

Kick-off Meeting on JICA Clean City Initiative  
International Seminar

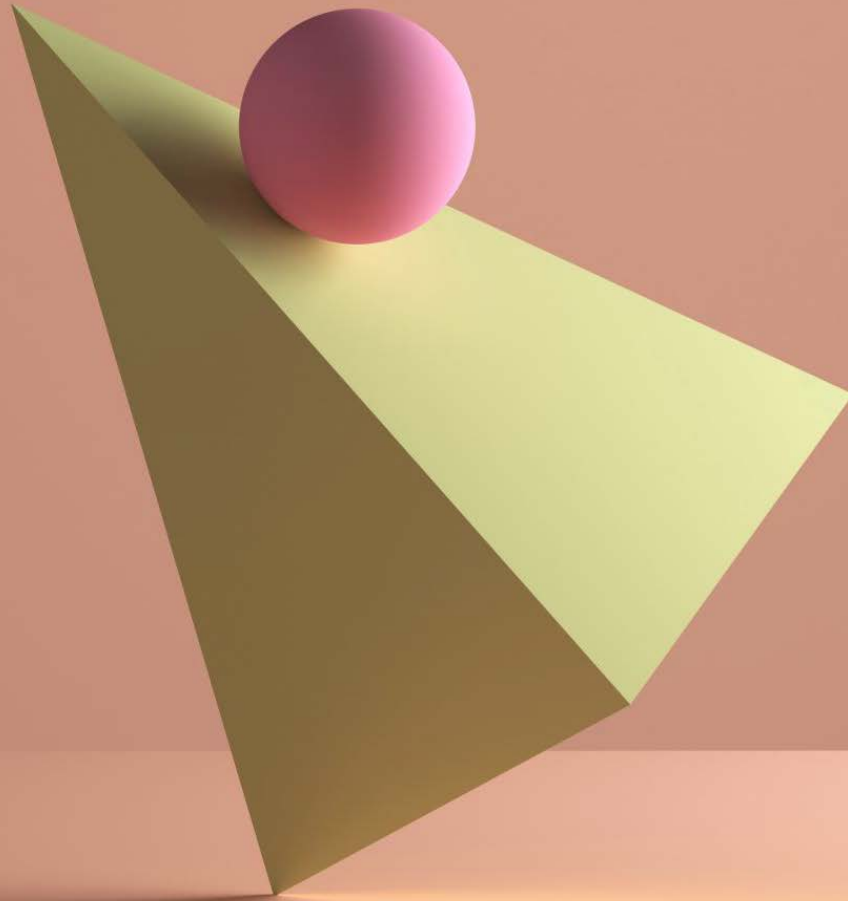
# International Cooperation Towards a Sound Material Cycle Society and Circular Economy

Mitsuo Yoshida

Senior Advisor

Japan International Cooperation Agency

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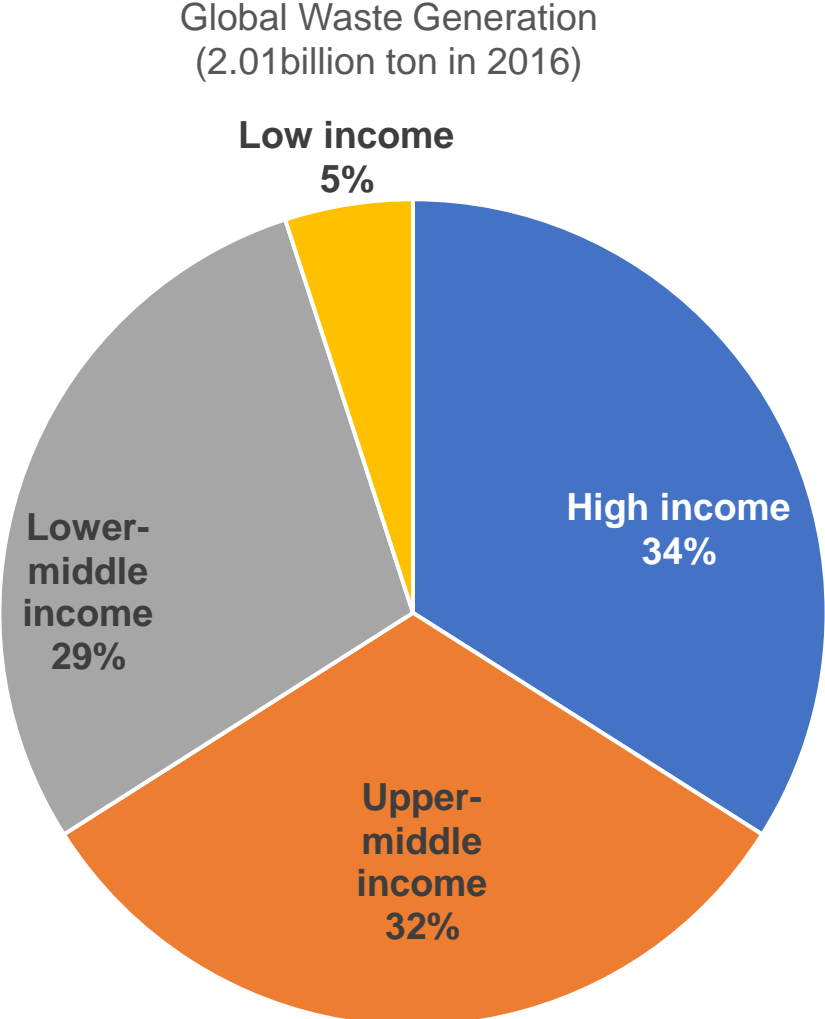


# What to talk about?

**I will talk about an overview of the current state of the waste management and material recycling in developing countries, summary of previous efforts of technical assistance, and consider future challenges towards the formation of a sound material-cycle society and economy, in the context of Clean City Initiative.**

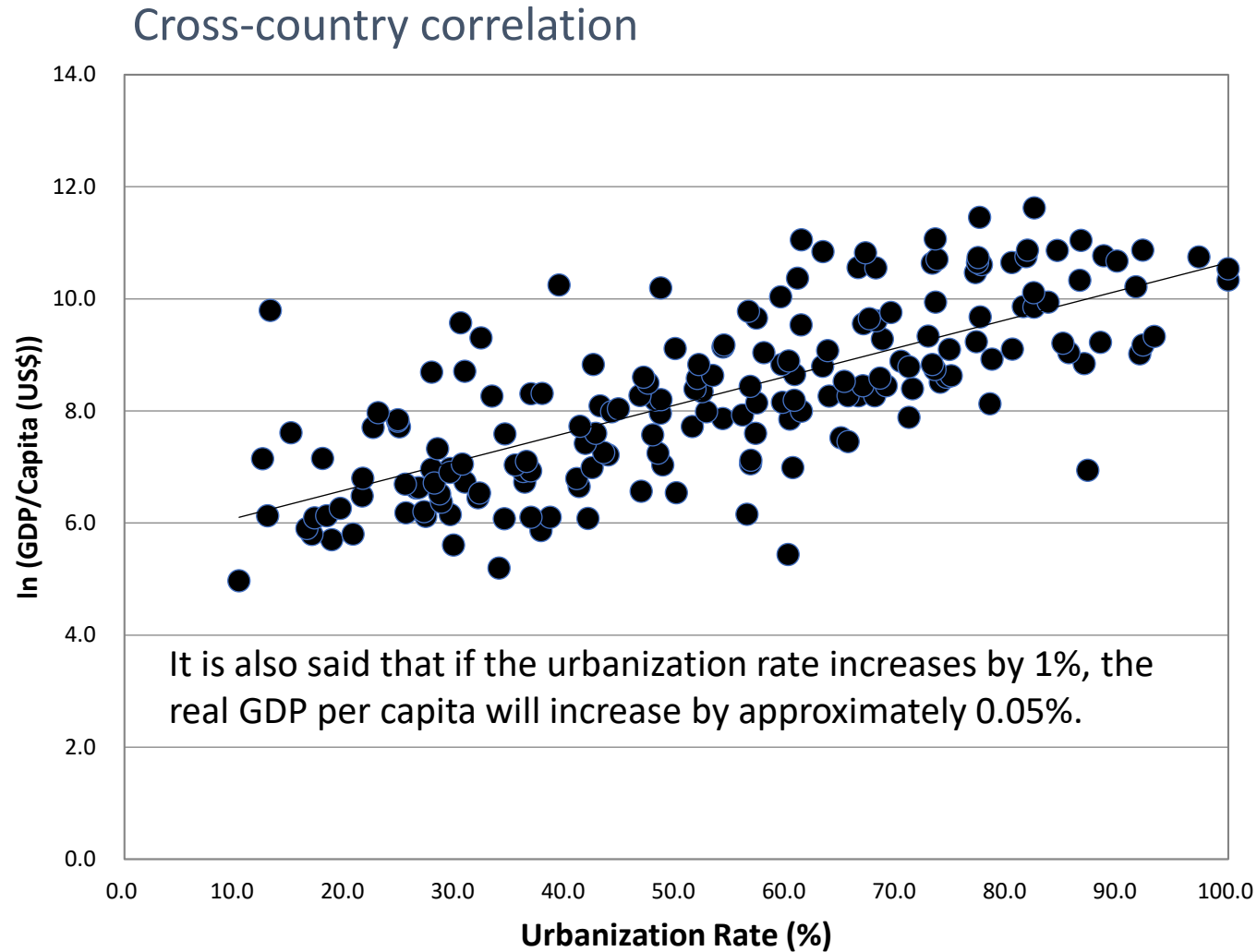
1. Present situation of solid waste in developing countries
2. Technical assistances so far
3. Challenges towards a sound material cycle society and circular economy
4. Conclusions

**The total amount of waste generated worldwide is estimated to be more than 2 billion tons per year, 66% of which is generated from developing countries.**



Income level (GNI/capita/year; USD)  
Low (\$1,025 or less)  
Lower middle (\$1,026–\$4,035)  
Upper middle (\$4,036–\$12,475)  
High (\$12,476 or more)

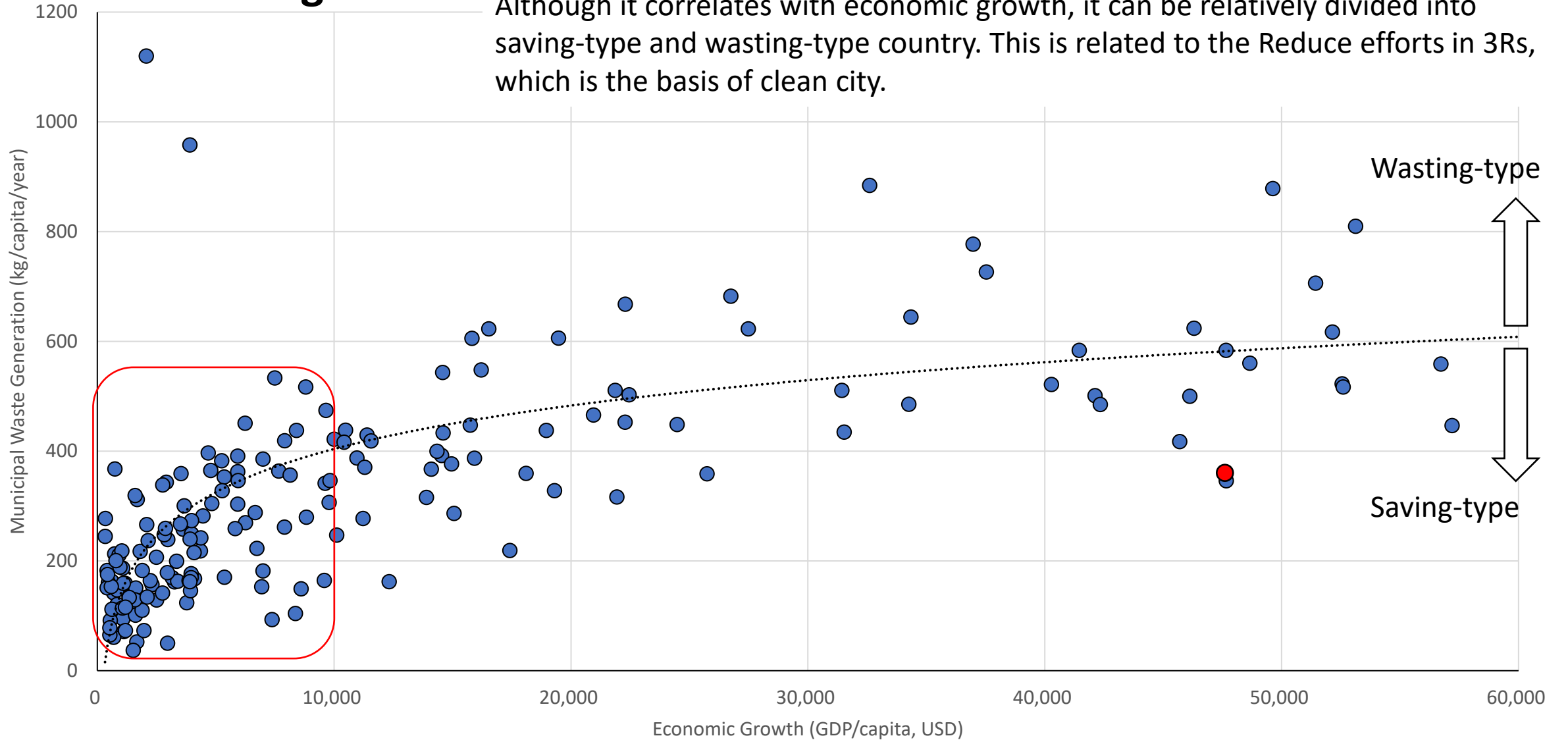
# Correlation between urbanization rate (%) and economic growth ( $\log_e(\text{GDP/capita})$ )



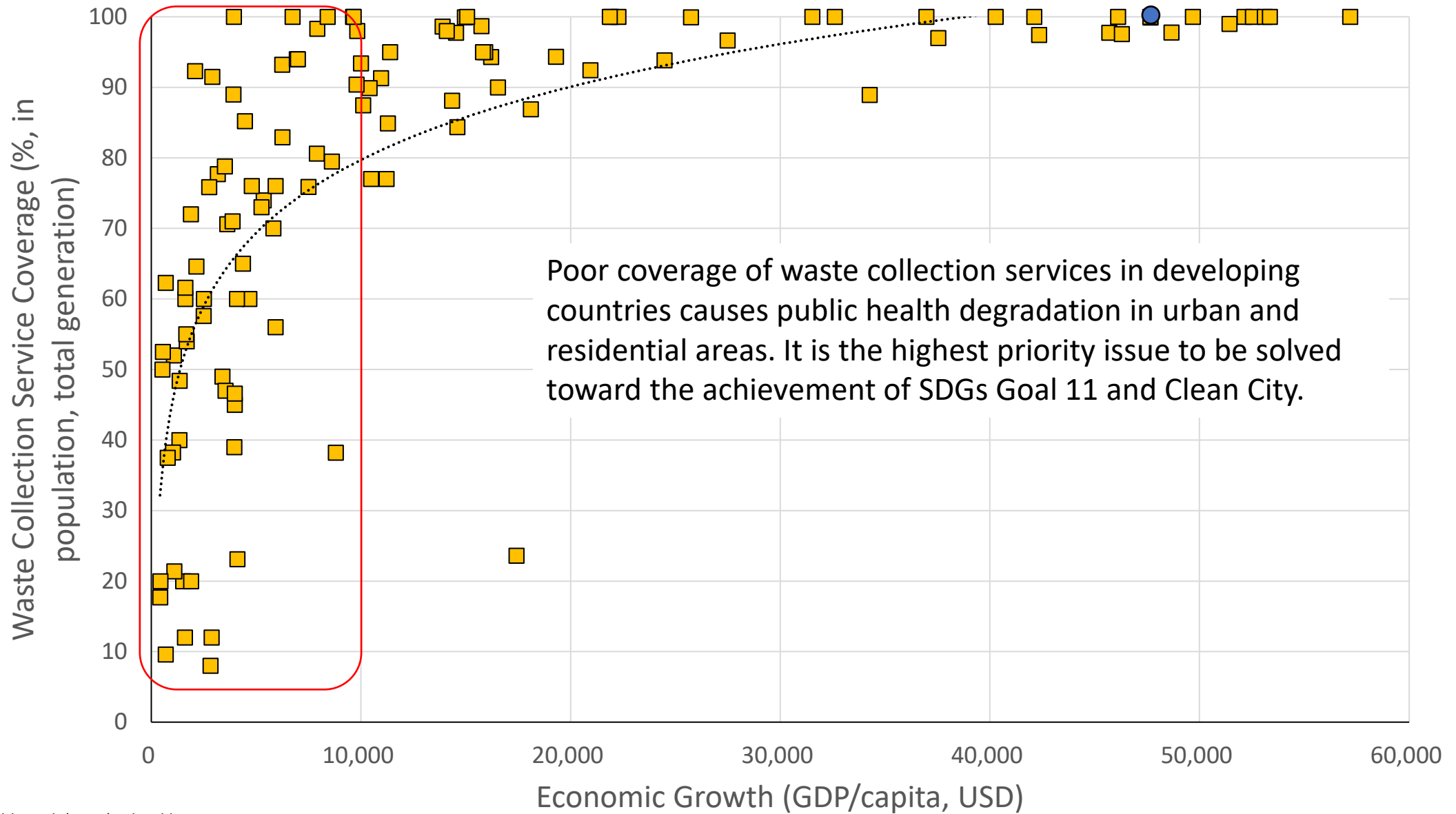
Urbanization promotes economic growth. Economic growth promotes the activation of economic activities and the diversification of lifestyles. As a result, the amount of waste generated increases, and a large amount of difficult-to-treat waste is included.

# Per capita waste generation (kg / capita / year) correlates with economic growth.

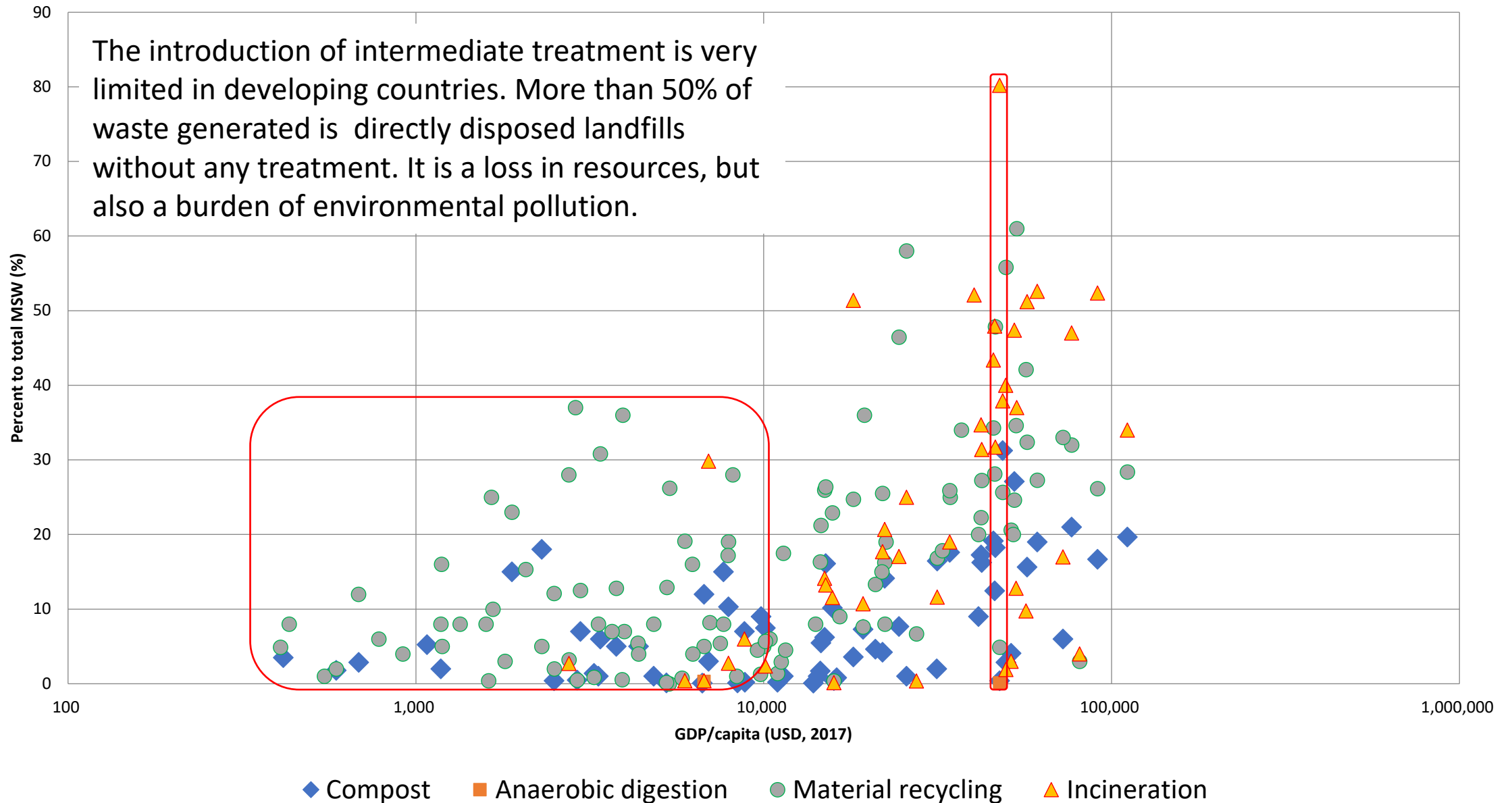
Although it correlates with economic growth, it can be relatively divided into saving-type and wasting-type country. This is related to the Reduce efforts in 3Rs, which is the basis of clean city.



# Waste collection service coverage (%) correlates with economic growth.

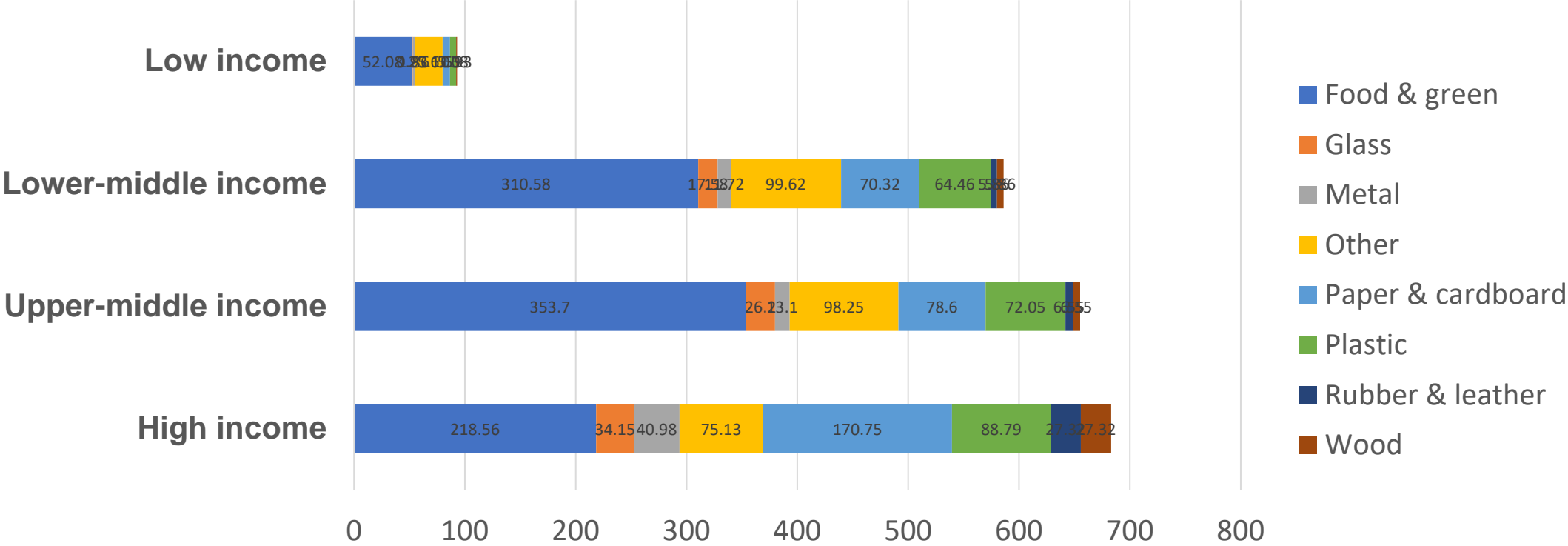


# Trends of intermediate treatment technology in waste management



From the average composition of the generated waste, biodegradable organic waste such as food residue accounts for about 50%

World waste generation and composition (million tons/year)

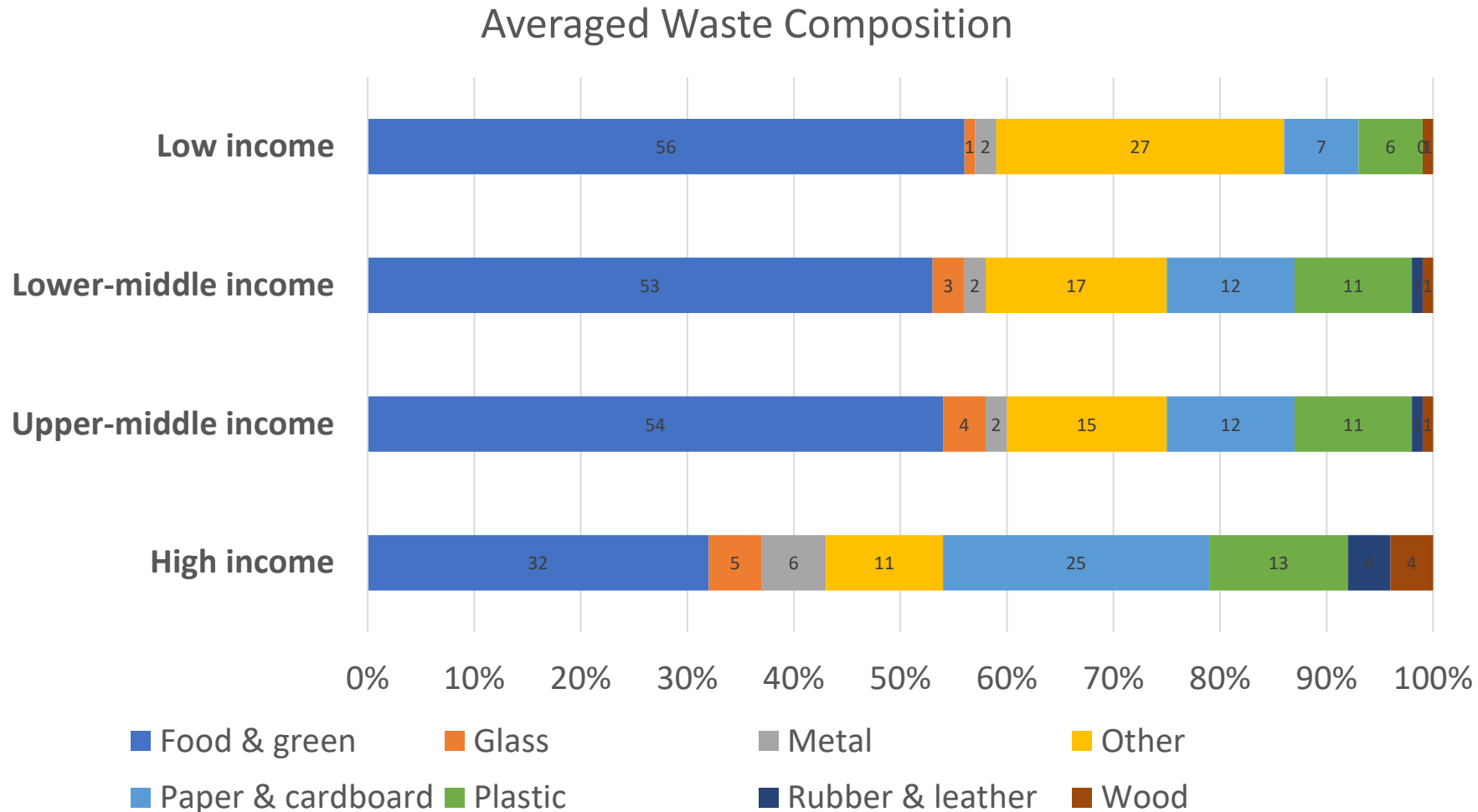


In low-income countries, there is a tendency that there are few recyclable substances other than biodegradable organic waste such as food residues.

Data: World Bank (2018) What a waste 2.0

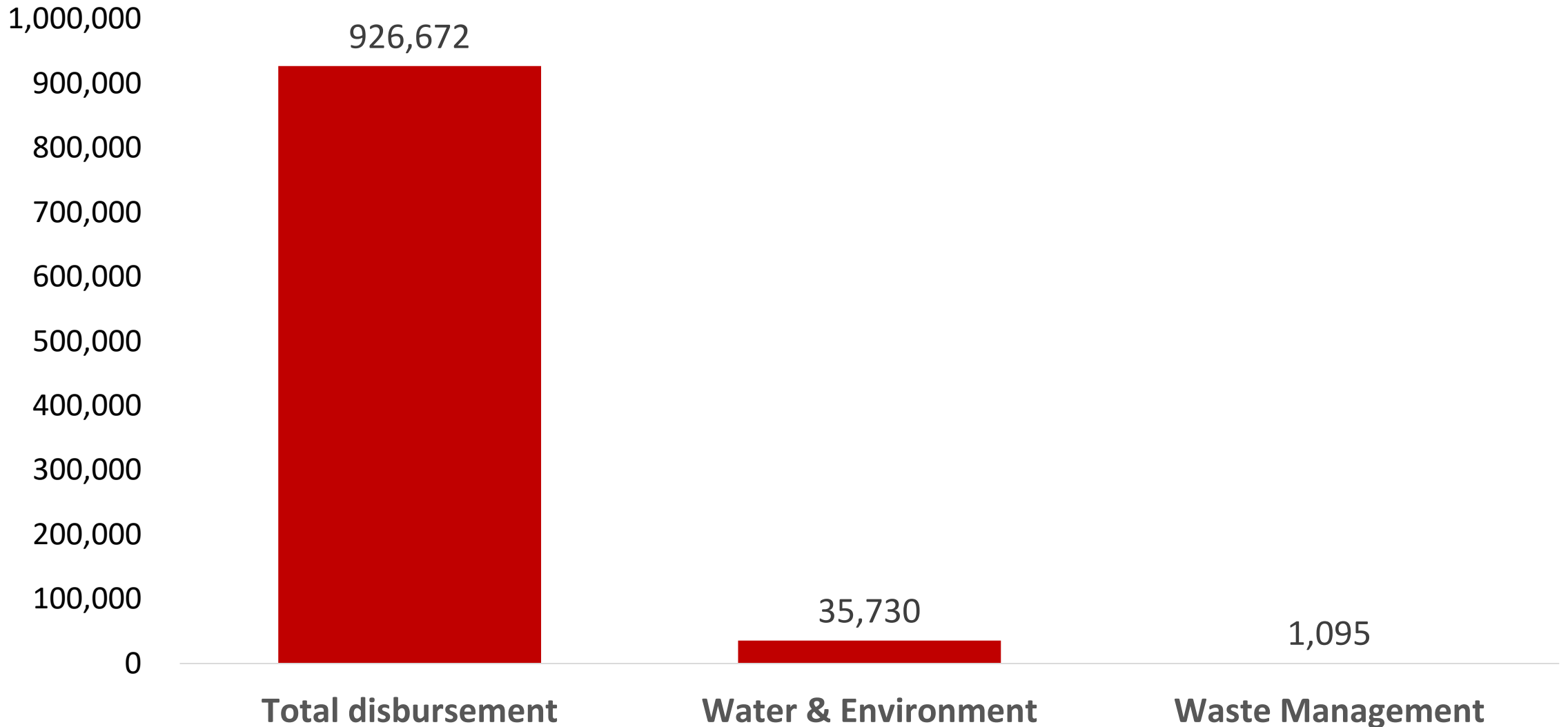


In low-income countries, the amount waste generated is small and the amount of recyclables tends to be small, which indicates unintentional 3Rs.



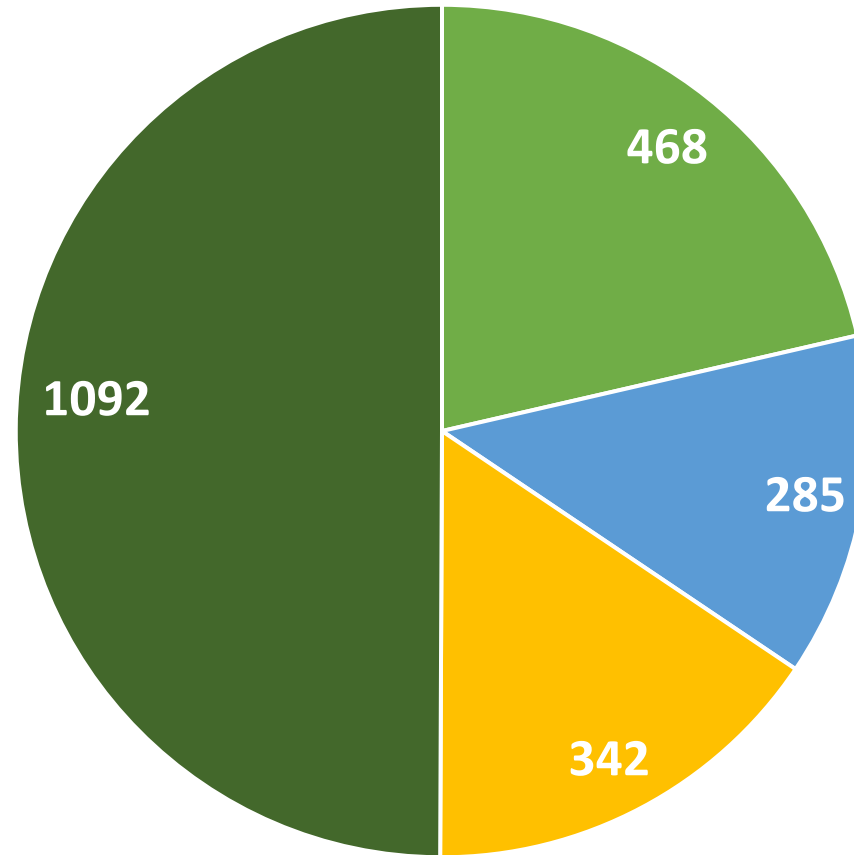
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# Official Development Assistance (ODA) Expenditure in OECD-DAC Countries (2009-17) (Unit: US \$ 1 million)



# Donor contributions in the field of waste management over the last 9 years (2009-2017)

(Data source: OECD-CRS database; unit: million USD)

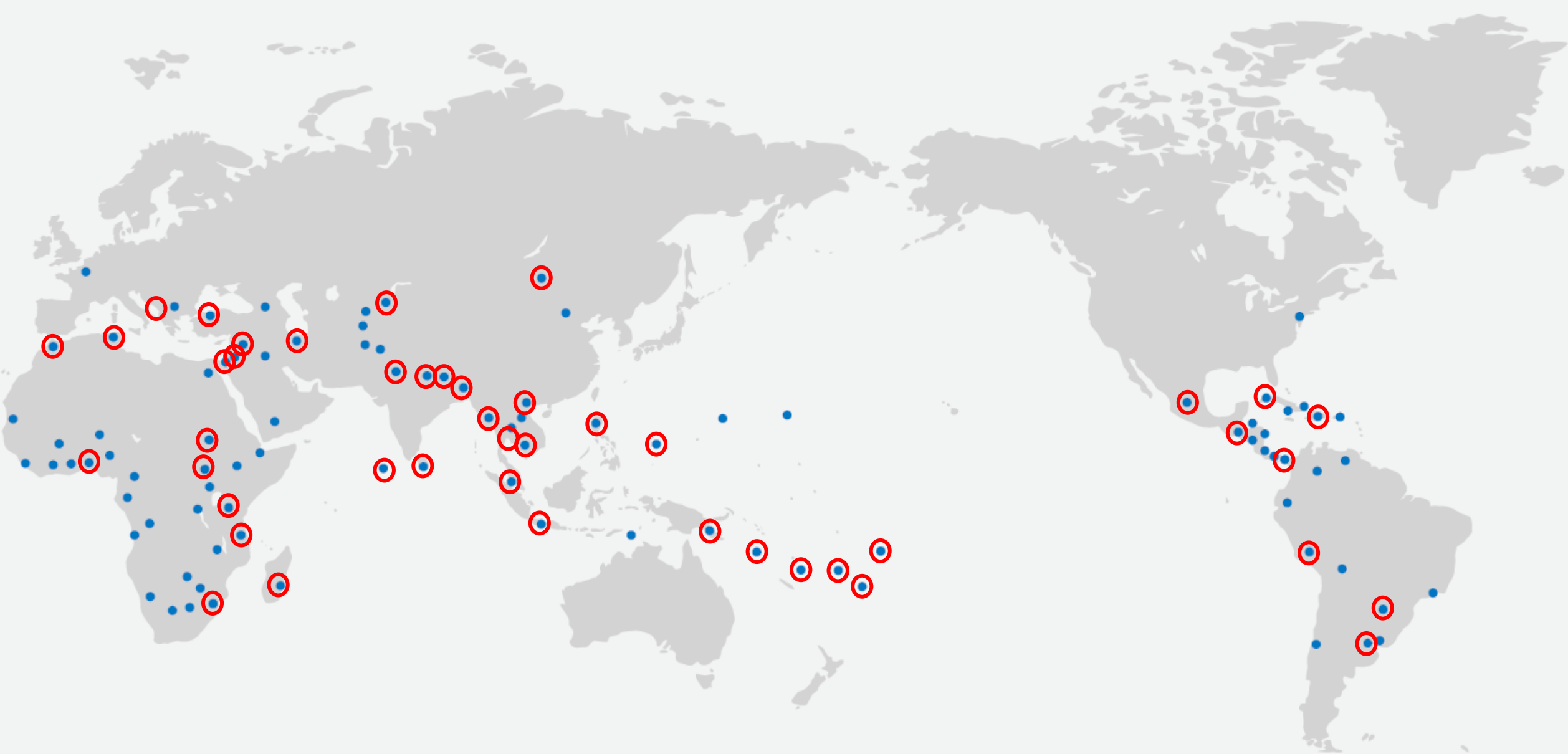


Bilateral assistance from OECD-DAC countries accounts for half of the total.

■ Japan ■ Germany ■ Other DAC OECD ■ World Bank and others

# JICA Technical Cooperation Projects for Capacity Development in Municipal Solid Waste Management

- JICA Office
- MSWM Project



# Major official development assistance in the field of waste Management in Japan, since 1980s

Development Study : 18 projects

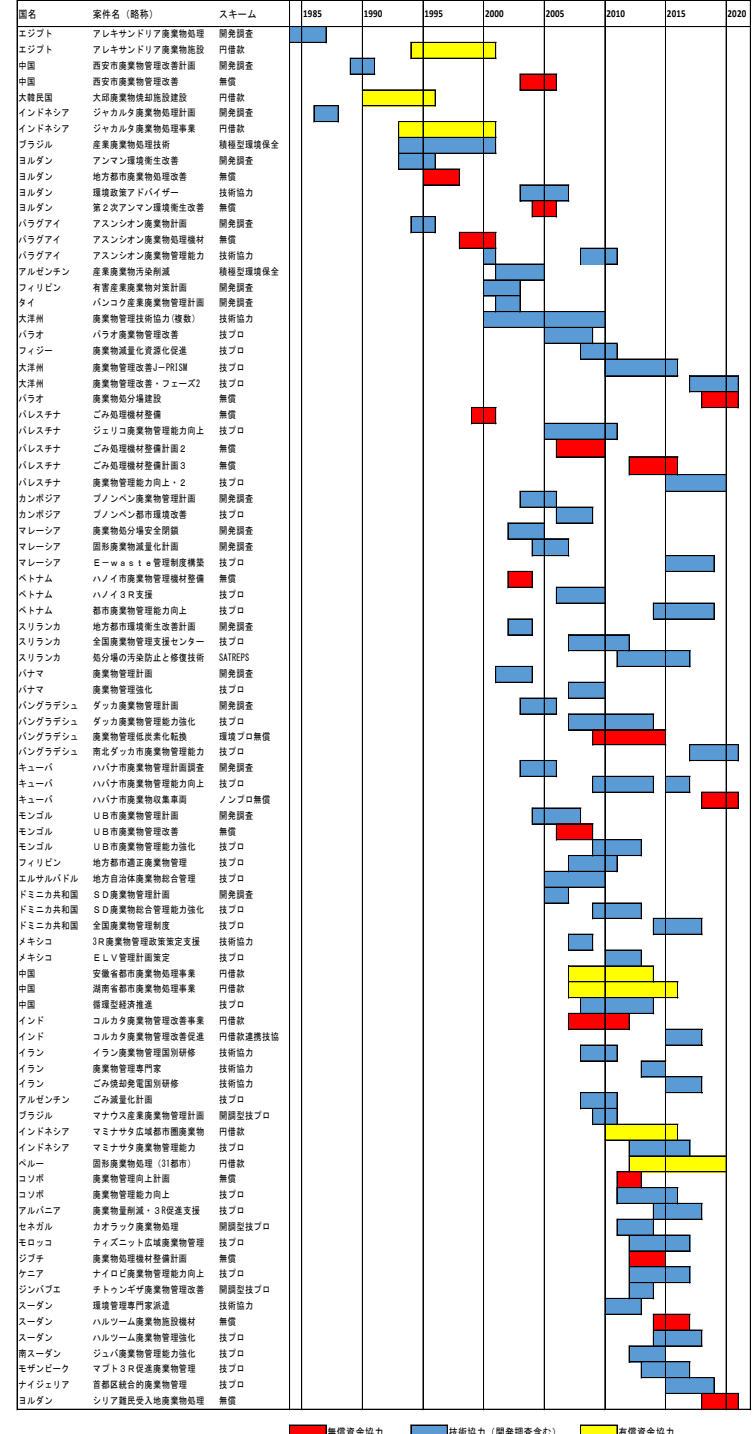
Technical Cooperation : 45 projects

Equipment/Facility Grant Aid : 17 projects

Loan Project : 7 projects

Total: 87 projects

Duration of the program: 10 to 15 years



■無償資金協力 ■技術協力(開発調査含む) ■有償資金協力

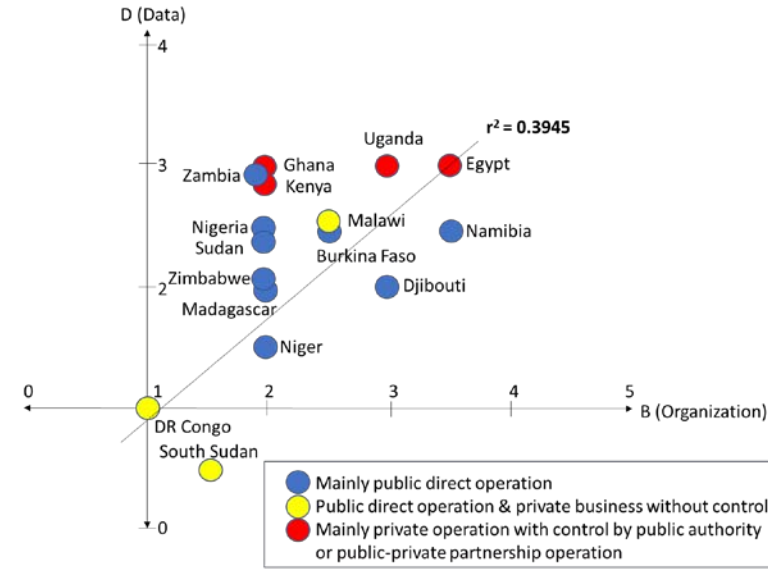
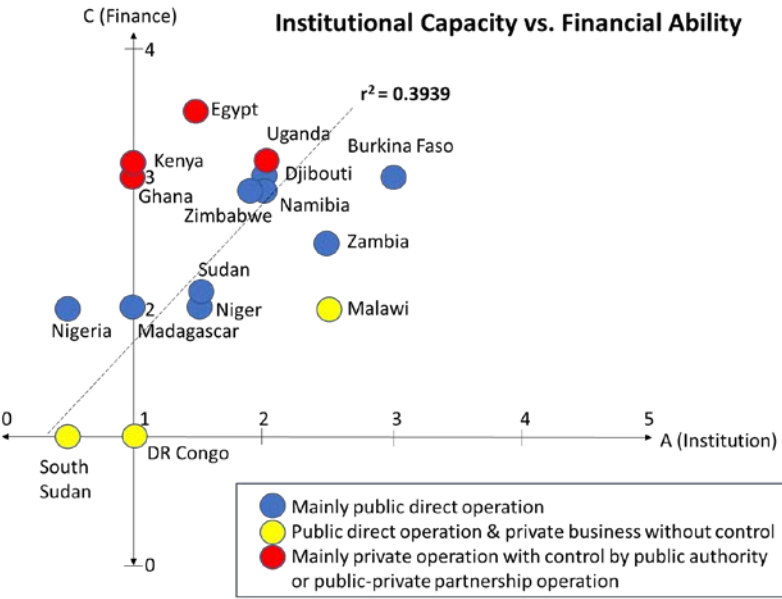
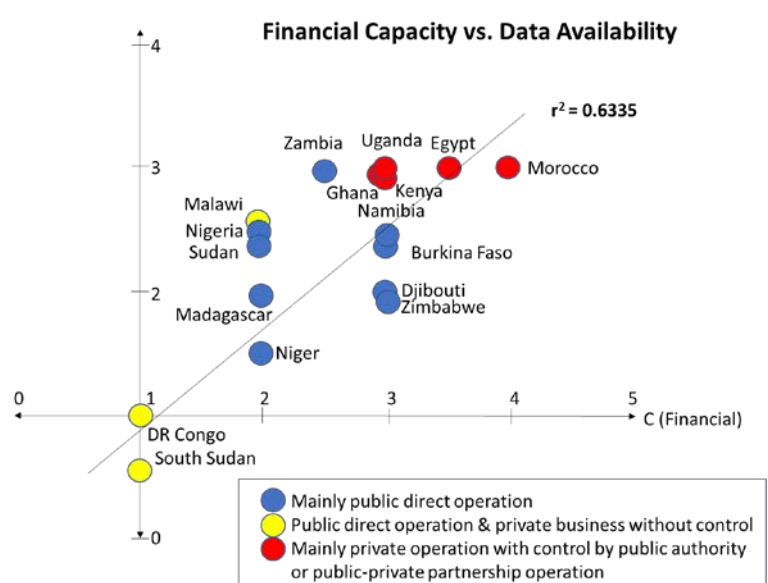
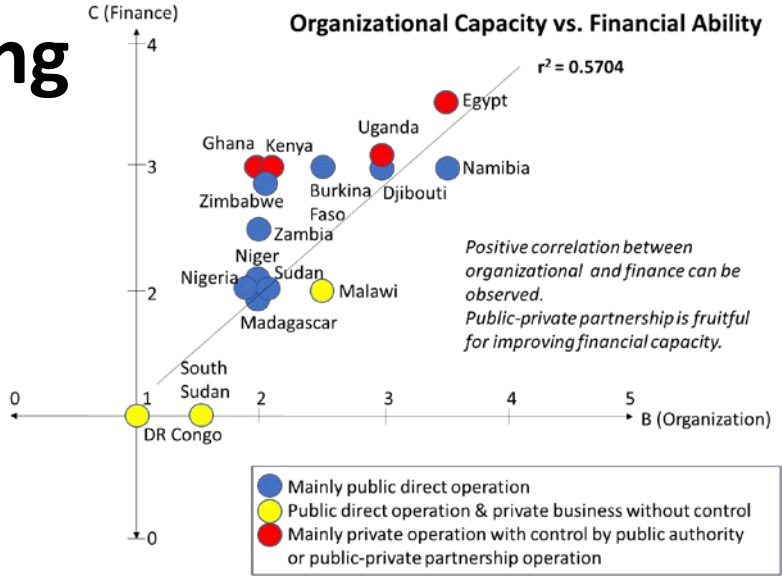
# Issues of waste management and material cycling in developing countries (Stage 1)

- In low-income countries (GNI / capita <1,025), organizations and systems are not always established, and data for grasping the current situation are scarce.
- The waste contains only a small amount of recyclable substances other than biodegradable organic waste, and the structure recovered by the waste picker, which indicates a spontaneous and unintentional 3Rs.
- Ensure public health through waste collection
  - Basic information survey on waste generated
  - Establishment of waste management system, legal system, implementing agency, securing of human resources, finance, formulation of plans.
  - Ensuring amenities and public health in urban and residential areas by strengthening collection and transportation capabilities.
- Resource recycling by composting organic waste
- Appropriate positioning (internalization) of waste pickers and informal sectors in waste management

# Challenges for strengthening the capacity of the implementation system

	Institutional	Organizational	Financial	Data availability
Institutional	-	0.2993	0.3939	0.1656
Organizational		-	<b>0.5704</b>	0.3945
Financial			-	<b>0.6335</b>
Data availability				-

**Institutional, organizational, financial, capacities and waste data acquisition capabilities correlate with each other (African Sub Sahara).**





Rotary Composter for house composting  
in Gaza, Palestine (JICA 2021)



# Cooperation with waste picker, internalization to the system

Dump waste pickers in Ulaanbaatar. They are communicating with the public SWM agency for coordinating landfill operation. (photos: Yoshida, 2008)



Licensing for waste pickers, Phnom Penh  
(Photos: JICA & Phnom Penh Municipality, 2008)





## Issues of waste management and material cycling in developing countries (Stage 2)

- In middle-income countries ( $1,025 < \text{GNI} / \text{capita} < 12,475$  USD), the recyclable content will spike during the waste flow. However, since spontaneous and unintentional 3Rs will gradually decline, the promotion of intentional 3Rs by the public will gradually become an issue.
- The waste problem related to landfill of waste has become a social problem, and the closure of open dump sites and the construction of environmentally friendly landfill disposal sites have become issues.
- Hazardous waste management and environmental protection

Collapse of dumpsite in Colombo, Sri Lanka (2017)



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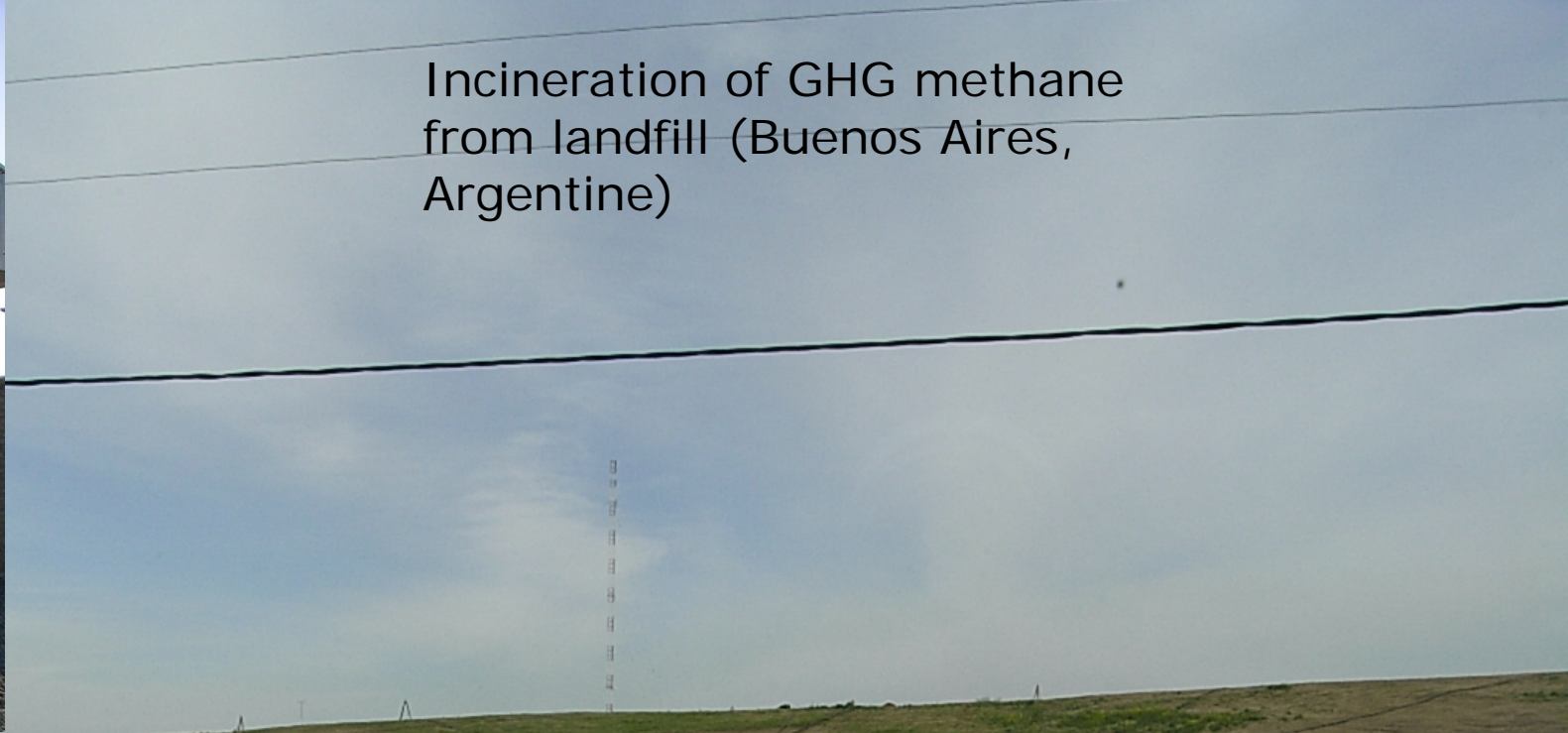
Sanitary landfill in Ulaanbaatar, Mongolia, constructed by grant aid project

右下写真は日本大使館提供、他はJICA専門家チーム撮影

Flaring tower



Incineration of GHG methane from landfill (Buenos Aires, Argentine)

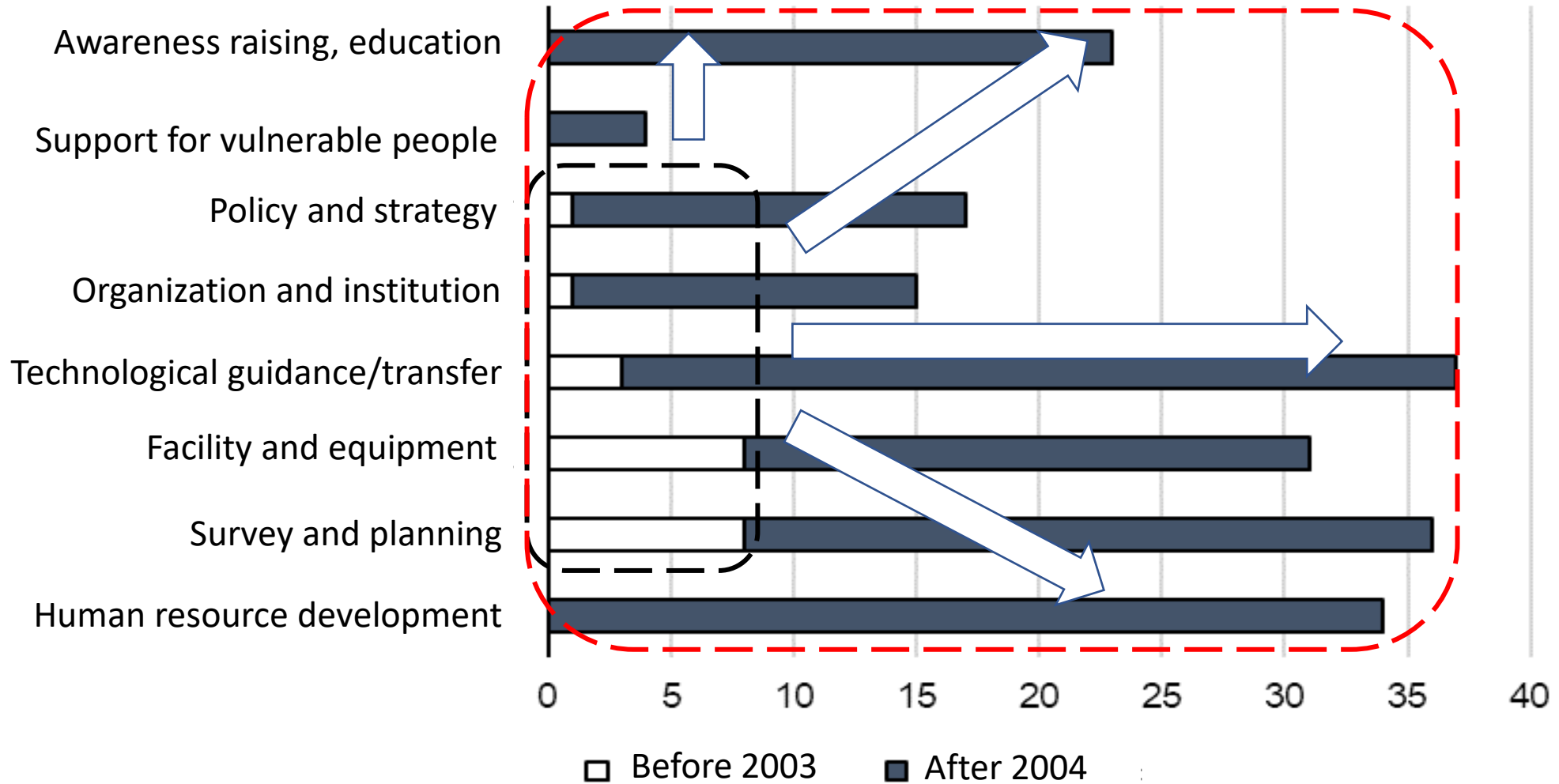


Gas recovery pipe network



Methane gas recovery from anaerobic landfill (CDM project, Buenos Aires, Argentine)

# Expansion of supporting issues



The main activity contents and goals of the JICA's technical assistance in waste management and recycling. Some projects have multiple activities and goals.



# Issues of waste management and recycling in developing countries (Stage 3)

- At relatively high levels of middle-income countries ( $4,036 < \text{GNI} / \text{capita} < 12,475$  USD), the content of recyclables is high and the amount of untreated landfills increases. The challenge is to promote 3Rs, including recycling by introducing intermediate treatment facilities.
- Consensus building, Public awareness raising and engagement
- Investment in intermediate treatment facilities, waste-to-energy facilities will also be active from this stage. Creating a system to deal with investment and public-private partnership are important factors.
- Governments, public organizations, non-governmental organizations, private sector, and the general public need to participate and network according.
- The formation of the A Sound Material-Cycle Society was the creation of a vessel that forms a place for resource circulation. A circular economy in the vessel, an initiative of the industrial and private sectors is indispensable.

# Support for building a waste management and material cycling system through cooperation by private sector



Construction of environment-friendly automobile recycling system in Brazil



Circulation and decentralized treatment of general waste in Denpasar, Bali, Indonesia



Landfill restoration using waste incineration in Hue, Vietnam

Material recycling in Cebu, the Philippines

Environmental protection and Landfill construction in Sri Lanka



Infectious waste treatment using small-scale incinerator, Indonesia



Infectious waste treatment system in Haifa, Vietnam



Community composting in Surabaya, Indonesia



Material recycling of urban waste in Sri Lanka



Fuel production from sludge in Lima, Peru



Fuel production from waste palm residue in Indonesia



Fuel production from waste plastic, South Africa

1. 開発途上国のごみ問題の現状
2. 廃棄物資源循環分野の国際協力のこれまでの取り組み
3. 循環型社会・経済の形成に向けての今後の課題
4. まとめ

# Clean City Initiative and SDGs

- General direction
  - ①Improvement of waste management system based on development stage
  - ②Capacity strengthening of implementing agency
  - ③Consideration on climate change (ex. disposal of biodegradable organic waste)
  - ④Partnership with private sector and NGOs
  - ⑤Towards a sound material cycle society and circular economy through a promotion of 3Rs and integrated SWM
- **The Clean City Initiative will contribute to the achievement of the two goals of the SDGs.**
- **Goal 11 Make cities and human settlements inclusive, safe, resilient and sustainable**
- **Goal 12 Ensure sustainable consumption and production patterns**

# Phased development of technical assistance in waste management and material cycle

## Stage 1

**Ensuring public health in cities and residential areas**

**Understanding the current situation, establishing legal systems/standards, establishing implementation systems**

**Enhancing the waste collection and transportation service**

## Stage 2

**Environmental protection and measures against climate change**

**Construction of sanitary landfill and safe closure of open dumpsites**

**Reduction of the disposal of untreated waste**

**Hazardous waste treatment**

## Stage 3

**Efforts for material cycle and energy recovery from waste**

**Promotion of 3Rs and sound material-cycle society / circular economy**

**Partnership with industries**

**Creating demand for recycled resources**



# Challenges in response to the SDGs

- Through the technical assistance so far, we have contributed a lot to strengthening the implementation capacity of waste management, which is also the contribution towards the SDGs Goal 11.
- However, with regard to Goal 12, it was in a relatively small position in the cooperation agenda.
- Enhanced waste management at SDG11 needs to be integrated with the material cycle perspective of SDG12 and considered within a large framework. Not only the public (administrative) but also the private sector will be the main actors in the issue.

# Conclusions

- Capacity development in waste management and material cycle field in developing countries generally show a phased development of three stages.
- Each stage has its own issues, challenges, solutions, and goals, which the **Clean City Initiative** puts together as a cooperation strategy.
- Japan's ODA projects in this field have recently been the top donors on a performance basis and are expected to continue to play an important role in developing countries.
- In the future, we will integrate SDGs Goal 11 “Make cities and human settlements inclusive, safe, resilient and sustainable” and Goal 12 “Ensure sustainable consumption and production patterns” in the projects, where opportunities and places will be created for the private sector to play a role as an actor in the circular economy.
- There is a need to revitalize the diverse initiatives of each actor and promote comprehensive capacities for a sound material cycle society and circular economy.

Thank you for your kind attention.

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