



The Social Capital and Impact in Waste Management of the Waste Bank System in Yogyakarta Indonesia

Modal dan Dampak Sosial dalam Pengelolaan Sampah Sistem Bank Sampah di Kota Yogyakarta

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ABSTRACT

A waste bank is a waste treatment facility that practices the 3R (reuse, reduce, recycle) to treat waste from the source at the local level. The Waste Bank Plan is based on applying social capital and covers the core elements of social capital implementation: trust, norms, networks, reciprocity, and value. This study aims to explore the relationship between social capital and the social impact of waste management using a waste bank program in Yogyakarta, Indonesia. The article considered social impacts such as income growth, employment, and environmental health. The subjects of this study were 100 waste bank customers from his five locations in Yogyakarta. This study uses Spearman's correlation to analyze data in SPSS 16. The results indicate a weak correlation between social capital and social impact on income and employment growth. This is shown to have correlation coefficient (r) values of 0.111 and 0.095, respectively, with significant values of $0.346 > 0.05$. Furthermore, the correlation between social capital and social impact on environmental health is very powerful, with a coefficient value (r) of 0.454 at the significance level of $0.00 < 0.05$.

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ABSTRAK

Bank sampah adalah salah satu strategi pengelolaan sampah dengan penerapan 3R (Reuse, Reduce, Recycle) dalam pengelolaan sampah di titik asal tingkat masyarakat. Model Pengelolaan sampah dengan bank sampah di wilayah kota Yogyakarta didasarkan pada penerapan modal sosial yang meliputi unsur-unsur yang menjadi inti dari pelaksanaan modal sosial (social capital) yaitu kepercayaan, norma, jaringan, resiprositas serta nilai. Keberadaan bank sampah akan menimbulkan manfaat ekonomi maupun dampak sosial khususnya bagi masyarakat. Tujuan dari penelitian ini adalah untuk mengetahui hubungan antara modal sosial dan dampak sosial pengelolaan sampah dengan program bank sampah masyarakat kota Yogyakarta. Dampak sosial yang diteliti meliputi peningkatan pendapatan, penyerapan tenaga kerja serta kebersihan lingkungan. Pengambilan data pada penelitian ini dilakukan dengan metode pengukuran, wawancara dan observasi di lima lokasi bank sampah Kota Yogyakarta dengan jumlah responden sebanyak 100 responden. Analisis data dengan menggunakan analisis korelasi spearman. Hasil penelitian menunjukkan bahwa hubungan modal sosial dengan dampak sosial terhadap peningkatan pendapatan mempunyai hubungan yang lemah dengan koefisien korelasi (r) sebesar 0,111; terhadap penyerapan tenaga kerja mempunyai hubungan yang lemah dengan koefisien korelasi (r) sebesar 0,095 dengan taraf signifikan $0,346 > 0,05$; terhadap kebersihan lingkungan mempunyai hubungan yang cukup kuat dengan koefisien korelasi (r) sebesar 0,454 dengan taraf signifikan $0,00 < 0,05$ (signifikan).

1. INTRODUCTION

1.1 Background

Waste is a complex and multi-faceted issue with social, economic, and other implications. Countries worldwide are currently working on the disposal of solid waste, considering its impact on humanity (Suardi, 2018). As the amount of waste increases, it becomes inconsistent with waste management programs. Many communities still treat their waste in traditional ways and are unaware of its environmental impact (Janjua, 2012). Lack of financial opportunities for waste management impact waste management program’s sustainability (Meidiana & Gamse, 2011). States need more ability to fund waste disposal. It reduces the sustainability of waste management programs. Waste management systems must be economically affordable, environmentally friendly, and socially responsible (Morrissey, 2010).

The waste bank program is used as a method by the Yogyakarta government to address the waste problem. Fundamentals of Establishing a Waste Bank is the Waste Management Act No. 18 of 2008, which states that the waste management paradigm needs to shift from waste to resource scarcity and resource recycling. Waste Bank is a collaborative implementation of the 3R (Reuse, Reduce, Recycle) strategy for waste management at source. The waste bank is defined by Regulation No. 13 Year 2012 of the Minister of Environment of the Republic of Indonesia as a place for the segregation and recycling of economically valuable waste that can be recycled and/or reused. Landfills bring both economic benefits and social impacts, especially to local communities.

Waste bank management in Yogyakarta is based on applying social capital such as trust, norms, networks, mutual relationships, and values. Social capital has been examined by many (interdisciplinary) studies from different disciplines over the past decades (Liu et al., 2014). Social capital is inherited through cultural mechanisms such as religion, tradition, and culture (Fukuyama, 2003). Social capital is a new variable in growth modeling, representing the productivity-related forms of trust and social ties that drive growth (Lopez, 2012). This means that social capital is one variable that drives economic growth through trust and social networks. Social capital is an individual or group’s empathy or sense of duty toward others (Robison, 2011). Social capital is commonly defined as the networks, norms, and beliefs in the social relationships of individuals and groups (Lukatela, 2007). Social capital is considered a bridge in creating norms and beliefs in network structures (Frick, 2012). The ability of people to come together in a synergistic environment has a positive impact on social capital (Hasbullah, 2006).

1.2 Research Purposes

The purpose of this study is to clarify the relationship between social capital in waste management and social impacts such as high income, employment, and environmental health, using the Waste Bank Program in Yogyakarta City.

2. METHODS

The research location is Yogyakarta, Indonesia. Based on Yogyakarta City Environment Department data. The top five landfills are the Lintas Winongo Waste Bank, located in Bumijjo Village, Jetis District. “Sloralaras” trash bin in Notoprajan village, Ngampilan district. Garbage bin “Migunani” in Pakuncen Village, Wirobrajan district. Waste bank “Sinar Lestari” in Purbayan village, Umbulharjo district, and “Mondoroko” Waste Bank in Prenggan Village, Kotagede District. The sampling technique used is targeted sampling. Specifically, the survey locations were determined from the following perspectives:

- 1) The landfill customer count for this location includes the landfills with the most customers and the most active landfills compared to other regions.
- 2) According to Yogyakarta City Environment Agency data, five landfill sites are landfill sites. A company in the area is actively engaged in landfill waste management and has received awards from the Environment Agency and PT Unilever Indonesia for its efforts in landfill waste management in the region.
- 3) Landfill management at this site is well organized and professional.
- 4) High awareness and sense of ownership of the study area residents to participate in landfill activation and development.
- 5) As collaborators/partners in landfill implementation and support, there is a network run by the Environment Agency and PT Unilever Indonesia.
- 6) Local communities desire to keep their living environment clean, tidy, comfortable, and to have economically viable waste management.
- 7) Respondent characteristics of each landfill site in Yogyakarta are almost the same.

The target of this survey is waste bank customers, has 100 respondents. The sampling procedure is as follows:

- 1) The sampling method is determined by target sampling, the method of determining the sample from a certain point of view (Sugiyono, 2011). This study’s samples were taken from his five waste banks in five villages in Yogyakarta.
- 2) Use Slovin’s formula (Equation 1) to determine the number of respondents to use as a sample.

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

where, n= number of samples, N= number of population, e = margin of error (10%).

$$N = 993 : (1+993(0,1)^2) = 90.85.$$

After calculation and rounding, we have a sample of 100 respondents. A questionnaire is used to collect the data. The questionnaire consists of two types of social capital

questionnaires (21 questions): trust (6 items), norms (5 items), networks (4 items), reciprocity (3 items), value (3 items), the social impact of waste management (15 items). The social impact questionnaire consists of questions about respondents' income increases, the number of jobs created by landfills, and environmental health. The scores used are 1–4. The independent variable in this study is social capital. The dependent variable is social impact, which consists of income, environmental health, and employment. Data are recorded statistically in SPSS 16. Spearman's correlation was used to analyze the data. This investigation took two months.

3. RESULTS AND DISCUSSION

3.1 Respondent's Characteristic

The number of respondents in this study were 100 respondents. Respondents the samples in this research are waste bank customers in each designated waste bank. The characteristics of the respondents can be described in the following Table 1.

Table 1 shows that 87% of the respondents are female and 13% are male. As for the age of the respondents, the age group between 46 and 60 makes up 36%. In terms of education, the majority of customers are high school graduates, namely 42%. In terms of work, housewives are the most customers, namely 52 %. About 61% of respondents reported having an income of less one million rupiah. About 61% of respondents reported having an income of less one million rupiah. These results suggest that many of the waste bank customers are from low-income, post-secondary educated groups.

Tabel 1. Respondent characteristic

Variable	Frequency	Percentage
Sex		
Male	13	13 %
Female	87	87 %
Age (year)		
8 -25	11	11 %
26-45	27	27 %
46-60	36	36 %
>60	26	26 %
Education		
Bachelor	14	14 %
Senior High School	42	42 %
Junior High School	14	14 %
Elementary School	30	30 %
Occupation		
Civil servant/Army/Police/ Pensioner	5	5 %
Entrepreneur	29	29 %
Farmer	5	5 %
Housewife/ nort working	52	52 %
Student/ University Student	9	9 %
Income (Million Rupiah)		
<1	61	61 %
1-2	29	29 %
2-3	9	9 %
>3	1	1 %

Source : Prime Data

3.2 Respondent's Income

The income of the respondents obtained from activities other than saving at the waste bank (before becoming a waste bank customer) was as follows: 58% earned < 1 million rupiah, 26% 1–2 million rupiah, 4% 2–3 million rupiah, and more than 3 million rupiah as much as 2.5%. Respondent's income after becoming a customer of a garbage bank is as follows: 54% of respondents earning < 1 million rupiah, 26% of respondents earning 1–2 million rupiah, 16% of 2–3 million rupiah, and 4% of more than 3 million rupiah. Thus, there is an increase in income of 17.5% due to the presence of a waste bank.

In Figure 1 it can be seen that the income after the existence of a waste bank that has increased the most is for people with low incomes (less than 1 million). Most of the garbage-saving respondents earn less than IDR 1 million, below the average minimum wage of IDR 1,572,000 in Yogyakarta City in 2016. Significant increases in customer revenues from landfills depend on the amount of waste saved. The results showed that 76% of the respondents had an income increase of less than IDR 100,000 monthly respondents, 3% reported an increase in customer's income over IDR 500,000.

Paper waste is the most common garbage entering the waste bank. Paper trash is sorted again in waste banks according to its type, which includes archival waste, duplex, HVS paper, notebooks, textbooks, newspapers, and cardboard. Plastic garbage is classified into numerous categories, such as plastic sacks, transparent plastic, plastic packaging, plastic bottles, and plastic cups. Paper waste is most the majority of the composition because practically every household has no longer utilizes paper garbage such as textbooks, archives, newspapers, magazines, and HVS paper. Because there are few of them, the metal trash and glass waste components need to be distinguishable. This is consistent with the activities of the Jombang Main Garbage Bank, which has 25 Garbage Banks in neighborhoods, schools, and markets, with a monthly income of IDR 18,502,800. With 5,312 customers, including individuals and groups (Iftitah, 2018). If the community is creative, it can increase the economic worth of waste. If the community is creative, it can increase the economic worth of waste. The economic value is increasing as a result of the government's providing of knowledge through trash awareness socialization.

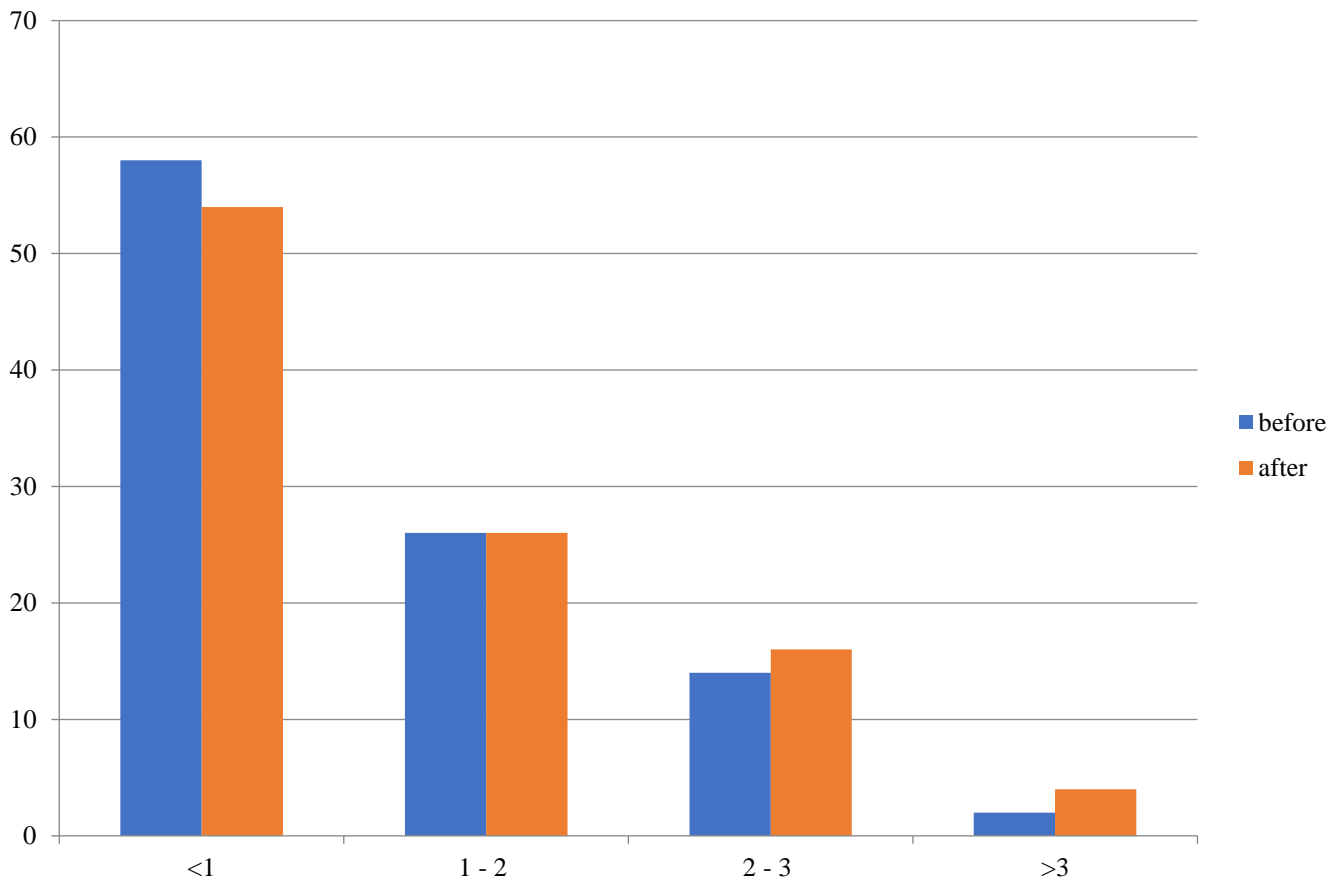


Figure 1. Customer income before and after saving at waste bank (Unit: million rupiah)

3.3 The Social Impact of Waste Bank

Before the waste bank was built, 40% of respondents said the waste bank needed to be cleaned. About 55% of respondents said it was clean. About 65% of respondents stated the environment was cleaner after the garbage bank was established, and 35% said it was significantly cleaner. In Figure 2, it can be seen that 65% of the respondents said the environmental conditions after the existence of the waste bank were cleaner.

Each waste bank requires personnel who are in charge of managing the waste bank finances or waste bank administration. Managing a waste bank requires a skilled workforce so that mistakes do not occur in nominalizing waste. In this case, the waste bank expands employment opportunities for residents in the vicinity. Implementing a waste bank has provided an accurate output for the community through job opportunities in managing waste bank operations and investment in savings.

Waste management in waste banks requires skilled workers to avoid mis designation of waste. Establishing the waste bank has produced real results for residents, including job opportunities in waste management and investments in savings. Waste Bank in Yogyakarta requires about 8–10 staff on average. These managers include administrative staff, waste-weighing workers, and waste-sorting workers. For waste bank management officers, in accordance with the agreement of the residents at the time of establishment of the waste bank, they get a commission of 20% of the total waste generated.

The existence of a waste bank is seen from the side of employment; respondents who answered that the garbage bank could expand employment so as to overcome unemployment by 27 people (27%) added employment so that unemployment decreased by 52 people (52%), those who answered did not affect the workforce work as many as 21 people (21%).

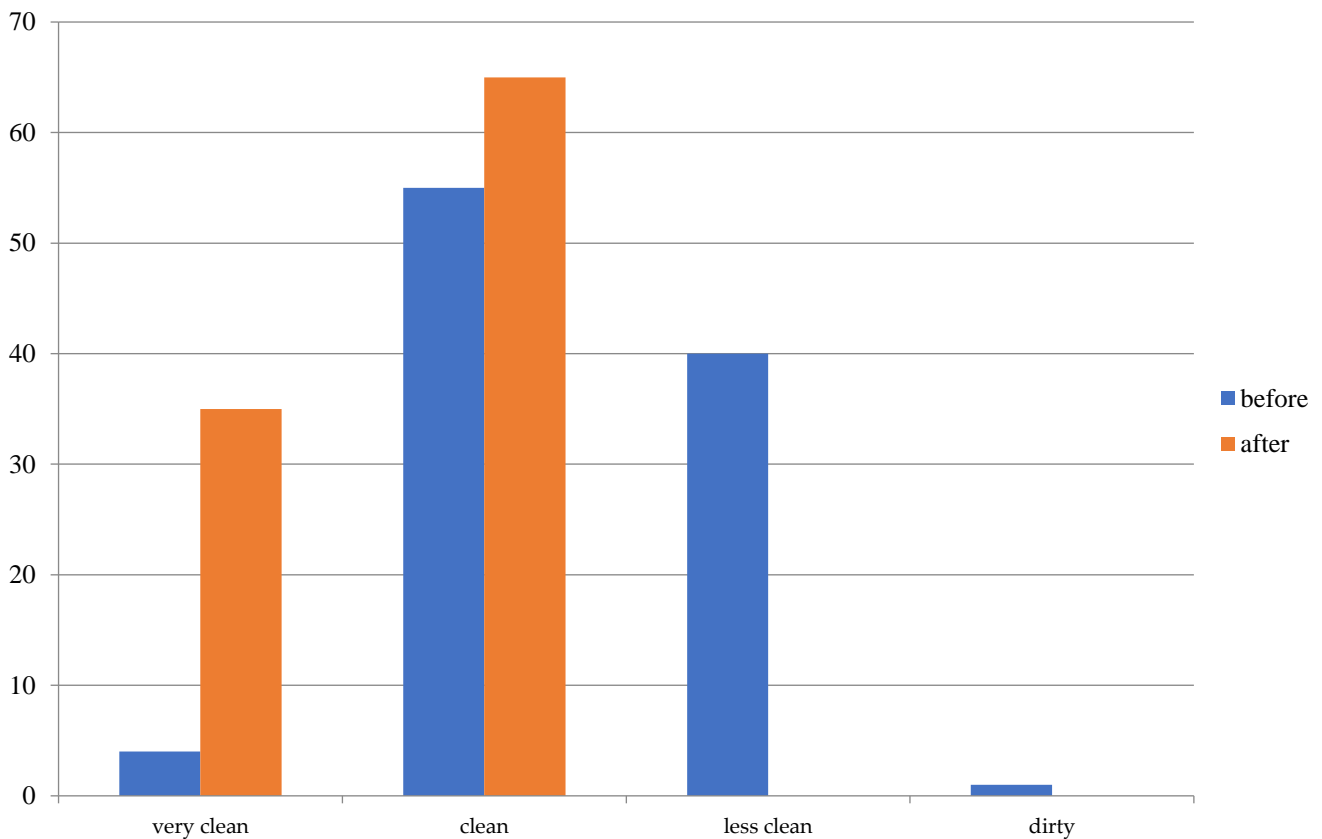


Figure 2. Environmental conditions before and after waste bank

Waste bank management varies in each waste bank. Waste management at the Ragajaya Bojong Gede Bogor waste bank is carried out by housewives starting from sorting the garbage at home according to the type of garbage, bringing the garbage to the waste bank, and an administrator of the waste bank, weighing and recording waste recording to ledger and customer savings book. In addition to the routine of weighing garbage, housewives households who are members of the waste bank are involved to participate in outreach activities waste management training that is useful to be able to increase mother's knowledge household about the dangers of waste that is not well managed. In addition, housewives who attended the training became better trained to process non-organic waste into handicraft products such as tote bags, vases flowers, or other items of value economy (Masduqie et al., 2021).

3.4 Social Capital of Waste Bank

In managing waste with the waste bank program, social capital is an important factor that must exist for a program to run. Based on data collection in the field, from 100 respondents the elements of social capital managers, officers (collectors) and waste bank customers can be described in the Figure 3 as follow:

Figure 3 illustrates the magnitude of respondent responses to the confidence factor indicator. The Waste Bank Social Capital Survey is conducted with waste bank managers,

stakeholders (collectors), and customers. As a result, the respondents' confidence in waste bank management was 100%. 100%, 100%, 82.5%, and 100% of respondents indicate the importance of trust, integrity, financial transparency, and accountability, respectively.

This standard will be reviewed based on customer knowledge of waste bank regulations. About 90% of respondents said they have waste bank regulations, and 10% of respondents said they do not know about waste bank regulation. The respondent who said she knew 49% of the written rules knew 84% of the rules. All 100 respondents answered that they comply with landfill regulations. The regulation stipulated that customers must sort their waste before throwing it in the trash. About 7% of respondents said they violated regulations.

The customer network indicator in this study stems from the importance of knowing and maintaining good relationships between other customers, managers, and waste bank managers. About 100% of respondents indicated the importance of knowing and building trusting relationships with other customers/managers and bank management. A total of 71 respondents reported meeting other customers, management, and trash can employees at least twice a month, while 29 customers reported meeting more than twice a month.

Customer reciprocity indicators in the survey were 95% of respondents felt they benefited from trash bins, 81% improved family well-being, and 56% of customers received

government support. The trash reciprocity index is also derived from trash manager responses that indicate that the trash manager's interests are included. Garbage bins receive 20% of the value of trash that goes into the trash. We observe similar things with officials who feel optimistic about bank waste management.

Waste management with waste bank provides the added value of 98% improvement in environmental health and comfort. Another value implied in waste management with bins is that residents feel that her 100% of respondents can tighten the ropes in Brotherhood (Silaturahmi).

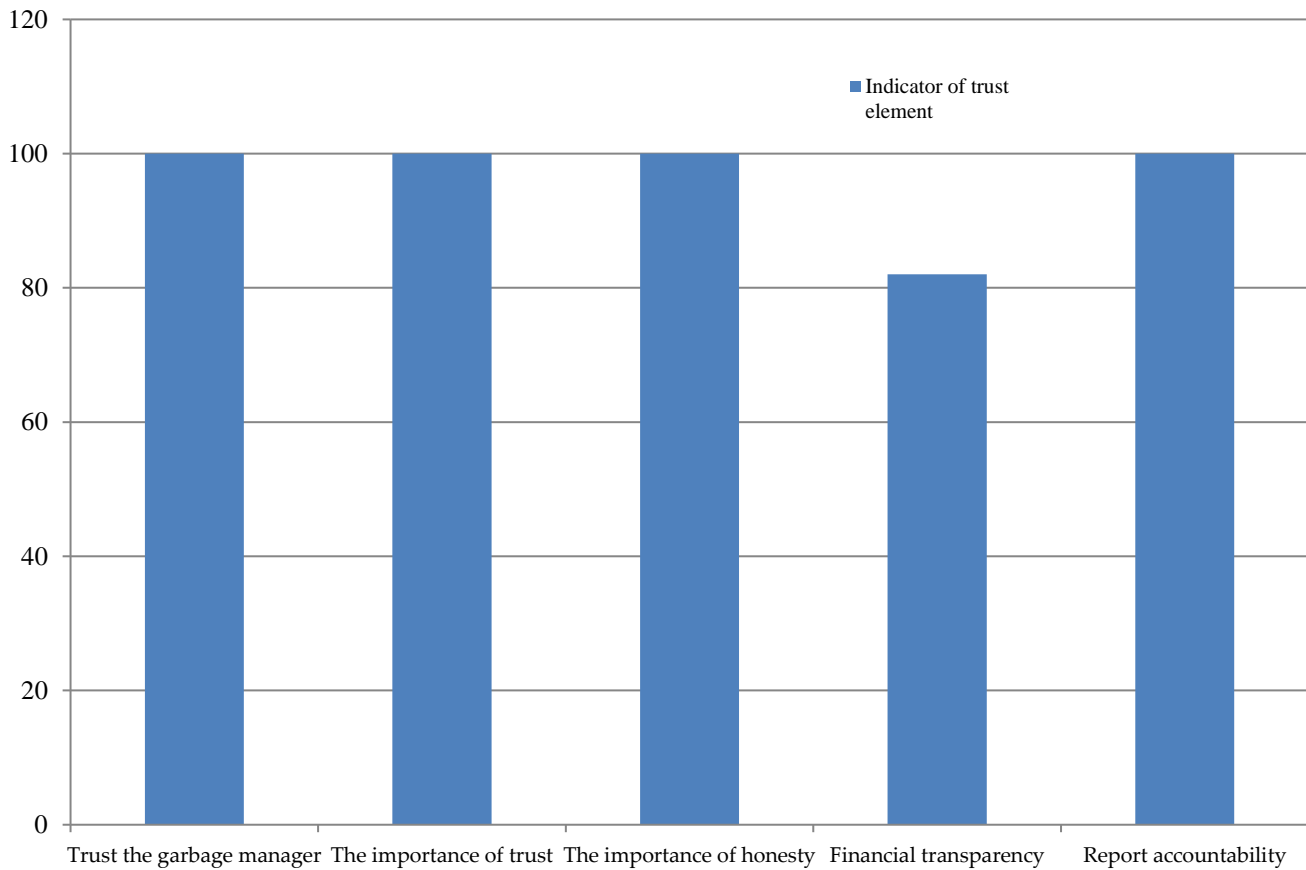


Figure 3. Indicator of Trust Element

The Spearman correlation test is used to measure the relationship between social capital and the social impact of waste management using the waste banking system. Results are shown in Table 2.

Table 2. The relationship between social capital and social impact of waste management in waste bank

Variable	r value	Sig	Explanation
Increasing income	0,111	0,273	Weak relationship, not significant
Employment	0,095	0,346	Weak relationship, not significant
Environmental hygiene	0,454	0,000	Strong relationship, significant

Correlation tests show a weak association between social capital and social impact on income and employment growth. This is shown to have correlation coefficient (r) values of 0.111 and 0.095, respectively, with significant values of 0.346 > 0.05. Furthermore, the correlation between social capital and social impact on environmental health exhibits a strong coefficient value (r) of 0.454 at the significance level of 0.00 < 0.05. This means that a waste bank impacts the economics and social fields. The social impact caused is a positive impact, namely, making the environment clean. Meanwhile, economically, the impact has not had too much influence on people's income. This is in line with research at the Kampungku Resik Waste Bank in Watu Golong Village which has provided benefits to residents, especially direct benefits with reduced waste generation in the community, the environment becomes cleaner and more beautiful, as well as the economic independence of the residents (Lestari et al., 2020). The waste management system will be effective if it is based on capital social community. Social capital is the social

power of society to achieve goals together, namely the Free Garbage Area (Syahli & Sekarningrum, 2017).

The waste bank program can be beneficial in reducing the amount of garbage in Yogyakarta City and changing the perception and behavior of the local community towards garbage, thus changing the habits of people who usually throw garbage everywhere. People are throwing out their garbage more methodically their place. The existence of the waste bank has brought benefits in the form of increased income and economic benefits. Communities also benefit greatly from income from landfills, according to those surveyed, but that income is still small. The income generated from the trash bins is used by respondents for a variety of purposes, including meeting basic needs, maintaining good health, paying for their children's school, and spending leisure time with members of the trash bin users.

The income from the waste bank is low, but the community feels that the income from the landfill helps meet their daily needs. The impact is a result of program policy. Its impact can be seen in changes in the attitudes of resident (Ilmy, 2020). Waste bank programs help strengthen the environment and communities at the same time. Waste Banks increase the knowledge and autonomy of residents, enabling them to solve waste problems to their potential (Muntazah, n.d.). The social impact of waste banks can be seen in increased income, employment, and even improved environmental health.

Waste management through the waste bank program is an alternative means to solve the waste problem and protect the environment, positively contributing to the environment. In general, the environmental benefits of landfill planning are that landfills can contribute to creating a cleaner and healthier environment, reduce littering habits, and maintain the cleanliness of rivers. Poor public perception of the waste bank is due to the lack of participation from the Village (Kalurahan), Neighborhood Association (RT), and the Environmental Service (DLH) to socialize the waste bank program, so many housewives still have a bad view of waste management. Therefore, education to the public about the meaning of a waste bank that can provide economic value and the purpose of a waste bank that can keep the environment clean and healthy needs to be done (Erris & Krisdiyanta, 2022). Waste banks face challenges in the form of a lack of competence in human resources to socialize waste banks and a lack of supervision in the socialization process (Astuti *et al.*, 2022). The role of community leaders is needed to provide emotional, instrumental, and informative support, including emotional support, instrumental support, informative support (Ragiliawati & Qomaruddin, 2020). Managers can encourage community members to participate in the form of motivation, aspirations, and individual needs so that they can increase community participation in waste bank management. This can increase the success of the waste bank (Mulasari, 2021). With the socialization of the waste bank, it is hoped that it will encourage citizen participation in collecting waste that can be saved in the waste bank so that they can earn

income from the waste bank (Wulandari *et al.*, 2017). The implementation of waste bank policies drives sustainable environmental management. Good communication between stakeholders increases community participation in managing waste properly. Community-based movement in waste management needs to be optimized with a collaborative approach (Fatmawati *et al.*, 2022). Waste, social, and economic problems can be overcome by collaboration between waste banks and the Government in togetherness in realizing the local economy and community empowerment (Wulandari *et al.*, 2017).

One of Yogyakarta's strengths is introducing social capital for residents to use based on the existing social resources that have been developed. The utilization of this social capital will be the capital for the people of Yogyakarta to maintain their involvement in waste management. Through this perspective, the study of social capital works in the space of relations between the actors involved and maintains consistency of the shared commitments they build in relation to waste management. The establishment of a waste bank is one of the alternative solutions to foster a culture of disposing of waste in a good and right place (Gunartin *et al.*, 2020). Sorting and managing waste in the domestic environment are an intellectual independence that creates economic independence. Therefore, community-based environmental management owned by the Waste Bank can build community independence (Wijayanti & Suryani, 2015).

In the handling and managing of waste at a landfill site, the landfill manager should be socially responsible in terms of trust in establishing good relationships and interactions with customers and waste collectors with whom he has powerful social relationships, culturally, and culturally inseparable. This relationship of trust is the most important asset in landfill management. Landfill management can only work by building trust. Loyalty, honesty, and trust are the strong strengths of our long-term cooperation. The most important asset in running a waste bank is trust. Trust is necessary for a waste bank to function well. Trust pressures on social capital in moral ways such as loyalty, honesty, and trust are factors for sustaining concluded cooperation (Fukuyama, 2003). In the process, landfill management not only deals with aspects of reciprocity and economic interrelationships, but also the most essential aspects of interrelationships in a social context. There are relationships with social values between landfill managers and customers and between landfill managers and collectors. Reciprocity or mutually beneficial context means that people are the key to waste management at the waste bank.

The history of waste bank management is not limited to aspects of reciprocity and reciprocal economic relations, most notably reciprocity in the social context. Garbage collectors are in a relationship that emphasizes social value. The context of reciprocity or socially beneficial relationships among stakeholders is key to sustainability in landfill waste management. Waste banks support economic development and improved quality of life in the form of higher incomes.

According to the interview survey, although the amount is not large, the increase in income from landfilling has greatly helped residents. Additional income from the waste bank is used for daily necessities, medical care, child support, and time spent with other members of the waste bank. Income is the result of business activity based on what the business produces (Poerwadarminta, 2006). These efforts result in wages or salaries, interest, or profits. In general, income refers to the income received by a community as an estimated service over a period of time, derived from basic or non-basic labor or ancillary activities over a period of time, valued in Rupiah.

The concept of social capital has been explored in various disciplines (interdisciplinary) studies in recent decades (Liu et al., 2014). One of Yogyakarta's strengths is introducing social capital for residents to use based on the existing social resources that have been developed. The deployment of this social capital will be the capital for the people of Yogyakarta City to maintain and maintain their involvement in waste management. Through this perspective, it works in relationships between stakeholders involved in social capital research and maintains the coherence of shared commitments built around waste management.

Waste bank management cannot be separated from economic factors and their critical assets. However, intangibles and assets are now more emphasized in waste management managed by local people. These invisible assets can be identified by social capital such as: trust, networks, norms, reciprocity, and values (Putnam, 2000). The introduction of social capital utilized by residents in Yogyakarta is one of its strengths based on existing and developed social resources. Yogyakarta community residents use this social capital to maintain their involvement in waste management. Furthermore, bonded solidarity has been described as a possible scheme of strong relationships and cooperation within groups (Supriyono, n.d.).

Waste collection using Yogyakarta Waste Bank showed an internal and external network. An internal network is formed between customers, administrators, and waste collectors. Meanwhile, an external network has been formed between the Waste Bank Forum and Waste Bank Managers belonging to the Yogyakarta Environment Authority and PT Unilever Indonesia as partners in implementing the Waste Bank Program in Yogyakarta. Rather than being constructed by a single person, social capital tends to form groups of people who socialize based on the addition of basic principles (Mawardi, 2007). Social groups tend to transform traditionally based on repeated social experiences and religious beliefs and tend to be characterized by high levels of cohesion, as well as close relationships and trust. There are no written regulations on waste management in landfills. There are no written rules that all members of the Waste Bank can understand, only verbal instructions on how to separate waste at the household level. Collective rules are usually not clearly understood by people and affect social interactions (Hasbullah, 2006).

Correlation tests show a weak correlation between social capital and social impact on income growth. This is indicated by the correlation coefficient (r) value of 0.111. It is concluded that high customer social capital has a small impact on income. This is because the revenue generated from waste banks is minimal and is not the primary source of income for waste bank customers. This is consistent with research by Hapiz (2015). Although the level of social capital is high, the impact on income is negligible.

The relationship between social capital and employment is weakly correlated with a correlation coefficient (r) of 0.095. This shows that even though social capital is high, employment is low because of waste banks, and it does not affect employment. The correlation coefficient (r) for the relationship between social capital and social influence is 0.454, which is very strong. Social capital indirectly encourages raising the local population's environmental awareness through waste management through the waste banking system. This is consistent with the opinion of Liu et al. (2014) states that cognitive social capital is an intermediary that links economic benefits to residents who act in environmentally friendly ways. On the structural side, on the other hand, social capital includes structures, practices, formal and informal institutions that help promote the mutual benefits of collective action. Both cognitive and structural social capital are positively related to activity and community environments (Jones, 2010). According to Frick (2012), social capital is the link in forming norms and trust in network structures.

4. CONCLUSION

The waste bank positively impacts the economy, as seen from the waste, which has become something of economic value and contributes to increasing family income. The application of waste banks in residential areas has changed the community's discipline in managing waste to create clean and comfortable settlements for the community. Social capital is a force that can encourage the community to maintain commitment and consistency in the sustainability of waste management with the waste bank program that has been running so far.

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