

# NATIONAL EFFECTS OF INTEGRATED WASTE MANAGEMENT MEASURES BY MUNICIPALITIES IN JAPAN

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## 1. INTRODUCTION

Reduce, reuse, and recycle (3R) policies in Japan have been implemented by municipality and coordinated by three national material flow indicators (resource productivity, cyclical use rate, and final disposal amount), and achieved significant progresses from 2000. However, national contribution of municipalities' policies is yet unclear, and it is difficult to understand how far Japan can advance its policies for circular economy. It is also necessary to take account of different situations and remaining potentials of approximately 1,700 municipalities nationwide. We therefore aimed at estimating national effects of waste management policies taken by respective municipalities and analyzing the distributions of indicators of every municipality by constructing a material flow model.

## 2. METHOD

We developed a material flow model to evaluate the national effects of policies on municipal waste by municipalities (referred to as "Municipal Waste Model: MWM") presented in Fig.1. We also used data from the Survey of Actual States of Municipal Waste Management (SASMWM)<sup>1)</sup> and established "BaU scenario" and "policy scenario". Table 1 presents measures and parameters of the respective applied policies. Additionally, we set four population segments at divisions of 10,000, 50,000, and 100,000.

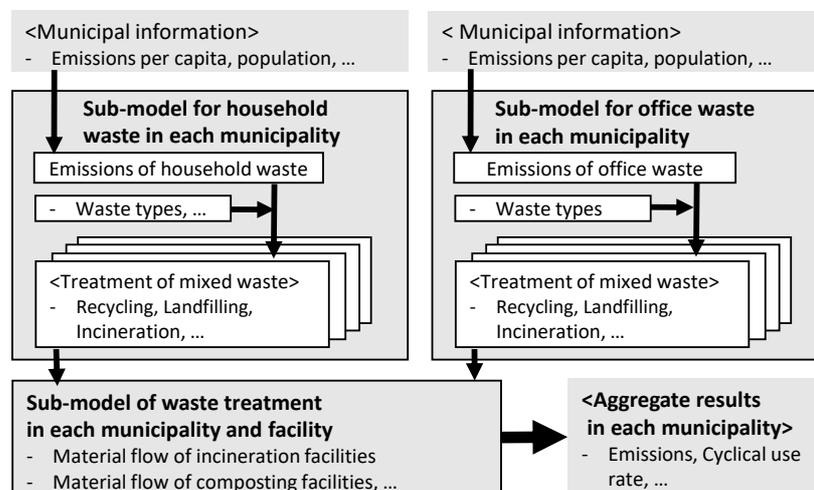


Fig.1 Structure of Municipal Waste Model developed

Table 1. Measures and parameters in the policy scenario

Measures		Parameters	Contents	
Reduce	Household waste	Charging for collection	Implementation rate	Implementation in municipalities that have not been charged for collection at present
		Change of collection service	Frequency of collection	Change the collection frequency of 3 times or more to 2 times at present
	Office waste	Separating of garbage	Implementation rate	Implementation in the municipalities which have a certain amount of farming area
	Office waste	Reducing in large-emission municipalities	Reducing rate at food related industry	Progress of approach at the municipalities with the largest waste generation per employee
Collection	Household waste	Introducion of disposer in kitchen	Distribution rate of garbage for sewage	Introduction of disposer to 50% of newly built apartment houses
		Collection of miscellaneous paper	Implementation rate	Implementation of miscellaneous paper collection in the top 20% of large population municipalities
	Office waste	Plastic collection at stores	Amount of collection	Collection at retail stores nationwide (approximately 9.2 kg per site per year)
Treatment	Composting	Promotion of composting	Distribution rate for composting	Increase of destination rate in municipalities where composting of garbage is possible

### 3. RESULTS

Municipal waste generation per capita by population segment and scenario (Fig. 1) is shown to increase in 2030 from the amount recorded in 2015, but is shown to decrease in the policy scenario in the same year. The amount becomes larger in more populated segments. The average cyclical use rate (Fig. 2) increases slightly in the BaU scenario in 2030 compared to 2015, and increases further in the policy scenario of the same year. These tendencies are more pronounced in less populated segments.

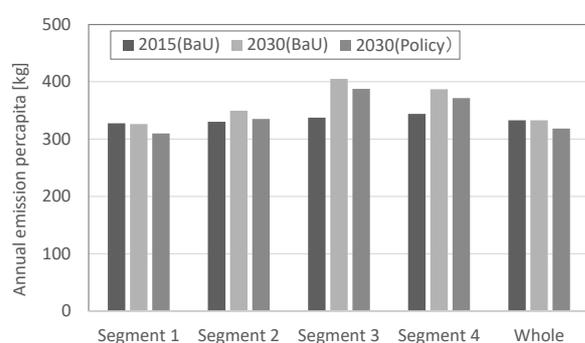


Fig.1 Waste emissions per capita in each segment

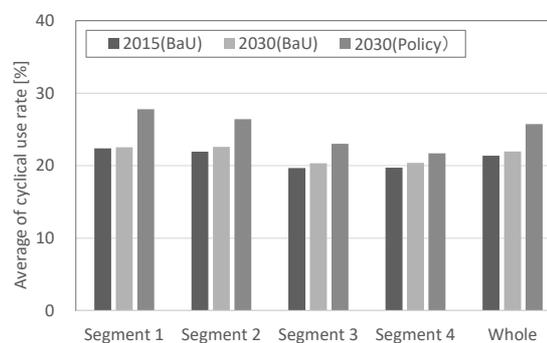


Fig.2 Average cyclical use rates in segments

### 4. SUMMARY

We developed national model that can evaluate effects of waste management by municipalities. As a result, the tendency of the effects by waste management policies was found for each municipality in the population segments as material flow indicators.

#### Acknowledgement

This study was supported by the Environment Research and Technology Development Fund (1-1601) of Environmental Restoration and Conservation Agency.

#### References

1) Ministry of Environment, Survey of Actual States of Municipal Waste Management (2007-2015) (in Japanese)