

# Waste Bank Application in Jelegong Village, Bandung District, Indonesia



Yonik Meilawati Yustiani, Lili Mulyatna, Rikawati

**Abstract:** *Jelegong Village is located on the banks of the Citarum River. This river has a high level of pollution caused by industrial and domestic waste. Garbage from Jelegong Village has the potential to pollute the Citarum River both directly and indirectly. The waste bank, a disaggregated waste trading place, is one of the technologies that can help to overcome the waste problem in the Hamlet 03 Jelegong Village. Before the waste bank is operated it is necessary to know the readiness of the community to operate it. This study aims to analyze the readiness of the people of the Hamlet 03 Jelegong Village towards the operation of the garbage bank using the KAP (Knowledge, Attitude, Practice) survey method. The questionnaire was distributed to 80 respondents to determine the level of knowledge, attitudes and daily behavior. Based on the results of the study it was found that the community of the Hamlet 03 Jelegong Village has a high level of knowledge (85%), a positive attitude (51.25%), and good behavior (54.55%). Based on the results of this analysis it can be concluded that the community RW 03 Jelegong Village is ready to operate the waste bank. Some recommendations were pointed out for the waste bank of the Hamlet 03 Desa Jelegong which focuses on increasing people's motivation to trade their waste at the waste bank.*

**Keywords :** Citarum River, waste bank, KAP method.

## I. INTRODUCTION

Indonesian Regulation Number 18 of 2008 concerning Waste Management and Government Regulation Number 81 of 2012 concerning Management of Household Waste and Waste of a Kind of Household Waste mandates the need for a fundamental waste management paradigm change from the conventional collecting-transporting-disposal paradigm into the processing that focuses on processing waste reduction and handling.

The new paradigm in waste management must be managed properly directed at the 3R concept (Reduce, Reuse, Recycle) which involves the community in it [1].

One of the waste management infrastructure needed by rural communities is a waste bank. A waste bank is a place to trade various kinds of waste that have been sorted according to their type [2]. In the waste bank, the waste can be traded with money or other useful item [3].

The waste bank is one of the strategies to build public awareness in order to process waste to get direct economic benefits from waste. The implementation of the waste bank can provide real output for the community in the form of employment opportunities in carrying out the management of the waste bank operation and investment in the form of economical transaction [4].

Jelegong Village is a village located in the administrative area of Kutawaringin District, Bandung Regency, West Java. Jelegong Village is located on the banks of the Citarum River which has a high level of pollution caused by industrial and domestic wastes. Garbage from Jelegong Village has the potential to pollute the Citarum River both directly and indirectly. Several measurements have been conducted to handle the pollution problem of urban river [5]-[6]. To reduce the pollution of Citarum River, the waste needs to be handled from the source.

There are several hamlets, sub village, in the Jelegong Village. The Hamlet 03 is one of the sub village that has already had instrument to operate the waste bank. However, operation of a waste bank has to be supported by the surrounding community. The purpose of this study was to analyze the readiness of the Hamlet 03 Jelegong Village community to operate a waste bank and to formulate a recommendation concerning the most suitable waste management program.

## II. METHODOLOGY

### A. Number of Respondents

Determination of the number of respondents was using the Slovin formula in Eq. 1, where n is number of respondents and N is number of population [7].

$$n = \frac{N}{1 + N(e^2)} \quad (1)$$

The Hamlet 03 Jelegong Village consists of (N) 399 Families. With the tolerance limit (e) used is 10%, the formula gives 80 number as respondents.

### B. Questionnaire

Method used in this study is the Knowledge, Attitude and Practice (KAP) survey.

Manuscript published on November 30, 2019.

\* Correspondence Author

**Yonik Meilawati Yustiani\***, Department of Environmental Engineering, Universitas Pasundan, Bandung, Indonesia. Email: yonik@unpas.ac.id

**Lili Mulyatna**, Department of Environmental Engineering, Universitas Pasundan, Bandung, Indonesia. Email: lili.mulyatna@gmail.com

**Rikawati**, Department of Environmental Engineering, Universitas Pasundan, Bandung, Indonesia. Email: rikawati.153050024@mail.unpas.ac.id

© The Authors. Published by Blue Eyes Intelligence Engineering and Sciences Publication (BEIESP). This is an [open access](https://creativecommons.org/licenses/by-nc-nd/4.0/) article under the CC-BY-NC-ND license <http://creativecommons.org/licenses/by-nc-nd/4.0/>

Knowledge, attitude, and practice (KAP) studies are representative studies of a specific population to gather information about what is known, believed, and carried out in relation to a specific topic [8]. The expected output from this KAP study is a change in community behavior in handling waste with the presence of a waste bank.

The level of knowledge measurement uses 10 statements about the understanding of the waste bank, the purpose, benefits and advantages of the waste bank, and the understanding of organic and inorganic waste. The measuring instrument used was a questionnaire using the Guttman Scale and assessment criteria based on Notoatmojo [9]:

- High, when the answer score is 76% - 100%
- Moderate, when the answer score is 56% - 75%
- Low, when the answer score is 40% - 55%

The Guttman scale is used to measure firmly and consistently about the attitudes, opinions, perceptions of a person or group of people about a particular phenomenon that you want to know about. On the Guttman scale only two alternative answers are provided, for example: Yes - no; agree - disagree; never - never. So if the data is quantified, the values are only 0 and 1, or only 1 and 2.

Calculate the final percentage of aspects of knowledge and attitudes that is by calculating the percentage of respondents contained in the assessment criteria. The highest percentage of respondents represented the condition parameters of knowledge and attitudes of the community towards waste banks.

The measurement of community attitudes towards waste banks uses 16 statements consisting of 14 positive statements and 2 negative statements regarding community attitudes in waste management and the existence of waste banks. The measuring instrument used was a questionnaire with a Guttman Scale, and assessment criteria based on Azwar [10]:

- Positive attitude, when the total score is  $\geq 66.7\%$
- Negative attitude, when the total score is  $<66.7\%$

Behavioral measurement about waste management uses 11 statements consisting of 7 positive statements and 4 negative statements. Community behavior regarding waste management includes real behaviors or activities of respondents that reflect caring behavior towards waste management. Measuring instruments and assessment criteria used are questionnaires with a Likert Scale:

- Good, when the total score is 66.3% - 100%
- Fairly good, when the total score is 33.3% - 66.2%
- Poor, when the total score is 0% - 33.2%

Likert scale is a measurement method used to measure the attitudes, opinions and perceptions of a person or group of people about social phenomena. Respondents were asked to indicate the level of agreement through the statement given [11]. For positive statements, the scoring of answers is usually: Strongly Agree = 5; Agree = 4; Neutral = 3, Not Agree = 2, and Strongly Not Agree = 1; whereas the negative statement is the opposite.

Final percentage of behavioral aspects is acquired by calculating the percentage of respondents contained in the assessment criteria. The highest percentage of respondents represented the condition of people's behavior in waste management.

### C. Waste Bank Simulation

Simulation is trial of the Hamlet 03 Waste Bank operation. It was conducted to get ideas of the most appropriate style of the waste bank to be implemented. This trial includes waste weighing, recording, sorting and packaging activities based on a system agreed upon by the director of the waste bank. The location of the waste bank simulation is in front of the appointed leader of waste bank. The simulation / trial takes place within a period of  $\pm 1$  month.

Questionnaires were distributed twice, i.e. prior and after te waste bank trial activity. It was conducted to measure the changing condition of respondents and evaluate the waste bank procedure.

## III. RESULT AND DISCUSSION

### A. Existing Condition

Most people in the Hamlet 03 Jelegong Village burn trash in front or back of the house. This is done because the community is not fully aware of the dangers of burning rubbish. The community believes that the availability of vacant land in their homes makes it very easy to eliminate waste, by burn and/or bury them. In addition, the absence of appropriate separated waste bins and the lack of support from the village government in integrated waste disposal are other reasons for people awareness.

### B. Respondent Characteristic

The majority of respondents are women, which is 78 respondents (97.5%). Usually, women take most action and responsibility in handling domestic solid waste [12]. Most respondent age groups are between 20-30 years (42.5%). The majority of respondents work as housewives, as many as 69 respondents (86.25%), and the majority of education level is elementary school graduates as many as 32 respondents (40%).

### C. Result of Prior Simulation Survey

From 80 respondents, there are only 25 persons attended the waste bank simulation. The results of the questionnaire in the Table 1 are the results of the preliminary questionnaire of respondents who took a series of simulations of the waste bank and filled out the final questionnaire of 25 respondents.

**Table- I: Result of Prior Simulation Survey**

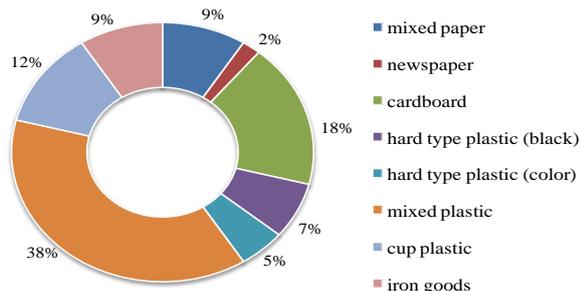
No	Aspect	%	Category
1	Knowledge	80	High
2	Attitude	80	Positive
3	Practice	60	Fairly Good

Based on the results of the questionnaire using the KAP Survey method, the majority of knowledge level in the Hamlet 03 Jelegong Village are high, namely 20 respondents (80%). This is because the social and educational conditions of the Hamlet 03 Jelegong Village are quite good so that the possibility of access to information is greater. The environmental education has already integrated in the school education curriculum; therefore it helps the community to acquire high knowledge on solid waste management [13].

Aspect aspects of the majority of respondents have a positive attitude about the waste bank. This is seen as many as 20 respondents (80%) have a positive attitude towards the waste bank. Aspects of community practice in the Hamlet 03 Jelegong Village are fairly good behavior, as many as 15 respondents (60%) are able to sort and utilize waste properly, which is sorting and collecting inorganic waste, especially plastic waste.

**D. Result of Waste Bank Simulation**

The success indicator of waste bank is that no more garbage being burned or untreated properly, the inorganic wastes are separated accordingly. Fig. 1 shows the waste types that were traded in the waste bank during trial period.



**Fig. 1. Waste type portion that been traded in waste bank during trial period.**

The results of a waste bank simulation / trial show several obstacles, i.e.:

- There are still customers who mix types of waste, for example mixing plastic and paper.
- Difficult to invite the surrounding community to trade their waste in the waste bank.
- It is difficult to find locations for the implementation of waste bank operations that are easily accessible by the community.
- Absence of temporary storage or warehouse for the collected wastes.

**E. Result of After Simulation Survey**

The results of the questionnaire below are the results of the after simulation survey of respondents who also filled out the prior simulation questionnaire and participated in a simulation / trial of the waste bank, which were 25 respondents. Following is Table 2 showing the results.

**Table- II: Result of After Simulation Survey**

No	Aspect	%	Category
1	Knowledge	88	High
2	Attitude	92	Positive
3	Practice	84	Good

The results of the KAP after simulation survey questionnaire at the level of knowledge, attitudes and behavior are in the category of having high knowledge (88%), positive attitude (92%) and good behavior (84%). The practice aspect shows improvement comparing prior and after the simulation.

**F. Discussion**

Although the survey shows improvement of KAP score, there were only 25 out of 80 respondents attended the simulation. Several obstacles and problems have to be

resolved.

Based on the results of the initial and final questionnaires of the 25 respondents, there were 2 respondents who participated in the waste bank trial experiencing an improvement in the level of knowledge from moderately to high, 3 respondents from negative to positive attitudes, and 6 respondents from behaving moderately to good behavior. The increase is evidence of changes in respondents' knowledge, attitudes and behavior towards the waste bank.

Knowledge, attitudes and behavior of respondents after a garbage bank trial has improved that is not so significant this is due to the duration and frequency of the implementation of the garbage bank trial carried out in only 3 hours, namely from 11.00 - 14.00 WIB with the frequency of implementation once a week. The duration and frequency are not sufficient for a significant change in people's knowledge, attitudes and behavior. In addition, it can also be caused by the lack of information and introduction of the presence waste bank trial was conducted.

**G. Recommendation**

Recommendations for the location of the implementation of the waste bank are more placed in locations that are more easily accessible by the public, for example the patrol post. The location of the post patrol is in the Hamlet 03 neighborhood and is often passed by the community. The post guard was used as a temporary location for the operations of the waste bank before being taken to one of the residents' yard to do the enumeration.

Seeing the existence of competitors in the Hamlet 03 in Jelegong Village, which are mobile raiders, it is necessary to pick up trash with the frequency of picking up trash twice a week. This is done to be able to compete with the traveling trash pickers. To be able to compete in terms of the waste price, the waste bank can alter the plastic waste into chopped stage so that the purchase price of also can be altered.

The alternative of trading waste that can be done for the waste bank is by trade with groceries, household appliances, etc. Trade can also be made between waste and local administration expenses such as monthly subscription, electrical bill, etc. Another recommendation is to work together with supporting health centers by providing health insurance with traded waste as a health program financing. The public is required to trade waste every month to pay for health costs, which later on the waste will be managed by the waste bank. The institutional aspects of the Hamlet 03 waste bank are recommended to consist of the director of the waste bank, secretary, treasurer and division / section. During the garbage bank simulation the director of the waste bank has been working well, so the director of the waste bank who will lead is the director at the waste bank simulation. Whereas the other waste bank administrators can be recruited from the community who have high interest in operating the bank. In addition, there is a critical need of community motivators to increase the marketing value of the waste bank.

## IV. CONCLUSION

Based on this research, there are several points that can be addressed:

- The KAP questionnaire analysis shows that the community of the Hamlet 03 Jelegong Village is ready to operate the waste bank.
- Some recommendations were given for the Hamlet 03 Jelegong Village waste bank which focuses on increasing people's motivation to trade their waste at the waste bank.

## REFERENCES

1. Y. M. Yustiani, A. Rochaeni, and E. Aulia, "Konsep Pengelolaan Sampah di Desa Babakan Kabupaten Bandung," *EnviroScientee*, vol. 15(1), April 2019, pp. 121-126.
2. M.M. Solihin, "Sustainable Waste Management through Trash Bank in Ragajaya Village, Bogor Regency, West Java Province, Indonesia," *International Journal of Progressive Science and High Technology*, vol. 9(2), July 2018, pp. 190-198.
3. Y. M. Yustiani and D. F. Abror, "Operasional Bank Sampah Unit dalam Pengelolaan Sampah Perkotaan," *Jurnalis*, vol. 2(2), August 2019, pp. 82-89.
4. D. Wulandari, S. H. Utomo, and B. S. Narmaditya, "Waste Bank: Waste Management Model in Improving Local Economy," *International Journal of Energy Economics and Policy*, vol. 7(3), 2017, pp. 36-41.
5. Y. M. Yustiani, S. Wahyuni, and S. N. F. Dewi, "Determination of Maximum BOD Load using Water Quality Modeling of Upstream Citarum River," *International Journal of Geomate*, vol. 16(56), pp. 118-122.
6. Y. M. Yustiani, M. Nurkanti, N. Suliasih, and A. Novantri, "Influencing Parameter of Self Purification Process in the Urban Area of Cikapundung River, Indonesia," *International Journal of Geomate*, vol. 14(43), pp. 50-54.
7. C. G. Sevilla, J. A. Ochave, T. G. Punsalan, B. P. Regala, and G. G. Uriarte, *Research Method, Revised Edition*, Pilippine: Rex Bookstore, 1995, p.182
8. K. Kaliyaperumal, *Guideline for Conducting a Knowledge, Attitude and Practice (KAP) Study*. Available: [http://v2020eresource.org/content/files/guideline\\_kap\\_Jan\\_mar04.pdf](http://v2020eresource.org/content/files/guideline_kap_Jan_mar04.pdf)
9. S. Notoatmodjo, *Metodologi Penelitian Kesehatan*, Jakarta: Rineka Cipta, 2012.
10. S Azwar, *Sikap Manusia, Teori dan Pengukurannya*, Jakarta: Pustaka Pelajar, 2011.
11. Sugiyono, *Metode Kajian Kuantitatif dan R&D*, Bandung: Alfabeta, 2012.
12. D. Awunyo-Vitor, S. Ishak, G. S. Jasaw, "Urban Households' Willingness to Pay for Improved Solid Waste Disposal Services in Kumasi Metropolis, Ghana," *Urban Studies Research*, vol. 2013, 8 p.
13. M. Fredrick, J. C. Oonyu, J. Sentongo, "Influence on Education on the Solid Waste Management Practices of Communities in Kampala City," *Journal of Environment and Waste Management*, vol. 5(1), February 2018, pp. 261-274.

## AUTHORS PROFILE



**Yonik Meilawati Yustiani** received the Bachelor and Master degree of Environmental Engineer in the Department of Environmental Engineering of Institut Teknologi Bandung, Indonesia. The doctoral degree was received from the Tohoku University, Japan with full scholarship from the Ministry of Education of Japan. She is currently working as a faculty member in the Department of Environmental Engineering in Universitas Pasundan. Her research interests are environmental quality management, modeling of coastal and river pollutants distribution, young generation environmental awareness, environmental education, monitoring tools innovation, etc.



**Lili Mulyatna**, is an associate professor in the Department of Environmental Engineering, Universitas Pasundan. He received his Bachelor and Master degrees in the Department of Environmental Engineering in Insitut Teknologi Bandung, Indonesia. He is now enrolling the doctoral course in the Department on

Environmental Science in the Padjadjaran University.



**Rikawati**, is in her last year enrolling undergraduate course in the Department of Environmental Engineering of Universitas Pasundan. Her research interest is on solid waste management, especially waste bank.