# HOUSEHOLDS RECYCLING BEHAVIOR TOWARD WASTE BANK PROJECT IN KLATEN, INDONESIA

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## 1. Introduction

In Indonesia, approximately 200,000 tons of waste is generated every day, and this total increases 2-4 percent every year.<sup>1)</sup> This huge amount of waste causes problems as it is difficult to expand landfill areas. A waste bank, in which recyclables are recovered from the waste stream, is one method that has been considered to reduce the volume of landfill materials.<sup>2)</sup> However. the characteristics of the residents participating in waste banks have not yet been studied. Our objective in this study was to evaluate the characteristics of households participating in waste banks and to identify factors influencing participation in the waste bank program. As a case study, we investigated waste bank participation in Klaten Regency, Indonesia.

### 2. Outline of Waste Banks in Klaten

As of 2016, Klaten Regency, located in the province of Central Java, had a population of 1.5 million. To support the establishment of community waste banks, the local government provides storage houses, vehicles, waste bins, composters, and machines for crushing waste. With these supports, the number of community waste banks has increased in recent years from two in 2012 to 33 in 2016.

There are three types of waste banks in Klaten (Table 1). In Type I, households discharge their unseparated waste for waste collection with no associated fee, and the waste bank officers separate the recyclables after collection to sell to recycling companies. In Type II, households also discharge their waste without separation but they pay a fee for waste collection to the waste bank officer. The waste bank officers can also receive income by selling the recyclables. In Type III, households separate their own waste and bring it to the waste banks without being charged any fee.

Table	1.	Waste	hank	types	of in	Klaten
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Categories	Type I	Type II	Type III
Number of groups	16	4	13
Number of households	16,097	5,999	11,330
in the area			
Participation rate of	18.7	30.8	16.2
households (%)			
Amount of recycled	5,300	7,750	6,470
waste (plastics,			
papers, and metals)			
(kg/month)			
Recycling rate (%)	0.30	0.44	0.37

## 3. Research Method

In this study, we focused on the Type III waste bank system because the local government encourages

communities to establish this type, as per Indonesian Government Regulation No. 81/2012 concerning Household Solid Waste Management. We selected 197 households that are Type-III waste bank participants (G1) who completed the questionnaire survey between 20 August and 15 September 2017. In addition, we surveyed 90 non-participating households (G2) in the neighborhood of the Type-III participants. From several relevant journal papers, we identified a number of factors influencing household recycling behavior, including sociodemographic and economic factors, and social and personal norms<sup>3),4)</sup>, which comprised the four variable categories in the questionnaire. Table 2 shows an outline of the questionnaire, which included questions regarding social norms (SN), personal norms (PN), and economic factors (EF).

Code	Variables	Questions
SN1	Social	I respond to the request of the
	Norms	community leader on how to handle
		solid waste
SN2		I respond to the request of my
5112		naighbors on how to handle solid
		wests
(1) I O		waste
SN3		The availability of recycling
		facilities nearby can encourage to
		handle solid waste properly
PN1	Personal	Reusing recyclable thing is
	Norms	unhygienic
PN2		Collecting reusable material to sell
		is shameful
PN3		I feel guilty if I harm the
1113		anyironmont
DNIA		environment
PN4		Waste management requires time
		and additional work
EF1	Economic	I can get additional income through
	Factors	recycling
EF2		I think recycling program can
		reduce unemployment
EF3	1	Offers the chance to save money by
		selling recyclable waste
L		sening recycluble waste

Table 2. Que	estions used	l in Q	Juestionnaire
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Respondents answered each question on a Likert Scale from 5 (strongly agree) to 1 (strongly disagree). We used by SPSS 17 for Windows to run an independent sample t-test to determine the significance of the mean difference between G1 and G2.

### 4. Results and Discussion

Table 3 shows the sociodemographic variables of the household participants. We found the characteristics of the respondents to be essentially the same with no significant differences. The income level of the respondents was typical of the low economic class in Indonesia.

Table 3. Average	of Sociodemographic	Variables
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Variables	Туре	Average	Standard Deviation
Age	G1	46	10.6
-	G2	45	10.1
Income	G1	1.5	0.71
(Million Rp)	G2	1.5	0.58
Family	G1	3.8	1.4
members	G2	4.0	1.2

#### **Table 4. Questionnaire Results**

Code	Scores G1	Scores G2	* Significance level of 5 % ** Significance level of 1 %
SN1	3.319	2.989	*
SN2	3.355	3.356	-
SN3	4.335	4.133	**
PN1	2.619	3.289	**
PN2	2.005	2.256	*
PN3	4.457	4.322	-
PN4	3.843	3.822	-
EF1	4.061	4.133	-
EF2	4.046	4.067	_
EF3	4.305	4.211	_

Table 4 shows the questionnaire survey results. The score of the G1 households for SN1 is higher than that of the G2 household at the 5% significance level. We found that the influence of the community leaders in RW (Rukun Warga) and RT (Rukun Tetangga) on handling waste was stronger in the G1 households than in G2. Because the G1 households might tend to more readily obey their community leaders, they participated in the waste bank based on the leaders' advice. However, neighbors had no influence on waste handling, as indicated by the SN2 score being no different for G1 and G2. The SN3 score of the G1 households was higher than that of G2 at the 1% significance level. G2 households might feel inconvenienced by the waste bank system, based on the location of the offices and space available for the storage of recyclables. However, the G1 households expressed no concern about inconvenience and had become accustomed to the system.

The PN1 score of the G1 households was lower than that of G2 at the 1% significance level. The G2 households considered the handling of recyclables to be unhygienic. The G2 households might be concerned about insects and odor arising from the storage site, despite the lack of concern expressed by the G1 households. The PN2 score of the G1 household was also lower than that of G2. The G2 households consider receiving money by selling recyclables to be a job for lower class people. In contrast, G1 households G1 express pride in their recycling behavior as something that contributes to the improvement of the environment.

The G1 and G2 households both reported concern about the environmental destruction and harm caused by the burning of waste in backyards, as evident from their similar PN3 scores.

We found no significant difference in the EF variables, at a 5% significance level, between G1 and G2 households. Since the scores are higher than 4 (Agree), both sets of households recognize that recycling produces economic benefits.

### 5. Conclusion

We found household participation in waste banks in the study area to be strongly influenced by the request from community leaders and the availability of recycling facilities. We found economic aspects to have no effect on participation in waste banks.

We recommend that the local government encourage village community leaders like the heads of RW and RT to persuade households to participate in waste banks. Additionally, the local government must provide hygienic storage sites and waste bins to increase participation levels.

As a future study, the most influential factors should be determined to identify the role of local leaders in encouraging households to participate in waste banks.

### References

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