduction exceeding 10% or more cannot be achieved only by material recovery.
- The operation cost for the MRF cannot be covered by material sales within 2017.

(b) Recommendations

- The increase of sales from recyclable items necessitates community cooperation and understanding. It is highly recommended that the city secures substantial budget for public awareness raising.
- As for the expenditure for the MRF in 2017, it is recommended to maintain the current salary level and to examine the possible salary increase taking account of the sales trend.
- The sales of recyclable items should be large enough to cover the MRF operation cost. It then requires improved waste separation at source and area extension to other Kelurahans.
- The awareness raising activities attempted in the SS-PP was not implemented fully and showed limited effects. Utilizing the experiences in the SS-PP, DLH is expected to carry out awareness raising activities in a timely and constant manner.
- The MRF has 30 ton/day of the operation capacity and serve for three Kelurahans. Area extension without improvement of source separation, however, will result in increased mixed waste delivery, odor and pest problems and residents' complaints. Awareness raising is a top priority.

The MRF should be financially supported by the city until it becomes self-sustainable.

＜Organic Waste Composting System Pilot Project (Com-PP)＞

(1) **Lesson Learned**

Waste separation at source needs a system to separately collect and transport the pre-sorted waste and a facility that receives it. In this Com-PP, the original plan to expand composting yard at Kota Hijau was changed to use the TPST, and further its construction schedule repeatedly delayed. Under such an unclear conditions about waste destination, the development of transportation system (platform construction and arrangement of transportation equipment) was inevitably postponed. This clearly proved the fundamental lesson that waste separation had to be designed in a holistic manner starting from the source to the treatment process.

As for the waste separation in the market, it was found that vegetable waste collection would be possible without troubles as vegetable waste was mostly produced at vegetable vendors and no other kinds of waste was mixed very much. It will be a right direction for the city to develop the vegetable waste composting system covering all the eight traditional markets under the city authority for waste reduction.

(2) **Recommendations**

- As stated above, DLH needs to immediately develop the vegetable waste transportation system for TPST.
- Since the TPST is not equipped with a weighbridge, the amount of incoming waste must be estimated by the number of vehicles. This then needs the understanding of unit volume of vegetable waste per one unit of vehicle.
- The city singed a minutes of understanding with PT. Pupuk Indonesia, a national fertilizer producer, and the company will buy compost produced in the city. In general, one of the obstacles to composting projects is how to secure a sales channel, but in case of Balikpapan, this issue is already cleared. Also, it is said that Ministry of Energy and Mineral Resources has a plan to develop an organic waste processing facility in the city. In order to make the best of such opportunities, DLH should first concentrate its resource to the development of vegetable waste transportation system for the Com-PP and acquire necessary expertise for next steps.

10-2 Statement regarding Achievement of Overall Goal

(1) **Outline of results of intermediate evaluation and terminal evaluation**

Special notes at the time of intermediate evaluation are shown in the below.

1) Confirmation of Ministerial Ordinance and related laws and regulations subject to support of development
2) Review of PDM
3) Factors concerning delays in PP implementation, Detailed understanding of PP implementation situation by both cities
4) Improvement on coordination between C/Ps for smooth implementation of PP
5) Improvement on how to share information among expert teams
6) Necessity of issues and common recognition for dissemination of project output

7) Lessons Learned - Necessity of project plan with full consideration of local situation and implementation conditions -

In addition, the outline of the evaluation results of project purpose and each output at the time of terminal evaluation is shown in the below.

Table 10-2 Outline of the Evaluation Results of Project Purpose and Each Output (Terminal Evaluation)

Project Purpose／Output	Indicator	Outline of evaluation
Project Purpose: "3R and solid waste management (household and household-like waste) is appropriately implemented in the target cities based on the act on solid waste management (no.18/2008), the related government regulations, ministerial regulations as well as local regulations".	Indicator "*1. Implementation of Pilot Project is disseminated to other regions in accordance with the related government regulations, ministerial regulations and local regulation"* (achieved):	In both Palembang and Balikpapan, the dissemination of the pilot activities is by and large completed. In Palembang, waste bank activities in AAL are disseminated to Sematang Borang (Kel. Srimulya) and to Sukarami (Kel. Sukodadi) by mid-2016. In Balikpapan, the expansion of activities from 13 RT to 54 out of 57RTs is complete in February 2016.
	Indicator "*2. Solid waste hauled to the final disposal site will be reduced*" (the assessment is not possible):	The definition of the indicator is not clear.
Output 1: "Draft governmental and ministerial regulations necessary to properly enhance the technical substance and to execute 3R and solid waste management (household waste and household-like waste) are prepared in accordance with the Act on Solid Waste Management (No.18/2008)."	Indicator 1-1 「Draft governmental and ministerial regulations will be prepared by October 2016」 (achieved):	Output 1 was evaluated as achieved, because its indicator 1-1 "*Draft governmental and ministerial regulations will be prepared by October 2015"* was met.
Output 2: "In the target cities, solid waste management plans(mid-term(10 year)action plans with emphasis on waste reduction) are prepared according to draft local regulations"	Indicator 2.1"*Local regulations will be drafted by the end of 2014*" (achieved):	The drafting of the local decree for the implementation of WMA is complete in both cities. In Palembang, it was officially issued in June 2015 as "the city decree No.3（2015）on the management of household waste and waste similar to household waste", and in Balikpapan, in December 2015 as the city decree No.13（2015）on domestic and domestic-like waste management".
	Indicator 2.2"*Solid waste data is organized and updated in the target cities*" (yet to be achieved):	The system is not as utilized as it was initially expected.
	Indicator 2.3"*Mid-term action plans for waste reduction will be prepared by the middle of 2014*" (achieved with reservation):	While the preparation of the A/Ps through 3R Stars meetings is complete in both cities by end of 2014.
Output 3 : "The capacity of the target cities in terms of 3R and Solid Waste Management is strengthened through the pilot projects"."	Indicator 3.1" *Capacity of the target city governments meets the set-up criteria*" (achieved but partially):	The capacity of the C/Ps in administering pilot activities in Balikpapan was strengthened to a certain degree, owing mainly to the strong ownership of the government to oversee the entire process from primary collection to landfill. In Palembang, the capacity development through the pilot activities was somewhat limited, because the nature of the "community-based" waste management, limits the participation of the C/Ps in the pilot activities.
	Indicator 3.2" *Solid waste hauled to the final disposal site from the Pilot Project area will be reduced by 20 %(reduction ratio) in target cities*" (yet to be achieved)	In Palembang, the estimated rate of waste reduction in the 16 target RTs is 12.2%. In Balikpapan, the waste reduction rate in the 54 RTs purely through the project activities is 1.3%.

(2) Overall goal

The appropriate management of household waste products and household waste-like products, based on the Waste Management Act and related government regulations, ministerial regulations and regional regulations, is being progressively introduced by local governments around the country.

➢ Dissemination mechanism of PP components

In order to disseminate the PP components to other cities in Indonesia, based on the PP experiences in Palembang and Balikpapan, PP Component Booklet was prepared by the KLHK and PUPR supported by JICA experts. And then, in October 18 2017, National Workshop on Dissemination of 3R Project in Indonesia was held in Jakarta.

The process for the preparation of the dissemination mechanism is shown in the figure below.

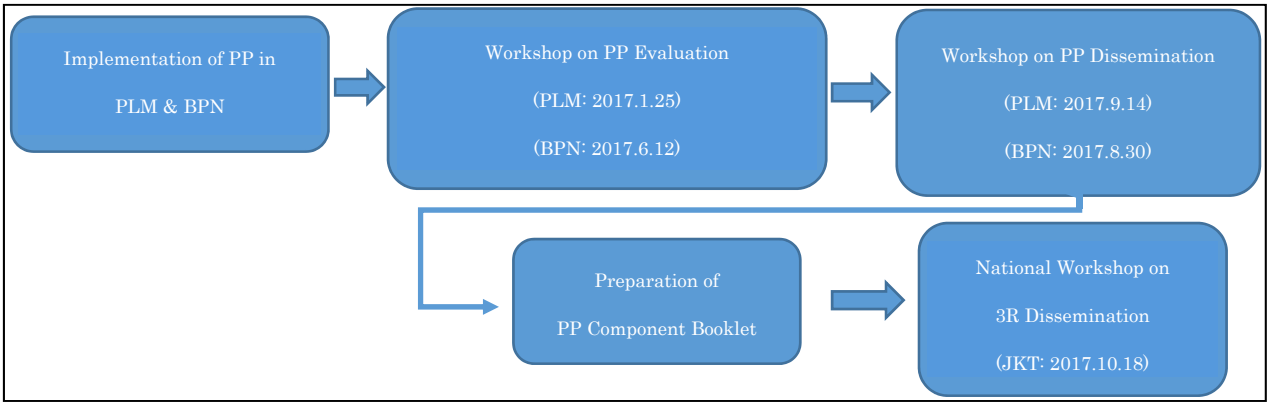


Figure 10-3 Process for the preparation of PP Dissemination Mechanism

In the National workshop, approx. 40 cities were attended and dissemination policy of KLHK and PUPR were presented and discussed. Outline of the dissemination mechanism of each ministry is as follows.

<KLHK>

As shown in the table below, KLHK planning to disseminate Waste Bank, TPS-3R and its collaboration model to 50 cities in Indonesia.

Table 10-3 KLHK planning to disseminate Waste Bank, TPS-3R

Kota Tangerang	Kota Cimahi	Kota Bukittinggi	Kota Bitung	Kota Tanjung Pimang
Kota Semarang	Kota Jambi	Kota Pasuruan	Kab. Lahat	Kab. Karimun
Kota Makasssar	Kota Yogyakarta	Kab. Banyumas	Kota Mojokerto	Kab. Sleman
Kota Depok	Kota Padang	Kota Magelang	Kota Tebing Tinggi	Kota Gorontalo
Kota Bandung	Kab. Tullungagung	Kota Blitar	Kab. Muntilan	Kab. Cilacap
Kota Jakarta Pusat	Kab. Kudus	Kota Kendari	Kota Jayapura	Kota Mataram
Kota Jakarta Selatan	Kota Madiun	Kota Banda Aceh	Kota Salatiga	Kota Ambon
Kota Banjarmasin	Kota Bau-Bau	Kota Banjarbaru	Kota Sukabumi	Kota Dempasar

Kota Tangerang	Kota Cimahi	Kota Bukittinggi	Kota Bitung	Kota Tanjung Pimang
Kota Malang	Kab. Jepara	Kab. Banyuwangi	Kota Payukumbuh	Kota Probolinggo
Kota Pekanbaru	Kab. Jombang	Kab. Lumajang	Kab. Sidoarjo	Kota Jakarta Timur

Implementation program and target to implement the waste bank and TPS-3R is shown in figure below.

	PROGRAM	UNIT	TARGET/YEAR									MAIN SECTOR	SUPPORTING SECTOR
			2017	2018	2019	2020	2021	2022	2023	2024	2025		
1	Establishment of centralwaste bank in region / city	Region /City	8	8	8	8	8	8	8	7	7	KLHK	Provinve, Region /City
2	Integration of waste banks into Environmental concern UKM (*Small to Medium Enterprises*) to get KUR (*Business Credit*)	Unit/ year	10	10	10	10	10	10	10	10	10	KLHK, Ministry of Cooperatives and Small and Medium Enterprises	MoF, Provinve, Region /City, bussiness
3	Implementation of incentive system for Household and Household-like Waste community-based reduction efforts through recycling and reuse of Household and Household-like Waste	Group of people / Waste Bank / year			10	10	10	10	12	12	12	KLHK, Ministry of Cooperatives and Small and Medium Enterprises	Ministry of Industry, KemenPPN/Bappenas, MoF, MoT, province, Region /City
	1)Development of the sorting model of Household and Household-like Waste												
	a)Establishment of waste bank unit in the community	Unit/ year	2125	2725	3325	3535	3645	3755	3865	3975	4085	KLHK and Region /City	Ministry of Small and Medium Business Credit (*Kementerian KUKM*), Ministry of Village, Development of Underdeveloped Regions and Transmigration (*Kemendes PDTT*), province, and bussiness
	b)Area (TPS3R)	Region/ city	72	90	72	50	30	20	20	20	20	PUPR, MoHA, KLHK, and Region /City	Kementerian PPN/Bappenas, Kemenperind, Kemendag, Kemenpar, Kemenhub, dan Kementerian BUMN

Figure 10-4 Figure Program & Target to Implement Waste Bank and TPS-3R

<PUPR>

National program of PUPR on 3R, focused on the dissemination of TPS-3R and TPST from 2015 to 2019, is shown in the table below.

Table 10-4 National program of PUPR on 3R, focused on the dissemination of TPS-3R and TPST from 2015 to 2019

Physical Program: 2015- 2019	Non-Physical Program: 2015-2019
1. Management at source • Collection • TPS-3R • TPST 2. Management at collection & disposal • Transportation Facility • Landfill	1. Campaign, education and promotion 2. Advocacy of local government (executive & legislative) 3. Institutional technical assistance 4. Capacity building human resources 5. Cross-sector synchronization (implementation of funding)

In addition, in the National workshop, it was clarified that JAKSTRANA on SWM, which is under preparation, will

be the key policy for the implementation of 3R in Indonesia. Outline of JAKSTRANA is shown in Figure below.

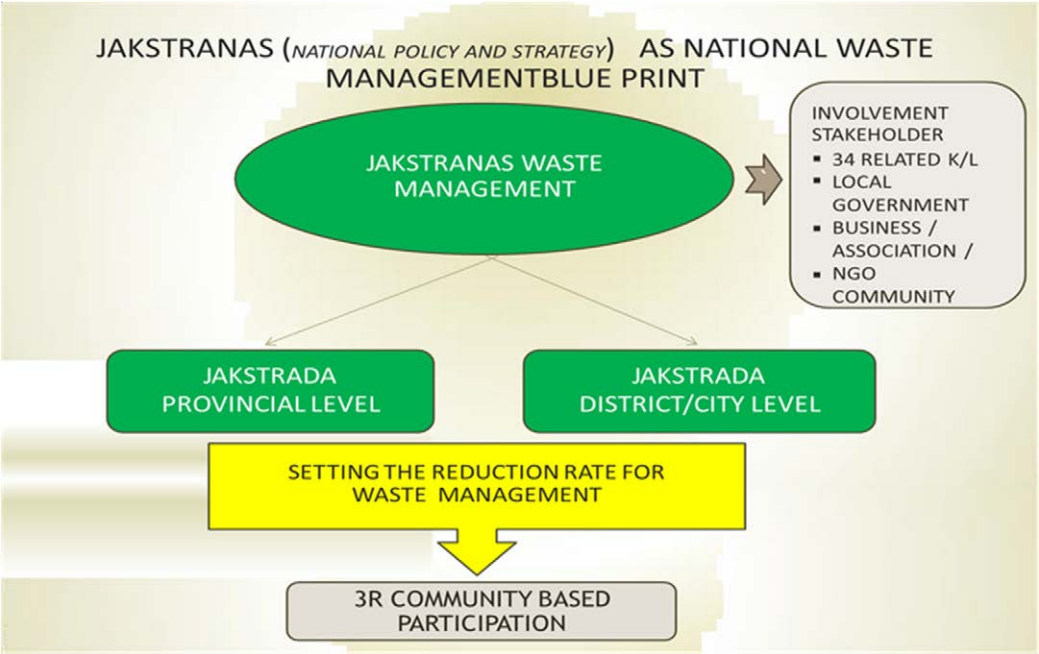


Figure 10-5 Outline of JAKSTRANA

Based on the discussion in the Workshop, and considering the dissemination policy/program of each ministry, followings are recommendations for the dissemination of PP components to other cities in Indonesia.

- KLHK and PUPR are working towards expanding practical implementation of waste management (preparation of regulations, data management, setting action plans, implementation of pilot projects) to target cities, primarily focusing on the 50 cities which participated in the 3R National Seminar held on 18 October 2017.
- KLHK and PUPR will use the component sheet developed during the pilot programs of 2 target cities as a tool that can be introduced in other cities.
- KLHK and PUPR will continue, with the cooperation of the cities of Palembang and Balikpapan, to provide financial assistance and information to cities which have the intention of using experience gained from the project.
- KLHK are working towards expansion of appropriate waste management in other countries using regulations regarding waste management currently in development as a guideline.
- KLHK is working to expanding appropriate waste management in other cities through existing programs (ADIPURA system, development of Waste Banks, development of recycle centers, providing equipment, smart village structure, national Waste Bank conference).
- PUPR is working through the current TPS-3R and TPST promotion initiative to expand appropriate waste management to other cities.

- PUPR is working to expand appropriate waste management in other cities based around activities for the promotion of the TPS-3R guideline which was revised in 2017.
- Regarding spreading adoption of TPS-3R, PUPR is giving special attention to the TPS-3R and Waste Bank corporate model applied in Palembang City.

⟨Annex⟩

Annex 1 The change of PDM

(a) Project Design Matrix (PDM)

Project Name: The Project for Capacity Development of Central and Local Government for 3R and Domestic Solid Waste Management System
Target Area: The whole country (Target Cities: Palembang and Balikpapan)
Duration: 2013–2016(3 years)
Target Group: State Ministry of Environment (MOE) and Local Governments of Target Cities<*1
Ver.0.0 (May 2013)

Narrative Summary	Objectively Verifiable Indicators	Means of Verification	Important Assumption
Overall Goal 3R and solid waste management (household and household-like wastes) is appropriately implemented successively in representative local governments of the country in accordance with the Act on Solid Waste Management (No.18/2008), the related government regulations, ministerial regulations and local regulations.	In three (3) years after completion of the technical cooperation period, more than xx<*2 large-scale local governments and metropolitans will satisfy the requirements of the national policy and strategy to be developed on solid waste management and 3R.	Management/monitoring surveys by State Ministry of Environment	
Project Purpose 3R and solid waste management (household waste and household-like waste) is appropriately implemented in target cities based on the Act on Solid Waste Management (No.18/2008), the related government regulations, ministerial regulations as well as local regulations.	Solid waste hauled to the final disposal will be reduced to xx% (reduction ratio) in target cities in 2015.	Project Activity Report	
Outputs 1. Draft ministerial regulations, etc., necessary to properly execute 3R and solid waste management (household waste and household-like waste) are prepared in accordance with the Act on Solid Waste Management (No.18/2008).	1. Draft ministerial regulations, etc. will be prepared by the end of 2014.	1. Draft Ministerial Regulations	Ministerial regulations, local regulations, action plans for waste reduction on solid waste management become effective. (Procedure for approval does not get delayed)
2. In the target cities, solid waste management plans (mid-term (10 year) action plans with emphasis on waste reduction) are prepared according to draft local regulations.	2-1. Local regulations will be drafted by the end of 2014. 2-2. Mid-term action plans for waste reduction will be prepared by the middle of 2014.	2-1.Draft local regulations 2-2. Action plans (project reports)	
3. The capacity of the target cities in terms of 3R and Solid Waste Management is strengthened through the pilot projects.	3. Capacity of the target city governments meets the set-up criteria <*3	3-1. Project Activity Report 3-2. Capacity assessment on project activities by the Japanese Experts	

<*1: In addition to the target cities, sub-target cities will be selected for exchange of views and experiences through workshops, seminars, etc.
<*2: The number of the local governments to be decided within 6 months from the commencement of the Project by both the Indonesian C/P and the Japanese Experts.
<*3: Criteria to judge the capacity should be set up within 6 months from the commencement of the Project by both the Indonesian C/P and the Japanese Experts. The criteria might include: 1) comprehensive understanding of 3R activities (e.g. social, legal and technical aspects), 2) solid waste amount data management/analysis, 3) public awareness/environmental education, 4) skills for facilitation, 5) ability for coordination with relevant organizations, 6) skills for reporting and presentation, etc.

Activities	Inputs		
	Japanese Side	**Indonesian Side**	Turnover of Indonesian C/P does not occur frequently.
1. Prepare draft Ministerial Regulation 1-1. Establish a working group at central level for preparation of draft ministerial regulations. 1-2. Conduct surveys on the existing legal system on solid waste management, and completed / on-going / planned 3R activities of main cities, and then prioritizes items to be regulated, and decide work procedures. 1-3. Prepare draft ministerial regulations according to the order of priority. 1-4. Carry out necessary follow-up for the draft to be approved as official documents of the government.	a. Assignment of Experts Long-term Expert 1. Team Leader/Solid Waste Management Policy 2. Project Coordinator Short-term Expert 1. Waste Reduction Policy (Co-Team Leader) 2. Legal System 3. 3R/Citizens' Participation 4. Environmental Education/Public Awareness 5. Solid Waste Data Management 6. Institution and Finance on Solid Waste Management 7. Other Japanese expert and Local experts/ Consultants as needed b. Equipment (for pilot projects) c. C/P Trainings	a. Assignment of Counterpart Personnel b. Provision of Office space (by MOE) and other necessary facilities c. Allocation of operational cost for the Project	
2-1. Prepare Draft Local Regulations in the Target Cities 2-1-1. Establish working groups in target cities for preparation of local regulations 2-1-2. Investigate the existing local regulations related to solid waste management. 2-1-3. Clarify items for addition and/or revision on the existing local regulations. 2-1-4. Prepare draft local regulations of the target cities. 2-1-5. Follow up for revision of local regulations based on pilot project results and change of conditions, etc.			
2-2. Manage Solid Waste Amount/Composition Data 2-2-1. Establish working groups for solid waste management data 2-2-2. Review the existing solid waste data management in Indonesia. 2-2-3. Draw up basic concept for the system design. 2-2-4. Design a system for statistical data on solid waste management (solid waste amount/waste composition). 2-2-5. Determine the indicators required to judge the Project performances. 2-2-6. Conduct surveys in target cities. 2-2-7. Compile the collected data statistically and release to the public through web site and/or newsletters.			
2-3. Prepare Action Plan for Mid-term Waste Reduction 2-3-1. Establish working groups for preparation of action plan for mid-term waste reduction. 2-3-2. Survey the present conditions (including the on-going 3R and solid waste management activities) of solid waste management in the target cities. 2-3-3. Prepare draft action plans (including CSR<*4 if possible) for each target city utilizing available data from solid waste amount data.			

2-3-4. Hold consultation meetings with participation of citizens and relevant organizations in the target cities in order to finalize the action plans.			
3. <u>Implement 3R related Pilot Projects</u> 3-1. Establish working groups for implementation of pilot projects 3-2. Review 3 R activities in Surabaya city and Malang city as a reference. 3-3. Identify the needs of residents through holding participatory workshops 3-4. .Prepare detailed implementation plans for pilot project. 3-5. Prepare monitoring plans of the MOE/MOPW<*5 for the pilot projects in the target cities 3-6. Implement the pilot projects with support from MOE/MPOW and other relevant organizations. 3-7. Monitor and evaluate the pilot projects. 3-8. Prepare recommendations and/or suggestions with regard to the evaluation and learning of the pilot projects. 3-9. Propose a mechanism for dissemination to other local governments in collaboration with relevant organizations. 3-10. Hold workshops aiming at dissemination of pilot projects to other local cities of the country.			**<u>Pre-Conditions</u>**

<*4: CSR=Corporate Social Responsibility <*5 MPOW=Ministry of Public Works

(b) Project Design Matrix (PDM) first revise

Project Name: The Project for Capacity Development of Central and Local Government for 3R and Domestic Solid Waste Management System
Target Area: The whole country (Target Cities: Palembang and Balikpapan)
Duration: 2013–2016(3 years)
Target Group: State Ministry of Environment (MOE) and Local Governments of Target Cities<*1
Ver.0.0 (May 2013)

Narrative Summary	Objectively Verifiable Indicators	Means of Verification	Important Assumption
Overall Goal 3R and solid waste management (household and household-like wastes) is appropriately implemented successively in representative local governments of the country in accordance with the Act on Solid Waste Management (No.18/2008), the related government regulations, ministerial regulations and local regulations.	In three (3) years after completion of the technical cooperation period, more than xx<*2 large-scale local governments and metropolitans will satisfy the requirements of the national policy and strategy to be developed on solid waste management and 3R.	Management/monitoring surveys by State Ministry of Environment	
Project Purpose 3R and solid waste management (household waste and household-like waste) is appropriately implemented in target cities based on the Act on Solid Waste Management (No.18/2008), the related government regulations, ministerial regulations as well as local regulations.	Solid waste hauled to the final disposal will be reduced to xx% (reduction ratio) in target cities in 2015.	Project Activity Report	
Outputs 4. Draft ministerial regulations, etc., necessary to properly execute 3R and solid waste management (household waste and household-like waste) are prepared in accordance with the Act on Solid Waste Management (No.18/2008).	1. Draft ministerial regulations, etc. will be prepared by the end of 2014.	1. Draft Ministerial Regulations	Ministerial regulations, local regulations, action plans for waste reduction on solid waste management become effective. (Procedure for approval does not get delayed)
5. In the target cities, solid waste management plans (mid-term (10 year) action plans with emphasis on waste reduction) are prepared according to draft local regulations.	2-1. Local regulations will be drafted by the end of 2014. 2-2. Mid-term action plans for waste reduction will be prepared by the middle of 2014.	2-1.Draft local regulations 2-2. Action plans (project reports)	
3. The capacity of the target cities in terms of 3R and Solid Waste Management is strengthened through the pilot projects.	3. Capacity of the target city governments meets the set-up criteria <*3	3-1. Project Activity Report 3-2. Capacity assessment on project activities by the Japanese Experts	

<*1: In addition to the target cities, sub-target cities will be selected for exchange of views and experiences through workshops, seminars, etc.
<*2: The number of the local governments to be decided within 6 months from the commencement of the Project by both the Indonesian C/P and the Japanese Experts.
<*3: Criteria to judge the capacity should be set up within 6 months from the commencement of the Project by both the Indonesian C/P and the Japanese Experts. The criteria might include: 1) comprehensive understanding of 3R activities (e.g. social, legal and technical aspects), 2) solid waste amount data management/analysis, 3) public awareness/environmental education, 4) skills for facilitation, 5) ability for coordination with relevant organizations, 6) skills for reporting and presentation, etc.

Activities	Inputs		
	Japanese Side	**Indonesian Side**	Turnover of Indonesian C/P does not occur frequently.
1. Prepare draft Ministerial Regulation 1-1. Establish a working group at central level for preparation of draft ministerial regulations. 1-2. Conduct surveys on the existing legal system on solid waste management, and completed / on-going / planned 3R activities of main cities, and then prioritizes items to be regulated, and decide work procedures. 1-3. Prepare draft ministerial regulations according to the order of priority. 1-4. Carry out necessary follow-up for the draft to be approved as official documents of the government.	b. Assignment of Experts Long-term Expert 3. Team Leader/Solid Waste Management Policy 4. Project Coordinator Short-term Expert 8. Waste Reduction Policy (Co-Team Leader) 9. Legal System 10. 3R/Citizens' Participation 11. Environmental Education/Public Awareness 12. Solid Waste Data Management 13. Institution and Finance on Solid Waste Management 14. Other Japanese expert and Local experts/ Consultants as needed b. Equipment (for pilot projects) c. C/P Trainings	c. Assignment of Counterpart Personnel d. Provision of Office space (by MOE) and other necessary facilities c. Allocation of operational cost for the Project	
2-1. Prepare Draft Local Regulations in the Target Cities 2-1-6. Establish working groups in target cities for preparation of local regulations 2-1-7. Investigate the existing local regulations related to solid waste management. 2-1-8. Clarify items for addition and/or revision on the existing local regulations. 2-1-9. Prepare draft local regulations of the target cities. 2-1-10. Follow up for revision of local regulations based on pilot project results and change of conditions, etc.			
2-2. Manage Solid Waste Amount/Composition Data 2-2-8. Establish working groups for solid waste management data 2-2-9. Review the existing solid waste data management in Indonesia. 2-2-10. Draw up basic concept for the system design. 2-2-11. Design a system for statistical data on solid waste management (solid waste amount/waste composition). 2-2-12. Determine the indicators required to judge the Project performances. 2-2-13. Conduct surveys in target cities. 2-2-14. Compile the collected data statistically and release to the public through web site and/or newsletters.			
2-3. Prepare Action Plan for Mid-term Waste Reduction 2-3-5. Establish working groups for preparation of action plan for mid-term waste reduction. 2-3-6. Survey the present conditions (including the on-going 3R and solid waste management activities) of solid waste management in the target cities. 2-3-7. Prepare draft action plans (including CSR<*4 if possible) for each target city utilizing available data from solid waste amount data.			

2-3-8. Hold consultation meetings with participation of citizens and relevant organizations in the target cities in order to finalize the action plans.			
6. <u>Implement 3R related Pilot Projects</u> 3-11. Establish working groups for implementation of pilot projects 3-12. Review 3 R activities in Surabaya city and Malang city as a reference. 3-13. Identify the needs of residents through holding participatory workshops 3-14. .Prepare detailed implementation plans for pilot project. 3-15. Prepare monitoring plans of the MOE/MOPW<*5 for the pilot projects in the target cities 3-16. Implement the pilot projects with support from MOE/MPOW and other relevant organizations. 3-17. Monitor and evaluate the pilot projects. 3-18. Prepare recommendations and/or suggestions with regard to the evaluation and learning of the pilot projects. 3-19. Propose a mechanism for dissemination to other local governments in collaboration with relevant organizations. 3-20. Hold workshops aiming at dissemination of pilot projects to other local cities of the country.			**<u>Pre-Conditions</u>**

<*4: CSR=Corporate Social Responsibility <*5 MPOW=Ministry of Public Works

(c) Project Design Matrix (PDM) second revise

Project Name: The Project for Capacity Development of Central and Local Government for 3R and Domestic Solid Waste Management System
Target Area: The whole country (Target Cities: Palembang and Balikpapan)
Duration: 2013.11–2016.11(3 years)
Target Group: State Ministry of Environment and Forestry, Ministry of Public Works and Public Housing, Palembang City and Balikpapan City

Narrative Summary	Objectively Verifiable Indicators	Means of Verification	Important Assumptions
Overall Goal 3R and solid waste management (household and household-like wastes)is appropriately implemented successively in representative local governments of the country in accordance with the Act on Solid Waste Management (No.18/2008), the related government regulations, ministerial regulations and local regulations.	In three (3) years after completion of the technical cooperation period, the model are disseminated to more than 29, including 14 metropolitan and 15 large cities, and some of 29 cities plan to adopt the practices in the target cities (i.e. local regulations, data management, action plan and its implementation).	Management/monitoring surveys by State Ministry of Environment and Forestry	
Project Purpose 3R and solid waste management (household and household-like wastes) is appropriately implemented in the target cities based on the Act on Solid Waste management (No.18/2008), the related government regulations, ministerial regulations as well as local regulations.	1. Implementation of Pilot Project is disseminated to other regions in accordance with the related government regulations, ministerial regulations and local regulations (from the one PP area to other two areas in Palembang city/ from the PP area of 13 RTs to all RTs in Kelurahan Gurung Bahagia, Balikpapan city). 2. Solid waste hauled to the final disposal site will be reduced.	Project Activity Report	
Outputs 1. Draft governmental and ministerial regulations necessary to properly enhance the technical substance and to execute 3R and solid waste management (household waste and household-like waste) are prepared in accordance with the Act on Solid Waste Management (No.18/2008). 2. In the target cities, solid waste management plans (mid-term (10 year) action plans with emphasis on waste reduction) are prepared according to draft local regulations. 3. The capacity of the target cities in terms of 3R and Solid Waste Management is strengthened through the pilot projects.	1. Draft governmental and ministerial regulations will be prepared by October 2016. 2-1. Local regulations will be drafted by the end of 2014. 2-2. Solid waste data is organized and updated in the target cities. 2-3. Mid-term action plans for waste reduction will be prepared by the middle of 2014. 3-1. Capacity of the target city governments meets the set-up criteria. 3-2. Solid waste hauled to the final disposal site from the Pilot Project area will be reduced by 20% (reduction ratio) in target cities.	1. Draft Governmental and Ministerial Regulations 2-1.Draft local regulations 2-2. Action plans (project reports) 3-1. Project Activity Report 3-2. Capacity assessment on project activities by the Japanese Experts	Governmental and Ministerial regulations, local regulations, action plans for waste reduction on solid waste management become effective (Procedure for approval does not get delayed).
Activities	**Inputs**		

1. Prepare Draft Governmental and Ministerial Regulations 1-1 Establish a working group at central level for preparation of draft governmental and ministerial regulations. 1-2. Conduct surveys on the existing legal system on solid waste management and completed/on-going/planned 3R activities of main cities, and then prioritizes items to be regulated, and decide work procedures. 1-3. Prepare draft governmental and ministerial regulations according to the order of priority. 1-4. Carry out necessary follow-up for the draft to be approved as official documents of the government. **2-1. Prepare Draft Local Regulations in the Target Cities** 2-1-1. Establish working groups in target cities for preparation of local regulations. 2-1-2. Establish "3R Stars" which is consisted from diverse stakeholders in the target cities. 2-1-3. Investigate the existing local regulations related to solid waste management. 2-1-4. Clarify items for addition and/or revision on the existing local regulations. 2-1-5. Prepare draft local regulations of the target cities. 2-1-6. Follow up for revision of local regulations based on pilot project results and change of conditions, etc. **2-2. Manage Solid Waste Amount/Composition Data** 2-2-1. Establish working groups for solid waste management data. 2-2-2. Review the existing solid waste data management in Indonesia. 2-2-3. Draw up basic concept for the system design. 2-2-4. Design a system for statistical data on solid waste. 2-2-5. Determine the indicator for Output 2-2. 2-2-6. Conduct surveys in target cities. 2-2-7. Compile the collected data statistically and release to the public through web site and/or newsletters. **2-3. Prepare Action Plan for Mid-term Waste Reduction** 2-3-1. Establish working groups for preparation of action plan for mid-term waste reduction. 2-3-2. Survey the present conditions (including the on-going 3R and solid	**Japanese Side** a. Assignment of Experts Long-term Expert 1. Team Leader/Solid Waste Management Policy 2. Project Coordinator Short-term Expert 1. Waste Reduction Policy (Co-Team Leader) 2. Legal System 3. 3R/Citizens' Participation 4. Environmental Education/Public Awareness 5. Solid Waste Data Management 6. Institution and Finance on Solid Waste Management 7. Other Japanese expert and Local experts/ Consultants as needed b. Equipment (for pilot projects) c. C/P Trainings	**Indonesian Side** a. Assignment of Counterpart Personnel b. Provision of Office space (by Ministry of Environment and Forestry) and other necessary facilities c. Allocation of operational cost for the Project d. Counterpart expenses for joining in-country training	Turnover of Indonesian C/P does not occur frequently. **Pre-Conditions**

waste management activities) of solid waste management in the target cities. 2-3-3. Prepare draft action plans (including CSR if possible) for each target city utilizing available data from solid waste amount data. 2-3-4. Hold consultation meetings with participation of citizens and relevant organizations in the target cities in order to finalize the action plans. **3. Implement 3R related Pilot Projects** 3-1. Establish working groups for implementation of pilot projects. 3-2. Review 3R activities in Surabaya city and Malan city as a reference. 3-3. Develop the framework of the Pilot Projects. 3-4. Identify the needs of residents through holding participatory workshops. 3-5. Prepare detailed implementation plans for pilot project. 3-6. Prepare monitoring plans of the Ministry of Environment and Forestry /Ministry of Public Works and Public Housing for the pilot projects in the target cities. 3-7. Implement the pilot projects with support from the Ministry of Environment and Forestry /Ministry of Public Works and Public Housing and other relevant organizations. 3-8. Monitor and evaluate the pilot projects. 3-9. Prepare recommendations and/or suggestions with regard to the evaluation and learning of the pilot projects. 3-10. Propose a mechanism for dissemination to other local governments in collaboration with relevant organizations. 3-11. Hold workshops aiming at dissemination of pilot projects to other local cities of the country.			

Target Cities: Palembang and Balikpapan

Annex 2 The record of JCC

MINUTES OF MEETING

ON

DRAFT WORK PLAN

OF

THE PROJECT FOR CAPACITY DEVELOPMENT OF
CENTRAL AND LOCAL GOVERNMENT FOR
3R AND DOMESTIC SOLID WASTE MANAGEMENT SYSTEM

IN THE REPUBLIC OF INDONESIA

20 November 2013

Mr. Seiji Tsutsui

Chief Advisor

The JICA Expert Team

Mr. R. Sudirman

Assistant Deputy for Solid Waste Management,

Deputy Minister for Hazardous Substances, Hazardous Wastes and Solid Wastes Management

Ministry of Environment

The Republic of Indonesia

Mr. Yuki Aratsu

Senior Representative,

Indonesia Office

Japan International Cooperation Agency

Mr. Djoko Mursito

Director of Environmental Sanitation Development,

Directorate General of Human Settlements,

Ministry of Public Works

The Republic of Indonesia

1. Mr. Rasio Ridho Sani, Deputy Minister for Hazardous Substances, Hazardous Waste and Solid Waste Management, the Ministry of Environment (MOE) opened the meeting and addressed the followings:

- Today Indonesia is in a different situation compared to 20 years ago, and has been facing many challenges including the globalization and humanization which has increased burden on environment. To overcome the situation, we need innovation.
- Currently Indonesia has a serious problem about waste management. We know that Japan is one of the countries which promote recycling successfully to develop a so-called recycling society. We can learn a lot from Japan, not only the technology, but also know-how and experiences. That is why this project, which focuses on the capacity development, is important for us.
- We do believe that the success of this project is on the commitment and collaboration of all of our stakeholders in this country, including KLH, PU, local governments, private sector as well as community.
- Our commitment is shown here today by the presence of mayor of Balikpapan City, and representatives of Palembang City.
- Balikpapan City and Palembang City were selected as the target cities because under the leadership of the mayor, both cities has been making efforts to solve problems in waste management, and the both have successfully awarded for Adipura from the President of Indonesia.
- I expect that this JCC can give a direction of how to make Balikpapan and Palembang a role model of environmental protection, especially 3R, in Indonesia.

2. Mr. Yamauchi, the Leader of the JICA Expert Team (JET) of the Project for Capacity Development of Central and Local Government for 3R and Domestic Solid Waste Management System in Indonesia (the Project) has explained the Draft Work Plan to the Indonesia side on 20th November 2013. Indonesia side and Japanese side agreed on the Work Plan and confirmed on the following discussions.

2-1. Modification of the Project Design Matrix (PDM)

JET explained that the PDM which was agreed upon in the R/D needed to be modified taking into consideration the actual project activities. Indonesian Side agreed upon with some inputs and suggestions stated as follows:

a. Indicator for the Overall Goal

Indonesian side proposed that number of cites to be put in the indicator should be 29, including 14 Metropolitan and 15 large cities. Japanese side agreed on this proposal. Indonesian side will provide a list of 29 cities to the JET.

b. Indicator for the Output 3

JET explained that the waste reduction target is set as 20% based on the comments received in the Steering Committee held in Jakarta on 25th October 2013 (20% is stated in the PU regulation No.29/PRT/M/2006). Indonesian Side pointed out that the expression of the target in the draft Work Plan is not clear whether it meant waste should be reduced to 20% or by 20%, and also proposed that the target should be as follows:

'the amount of waste hauled to the final disposal site from the Pilot Project area will be reduced by at least 20% in the target cities.' Japanese side agreed on this modification.

c. Schedule of Drafting Ministerial Regulation

Indonesian side emphasized that the ministerial regulation should be finalized before the Presidential election in 2014, not only just drafting. Japanese side answered that the National 3R Working Group should be set up first to discuss the priority of the regulations to be drafted, as well as its contents, then the implementation schedule will be modified according to the progress states and working volume.

d. Schedule of Drafting Local Regulations

The Ministry of Public Works (MOPW) proposed that the Local Regulation should be in line with Ministerial Regulation, because the Ministerial Regulation will be the basis of the Local Regulation. Therefore, if the Ministerial Regulation will be fixed in the end of 2014, the Local Regulation can be drafted and finalized in the next year (2015). The local government suggested that the Local Regulations should be drafted based on the current legislations by the middle of 2014 as the indicator of the Project. JET answered that the schedule of drafting the local regulation will also be discussed in the 3R Working Group in each target city.

2-2. Project Implementation Organization

Project implementation organization was confirmed as following:

a. Member Agencies of 3R Working Group

Working Group	Member Agencies
National 3R – Working Group	• Ministry of Environment • Ministry of Public Works • Ministry of Home Affairs • BAPPENAS
3R Working Group in Pelembang	• Assistance II (as a coordination agency) • BLH • City Cleansing Department (DKK) • BAPPEDA • PU Cipta Karya & Bina Marga • Board of Community Development
3R –Working Group in Balikpapan	• BAPPEDA (as a coordination agency) • City Environment Agency (BLH) • City Cleansing Department (DKPP) • Department of Health • Department of Home Affairs • Head of Sub-Districts

b. Counterparts

Counterparts in each MOE, MOPW, Palembang and Balikpapan were confirmed as attached.

2-3. Project Approach

a. Involvement of Multi-Stakeholders

Indonesian side and Japanese side both recognized the importance of involvement of and collaboration among stakeholders from academic, community, NGO, government sector and private sector, and agreed on the setting up of 3R Stars as a multi-stakeholder forum. Indonesian side also stressed the importance of socialization and campaign to raise awareness, as well as development of capacity of local governments to facilitate community activities.

b. Capacity Development

Indonesian side recognized that this project is not focused to the physical implementation of facilities but to capacity development.

c. Involvement of Parliament

Indonesian side suggested that, as Draft Local Regulation is one of the Project Output, the Project should arrange the time to have discussion with Regional parliament (DPRD) in both cities.

2-4. Counterpart Budget

The Local Government requested the Central Government to provide a guidance regarding Regional Government Budget and Special Allocation Fund (APBD & DAK) for 3R Program. The MOE explained that both of the MOE and the MOPW will allocate Special Allocate Fund (DAK) to support Palembang City and Balikpapan City to work for this Project. However, the special budget can be allocated only from 2015. Therefore the MOE requested Palembang and Balikpapan to allocate their own counter budget for the project activities in 2014.

2-5. Others

- The MOE proposed to arrange another meeting to discuss the activity plan of 3R among MOE, MOPW, JICA and 29 cities.

PROJECT FOR CAPACITY DEVELOPMENT OFCENTRAL AND LOCAL GOVERNMENT FOR 3R AND DOMESTIC SOLID WASTE MANAGEMENT SYSTEM IN THE REPUBLIC OF INDONESIA

Counterparts in Central Government

Ministry of Environment

- Mr. R. Sudirman (Assistant Deputy for Solid Waste Management), as a Project Manager
- Mr. Ujang Solihin Sidik (Program Development Officer)
- Mr. Agus Saefudin (Head Solid Waste Division for Restriction)
- Mr. Anton Sardjanto (Head of Division of Recycling and Waste Utilization)

Ministry of Public Works

- Mr. Djoko Mursito (Director for Environment Sanitation Development), as a Co-Project Manager
- Mr. Rudi A. Arifin (Head of Sub-Directorate of Solid Waste)
- Ms. Emah Sudjimah (Head of Sub-Directorate of Regulation and Institutional Development)
- Ms. Nyimas Nina Indrasari (Head Section of Region 2 Sub-Region Waste Sector)

Counterparts in Palembang

<table>
<tr><td colspan="4">Leader</td></tr>
<tr><td colspan="2">Palembang</td><td colspan="2">JICA Expert Team</td></tr>
<tr><td colspan="2">BLH : M. Tabrani
DKK : Agoeng Noegraha</td><td colspan="2">Seiji Tsutsui
Hisashi Yamauchi</td></tr>
<tr><td colspan="4">Coordinator</td></tr>
<tr><td colspan="2">BLH : Heni Kurnaiawati
DKK : Saparudin</td><td colspan="2">Hitoshi Katayama
Yume Mori</td></tr>
<tr><td>Activity I</td><td>Activity II</td><td>Activity III</td><td>Activity IV</td></tr>
<tr><td colspan="4">BLH</td></tr>
<tr><td>Heni Kurnaiawati
Head of pollution control division</td><td>Desy Elvianti
Head of division of environmental communication and environmental protection law</td><td>Nyimas Ida Apriani
Head of sub-division of environmental damage control</td><td>Hardian
Head of Sub-division of domestic waste and hazardous waste management</td></tr>
<tr><td colspan="4">DKK</td></tr>
</table>

Saparudin Head of TPA Sukawinatan	**Ihwan Mulyawan** Head of Waste Utilization (Compost)	**Neni Trisia** Head of Planning Division	**Armansyah** Head of Cleansing
JICA Expert Team			
Takashi IKEGUCHI	Ron NAGAI	Takatoshi ARAI Junkichi YAMAZAKI	Takatoshi ARAI Ryoko Tachibana

Counterparts in Balikpapan

Leader			
Balikpapan		JICA Expert Team	
BAPPEDA: Suryanto BLH : Fachruddin Harami DKPP : Robi Ruswanto		Seiji Tsutsui Hisashi Yamauchi	
Coordinator			
BAPPEDA: Freddy Nelwan (Head Division of Narutal Resources and Environment) BLH : Rosmarini DKPP : Astani		Hitoshi Katayama Yume Mori	
Activity I	Activity II	Activity III	Activity IV
BAPPEDA*			
Bertha Tekko, Staff of Division of Natural Resources and Environment **M. Ali Ichwani**, Staff of Division of Natural Resources and Environment **Erna Ismianing Arum**, Staff of Division of Natural Resources and Environment			
BLH			
Panti Suhartono, Secretary of BLH	**Rosmarini** Head of Information and Law Enforcement	**Salma** Staf of Sub Division of Information and Environmental Data	**Wahyu Mulia Doni** Head Sub Division of Information and Environmental Data
DKPP			
Astani Secretary of DKPP	**Syukur Efendy** Head of TPA Manggar, DKPP	**Ikbal Yahya** Head Division of Cleanliness, DKPP	**Haerul Ilmi** Head Division of Landscape Gardening
JICA Expert Team			

Mr. Takashi IKEGUCHI	Mr. Ron NAGAI	Mr. Juniji ANAI Ms. Noriko OTSUKI	Mr. Juniji ANAI Ms. Ryoko Tachibana

*) BAPPEDA C/Ps are not clearly divided into tasks

Major Activities by Each Group

Activity	Major Activity
Activity 1 Drafting of City Ordinance	• Grasp the existing local regulation and to discuss the idea on the preparation • Prepare the preliminary draft of the local regulation • Develop the final draft the local regulations
Activity 2 Data Management System	• Review the existing data management system • Prepare the draft design of the waste data management system and method of waste amount and composition survey • Develop the draft waste data management system
Activity 3 Development of Action Plan	• Identify a waste flow based on the collect data • Formulate the strategy to achieved the target, and prepare a Mid-Term Plan including organizational structure, facility, funding
Activity 4 Pilot Project	• Develop the draft plan of PP • Develop the detailed PP plan and draft monitoring plan • Implement the PPs and monitoring • Monitor and evaluate the PP

LIST OF ATTENDANCE
JOINT COORDINATING COMMITTEE (JCC)

Project for Capacity Development of Central and Local Government for 3Rs and Domestic Solid Waste Management System

Sari Pan Pacific Hotel, Jakarta
Wednesday, 20th November 2013

Ministry of Environment			
1	R. Sudirman	Deputy Minister for Hazardous Substances, Hazardous and Solid Waste Management	Assistant Deputy for Solid Waste Management
2	Ujang Solihin Sidik	Solid Waste Management	Assistant Deputy for Solid Waste Management
3	Anton Sarjanto	Assistant Deputy for Solid Waste Management	Head Division of Recycling and Waste Utilization
4	Agus Saefudin	Deputy Minister of Hazardous Substances, Hazardous and Solid Waste Management	Head of Solid Waste Division for Restriction
5	Amrizal	Solid Waste Management	Statistics staff for Solid Waste Management
Ministry of Public Works			
1	Djoko Moersito	Director for Environment Sanitation Development	Head of Director for Environment Sanitation Development
2	Dwityo Akoro Koko	Ministry of Public Works-Directorate General Human Settlement	Head of sub-Directorate Overseas Cooperation
3	Nyimas Nina I.	Directorate of Environmental Sanitation Development – Sub Directorate of Solid Waste	Head of Section of Region 1 (Sumatera dan Jawa) - sub Directorate of Solid Waste, Directorate of Environmental Sanitation Development
4	Arindita Dessi P.	Directorate General of Human Settlement	Staff of Section of Region 1 (Sumatera dan Jawa) - sub Directorate of Solid Waste, Directorate of Environmental Sanitation Development
5	Welly Wihardi	Program Development - Directorate General Human Settlement	Staff of Directorate General Human Settlement
Palembang City			
1	H. M. Tabrani	Environmental Agency of Palembang	Head of environmental Agency of Palembang
2	Hardian	Environmental Agency of Palembang	Head of Sub-section Domestic Waste and Hazardous Waste and Hazardous

3	Agoeng Noegroho	Sanitation Agency of Palembang	Head of Sanitation Agency of Palembang
4	Neni Trisia	Sanitation Agency of Palembang	Head of Sub-section of Planning
Balikpapan			
1	Rizal Effendi	Office Mayor	Mayor of Balikpapan
2	Suryanto	BAPPEDA (Regional Development Planning Agency)	Head of BAPPEDA Balikpapan
3	Fachruddin	Environmental Agency of Balikpapan	Head of Environmental Agency of Balikpapan
4	Anytha Eva M.	Regional Planning and Development Agency Balikpapan	Head of Sub Division of Natural Resources Recovery of Balikpapan City
Consultant			
	M. Helmy	INSWA (Indonesia Solid Waste Association)	Representative of the organization
	Fazwan Bujang	IISIA	Representative of the organization

JICA			
	Takayuki Tomihara		Project Formulation Advisor
	Yuki Aratsu		Senior Representative of JICA Indonesia Office
JICA Expert Team			
1	Seiji Tsutsui	Chief Advisor of the 3R Project JICA Expert in Ministry of Environment	
2	Hitoshi Katayama	JICA Expert/ Waste Management and coordinator for 3R Project	
3	Hisashi Yamauchi	JICA Expert Team leader/ SWM Policy	
4	Ron Nagai	JICA Expert Team/ Legal systems	
5	Ryoko Tachibana	JICA Expert Team/EPR-CSR	
6	Siti Maryam	National staff of the project	
YEC			
1	Endah Sri Rejeki	National Staff	
2	Teppei Tsurubuchi	Japanese Staff	Business Promotion Officer Indonesia
3	Yuliati Rahayu	National Staff	

MINUTES OF MEETING

ON

THE JOINT COORDINATING COMMITTEE

FOR

THE PROJECT FOR CAPACITY DEVELOPMENT OF

CENTRAL AND LOCAL GOVERNMENTS FOR

3Rs AND DOMESTIC SOLID WASTE MANAGEMENT SYSTEM IN INDONESIA

November 9th, 2015

Mr. Genichiro Tsukada,

Chief Advisor,

The JICA Expert Team

Mr. R. Sudirman

Director of Solid Waste Management,

Directorate General of Hazardous Substances,

Hazardous waste, and Solid Waste Management,

Ministry of Environment and Forestry,

The Republic of Indonesia

Mr. Dodi Krispatmadi

Director of Environmental Sanitation Development, Directorate General of Human Settlements,

Ministry of Public Works and Housing,

The Republic of Indonesia

1. Outline of JCC

(1) Mr. R. Sudirman, Director of Solid Waste Management, Mr. Ade Palguna Ruteka, Secretary of Directorate General, Hazardous Substances, Hazardous Waste, and Solid Waste Management, the Ministry of Environment and Forestry (KLHK) opened the meeting.

(2) Mr. Tetsuya Harada, Senior Representative of JICA Indonesia office gave an addressing speech.

(3) Mr. M. Thabrani, Head of Environmental Agency (BLH) of Palembang City and Mr. Rizal Effendi, Mayor of Balikpapan City explained the Project's activities in each city.

(4) Mr. Genichiro Tsukada, Chief Advisor of the Project has explained the progress of the Project and modification of PDM.

(5) Mr. Hisashi Yamauchi, Leader of Japanese Consultant Team in the Project explained expansion of PP to other area both in Palembang and Balikpapan City.

2. Main Points to be Discussed and Agreed

2-1. Revision of Project Design Matrix (PDM) and Plan of Operations (PO)

Indonesian side and Japanese side agreed to revise the PDM and PO as per Attachment 1.

2-2. Pilot Project

(1) Progress and Issues for on-going Pilot Project

Head of BLH of Palembang and Mayor of Balikpapan explained the progress of on-going Pilot Project in 16 RTs at Kelurahan Talang Kelapa in Palembang City and 13 RTs at Kelurahan Gunung Bahagia in Balikpapan City

KLHK/Japan side pointed out issues to hinder the smooth implementation of PP in each city as follows;

➢ Palembang City

- Delay of construction of TPS-3R: Construction of TPS-3R has not commenced yet although it was confirmed to commence from June 2015 in MM for Mid-Term Review.
- DKK has allocated budget for the activities related to the project, but there will be a significant budget cut for the next fiscal year.
- Sustainability for Motivation of Environment Cadre: It is reported that motivation of some Environment Cadres who have played many and key tasks for socialization and awareness raising in PP, has become lower because of less of the incentive by Palembang City though the amount of workload is heavy as a voluntary basis.
- Improvement of waste collection for promoting PP activities: As agreed in MM for Mid-Term Review, further and continuous improvement of waste collection including the introduction of proper waste collection system with cooperation from primary collectors and residents by replacing TPS with TPS-3R, shall be necessary.

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➢ Balikpapan City

- Sustainability for Motivation of Environment Cadre: motivation of some Environment Cadres has become lower because of less of the incentive by Balikpapan City though the amount of workload is heavy as a voluntary basis.
- Distribution of plastic bag for source separation: Some RT leaders have not distributed plastic bags for source separation after the change of way to give it from BLH to RT leaders.

Indonesian side agreed to take prompt measures on the above key issues.

(2) Expansion of PP area

- Indonesia side expressed their intention to expand the PP Area in each city as follows:

  Palembang City: To add 2 new areas ((i) Srimulya and (ii) Sukodadi)

  Balikpapan City: To expand to whole area of Kelurahan Gunung Bahagia

  Japanese side basically agreed to provide continuous supports for the expanded PP area until the end of this project (November, 2016)

- Japanese side pointed out that in Palembang city, PP activities with TPS-3R at 2 new areas are expected not to commence by the end of the Project, because the preparation for the construction might not complete during the project period, and shall be handled by the initiative of Indonesian side even after the project.
- Japanese side emphasized that key issues above mentioned, 2-2 (1), shall be solved not only for smooth implementation of activities in original PP Area but also for commencement of activities in expansion PP area.
- Indonesian side and Japanese side tentatively agreed that more time is needed, and discussions will be held between JICA project team and the both Palembang city and Balikpapan City counterparts in order to decide the scope of JICA's supports in PP expansion area regarding the following activities;

➢ Palembang City: (i) Drafting PP Implementation plan, (ii) Source Separation and Separated collection, (iii) Establishment and Operation of Waste Bank, (iv) Socialization (including the promotion of "Home Compost"), (v) Improvement of current waste collection, (vi) Monitoring and Reporting

➢ Balikpapan City: (i) Drafting PP Implementation plan (ii) Source Separation and Separated collection, (iii) Establishment and Operation of MRF (iv) Socialization (including the promotion of "Home Compost"), (v) Monitoring and Reporting

2-3. Extension of the Project period

Indonesian side requested to extend the Project period because it is expected not to complete capacity development of central and local government for implementing and promoting 3R activities. Indonesian side also expected the area of PP to be expanded significantly along with Project extension. Japanese side explained that because the Project period still remains almost 1 year, it is too early to discuss and judge whether the Project shall be extended or not. Indonesian side and Japanese side agreed to continue to discuss the necessity of extension of the Project period.

Attachment 1

~~Annex XX~~ **Project Design Matrix (PDM) - Revised -**

Project Name: The Project for Capacity Development of Central and Local Government for 3R and Domestic Solid Waste Management System

Target Area: The whole country (Target Cities: Palembang and Balikpapan) **Duration: 2013.11–2016.11(3 years)**

Target Group: State Ministry of Environment and Forestry, Ministry of Public Works and Public Housing, Palembang City and Balikpapan City

Narrative Summary	Objectively Verifiable Indicators	Means of Verification	Important Assumptions
Overall Goal 3R and solid waste management (household and household-like wastes)is appropriately implemented successively in representative local governments of the country in accordance with the Act on Solid Waste Management (No.18/2008), the related government regulations, ministerial regulations and local regulations.	In three (3) years after completion of the technical cooperation period, the model are disseminated to more than 29, including 14 metropolitan and 15 large cities, and some of 29 cities plan to adopt the practices in the target cities (i.e. local regulations, data management, action plan and its implementation).	Management/monitoring surveys by State Ministry of Environment and Forestry	
Project Purpose 3R and solid waste management (household and household-like wastes) is appropriately implemented in the target cities based on the Act on Solid Waste management (No.18/2008), the related government regulations, ministerial regulations as well as local regulations.	1. Implementation of Pilot Project is disseminated to other regions in accordance with the related government regulations, ministerial regulations and local regulations (from the one PP area to other two areas in Palembang city/ from the PP area of 13 RTs to all RTs in Kelurahan Gurung Bahagia, Balikpapan city). 2. Solid waste hauled to the final disposal site will be reduced.	Project Activity Report	
Outputs 1. Draft governmental and ministerial regulations necessary to properly enhance the technical substance and to execute 3R and solid waste management (household waste and household-like waste) are prepared in accordance with the Act on Solid Waste Management (No.18/2008). 2. In the target cities, solid waste management plans (mid-term (10 year) action plans with emphasis on waste reduction) are prepared according to draft local regulations. 3. The capacity of the target cities in terms of 3R and Solid Waste Management is strengthened through the pilot projects.	1. Draft governmental and ministerial regulations will be prepared by October 2015. 2-1. Local regulations will be drafted by the end of 2014. 2-2. Solid waste data is organized and updated in the target cities. 2-3. Mid-term action plans for waste reduction will be prepared by the middle of 2014. 3-1. Capacity of the target city governments meets the set-up criteria. 3-2. Solid waste hauled to the final disposal site from the Pilot Project area will be reduced by 20% (reduction ratio) in target cities.	1. Draft Governmental and Ministerial Regulations 2-1.Draft local regulations 2-2. Action plans (project reports) 3-1. Project Activity Report 3-2. Capacity assessment on project activities by the Japanese Experts	Governmental and Ministerial regulations, local regulations, action plans for waste reduction on solid waste management become effective (Procedure for approval does not get delayed).
Activities **1. Prepare Draft Governmental and Ministerial Regulations** 1-1 Establish a working group at central level for preparation of draft governmental and ministerial regulations. 1-2. Conduct surveys on the existing legal system on solid waste	**Inputs** **Japanese Side** a. Assignment of Experts Long-term Expert 1. Team Leader/Solid Waste Management **Indonesian Side** a. Assignment of Counterpart Personnel		Turnover of Indonesian C/P does not occur frequently.

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management and completed/on-going/planned 3R activities of main cities, and then prioritizes items to be regulated, and decide work procedures. 1-3. Prepare draft governmental and ministerial regulations according to the order of priority. 1-4. Carry out necessary follow-up for the draft to be approved as official documents of the government. **2-1. Prepare Draft Local Regulations in the Target Cities** 2-1-1. Establish working groups in target cities for preparation of local regulations. 2-1-2. Establish "3R Stars" which is consisted from diverse stakeholders in the target cities. 2-1-3. Investigate the existing local regulations related to solid waste management. 2-1-4. Clarify items for addition and/or revision on the existing local regulations. 2-1-5. Prepare draft local regulations of the target cities. 2-1-6. Follow up for revision of local regulations based on pilot project results and change of conditions, etc. **2-2. Manage Solid Waste Amount/Composition Data** 2-2-1. Establish working groups for solid waste management data. 2-2-2. Review the existing solid waste data management in Indonesia. 2-2-3. Draw up basic concept for the system design. 2-2-4. Design a system for statistical data on solid waste. 2-2-5. Determine the indicator for Output 2-2. 2-2-6. Conduct surveys in target cities. 2-2-7. Compile the collected data statistically and release to the public through web site and/or newsletters. **2-3. Prepare Action Plan for Mid-term Waste Reduction** 2-3-1. Establish working groups for preparation of action plan for mid-term waste reduction. 2-3-2. Survey the present conditions (including the on-going 3R and solid waste management activities) of solid waste management in the target cities. 2-3-3. Prepare draft action plans (including CSR if possible) for each target city utilizing available data from solid waste amount data. 2-3-4. Hold consultation meetings with participation of citizens and relevant organizations in the target cities in order to finalize the action plans.	Policy 2. Project Coordinator Short-term Expert 1. Waste Reduction Policy (Co-Team Leader) 2. Legal System 3. 3R/Citizens' Participation 4. Environmental Education/Public Awareness 5. Solid Waste Data Management 6. Institution and Finance on Solid Waste Management 7. Other Japanese expert and Local experts/ Consultants as needed b. Equipment (for pilot projects) c. C/P Trainings	b. Provision of Office space (by Ministry of Environment and Forestry) and other necessary facilities c. Allocation of operational cost for the Project d. Counterpart expenses for joining in-country training	**Pre-Conditions**

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3. Implement 3R related Pilot Projects 3-1. Establish working groups for implementation of pilot projects. 3-2. Review 3R activities in Surabaya city and Malan city as a reference. 3-3. Develop the framework of the Pilot Projects. 3-4. Identify the needs of residents through holding participatory workshops. 3-5. Prepare detailed implementation plans for pilot project. 3-6. Prepare monitoring plans of the Ministry of Environment and Forestry /Ministry of Public Works and Public Housing for the pilot projects in the target cities. 3-7. Implement the pilot projects with support from the Ministry of Environment and Forestry /Ministry of Public Works and Public Housing and other relevant organizations. 3-8. Monitor and evaluate the pilot projects. 3-9. Prepare recommendations and/or suggestions with regard to the evaluation and learning of the pilot projects. 3-10. Propose a mechanism for dissemination to other local governments in collaboration with relevant organizations. 3-11. Hold workshops aiming at dissemination of pilot projects to other local cities of the country.			

Target Cities: Palembang and Balikpapan

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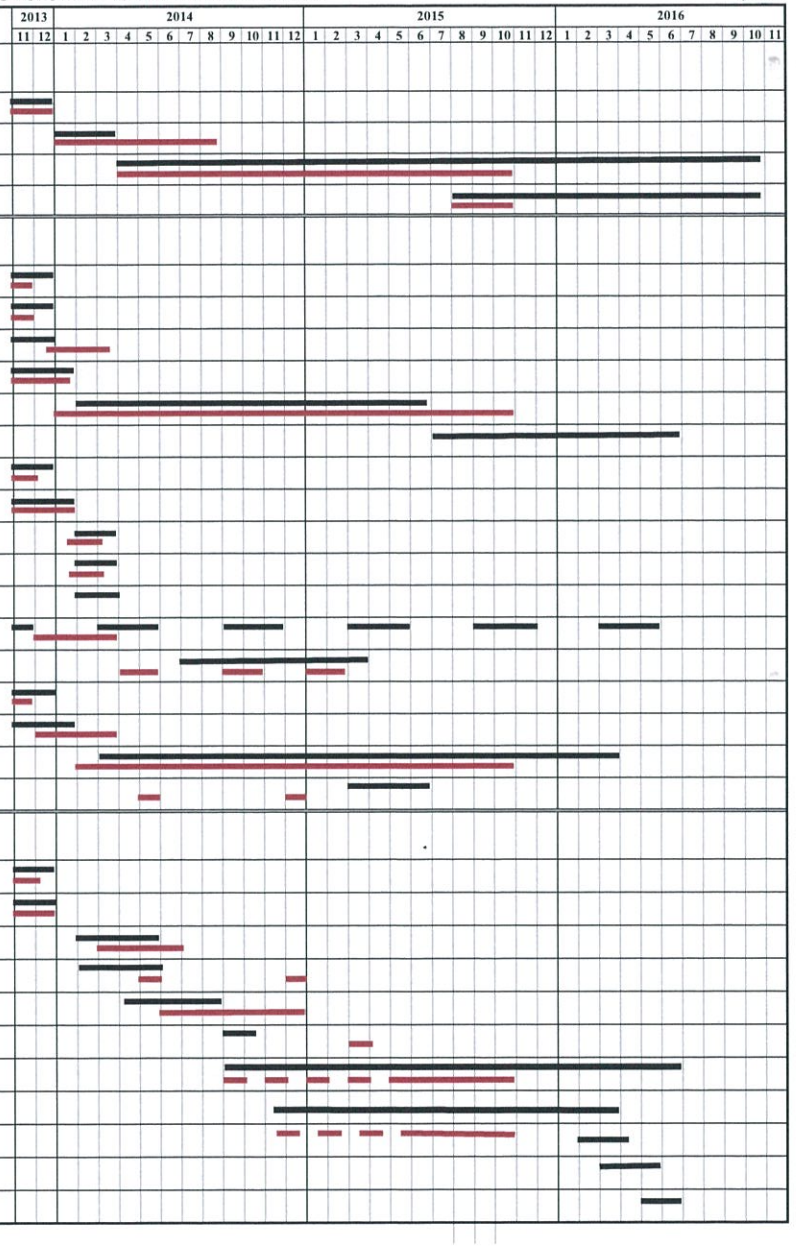
Plan of Operation-Revised THE PROJECT FOR CAPACITY DEVELOPMENT OF CENTRAL AND LOCAL GOVERNMENTS FOR 3R AND SOLID WASTE MANAGEMENT (Octob

No.	Activities	Person/Organization in charge	Collaborators
1	**Draft government and ministerial regulations necessary to properly enhance the technical substance and to execute 3R and solid waste management (household waste and household-like waste), are prepared in accordance with the Act on Solid Waste Management (No.18/2008).**		
1.1	Establish a working group at central level for preparation of draft governmental and ministerial regulations.	KLHK/PUPR	Target Cities
1.2	Conduct surveys on the existing legal system on solid waste management, and completed / on-going / planned 3R activities of main cities, and then prioritize items to be regulated, and decide work procedures.	KLHK/PUPR	Target Cities
1.3	Prepare draft governmental and ministerial regulations, etc. according to the order of priority.	KLHK/PUPR	Target Cities
1.4	Carry out necessary follow-up for the draft to be approved as official documents of the government.	KLHK/PUPR	Target Cities
2	**In the target cities, solid waste management plans (mid-term (10 year) action plans with emphasis on waste reduction) are prepared according to draft local regulations.**		
2-1-1	Establish working groups in target cities for preparation of local regulations	Target Cities	KLHK/PUPR
2-1-2	Establish "3R Stars" which is consisted from diverse stakeholders in the target cities	Target Cities	KLHK/PUPR
2-1-3	Investigate the existing local regulations related to solid waste management.	Target Cities	KLHK/PUPR
2-1-4	Clarify items for addition and/or revision on the existing local regulations.	Target Cities	KLHK/PUPR
2-1-5	Prepare draft local regulations of the targetl cities .	Target Cities	KLHK/PUPR
2-1-6	Follow up for revision of local regulations based on pilot project results,and change of conditions, etc.	Target Cities	KLHK/PUPR
2-2-1	Establish working groups for solid waste management data	Target Cities	KLHK/PUPR
2-2-2	Review the existing solid waste data management in Indonesia.	Target Cities	KLHK/PUPR
2-2-3	Draw up basic concept for system design.	Target Cities	KLHK/PUPR
2-2-4	Design a system for statistical data on solid waste management (solid waste amount/waste composition).	Target Cities	KLHK/PUPR
2-2-5	Determine the indicators for Output 2-2.	Target Cities	KLHK/PUPR
2-2-6	Conduct surveys in target cities	Target Cities	KLHK/PUPR
2-2-7	Compile the collected data statistically and release to the public through the white paper on the environment, web site and/or newsletters.	Target Cities	KLHK/PUPR
2-3-1	Establish working groups for preparation of action plan for mid-term waste reduction.	Target Cities	KLHK/PUPR
2-3-2	Survey the present conditions(including the on-going 3R and solid waste management activities) of solid waste management in the target cities.	Target Cities	KLHK/PUPR
2-3-3	Prepare draft action plans (including CSR if possible) for each target city utilizing available data from solid waste amount data.	Target Cities	KLHK/PUPR
2-3-4	Hold consultation meetings with participation of citizens and relevant organizations in the target cities in order to finalize the action p	Target Cities	KLHK/PUPR
3	**The capacity of the target cities in terms of 3R and Solid Waste Management is strengthened through the pilot projects.**		
3-1.	Establish working groups for implementation of pilot projects.	Target Cities, etc.	KLHK/PUPR
3-2.	Reciew 3R activities in Surabaya City and Malang City as a reference.	Target Cities, etc.	KLHK/PUPR
3-3.	Develop the framwork of the pilot project.	Target Cities, etc.	KLHK/PUPR
3-4.	Identify the needs of residents/stakeholders in target cities thorough holding participatory workshops.	Target Cities, etc.	KLHK/PUPR
3-5.	Prepare detailed implementation plans for pilot projects.	Target Cities, etc.	KLHK/PUPR
3-6.	Prepare monitoring plans of the Ministry of Environment and Forestry/Ministry of Public Works and Public Housing for the pilot projects in the target cities	Target Cities, etc.	KLHK/PUPR
3-7.	Implement the pilot projects with support from the Ministry of Environment and Forestry/Ministry of Public Works and Public Housing and other relevant organizations.	Target Cities, etc.	KLHK/PUPR
3-8.	Monitor and evauate the pilotl Projects.	Target Cities, etc.	KLHK/PUPR
3-9.	Prepare recommendations and/or suggestions with regard to the evaluation and learning of the pilot projects.	Target Cities, etc.	KLHK/PUPR
3-10.	Propose a mechanism for dissemination to other local governments in collaboration with relevant organizations.	Target Cities, etc.	KLHK/PUPR
3-11.	Hold workshops aiming at dissemination of pilot projects to other local cities of the country.	Target Cities, etc.	KLHK/PUPR



MINUTES OF MEETING

ON

THE JOINT COORDINATING COMMITTEE

FOR

THE PROJECT FOR CAPACITY DEVELOPMENT OF

CENTRAL AND LOCAL GOVERNMENTS FOR

3R AND DOMESTIC SOLID WASTE MANAGEMENT SYSTEM IN INDONESIA

March 20, 2017

Mr. Tetsuya Harada

Senior Representative,

Indonesia Office,

Japan International Cooperation Agency

Mr. R. Sudirman

Director of Solid Waste Management,

Directorate General of Hazardous Substances, Hazardous waste, and Solid Waste Management,

Ministry of Environment and Forestry,

The Republic of Indonesia

Mr. Genichiro Tsukada,

Chief Advisor,

The JICA Expert Team

Mr. Dodi Krispratmadi

Director of Environmental Sanitation Development,

Directorate General of Human Settlements,

Ministry of Public Works and Housing,

The Republic of Indonesia

- ✓ Role of the Environmental Cadre on operation of promotion, collection and sorting of recyclables.

- TPS-3R
  - ✓ Residents should pay the collection fee for the revenue source of TPS-3R operation.
  - ✓ Sorting of recyclables and organic materials from other waste, in case source separation is not carried out properly.
  - ✓ Recyclables sorted at the TPS-3R should be send/handled by the Waste Bank.
  - ✓ Establishment of sustainable system for producing and selling compost.

- Collaboration model of TPS-3R & Waste Bank
  - ✓ TPS-3R and Waste Bank should not necessarily be located at one place, however, function of each facility should be collaborated.
  - ✓ Profit and expenditure of both facility can be managed/shared by the single operation body/KSM.
  - ✓ Current consolidation of BLH and DKK can lead the easy management of the Model.

(2) Balikpapan City: "Institutional model"

- Discharge system
  - ✓ Waste collection points called "Halte Sampah".
  - ✓ Designated bag or substitute bag.
  - ✓ Day of the week and time of the day for waste discharge is applied.
  - ✓ Role of the residents on waste discharge manner/3R.

- Collection system
  - ✓ Source separation into 3 categories; organic waste, recyclable and other waste.
  - ✓ Bell collection system.
  - ✓ Curb-side collection system.

- Intermediate treatment system
  - ✓ MRF for segregation of recyclables from other waste.
  - ✓ TPST for composting of organic waste from households.
  - ✓ Composting facility in TPA, handling of organic waste from the market.

2-3. Dissemination mechanism of the PP components to other cities in Indonesia

Outline and/or basic idea of the dissemination mechanism of the PP components to other cities in Indonesia by the Central Government, presented and/or discussed in the JCC is as follows.

- Legal framework
  - ✓ Presidential regulation on national policy and strategy on waste management (JAKSTRANAS) will synchronize promotion and implementation of 3R activities in local governments
  - ✓ Revision of ministerial regulation No.13/2012 on the Guideline of Waste Bank is in process
  - ✓ Formulation of guideline on establish of central waste bank is under discussion
  - ✓ Components of Palembang/Balikpapan dissemination model will be regulated by mayor regulations in the each city

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1. Outline of JCC

(1) Mr. Dodi Krispratmadi, Director of Environmental Sanitation Development, Directorate General of Human Settlement, PUPR, gave an addressing speech and opened the meeting

(2) Mr. Tetsuya Harada, Senior Representative of JICA Indonesia office gave an addressing speech.

(3) Mr. Sapri Nungcik, Head of BAPPEDA Palembang City, Ms. Nining Sutriningsih, Head of BAPPEDA Balikpapan City, and Mr. Suryanto, Head of DLH Balikpapan City, explained the Project's activities in each city

(4) Mr. H. Yamauchi, Leader of Japanese Consultant Team in the Project explained the Work Plan of extension period and recommended main components of pilot project model to be disseminated in PLM and BPN.

(5) Ms. Haruki Agustina, Head of Sub-directorate for Specific Waste and Recycling, KLHK and Mr. Muhammad Sundoro, Head of Sub-directorate for Waste Management, PUPR, introduced current 3R promotion activities and proposed a dissemination mechanism of PP model to other cities in Indonesia.

2. Main Points to be Discussed and Agreed

2-1. Work Plan of Extension Period

Indonesian side and Japanese side agreed the Work Plan of Extension Period as per Attachment 1.

2-2. Dissemination Model of Pilot Projects

Main components of pilot project model for the dissemination to other cities in Indonesia were presented and tentatively identified in the JCC meeting. Scrutinizing and careful selection of the components will be conducted from now on. The definitive dissemination model of pilot projects selected by the central government shall be introduced in final seminar of the project in Jakarta in October 2017.

Tentatively, the following dissemination model of pilot projects were provided:

(1) Palembang City: "Communal model"

- Collection/ Discharge system
  - ✓ Source separation into 3 categories; organic waste, recyclable and other waste.
  - ✓ Apply plastic bag or bin for waste discharge.
  - ✓ Role of the Environmental Cadre on waste discharge manner/3R.
  - ✓ Participation of the Primary collectors in the waste collection services.
- Waste Bank
  - ✓ Circulate collection system (open-air weighing) and/or unit (group customer) system.

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- Financing (use of subsidies)
  - ✓ Making use of the program of "Green Infrastructure" with the People's Representative Council (DPR) is considered.
  - ✓ Subsidize through the Unit of Infrastructure, KLHK /PUPR is available

- Others
  - ✓ National seminars/workshops between central and local governments are scheduled
  - ✓ Workshops in Palembang city and Balikpapan city, such as 3R Stars Forum, are scheduled
  - ✓ Development and circulation of leaflets and booklets regarding components of Palembang/Balikpapan dissemination model is expected

2-4. Final Seminar of the Project

Final Seminar of the Project will be held in Jakarta in October 2017 with the following purposes.

- Dissemination of the Pilot Project outputs to the public and other cities in Indonesia by Palembang and Balikpapan city.
- Announcement of nationwide dissemination mechanism of 3R and Pilot Project outputs to the public and other cities in Indonesia by KLHK and PUPR.

2-5. Terminal Evaluation

Indonesian and Japanese side confirmed terminal evaluation will be conducted around late May to mid-June, 2017.

Attachment

1. Work Plan of Extension Period
2. Presentation Material from Indonesian side
3. Presentation Material from Japanese side
4. Attendance List

GT