

# Food Waste from Household Sources in Japan: Comparison of Sorting Analysis of Urban and Rural Areas

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## INTRODUCTION

Sustainable Development Goals' Target 12.3 calls for halving the amount of food waste that is generated at households, retail, and food service. The authors of this paper have developed an internationally applicable methodology for sorting analysis of household food waste, aiming at producing useful information for implementing reduction measures (Okayama et al 2019). Based on this methodology, sorting analyses have been conducted in several areas of Japan. This paper compares the results of these, between different localities as well as within a locality.

## MATERIALS AND METHODS

Since the conception of the methodology, the authors have applied it for several actual sorting analyses in Japan. In this paper, the results from Setagaya, Koganei and district X in Tokyo Met. Pref., Kawaguchi (Saitama Pref.), Seika (Kyoto Met. Pref.), and Nagai (Yamagata Pref.) are introduced and compared. Some of the sorting analyses were the authors' own initiative, some were conducted by the local authority as part of research for preparing the local waste plan. These took place between Aug 2019 and Jan 2021.

The sample waste was gathered from waste collection points with dedicated flat loader trucks, on routine collection days before the usual collection vehicle came around. Sample size varies: earlier analyses in Setagaya and district X took place as development and feasibility testing of the methodology, and involves a small sample. Later samples involve samples of more than 200kg. Here only the sorting results of burnable waste fraction are shown, as food waste contained in other separate collection fractions was negligibly small. The exception is Nagai City, where separate collection of food waste has been implemented. In the central part of Nagai City, the separately collected food waste is composted. In Nagai City, where separate collection of food waste is practised, each of the 21 sampled collection points was analysed separately for food waste as well as for burnable waste.

## RESULTS AND DISCUSSION

### Comparison between localities and housing types

Table 1 shows the results of food waste from the sorting analyses from six localities. Nagai and Seika are less urbanised than the rest which belongs to the Tokyo conurbation. We can see that in those locations there is a higher percentage of total food waste. Probably this is because in rural areas people tend to cook meals from raw ingredients as they have easier access to fresh products due to the proximity of farmland

Table 1: Results of the Sorting Analyses

Place of Analysis		Nagai			Seika			Kawaguchi			Koganei			District X		Setagaya		
Housing Types					New Detached	Old Detached	Flats	Detached	Flats family	Flats single				Detached	Flats			
Date of Analysis		Mar 20	Dec 19	Dec 18	Aug 19	Aug 19	Aug 19	Jun 19	Jun 19	Jul 19	Dec 18	Jul 18	Jan 21	Jan 21	Aug 19			
Total Sample Waste[kg]		1507	300	306	104	105	97	181	224	133	82	70	259	258	131			
Percentage of Food Waste[%]		40.1	52.0	44.8	27.8	32.3	37.9	44.8	54.6	25.9	41.5	44.3	27.3	21.4	32.1			
Avoidable Food Waste	A: unused ingredients	A1:unopened	2.2	4.9	28.7	6.4	10.4	2.6	2.5	1.6	11.6	3.6	7.0	4.1	7.6	8.1		
		A2w:whole	6.4	8.0		7.4	2.8	6.2	3.3	2.2	6.2	3.2		3.2	2.9	4.7		
		A2wf:home grown	10.7	2.4		0.5	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0		
		A2p:partly used	6.8	13.6		5.8	4.5	9.1	6.0	2.9	10.0	3.6		5.9	7.2	13.0	7.4	
	B:unused ready to be eaten food	B1:unopened	1.3	3.7	2.9	9.8	5.2	2.6	3.1	1.3	6.2	2.8	3.4	4.6	6.2	3.0		
		B2:partly used	3.8	4.1		4.9	4.4	4.4	0.2	0.0	0.0	2.6	1.4	5.6	1.9	0.2		
		B':drinks	0.0	0.0		0.0	0.7	0.0	0.0	0.0	1.5	0.0	0.0	0.5	1.4	3.2		
	C:leftovers	C:food	12.9	13.7	18.3	20.6	15.4	25.1	17.2	7.0	27.0	15.1	9.8	17.4	25.3	14.5		
		C':drink	0.1	0.1		1.0	0.5	0.4	0.2	0.0	0.0	0.0	0.0	0.0	0.0	1.1		
	Non-avoidable FW	D:intentionally removed	De:edible	33.7	23.1	23.3	20.2	17.5	15.1	19.0	14.3	12.4	21.8	12.6	23.2	17.1	23.6	
Di:inedible			20.0	24.1	24.1	18.4	25.4	31.0	40.8	35.2	15.8	46.0	54.4	33.9	24.5	26.4		
E: Unsortably Mixed Food Waste		2.2	2.4	2.7	5.0	3.2	3.6	7.6	35.5	9.3	1.3	5.4	0.2	0.0	7.9			

compared to urban areas. This also results in higher ratio of A(ingredients) and D(cooking scraps) categories. In urban areas, flat dwellers and single person households tend to generate less of A and D and more of B(already cooked foods) and C(leftovers). With this categorisation, sorting analyses can be useful in assessing the efficacy of reduction measures targeting specific food related activities in the household.

### Comparison within a locality

In the case of Nagai, the analysis was conducted with collection points as a unit. We also obtained census data on age distribution for each block of housing. Thiessen method was used in estimating the age distribution of users of each collection point, assuming that residents use the nearest site. An example of the use of collection point based data is Figure 1, which shows the relationship between working age population and avoidable food waste. It shows the tendency that both children and elderly people generate more avoidable food waste. In order for correlation with factors other than age, and for better accuracy, we are planning to conduct questionnaire surveys to identify the food customs of residents and the actual collection points they use.

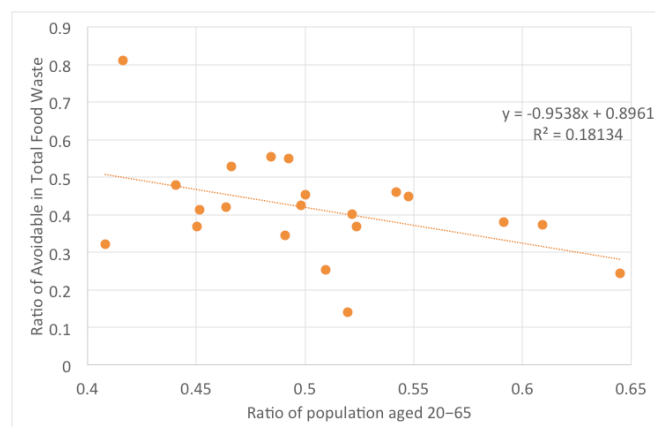


Figure 1. Example of data analysis for Nagai

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### REFERENCES

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