

Community Mentoring on the Inorganic Waste Management and Processing

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Abstract

The implementation of waste management from upstream (community) by the Yogyakarta City Government has had an impact on the city community, including residents of RW 6 Demangan Sub-district, Gondokusuman District. Communities have limited knowledge and ability to manage inorganic waste independently. Facing these problems, the community needs assistance to increase knowledge and develop the ability to manage inorganic waste. This is important so that the Yogyakarta City Government's goal of achieving zero inorganic waste can be realized. The community service program aims to educate the community through training and workshop in waste management and processing so that it can reduce the production of inorganic waste. Assistance in the form of education, training, and practices in managing and processing inorganic waste needs to be carried out to increase the knowledge and skills of the community so that waste self-management can be realized. The community service results show that the community of RW 06 is able to manage and process waste. However, waste management and processing activities must be carried out consistently so that the target of zero inorganic waste is achieved.

Keywords: *inorganic waste, mentoring, training, waste management*

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Introduction

The limited capacity of the Piyungan Landfill demands waste management in the region of Yogyakarta City. Management must be carried out from the upstream (community) so that the landfill burden can be resolved. The separation of organic and inorganic waste has been a program of the Yogyakarta City Government (Portal Berita Pemerintah Kota Yogyakarta, 2022). Inorganic waste is not allowed to be disposed of in landfills and must be self-managed by the community.

Kelurahan Demangan or Demangan Sub-district is one of the 5 sub-districts in the Gondokusuman District and borders Klitren Sub-district with an area of 0.68 square kilometers and Baciro Sub-district with an area of 1.06 square kilometers. The Gondokusuman District is the second largest district in the city of Yogyakarta with a very high population density. The northern side of the Gondokusuman District borders directly with the Sleman Regency (BPS Kota Yogyakarta, 2022).

According to data from the Yogyakarta City Statistics Agency, Demangan Sub-district has an area of 740 square kilometers or about 18.55% of the area of the Gondokusuman District. The sub-district is divided into 12 *Rukun Warga* (RW) and 44 *Rukun Tetangga* (RT). RW is a regional unit smaller than a sub-district, while RT is a regional unit smaller than RW. A community service program was planned to be carried out in the RW 6 area of Demangan Sub-district, which consists of 3 RTs, namely RT 19, RT 20, and RT 21. Problem exploration was carried out through interviews with the RW 6 management.

Based on discussions with the head and officials of RW 6, various problems faced by the community were found, namely the need to improve the children's integrated healthcare center and waste management. All problems were then mapped and analyzed in accordance with the objectives of the community service program of Universitas Kristen Duta Wacana and the expertise of the three volunteers. The results of the analysis concluded that the problems related to waste management and processing were very relevant to be raised and resolved through community service activities.

The implementation of the regulation of waste management and categorization in the Yogyakarta City area has an impact on household waste management, including residents of

RW 6 at Demangan Sub-district. The limitation of waste categories that could be disposed of at the temporary disposal site requires the community to be able to manage their household waste. From discussions with the head of RW 6, the community needed some education and training related to waste management and processing so that the burden of waste that must be accommodated at the temporary disposal site could be reduced.

Based on various studies and interviews, several problem formulations have been formulated that can play a role in resolving the current problem, namely waste management and processing that requires education, training, and practice for residents of RW 6 to approach zero inorganic waste. Education of residents regarding regulations, waste categorization, training, and practice of waste self-management and processing could be carried out as a provision for the community to resolve the problem.

Methods

Academics in universities are expected to play a role in the advancement of society (Wekke, 2022). The role of academics can be realized through community service activities. In addition to academics, the community is also required to be actively involved in the program to foster a sense of ownership (Sudarmanto et al., 2020).

There are three phases of activities in the implementation of community service activities, namely the preparation phase, the implementation phase, and the evaluation phase (Wulandari et al., 2022). Meanwhile, Rahmawati et al. (2021) revealed four stages of community assistance, which consist of the discussion stage with residents, observation, planning, and implementation.

The problems faced by the partner at that time, based on carried-out discussions and reference studies, could be resolved in several stages, as listed:

Preparation and Planning

The preparation stage was carried out in several activities, including initial surveys, interviews, and mapping of program needs.

Implementation

The community service activities were carried out by conducting community education activities related to the regulations of the Yogyakarta City Government on waste self-

management. In addition, education was provided on waste processing so that it has utility value, aesthetic value, selling value, and has an impact on the community's economy.

Results and Discussions

The Law on Waste Management number 18 of 2008 states that "Waste is the residual activity of daily human activities and/or natural processes that are solid in shape" and "The source of waste is the origin of waste production". Referring to the definition above, it is certain that every household produces waste. The prohibition on disposing of inorganic waste at the temporary disposal site has become a problem and challenge for the residents of RW 6 Sapan Yogyakarta.

There are 5 types of waste, namely organic waste, inorganic waste, hazardous and toxic waste, paper waste, and residual waste (World Health Statistics, 2008). In community service activities, the service team provided education about the importance of managing inorganic waste on a household scale, as well as training on the management and processing of inorganic waste.

Communities need assistance from academics to optimize their abilities (Amanah & Budiarta, 2017). Assistance is carried out through activities such as counseling, training, and workshops. Waste management is important for communities to manage waste within the household and reduce the burden on temporary disposal sites and final disposal sites. Waste management also provides economic value for residents. In addition to waste management, waste processing is an active action of converting waste into something else with utility value, aesthetic value, and economic value.

Counseling, training, and waste processing workshops were divided into two types based on the type of waste, namely glass waste and plastic waste. Figure 1 and Figure 2 show the activities of the community service team delivering a presentation about the emergency waste conditions in the city of Yogyakarta, as well as the importance of waste management and processing efforts. Waste management and processing can be done on a household scale. Waste management and processing efforts can be profitable for the community. The presentation also motivated the residents of RW 6 Sapan to self-manage and process waste. The presentation covered the topics of training and workshops that would be given to the community.



Fig. 1. Counseling and exposure about the importance of waste self-management and processing

Waste Management

Information sharing about the management of plastic waste was delivered by the Team and Bambang Nindyo Yuwono from Kenanga Trash Banking, Ngestiharjo, Bantul. The information sharing activity provides exposure to alternatives for managing plastic waste through weekly collection. Waste can be sorted and selected based on several categories and then sold to trash collectors. Money generated from the sale of waste can be deposited and then used by the agreement of trash banking clients in Ngestiharjo.



Fig. 2. The team provided counseling regarding transformation in economic and aesthetic value through waste management

The alternative waste management was well received by the residents of Sapen and sparked the hope that waste management in RW 6 Sapen could be improved. Waste in urban areas is a critical problem in the city of Yogyakarta. The approach presented attracted the interest of residents and is relevant to be implemented in the RW 6 Sapen area.

Figure 3 shows the resource person sharing the waste management activities that have been carried out by Kenanga Trash Banking. Such waste management while helping the community, also has a positive impact on the environment. The efforts made by Kenanga Trash Banking by their operation have yielded many advancements and benefited their clients who are also local community members.



Fig. 3. Counseling on inorganic waste management so that it has economic value for community

The community service team, in coordination with the Official of RW 6, is trying to optimize the performance of the RW 6 Trash Banking. Based on a workshop about waste management, the Official of RW 6 and Team helped the community sort waste. The results of the sorting will be submitted to the Waste Bank to be managed according to the type of waste. Inorganic waste (plastic and glass) can be developed into craft products. On the other hand, plastic waste can be collected and sold directly to collectors. To optimize waste sorting, the Team is providing rubbish bins (Figure 4) which will be placed in several strategic locations in the RW 6 area. The Team is also providing itself to assist the community in waste management activities.



Fig. 4. Handover of rubbish bin for waste management

Waste Processing

In addition to waste management through selection and sorting that can provide economic value for the community through trash banking, waste processing is one of the approaches that can be implemented by residents. In the community service, training and workshops on waste processing were divided into two materials, glass and plastic waste. Counseling on economic value, utility value, and aesthetic value was given by the community service team with a background in architecture and marketing. Training on glass and plastic waste processing was given by practitioners and academics competent in their fields, while workshops were carried out with the assistance of the community service team.

Glass Waste

The training and workshop on glass waste processing was divided into two categories, simple and complex processing, given by practitioner Ivan Bestari. Glass processing can be performed easily and simply by cutting and polishing the glass material. Even though it is relatively simple, the cutting method can improve the appearance and function of glass and yield a higher selling value. A glass bottle that was originally a waste can have a selling value of Rp. 5,000 to Rp. 20,000 after undergoing the cutting and polishing process.

In the training and workshop, the residents of Sapen were invited to cut glass bottle waste using simple techniques and tools (Figure 5). Cutting was performed by repeatedly rotating the bottle that had been placed on the cutting tool. After repetition, the bottle was cut into two parts, the bottom part can be used for various purposes such as flower pots or aesthetic functions. Cutting can be done vertically or diagonally to produce different variations.

For the remaining cut, the glass surface was then smoothed using sandpaper. This polishing activity was performed while running the glass with water to prevent glass dust from flying and endangering people around. After the polishing stage, the glass pieces were ready to be used for functional or aesthetic needs. Both values are greatly influenced by the type of bottle used and the shape of the cut that is made.



Fig. 5. Residents practiced the technique of cutting glass bottles (left), glass cutter (right)

The method of processing glass waste is more complex and was carried out using more complex equipment, such as welding and gas equipment. Processing began with the melting of broken glass using very high-temperature fire. The glass was formed into rods or glass sticks as raw materials and was ready to be transformed into various artistic shapes. Glass sticks could then be processed into various artistic shapes, including insect and vegetation shapes.

Although it requires a more complex method than cutting glass, processing glass into sticks and artistic products was interesting for residents. Some residents practiced this method in the workshop. Wearing special safety glasses was mandatory to maintain work safety. Figure 6 shows one of the residents processing glass through melting using a welding tool.



Fig. 6. One of the residents performed glass waste processing in the workshop

Plastic Waste

Among the various types of waste produced by humans, plastic waste is one that can be used as a forming or filling element of space (Winnerdy & Laoda, 2020). Aesthetics and space are inseparable from architecture and are interrelated (Ching, 2015). Aesthetic elements formed from plastic waste can become aesthetic elements of space. Counseling, training, and processing of plastic waste are important activities due to the high amount of plastic waste produced by households, including the residents of RW 6 Sapen. The training began with a presentation by the community service team about the aesthetic value that can be provided by processed plastic waste. The training was given by Kristian Oentoro, a lecturer and Head of the Product Design Study Program at Universitas Kristen Duta Wacana (UKDW).

The training on the processing of plastic bag waste (Figure 7) given by Kristian Oentoro applied a simple method that was easy to understand and practice for residents. The training was immediately followed by joint practice accompanied and guided by the community service team. The materials and tools used were easy to find and did not require a large budget. The primary materials were waste plastic bags of various colors and sizes, as well as souvenir wire. Meanwhile, the tools required were scissors and small pliers.

Plastic bags were cut to a certain size, twisted on a wire measuring about 20 cm, and cut at the ends. Next, the plastic folds on the wire were slowly unfolded to form a flower bud. The

neatness in this process greatly affects the quality of the resulting plastic flowers. In the next step, the plastic wire was wrapped in green plastic to create the impression of a flower stem. At the beginning of the workshop, some residents were able to practice immediately and produce good results (Figure 8), while others needed to practice several times. Overall, residents could do the activities easily and showed that processing plastic waste into flowers is relevant. Although using a simple and easy method, the selling value is quite high. Based on a search in online stores, flowers made from plastic waste can be worth IDR. 5,500,- to IDR. 7,500,- per piece. Residents have the opportunity to produce waste processing results to add additional income or to beautify their homes.



Fig. 7. The resource person and the community service team conducted a workshop on the processing of plastic bag waste into aesthetic flower bud products



Fig. 8. Residents creations during workshop on processing plastic bag waste into flower buds

Conclusion

The community service activities in the form of training, counseling, and workshops on waste management and processing generally ran well. The activities were positively received by the officials and residents of RW 6 Sapen, Demangan Sub-district. The community got new knowledge and skills in managing and processing inorganic waste.

The knowledge and skill can help the community reduce the burden on temporary disposal sites and final disposal sites while helping to improve the economy of the community. Inorganic waste can be managed and processed so that it has better utility, aesthetic, and economic value. No significant obstacles were experienced in all stages of the activity. However, in the development of the skills to process glass waste into artistic forms, residents were encouraged to visit the resource person's workshop which has more complete facilities and equipment.

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