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in the economic analysis
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What Factors Make People Recycle? -A Study of Community Waste Banks in Indonesia

Indonesia has set itself the challenge of managing its waste in an environmentally friendly way. However, government initiatives to drive waste reduction, reuse, and recycling have proven to be difficult to implement. To help find solutions to this problem, a new EEPSEA study has looked at a successful community-based recycling scheme in Depok municipality to determine the factors that encourage people to recycle their waste.

The study, which is the work of a team from Universitas Indonesia, found that the community waste banks that had been set up in Depok are important for promoting the sorting of waste and in reducing the amount of inorganic waste sent to landfills. It found that the tendency of households to engage in positive social behavior, effective leadership by waste bank managers, and good economic returns are all important factors in the waste banks' success. The study therefore recommends giving more support to waste banks so that they can play a full role in Indonesia's waste management strategy.

The findings of this research have also significantly contributed to the Zero-Waste City program currently being implemented by the Depok local government.



A summary of EEPSEA Research Report No. 2016-RR10: "Trust, Leadership, and Money Incentives and the Promotion of Participation in Community-Based Recycling Activity: Which One Works?" by Alin Halimatussadiah, Diah Widayati, and Shanty Syahril.

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Indonesia's waste challenge

Before 2008, the Indonesian government took an end-of-pipe approach to waste management. Waste disposal was mostly done using landfill sites. However, these sites were not always well-planned and caused various environmental problems and other issues, such as pollution, social conflict, and illnesses. In order to respond to these challenges and to improve resource recovery, the Indonesian Government enacted the Waste Management Act No. 18 in May 2008. This Act adopted a new waste policy direction, which focused on reducing the amount of waste sent to landfill.

Depok, named in 2005 as one of the dirtiest metropolitan cities in Indonesia, is one of the regions that responded to this new approach. A total of 40 waste treatment units have been built to support waste reduction and waste recycling activities. However, the system failed to operate as expected. This is mainly because communities were not used to sorting their waste.

Depok's waste banks

In response to the failure of government plans in the region, several communities in Depok have established community-based waste banks (Bank Sampah). The first recorded waste bank was built in 2008. It is estimated that there are now nearly 500 waste banks built in Depok. People join these waste banks as members, and then they deposit their domestic waste in them. The waste banks then sell any suitable waste for recycling or reuse. Members can periodically withdraw the value of the waste they deposit as cash, which creates a monetary incentive for members to participate.

Besides receiving monetary incentives, waste bank members can also obtain other value-added goods. Several waste banks produce products made of recycled materials.

Table. Paradigm shift brought by Waste Management Act No.18 of 2008

Parameter	Old Paradigm (End-of-the-Pipe)	New Paradigm (Waste Reduction from Front)
Age of final dump site	Short, seeking new area is difficult and expensive	Longer, just heaping up solid waste management residue from previous step
Transportation	More trucks used, wasteful, high GHG emissions	Fewer trucks used, economical, energy saving, low GHG emissions
Impact on environment	Prone to pollution due to waste lye, landslides, fires, odor, flies	Less pollution because wastes have been sorted and processed close to source

Note: GHG = greenhouse gas

The importance of waste banks

In Depok, the rapid development of waste banks has made it possible for the local government to reduce its responsibility for managing inorganic waste, and thus allow it to focus on managing organic waste and non-recyclable waste. As a result, in communities where waste banks are well-developed, the waste treatment unit (i.e., Unit Pengolah Sampah or UPS) operated by local government agencies now focus on processing organic waste into compost. The waste banks help to promote composting by encouraging people to send their organic waste to UPS.

In May 2014, the Depok municipality enacted Local Regulation No. 5 on Waste Management. Based on the new regulations, waste banks will form a key part of Depok's waste management system. It is thought that Depok could reduce waste by nearly 13% if 2,500 waste banks are created.

All things considered, waste banks create economic, social, and

environmental benefits for the community. Given the benefits they bring and the central role they now play in waste management, it is important to analyze the factors that make waste banks a success.

Why do waste banks work?

In order to provide this important information, the researchers from the Universitas Indonesia looked at the factors that encourage community to conduct sorting and to be actively involved in waste bank activity. They focused, in particular, on the levels of trust and "pro-social" behavior of community members and on the leadership qualities of waste bank administrators. A number of experimental "games" were used to measure these factors: (1) a trust game to see how well people trusted others in a group, (2) a public goods game to measure people's willingness to contribute for common benefit, and (3) a leadership game to determine whether the leader would exhibit a good example of pro-social behavior (by contributing more to the game) for the benefit of the community.



Community waste bank activity in Depok, Indonesia

The participation rates in waste bank activities were also assessed. Information was obtained using focus group discussions, in-depth interviews, and a variety of questionnaires. Secondary data, mainly collected from members' deposit books and waste bank selling forms, was used to measure the economic benefits that waste banks provide.

The importance of social participation and leadership

The study showed that the willingness of households to sort their waste depends on how willing they are to engage in positive social activities. These findings are not surprising—sorting waste takes quite a lot of time. Therefore, people should have the initiative to sort their respective waste and should be willing to help each other by getting involved.

The study also found that the leadership of waste bank administrators is a significant factor in encouraging members' participation in waste bank activities. This is also not surprising, as waste bank leaders are vital to the sustainability of the banks, and they drive their expansion. Also, the leader encourages the members to participate actively in waste bank activities. S/he also acts to create a market for recyclable scraps, and thus helps generate an economic incentive for members to participate. On the other hand, no significant relationship was found between trust and participation rates of waste bank members in waste bank activities.

The leadership and social commitment of waste bank leaders is highlighted by the type of people who become waste bank leaders. Most waste bank leaders are community activists; about 80% of waste bank administrators stated that they do not receive any financial incentive for doing their work.

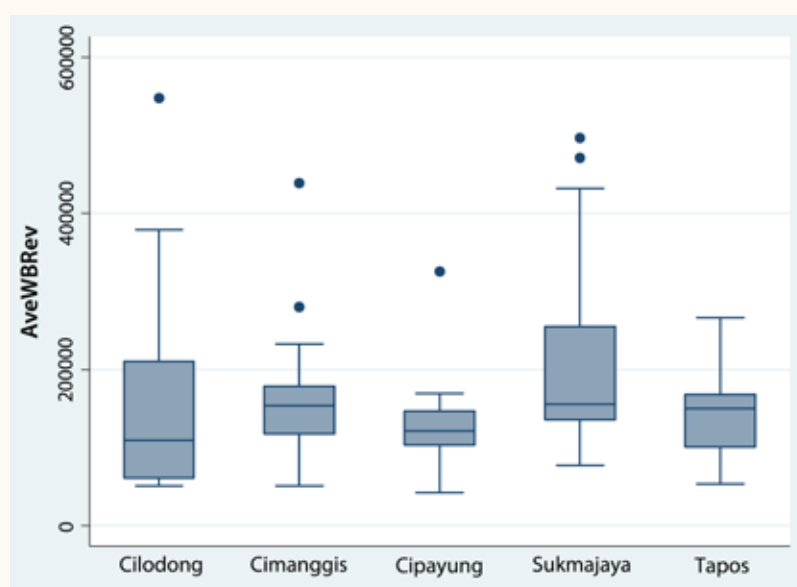


Figure. Boxplot of average waste bank revenue per weighing activity (n = 117)

Monetary incentives are important

The average deposit that people receive when they bring waste to a waste bank is about IDR 10,318 (USD 0.73). The incentive that waste banks provide is a key factor that encourages member participation. It is clear that economic incentives work well; this strategy could be adopted by the government in order to expand recycling activities across Indonesia.

As expected, the higher the revenue achieved by a waste bank, the higher the member participation rate. In addition, the higher the value of the waste collected from a member (relative to the other members), the more likely that that member will participate in the future. This may indicate that the monetary incentive that a household gets from participating in waste bank.

However, although monetary incentives are important, not all households are motivated by money. Some waste bank members are motivated either by environmental awareness or by the benefits they derive from taking part in community activities.

Other key factors

The level of education of waste bank members had a negative impact on their participation in waste bank activity. It is likely that people who are highly educated participate less in waste bank activity. They are more likely to contribute their money, rather than their time. People with higher education also tend to spend most of their time on activities with higher economic return. The study also shows that the older people are, the more willing they are to join.

Not surprisingly, being a member of a waste bank has a very positive effect on people's participation in waste bank activities. This result provides a positive argument as to why the waste bank program is important—it provides a focus for people and encourages them to sort their waste.

Ethnic diversity is also positively linked to the participation in waste bank activities. Depok municipality has a large immigrant population. The people who migrate to Depok come from different ethnicities and backgrounds. These differences may make them to become more enthusiastic about working toward a better environment for their new home.

Waste banks need financial support...

Despite the benefits provided by waste bank activity, several waste banks are experiencing periods of low participation or have unsustainable cash flows. This is partly because waste banks compete against private waste collectors. Private waste collectors offer higher prices for valuable recyclable inorganic waste, which diverts waste away from waste banks.

According to waste bank coordinators, storehouse rents and transportation costs are the biggest costs that waste banks incur. One waste bank has proposed using an idle UPS site as a storehouse; but to date, the government has not given permission for them to do this.

It is clear that more collaborative work is needed to integrate the role of all of the different stakeholders in waste management in Depok, particularly since waste banks support the local government by, for example, educating communities to sort their waste. Local government agencies could support the development of local markets for recycled material, make land available for waste bank activities, and establish supporting funds and policies.

... and support from the community

Although 68% of waste bank leaders feel supported by their local neighborhood association, there are several waste banks where the involvement of the neighborhood association leader is minimal. Neighborhood associations can support waste banks in a number of ways such as

by becoming waste bank members, by allocating a budget for waste bank operation, and by promoting waste banks within the community.

Overall, about 80% of waste bank administrators feel that they need support to improve the performance of their banks. Administrators also need materials such as large plastic bags and other containers and rope, as well as more people to help them.

In general, waste banks need back-up and support from local government, from broader institutions, from local leaders, and from local communities. Policy interventions could also be used to push participation, but these will need careful thought as, to be effective, they require an understanding of people's behavior regarding waste treatment at a household level.

The future of waste banks in Depok

According to Waste Regulation No. 5 of 2014, every household in Depok has to sort their waste. However, waste bank administrators doubt as to whether neighborhood associations will be capable of carrying out the necessary tasks of disseminating waste-sorting information and managing, collecting, and transporting sorted waste. Despite the concerns of waste bank administrators, the heads of neighborhood associations are quite certain that waste banks can carry out inorganic waste management within the new regulations.

Overall, it is clear that the role of waste banks is important for promoting waste segregation, reducing inorganic waste, and

encouraging home or communal composting. Local governments should therefore support waste banks and ensure the sustainability of waste bank activities.

Recently, a new mayor has been elected in Depok, and he has made the waste problem in the municipality a priority concern. Accordingly, the new local government has set to achieve a zero-waste Depok City through its "Zero Waste City" program, which is one of the city's three strategic programs for the next five years.

The findings of this research have significantly contributed to the development of the city's waste program; the research team served as advisers in the program development.

Waste banks play a significant role in the new program; it considers the sustainability of the activity particularly both in terms of the waste banks' operational and financial aspects. In collaboration with the Osaki Government of Japan, the local government of Depok has started to implement a recycling center, where the waste collected by the waste banks will be deposited to and processed further in this recycling center.

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