Community Empowerment in Resolving the Complexity of Waste Management

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Abstract. Complexity of waste management makes this problem can not resolved in short-term. Therefore, to resolved this problem in the long-term, needs community participation. Based on that, this article aims to indentified factors that influence the level of individual participation regarding waste disposal. Results survey of Indonesian Family Life Survei was used as data source. 25,000 respondents were used as samples. The waste score is significant related with individual participation score. The years of schooling have positive impact to the repondent waste. Individual enthusiasm and participation on social activities held on their environment will also raise their waste score, such as local meetings, village rehabilitation, youth group activities, religious activities, and family prosperity training. Therefore, community empowerment can be as one effort to resolve the complexity of waste management.

1. Introduction

Waste management is basically done by individual who are aware about environment. Where the people exist, there will be waste too. More people normally produce more waste \cite{1–3}. The waste is increasing day by day, making the environment worse to live in \cite{4}. Since then, waste management has become crucial while the population is growing rapidly and keeping the environment health is a must.

Most of current wastes come from packaging, and 85\% of them comes in a form of plastics \cite{5}. Waste can kill human race slowly in the long-term since most of modern wastes aren’t easily degradable. The environmental approach sees that the earth and environment is not for current generations, but also for the future.

Since keeping the environment health and clean is the priority, researchers from previous studies suggested various waste management to overcome the waste problem \cite{4,6,7}. Ways to overcome waste problem are vary from bio-degradable plastic.

This study used social approach to detect how an individual overcome wastes on their environment. This study views that the individual awareness of healthy and clean habit starts from the community level. An individual will care about waste and help keeping the environment clean as the clean habit applied on the community. The community’s empowerment will stimulate an individual to engage on such good-habit social activities and finally grow the environmental awareness onto individual habits.
To measure the individual awareness and participation, we used the data from IFLS to analyze how an individual respond and contribute to waste-related activities on the environment. From the framework, we hypothesized that individual awareness and participation on such activities are affected by other general social activities, and the number of activities held on the environment.

Before being able to use such technology, of course, Indonesia needs to have an effective waste disposal management. The problem of waste disposal in Indonesia that causes waste to be disposed in landfills and endangers environmental health must be resolved first [8,9]. Then after effective waste management is achieved, for a further target, large amounts of waste accumulation should be able to be changed and used as energy supply in Indonesia. That means, effective waste disposal management is one of the keys to fixing environmental problems in Indonesia.

With a high level of individual participation, then the waste policy can control community’s behaviour and be more effective. The various failures of waste policies will be reviewed later in this research review that identifies factors which influence the level of individual participation regarding waste disposal is very important.

2. Method

The data used in this study is the secondary data of Indonesian Family Life Survey (IFLS) wave 5 (year 2014). These datasets has been used for the analysis due to its good quality relatively compared to the other data, to compare and capture individual participation in waste handling related activities. The level of observation is individual and the samples are more than 25,000 respondents from more than 30,000 households.

Moreover, the individual participation is not just measured through 1 type of social activities. This study used several types of social activities related to clean lifestyle activities (not all social activities on the IFLS was used in this study). The related activities that has been included in this study, such as:

1. Local meetings (pertemuan masyarakat)
2. Neighborhood cleaning (kerja bakti)
3. Village rehabilitation (perbaikan kampung)
4. Youth group activities (karang taruna)
5. Religious activities (aktivitas keagamaan)
6. Health funds (dana sehat)
7. Watery and sanitation activities (pengelolaan air)
8. Solid waste-handling (penanganan sampah padat)
9. Family prosperity training (PKK)

The waste management score is measured from individual’s contributions to the activities held which related to waste and waste handling such as kerja bakti (environment cleaning), and solid waste handling activities. Moreover, the score also considers individual’s level of contribution. To analyse the impact of education level (years of schooling), per capita expenditure, individual participation score, and number of social activities to level of clean lifestyle, this study uses OLS regression method to analyse it [10]. The OLS regression method will be used to analyse the impact of those factors to the score of clean lifestyle.

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\text{Garbage score} = \beta_0 + \beta_1 \text{Indiv Partiscore} + \beta_2 \text{Empowerment} \quad (1)
\]

Where,

- \(\beta_0\) = constant parameter
- \(\beta_1, \ldots, \beta_2\) = parameter of each independent variables
- \(\text{Indiv Partiscore}\) = Individual score of participation on each social activities held in the respondent’s neighborhood
- \(\text{Empowerment}\) = number of social activities in respondent’s neighbourhood in last 1 week
In order to make the best analyses, this study tried to do several estimation based on available independent variables. The next table of estimations are the result through OLS regression method.

3. Results and discussion
On the next paragraph, the terms of ‘individual’s awareness on waste/waste-related activities’ will be changed into waste score. In Table 1 show that religiosity and years of schooling in characteristics of the respondents.

| Religiosity Levels | Mean of Years of Schooling | Std. Dev. | Freq. |
|-------------------|---------------------------|-----------|-------|
| 0                 | 11.1                      | 3.9136079 | 50    |
| 1                 | 9.372035                  | 3.0820313 | 801   |
| 2                 | 10.478024                 | 3.1257586 | 6,416 |
| 3                 | 10.187081                 | 3.5137577 | 18,190|
| 4                 | 9.1179935                 | 3.4007337 | 4,924 |
| Total             | 10.055265                 | 3.4363785 | 30,381|

The waste score is positively affected by individual participation score. The relationship is positive and significant. This means the respondents will highly participate and contribute on waste related activities like environment cleaning and solid waste-handling activities if they are also active on other social projects and activities. This confirmed our hypothesis that individual enthusiasm and participation on social activities held on their environment will also raise their waste score. The interaction between neighbors can influence the the community behavior and their attitude toward waste management activities [11].

The years of schooling also has positive and significant impact into respondent’s waste score. Higher years of schooling lead to higher waste score, meaning that the more educated community will certainly have high awareness on environmental caring [12]. Janmaimool [13] stated the sense of obligation is one of the reasons that push well-educated community to engage in the environmental activities. This also lead that the education level of people matters to community well-being. The highly-educated community supposed to have higher participation level on social activities, also higher contributions to their well-being, at least on the neighborhood level.

Per capita expenditure also has significant impact on the waste score. Per capita expenditure has been used to proxy respondents’ economic state. Per capita expenditure has positive and significant relationship to the waste score. This relationship is expected to raise the respondents’ awareness to environmental caring as their economic state is raising. In the other hand we conclude that richer community tend to give higher contributions and higher levels of awareness, compared to the less-rich one. This estimate also proxy that rich areas will be relatively much cleaner compared to the poor areas. But this relationship can be observed as further question on the research. On the fourth estimation, age has negative correlation to the garbage score. This means that older the age of respondents, lower their participation in waste-related activities. In this estimation sex has positive impact to the individual participation on those activities, meaning that men tend to contribute more than the women, in this case. This research shown that the most religious respondents are having 9 years of schooling on average (junior high schools).

4. Conclusion
Each factors give significant impact to the community empowerment related waste management. Community activities, the years of schooling, educated level, per capita expenditure have positive contribution to the garbage score, However, individual age has negative correlation with the
participation in waste-related score. To increase the community empowerment related waste problem should be start in individual and community level.

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