



## Introduction

Worldwide are mostly used landfills and worse open dumping as the main waste treatment method

Bandung is experiencing economic boom hand in hand with population growth

Waste management services are not sufficient, in remoted areas are not at all

From approximately 1,600 tons of waste daily, around 40 % is untreated, burned or dumped in rivers

Bandung city is in urgent situation and needs new strategies and solutions to overcome waste management problems

The study is focused on description and evaluation of current situation of municipal solid waste management in Bandung and perception of public to new waste treatment technologies

## Objectives

Assessment if the public demands that the government takes care of waste management services

Description and evaluation of municipal solid waste management and treatment methods in Bandung

Analysis of public perception of available municipal solid waste treatment methods and technologies in Bandung and its consequences for public



Figure 1.: Open burning of municipal solid waste

## Methods

### Primary data sources

Structured questionnaire - single response, multiple choice response, open-ended questions

Interviews - three groups of respondents, leaded in Indonesian language  
groups: officers from local government, officers of Sarimukti landfill, Bandung's inhabitants

Observation and documentation - due to lack of information, documentation of Sarimukti landfill and municipal solid waste management facilities in city was crucial

### Data analysis methods

To assess if the public demands, that the government takes care of waste management services, was used **descriptive statistic**

Description and evaluation of municipal solid waste treatment methods in Bandung was provided by **qualitative data**: interviews and observations and by **quantitative data**: descriptive statistics was used to analyse Waste Management indicators

For analysis of public perception of available municipal solid waste treatment methods and technologies in Bandung, was implemented Multivariate probit model

### Multivariate probit model

It was applied for modelling the multivariate adoption decision in the presence of adoption interdependence. It recognizes the correlation in the error terms of utilization equations and estimates a set of binary probit models simultaneously

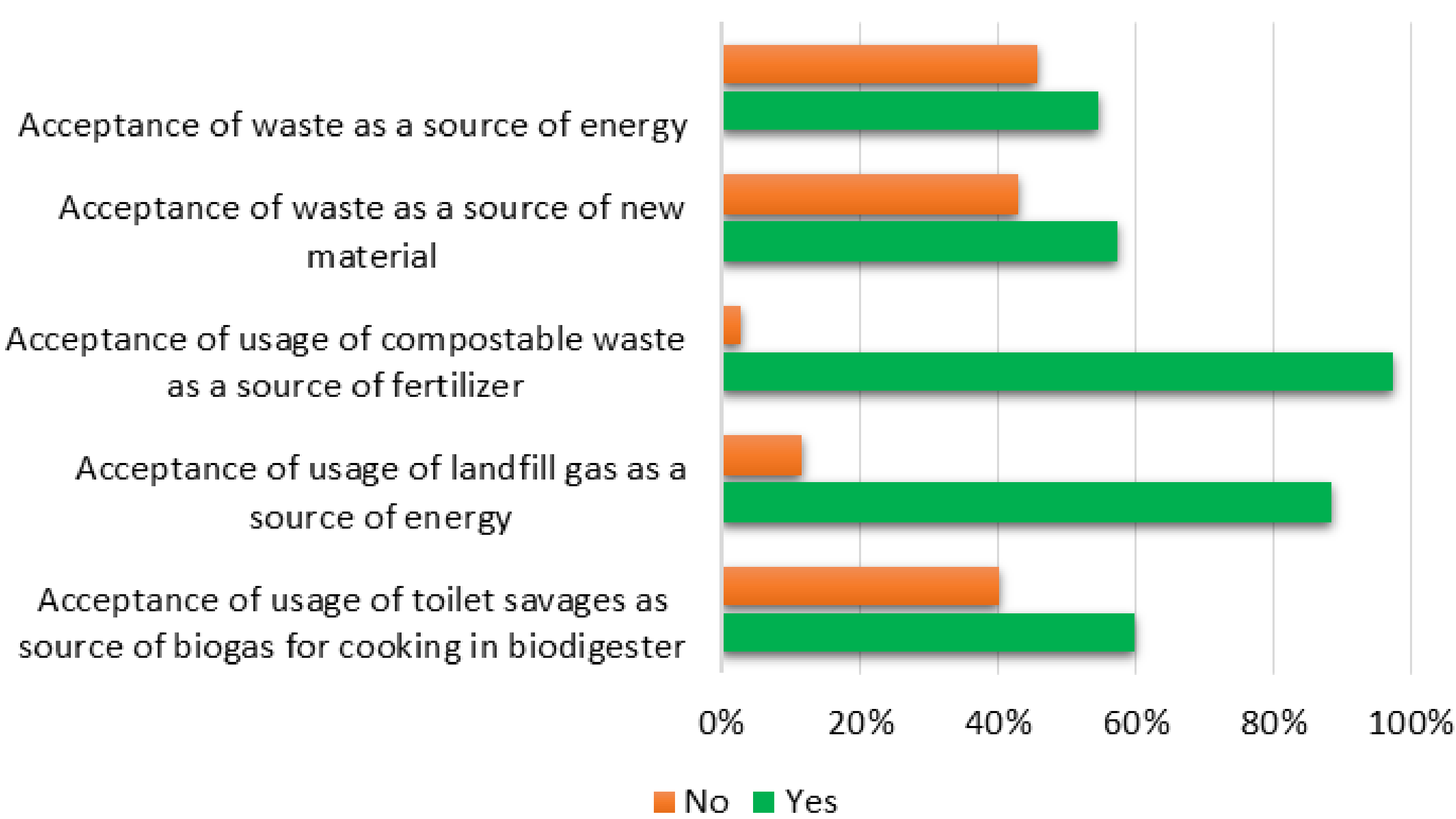


Figure 2. Data analysis results of acceptance of waste as a source



Figure 3.: Waste management services

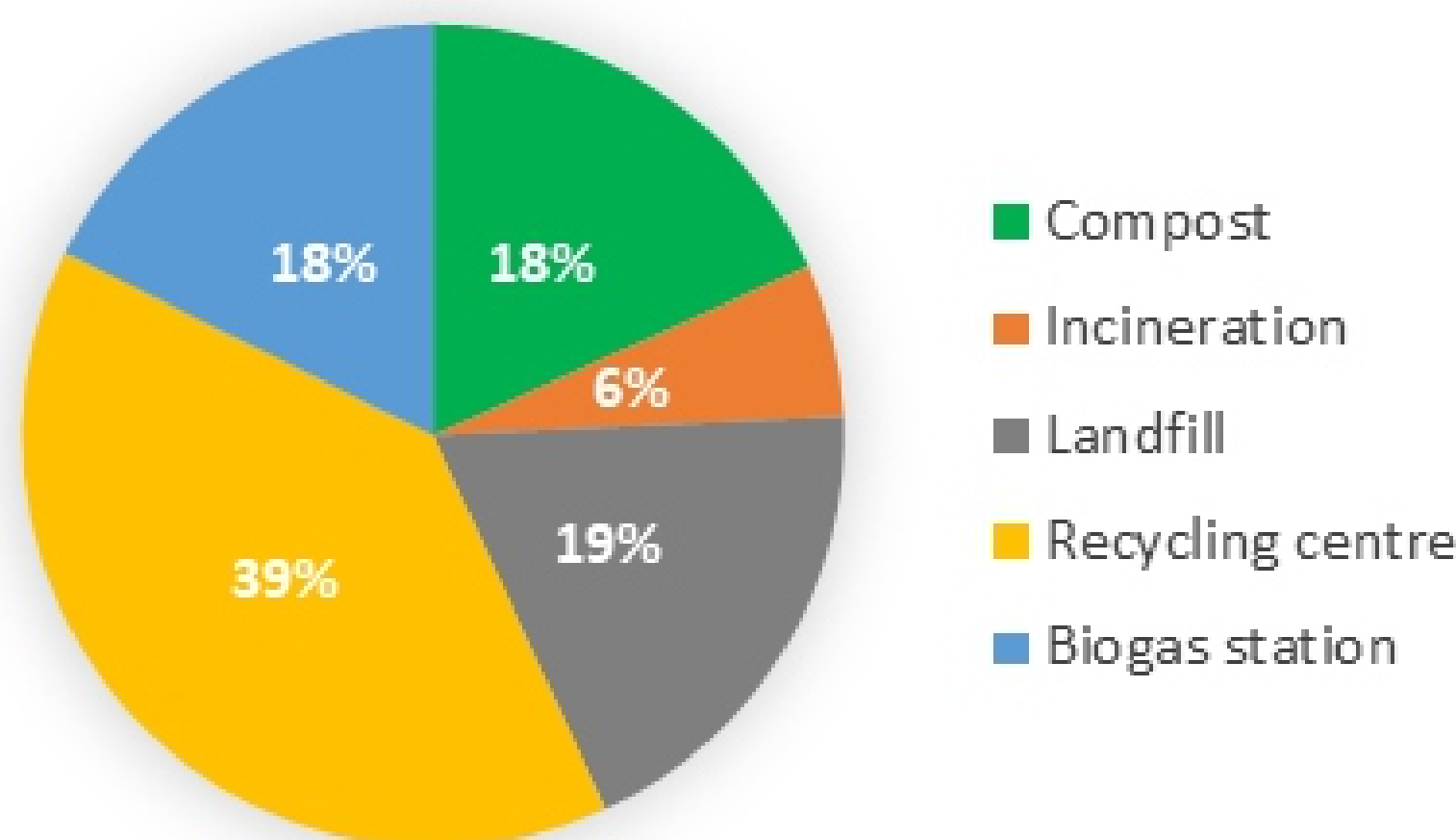


Figure 4.: Preference of technology for muncpal solid waste treatment



Figure 5.: Temporary waste treatment facility



Figure 6.: Collecting pond in Sarimukti landfill site

## Results

Knowledge of waste treatment technologies differs significantly across the respondents, most known is composting (90%) and landfilling (84%)

"People are not well aware of waste treatment technologies. Separation could help to better implementation. Otherwise there is necessity of incineration which could help decrease overweighting of infrastructure by heavy transportation and reduce of waste amount sent to landfills." (officer of Waste Bank in Bandung).

The most favourite technology among respondents is Recycling centre with around 40 %. Landfilling as a treatment method took 1/5 of preferences (second most popular opinion)

### Municipal feasibility of Waste Management services

Although MSWM services in Bandung are insufficient and 88 % residents were currently paying the taxes for MSW services. Majority (94 %) of respondents want government to take care of municipal solid waste management

In terms of money, 59 % of respondents were willing to pay up to 30 000 IDR monthly, 33 % were willing to pay 30-50 000 IDR and 8 % were willing to pay more than 50 000 IDR per month

### Description and evaluation of municipal solid waste management and treatment methods in Bandung

There were about 98 % of unsatisfied respondents with waste management system in Bandung

"There is no possibility how to handle the waste but throw it away. There are no bins or containers in the streets. Huge amount of waste is going down through the streams. People just throw it there and don't care." (resident of Bandung).

Almost 79 % of respondents answered that, there is no available MSW service in their location

Sarimukti landfill is operating as an emergency solution from 2005, despite the fact that disposal site filled its capacity in 2012 and was currently operating in 2019

Sarimukti landfill does not fulfil requirements for sanitary landfill, there is no impermeable layer, cover layers are not applied, waste is spreading among surrounding, there is no landfill gas control, no ventilation and open fires and explosions are common in this place

### Analysis of public perception of available municipal solid waste treatment methods and technologies in Bandung and its consequences for public

Respondents' opinion about each treatment technology is linked with other technologies

The most influencing factors for decision were education, gender and level of income

Education is very important for learning of waste treatment technologies due to the fact that in Bandung, there is almost no other possibility to see different treatment technology than disposal site



Figure 7.: Transportation of waste to Sarimukti landfill site

## Conclusion

Municipal solid waste management situation in Bandung city, Indonesia is in inappropriate conditions

Description of present WM situation is varying depends on the testimonies from interviews and observations

The main treatment method for the whole Bandung district is landfilling in operational disposal site Sarimukti, which does not meet international standards of sanitary landfills

Implementation of waste cycle is not adequate, collected mixed waste is hardly treated in different way than disposal

The most preferred technology for waste treatment in Bandung was recycling centre, which showed that people are already thinking about waste production consequences

## Recommendation

It is necessary to engage companies and factories in financing of municipal solid waste management in Bandung

As a beginning there is a necessity of waste sorting and waste awareness

Position of waste should be changed in view of Bandung's inhabitants

City infrastructure has to face changes in the terms of waste collecting services, waste transportation services and waste treatment facilities

Sorting and processing of organic waste should dramatically decrease amount of waste disposed in landfills

One of best solution for present situation seems to be incineration facility as Waste-to-Energy technology

Present incineration technologies met high environmentally friendly standards, in comparison with landfill it is better solution in the terms of emissions and has perceptible lower negative impacts on environment

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