Community accompaniment at Rw 16, Mangliawan village, Pakis subdistrict, Malang regency to create a clean and green environment

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Abstract. One of the environmental problems faced by the Malang Regency is the high amount of waste generated by the community every day. The regions that are the biggest contributors for garbage are Singosari and Pakis Subdistrict. RW 16 in Mangliawan Village is one of the areas located in Pakis Subdistrict. The main problems happening in the region were the level of awareness and understanding of the community in managing waste were still low and the environment was arid and hot. The solution to overcome this problem was to invite the community to conduct a comparative study. The other activities were to provide accompaniment to the community of RW 16 to manage waste and to plant TOGA and vegetables. The program has been able to increase the community’s awareness and understanding to manage waste, in addition, it can motivate the community so that they are willing to grow TOGA and vegetables in order to create a green environment.

1. Introduction

"Waste, a material which can be both a blessing and a problem," we call it. Waste can be a blessing if we can manage it well, for example, by doing the recycling for inorganic waste, whereas for organic waste, it is managed through the composting process. The opposite condition can occur if the waste is not managed properly. Waste which is not managed properly can cause various problems in the environment, for example, causing various kinds of diseases and being one of the causes of floods.

Based on the data obtained, in 2016 the number of waste generation in Malang Regency was estimated at 5.114 m³ per day. According to the data of the Environmental Agency of Malang Regency, the biggest contributor to waste generation was from Singosari and Pakis Subdistrict, respectively 346 m³/day and 284 m³/day [1]. RW 16 of Mangliawan Village is one of the areas in the Pakis Subdistrict of Malang Regency. This means, the people who live in the region also contribute to increasing the amount of waste generation in Malang Regency.

Well, how was the environmental condition in RW 16 of Mangliawan Village, Pakis Subdistrict, Malang Regency? When we visited the area, we would be able to see a pile of garbage in the vacant land in the area and at some point on the edge of the road. These conditions are shown in Figure 1 and 2.
The condition occurred in RW 16, Mangliawan Village, Pakis Subdistrict, Malang Regency was due to the relatively low level of the members of the community’s awareness and understanding in managing waste. These were shown from the habit of members of the community who often threw waste on empty land or on the edges of the road. In addition, the members of the community had not sorted waste before it had been discarded, did not reuse certain types of waste (for example used bottles, plastic bags used for cooking oil, etc.), and did not recycle waste. Another habit that was carried out by the community certainly causing new problems was burning waste. As we all know, this habit can cause air pollution caused by smoke from the process of waste burning.

Figure 1. Empty land used as a landfill by members of the community of RW 16.

Figure 2. One of the roadside points filled with waste.

This condition was exacerbated by the absence of a special garbage shelter provided at the RW and there were no special activities carried out intentionally to manage waste. In addition, the waste collection activity for each house by the waste collection officer was not carried out every day. If this condition was not treated immediately, the waste generation in the region would increase continuously. In addition, it would also have negative impacts on public health such as being a den for mosquitoes, rats, flies, environmental pollution, unpleasant odor, and of course unsightly view.

Apparently, the problems faced by the community of RW 16, Mangliawan Village, Pakis Subdistrict, Malang Regency were not only related to waste management but also, the environment in the region was hot and arid. This condition occurred because the community did not yet have the awareness to use
the vacant land around their homes to grow crops. It should be precise if the community could use the land to grow crops that were useful for their families, for example, medicinal plants or TOGA. TOGA is an abbreviation of tanaman obat keluarga (family medicinal plant). TOGA is essentially a plot of land which can be in the yard, garden, or field that is used to cultivate plants having medicinal properties in order to meet the family's needs for medicines [2]. Through TOGA planting activity in the neighborhood around members of the community's homes, it is hoped that the environment will become beautiful. In addition, members of the community can also take advantage of TOGA as medicines if there is one of the family members sick.

Through Community Service Program, we as the lecturer team of IKIP Budi Utomo Malang intended to participate and contribute to help and solve the problems that occurred in RW 16, Mangliawan Village, Pakis Subdistrict, Malang Regency. Through this program, it was also expected to reduce the amount of waste generation in Malang Regency.

As noted earlier, the problems faced by the members of the community of RW 16 occurred because their awareness and understanding level in managing waste and using vacant land to plant various types of plants were relatively low. The solution which could address both the major problems was inviting the community to conduct a comparative study to RW 03 of Sukun Village, Malang City, which was a national champion in the environment field. Through the comparative study, it was expected to increase the members of the community’s awareness and understanding in manage waste and greening environments. After the community took part in the comparative study, they were invited to discuss the activities they would be carried out. The next activity was accompanying the community to carry out the activities which had been programmed in order to realize a clean and green environment of RW 16.

2. Method of implementation

The method implemented in this program were as follows.

a. Conducting surveys in the community of RW 16, Mangliawan Village, Pakis Subdistrict, Malang Regency
b. Analyzing problems and planning solutions to the problems occurred
c. Conducting coordination meetings with the chief of RW 16 and several parties supporting this program
d. Inviting the community to join a comparative study
e. Discussing with the chief of RW 16 and the chief of PKK (Family Welfare Empowerment) in RW level to design activities that would be carried out to create a clean and green environment
f. Procuring equipment needed to support the implementation of the program
g. Accompanying community to carry out all programs which had been designed

3. Results and discussion

The program began by conducting the survey in the community of RW 16 and interview with the chief of RW 16. This activity aimed to find out the current condition of the environment. Thus, it could be seen the environment’s problems occurred in the area of RW 16 so that the appropriate plans could be drawn up to overcome the problems faced.

The next activity was conducting coordination between the Community Service Team and the chief of RW 16 to analyze the problems occurred in the environment. Through this activity, the information obtained was the main problems that occurred in RW 16 were the low level of members of the community’s awareness and understanding of managing waste. The other problem was the arid and hot environment. Next, a discussion was held to find solutions to environmental problems occurred in the area.

One of the solutions determined from the results of the discussions was inviting the community to conduct a comparative study. The location of the comparative study activity was Jl. S. Supriyadi RW 03 Sukun Urban Village, Sukun Subdistrict, Malang City. The reason why this place was chosen because it had won some awards as a national champion in the environment field. Through this activity, it was
expected that the awareness and understanding of the members of the community of RW 16 increased so that they had a willingness to managing waste and greening their environment. In addition, the members of the community were also expected to know the right ways to manage waste and effort greening effectively and efficiently. This solution was subsequently offered to the chief of RW 16 and several related parties.

The next activity was holding a coordination meeting with the chief of RW 16 and several parties who would support this activity. One of the things delivered at this meeting was an offer to invite the members of the community of RW 16 to conduct a comparative study. The documentation of this activity is presented in Figure 3.

![Figure 3. Coordination meeting with the chief of RW 16 and several related parties.](image)

The chief of RW and several related parties approved and supported the comparative study activity offered. Based on the results of the agreement, this activity would be carried out on April 21, 2019. The information related to this activity would be conveyed by the chief of RW 16 to the RT chiefs, then the RT chiefs would delegate his members of the community to participate in this activity.

The next activity was conducting a comparative study. The purpose of this activity was to increase the RW 16 members of the community’s awareness about the clean and green environment. Thus, RW 16 members of the community were expected to make various efforts to realize a clean and green environment of RW 16 consciously and without force from any party. This is because the success of waste management activities in the environment depends on the public awareness in changing daily waste management habits and changing people's perspectives or paradigms that "garbage is a source of income" [3].

In this activity, the members of the community obtained information about the waste management process carried out by members of the community of RW 03 Sukun. This information is presented in Figure 4. The members of the community were very enthusiastic about attending this agenda, moreover, some of them had discussed what plans would be done in RW 16. The activities in this agenda are given in Figure 5.

The next step was discussing with the chief of RW 16 and PKK RW. The purpose of this activity was to design activities that would be carried out by RW 16 members of the community to create a clean and green environment. These activities were designed based on the results of the comparative study done. There were two main activities that had been designed and agreed to be implemented immediately. The activities were managing waste and planting TOGA and various types of vegetables.

The next activity was procuring various types of equipment needed to support the planned activities. The equipment included composter barrels and various equipment used to grow and care for TOGA and vegetables grown by the members of the community. All equipment was provided for each RT in RW 16. Figure 6 is the equipment procured.

Once all the equipment is available, then do the assistance of citizens to carry out all the programs that have been designed. As previously stated, there are two activities that will be carried out by members of the community to create a clean and green environment, namely waste management and planting of TOGA and vegetables.
Organic and inorganic waste management activities can be carried out through the 3R method. Furthermore, waste management activities should be carried out through 3R and community-based approach [4]. Waste management is integrated waste management by managing from the source, namely the household. One way which can be done to reduce domestic waste is by applying the 3R concept [3].

The 3R method of waste management is an activity to treat waste by reducing, reusing, and recycling [6]. The purpose of this activity is to reduce the amount of waste disposed at the Final Disposal Site [5]. The following explanations tell us about 3R activities. First, Reduce, it as an activity reducing the use of all things causing waste [6,7]. This activity can be done by bringing your own shopping bags to put groceries while shopping at the store or market. Another example is reducing the use of tissue paper. This can be done by replacing the use of tissue paper with a napkin or handkerchief. Other things that can be done to reduce waste generation are choosing products packaged with recyclable materials, avoiding the use or purchase of products that have the potential to produce large amounts of waste and using products that can be refilled [6].

Second, Reuse, it is an activity undertaken to use waste back (junk) without changing the shape of the item, either use it for the same function and other functions [5,6]. For example, reusing used liquid soap plastic bottle by filling it with the newly purchased liquid soap from the refill packaging or using used cooking oil plastic packaging as pots to grow plants. Other examples are using containers or bags which can be used repeatedly, using batteries that can be charged), selling or providing sorted waste to those who need it [6]. The thing to remember, the level of security for health in reusing plastic packaging for food or drink should be paid attention to. This is because not all plastic packaging is safe for health if used repeatedly.

Figure 4. Waste Management Program on Jl. S. Supriyadi RW 03, Sukun Uban-Village, Sukun Subdistrict, Malang City.
Third, Recycle, it an activity to reuse waste after undergoing processing [6]. Waste recycling is the process of turning waste into a new product with the aim of utilizing waste so the waste is not thrown into the trash [7]. Recycling is an activity of reprocessing used materials supposed to become waste [5]. This process is done by changing the material from its original form to produce a new product. The examples of recycling process which can be done at a household scale are choosing products and packaging which are easily biodegradable and can be recycled. Other examples are processing organic waste into compost and processing non-organic waste into useful goods [5].

The organic and inorganic waste management carried out in RW 16 was as follows.

a. Procuring inorganic waste bank. One waste bank was provided in each RT.

b. Sorting organic and inorganic waste. During the comparative study, the members of the community learned about the differences between organic and inorganic waste and its sorting process. Thus, this activity could be carried out by each family respectively.

c. Processing organic waste into compost. Organic waste which had been collected was put into the composter barrel in order to produce compost. The compost produced was then used to fertilize TOGA and vegetable plants cultivated by the members of the community. The composting process was carried out using a composter barrel. The examples of organic waste which can be
used to make compost include rinds, raw vegetable residues, and waste obtained from gardening e.g. leaves and grass. One of the stages of composting is presented in Figure 7.

d. Utilizing inorganic waste. Inorganic waste can be reused by the community into pots or handicrafts, see Figure 8.

Figure 7. One of the stages in composting.

Figure 8. Utilization of Inorganic Waste.

The inorganic waste which had not been utilized was sold. The money from the sale of inorganic waste would be put into the RT cash. Figure 9 is documentation of sorting inorganic waste whether it would be reused or sold.

Other activities that would be carried out to create a clean and green environment of RW 16 were planting TOGA and various vegetables. TOGA is certainly not an unfamiliar term for us, in fact, most of the Indonesian people have known and used it since long ago. Previously, the community is familiar with the term of TOGA with "Live Pharmacy" [9,10]. TOGA (Tanaman Obat Keluarga) or family medicinal plant is a plant planted in the yard, garden, or plot of land or planted in a pot that is used as medicinal plant cultivation in order to meet the needs of family medicine [2]. It is a family medicinal plant (abbreviated as TOGA) is a home-grown plant that has medicinal properties [11].

As mentioned earlier, besides TOGA, other plants that would be cultivated by members of the community were vegetables. Thus, it was expected that the need for medicines and vegetables for members of the community of RW 16 can be met. In addition, through the cultivation of TOGA and vegetables, it was expected to create a green or beautiful environment. The cultivation of medicinal plants in the yard, not only being used as medicine but also being used as a garden ornamental plant, so that the yard looks more beautiful and fresher [9]. Furthermore, growing vegetables in the yard have many advantages, besides being able to meet the needs of the family vegetables, it can also make the yard look beautiful if the arrangement of plants is done well [12].

Figure 9. Inorganic Waste Sorting.
TOGAs and vegetables were planted by the members of the community in their own yards and in the TOGA parks in each RT. TOGA planted by the members of the community of RW 16 prioritized the types of plants needed as first aid if there were sick people in the family, for example, turmeric, ginger, betel, *Pluchea indica* Less, heartleaf maderavine madevine, *Averrhoa bilimbi*, *Aloe vera*, etc. According to [9], medicinal plants chosen to be planted in the yard are usually plants that can be used for first aid or medications for minor illnesses such as fever and cough. The examples of TOGA plants usually cultivated are *Curcuma zanthorrhiza*, hibiscus, god leaf, bitter, *Pluchea indica* Less, *Averrhoa bilimbi*, knob, clove, pomegranate, lime, Orthosiphon aristatus, mangosteen, tomato, and others [9]. The vegetables planted are also diverse, including mustard greens, kale, chilly, tomato, mustard green, lettuce, etc.

The TOGA and vegetable planting activities programmed in RW 16 was carried out in the following stages.

a. Preparing the planting media

The members of the community of RW 16 plant TOGA and vegetables in cans, used mineral water bottles, used cooking oil plastic bags, used rice plastic bags, etc. The activities of planting TOGA and vegetables by utilizing inorganic waste as pots are presented in Figure 8 and Figure 10. This method of planting aims to utilize inorganic waste. Plastic waste which has not been utilized properly can be used as TOGA growing media [13]. Besides using inorganic waste, planting TOGA and vegetables were also done in polybags. Figure 11 is the polybag prepared for growing vegetables and TOGA. The planting media used to grow TOGA and vegetables are the ready-to-use planting media that we buy in stores.

b. Taking care of plants

Plant care was done by watering the plants once a day, i.e. in the morning or evening (Figure 12). Another treatment was providing fertilizer to the plants. The fertilizers used were obtained from compost made by the members of the community. Thus, TOGA and vegetables produced were organic, free of chemicals, safe for our health.

c. Harvesting plants

The TOGA and vegetable crops were not marketed but used by the members of the community themselves. The TOGAs and vegetables harvested from the TOGA parks in each RT were distributed to the members of the community of RT.
4. Conclusion
This program has been able to increase the awareness and understanding of the members of the community in managing waste. This is proved from the attitude of the members of the community who have been willing and able to do waste-sorting, composting, and utilizing inorganic waste. This program has been able to motivate members of the community to make their environment green. This is proved from the attitude of the members of the community who have been willing to plant TOGA and vegetables in the yard of their house or in the TOGA park of RT.

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