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## **Android application turning trash into cash: an innovative approach on solid waste management in urban areas**

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**LOCAL ACTION WITH INTERNATIONAL COOPERATION TO IMPROVE AND  
SUSTAIN WATER, SANITATION AND HYGIENE SERVICES**

**Android application turning trash into cash: an innovative  
approach on solid waste management in urban areas**

*M. Sirait (Indonesia)*

**PAPER 2704**

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*Sesama is an android based application to help urban communities to connect to a waste bank nearby to gain more benefits from their waste. It allows users to order the waste bank to pick up their recyclables from their place, to monitor transactions with the waste bank and to decide what to do with the money deposit in the waste bank. A waste bank is a community-based recycling centre where solid waste collected, sorted and temporarily deposited before sold to recycling agent and factory. The application help the waste bank connected to its customers by responding to picking-up order, providing real time transaction information, and also helping the waste bank in creating reports and database which previously conducted traditionally on paper. This innovation has helped the community in increasing their interest on separating their waste, assisted the waste bank in its administrative works and helped government in monitoring the amount of solid waste recycled and delivered to landfill.*

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**Waste Bank in Jakarta**

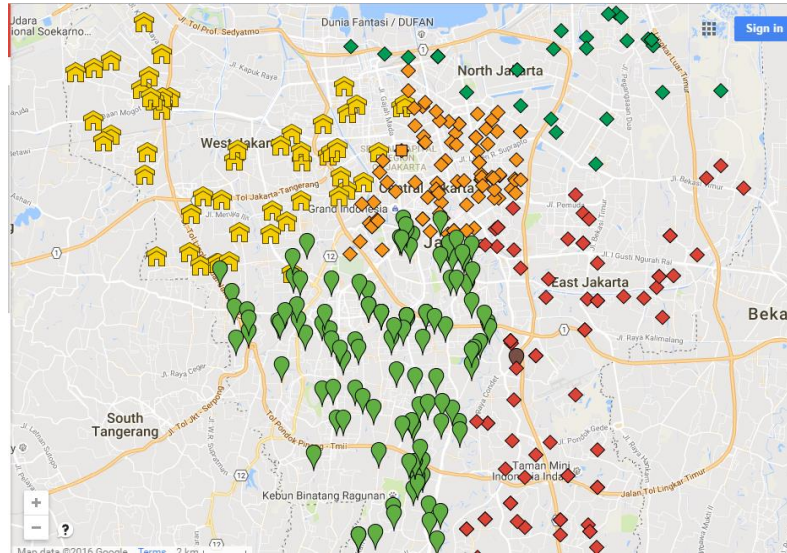
Every day Jakarta produces 7000 tons of solid waste and only about 5200 tons are able to be transported to the final disposal at Bantar Gebang landfill by 720 garbage trucks due to limited transportation capacity. Of the total solid waste, 47% is of industrial waste and 53% is of household waste with a composition of 67% of organic waste; 32.8% inorganic and plastic waste; and 0.2% other debris (Tempo, 2014).

Government has initiated the Waste Bank, a community-based solid waste management model, since 2008. This model has then also been adopted and implemented by NGOs and private sectors in community. Waste Bank is a temporary recycling centre managed by community that allows community to deposit their waste and receive benefits such as credits, payment of house utilities, savings and food supplies in return of waste deposited. Up to 2016, there were 375 waste banks throughout Jakarta, which have been growing rapidly since 2008, with approximately 16.608 customers. According to Jakarta Smart City data in 2016, there were 378 waste banks throughout Jakarta. They were distributed in North Jakarta (30), South Jakarta (118), East Jakarta (80), West Jakarta (58) and Central Jakarta (92).

It is called Waste Bank because its operational system is similar to banking system. It has customer service desk where people do registration, receive saving book, do weighing and pricing of the waste they want to deposit. It also has teller desk where customers can save their money, withdraw it or pay home utilities with their deposit as well as lending money. On the other hand, the back office of the waste bank will do sorting, compacting and repacking recyclables to be then delivered to recycle factory agents. The Waste Bank will receive profit from selling more variety of the sorting recyclables and from the price of sold items to the factory agents minus price of the items bought from the customers.

Wahana Visi Indonesia (WVI) through CLEAN Jakarta Project has assisted urban slum communities in North Jakarta in developing Waste Banks since 2014. Kenanga Peduli Lingkungan Waste Bank has about 200 customers and Maju Bersama has about 150. Both are located in North Jakarta. Each of the waste banks is capable of managing about 3-5 tons of inorganic waste per month with about 280 household customers in both. Not only do the waste banks have generated income and activities in the community, but also they have generated community interest in keeping their environment cleaner. However, most of the the waste

banks have difficulties on creating, updating or tracking their database and reports since they normally work on paper. Moreover, government also has difficulties in collecting data of amount of waste that has been collected in all waste banks in Jakarta in order to use for further decision.



**Figure 1. Waste Bank map in Jakarta**

Source: [https://www.google.com/maps/d/viewer?mid=1CpfBgm3G3pljxKy7tkVNBj4zb3Y&hl=en\\_US](https://www.google.com/maps/d/viewer?mid=1CpfBgm3G3pljxKy7tkVNBj4zb3Y&hl=en_US)  
Sept 2016



**Photograph 1. Children deposit their solid waste into Maju Bersama Waste Bank**



**Photograph 2. Sorting activity in Kenanga Peduli Lingkungan Waste Bank**

## Android application on waste management

### Online survey

In order to support urban waste management, WVI has developed android applications called SESAMA as an initiative approach to connect residents with nearby waste bank and help the waste bank managing its administrative works. This application allows residents ordering picking up, tracking their waste amount and

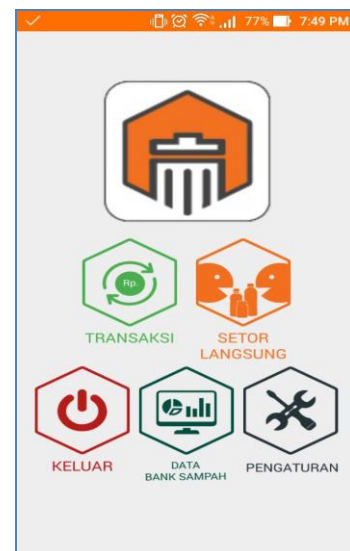
checking their money deposit in real time. On the other hand, the waste bank will be able to monitor the waste deposit amount, money deposit, customer's data and trends of their transaction timely and regularly.

Prior to developing the application, WVI conducted a quick online survey in Jakarta. A total 191 respondents responded the survey that consisted of 34% males and 64% females, with occupation as professional workers 50%, household mother 14%, and student 37%.

Table 1. Online survey result		
Questions	Yes	No
Is solid waste a problem in your neighbourhood?	96%	4%
Do you know the difference between organic and inorganic waste?	97%	3%
Do you do waste separation in your household?	42%	58%
Are you willing to separate your waste if you can gain additional value?	93%	7%
Do you know about waste bank?	72%	28%
Are you interested to use a smart-phone application that can help you get benefit from your waste?	84%	16%



Photograph 3. Application for Waste Bank customers



Photograph 4. Application for Waste Bank management

### Android application development

The application was developed based on inputs and requirements of several waste banks in North Jakarta. It took about four months to develop it including the trying out phase with about 12 waste banks and their customers. Based on their response, there were two applications that published and used.

#### *Application for Waste Bank management*

This application is named SESAMA admin, with main figures on the apps are:

- Waste Bank Profile
- Real time transaction (waste deposit, money, and people) real time.
- Customer registration (non smart-phone users)
- Rules and policy of the waste bank
- Reporting (finance, waste, customers)
- Updates info (pop up messages)

### ***Application for customers***

This application is named SESAMA, with main figures are:

- Pick-up ordering and dropping off waste
- Real-time money deposit
- Donation amount
- Practical ideas on waste management

### **Android application usage conclusion**

After one year implementation, it is found that the application is a very useful tool for its users and government. Local government has given a high appreciation and planned to introduce the application to all waste banks in Jakarta. However, there would be challenges on storage capacity if it is used massively by in Jakarta and a security issue since some information of users and waste banks are confidential. Therefore, WVI and government are working closely to deal with these issues.

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