Impact of ageing on household waste - A case study in Morinosato, Japan

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1. Background and aim of study

Ageing is a phenomenon observed globally both in developed and developing countries, and Japan is in the front line [1]. Currently, 23.1 % of the population is elderly (i.e. people aged over 65), and this number is expected to reach 40.1% by 2055[2]. This demographic change will affect the society in many ways, including social welfare, health insurance, labor market, and social inclusion[1]. The current solid waste management system might also be affected if the composition and amount of waste change as people grow old, but the impact of ageing on waste has not been paid much attention to date, both in practice and research. This study aims to clarify the impact of aging on the amount of household waste through a case study in Morinosato, a local community in Tsukuba City, Japan.

2. Framework of the study

2.1 Hypothesis: how ageing could impact household waste

Existing literatures indicate some interesting relationship between age and waste related activities of individuals. For example, the average expenditure per month, an indicator for consumption, decreases around the age of 65[3]. Questionnaire surveys show that waste reduction and separation is undertaken more seriously by older people than younger people[4]. Based on these and other findings, we assume that the amount of combustible waste from household will decrease at some point as ageing advance (Fig. 1).
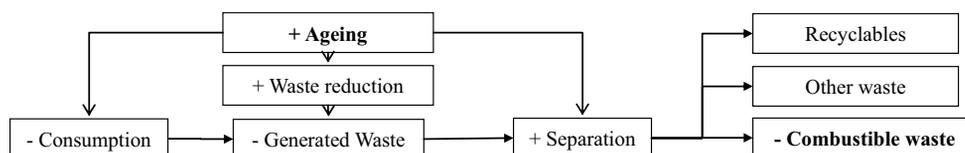

Fig.1 logical chain of the impact of ageing on amount of waste

2.2 Research method

In order to verify the hypothesis shown in Fig.1, the waste of relatively old people (mainly from 55 and above) were obtained and the amount of household waste disposed per day per person (unit waste amount, hereinafter) were calculated and compared by age[2]. For this, combustible wastes disposed from *Morinosato Community* (Morinosato, hereinafter) in Tsukuba City, Japan, were used. With the help of Morinosato Community Association, members of the local senior citizen's club were asked to participate in our survey. Participants were asked to separate waste as usual and to provide the combustibles. The waste bags of combustibles were collected from each household (Fig.2-(a)). Upon collection, age, number of people in household, last day of disposal, and some other questions regarding consumption and waste reduction / separation activities were asked. The collected waste bags were weighed and opened one by one, and the contents were separated into 22 compositions by hand, according to the separation category shown in Box.1 (Fig.2-(b)). The weights of each component were then recorded (Fig.2-(c)).

Collection took place on 2012/11/29, 12/3, and 12/6, and the records of 12/3 and 12/6 were used to calculate the unit waste amount. To adjust seasonal fluctuation, 'Plants and trees' were excluded from analysis.

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[2] Therefore, the findings from this study in itself are assumed to be applicable for relatively close future forecasting. For long term forecasting, cohort effect needs to be taken into consideration. This should be undertaken in a different study.

Fig.2-(a) Collection

Fig.2-(b) Separation

Fig.2-(c) Measuring

2.3 Setting the context – characteristics of Morinosato

The Morinosato is a local community in Tsukuba City, with 3194 people (1318 households) living in the area of ca. 30ha. Out of which, 25.2% is aged over 65, and 45.1% is over 60[5] (Fig.3). This community is a typical 'New Town', or a planned community for residential development, developed in the late 1970s (Fig.4 and 5). As young couples (many in their thirties at that time) moved in within a short period in 1979, the community is now facing rapid ageing and population decline, resulting in closure of retails and restaurants in the area, and provision of poor public transportation.

The residents in Morinosato are required to separate waste into nine categories, and carry them to an allocated waste collection point (30 in Morinosato) by their selves before 8:30 a.m.
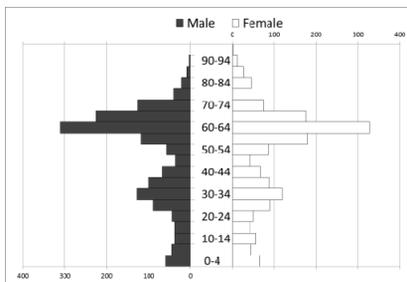

Fig.3 Age pyramid of Morinosato

Fig.4 Aerial Photo (Google map)

Fig.5 Picture of Morinosato

3. Results of survey

3.1 Sample overview

The overview of our sample is shown in Table 1. Among the 66 households that participated in our survey, 34 were consisted of elderly people only. 13 were single, 33 two-person, and 20 were households with three or more residents. Most of the two-person households were married couples (82%), and the household composition of the households with three or more residents varied, but was basically a mixture of mother, child (or a married couple), and grandchild(ren).

Table. 1 Sample overview

	Our sample	(c.f.) Tsukuba city
Number of households	66	88,984
Average age of people	64.0	40.4
Percentage of elderly	67.1%	16.0%
Average number of person per household	2.21	2.43