



WASTE MANAGEMENT EFFORTS WITH 3R (REUSE, REDUCE, AND RECYCLE) AT STIKES KARSA HUSADA GARUT

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ABSTRACT

The issue of waste remains a serious environmental problem at the global, national, and local levels. Population growth, changes in consumption patterns, and increasingly practical lifestyles have led to a steady increase in the volume of waste over time. The objectives of this study are: To identify and analyze waste management efforts through the application of the 3R concept (Reduce, Reuse, and Recycle) at STIKes Karsa Husada Garut as a form of support for creating a clean, healthy, and environmentally conscious campus environment. This study was conducted using qualitative research methods by observing and collecting information about the research object. The study was conducted by observing and analyzing the behavior of people in the environment of STIKes Karsa Husada Garut. The study analyzed the effectiveness and suitability of waste separation. Based on our observations, we can conclude that waste management through the process of separating organic and inorganic waste is very important to address environmental, health, and economic issues related to waste. Although waste management efforts are carried out at STIKes KHG, observations show that its implementation is still poor. The STIKES KHG community must be educated about disposing of waste according to its type. Waste management is beneficial for reducing the impact of environmental pollution and supporting the waste management system. Our discussion also shows the importance of applying the 3R (Reduce, Reuse, Recycle) concept in everyday life to reduce the amount of waste produced. The process of recycling waste into various products has economic and environmental benefits. The importance of waste management is also reflected in the objectives of waste management in mathematics and natural sciences. However, the report shows that students' understanding and awareness of waste sorting needs to be improved to achieve good waste management. In addition, we also show the benefits of waste management in reducing the use of natural resources and preserving the environment.

Keywords: *Efforts, Management Recycle, Reduce Reuse, Waste*

INTRODUCTION

The issue of waste remains a serious environmental problem at the global, national, and local levels. Population growth, changes in consumption patterns, and increasingly practical lifestyles have led to a steady increase in the volume of waste over time (Andhika Lungguh Perceka et al., 2025). Waste that is not managed properly can have various negative impacts, such as environmental pollution, health hazards, a decline in the aesthetic quality of the environment, and contributing to climate change (Perceka & Sutrisno, 2020). Therefore, systematic and sustainable waste management efforts involving all elements of society are needed (Apriliani & Maesaroh, 2021).

Educational environments, including universities, are significant producers of waste. Academic and non-academic activities such as lectures, practicums, student organization activities, canteen use, and campus administration produce various types of waste, both organic and inorganic. The most common types of waste found on campus include paper, plastic, beverage bottles, food packaging, and food scraps (Simatupang et al., 2021). If not managed optimally, this waste can accumulate and cause environmental problems on campus (Muhamnu et al., 2024).

STIKes Karsa Husada Garut, as a higher education institution in the health sector, has a strategic role in supporting the creation of a clean, healthy, and environmentally conscious environment (Perceka et al., 2021). As a campus that produces future health workers, STIKes Karsa Husada Garut is not only responsible for academic aspects but also for setting a real example of clean and healthy living, including waste management. A clean and well-organized campus environment will support the comfort of the teaching and learning process and reflect the values of health and concern for the environment (Sukmasetya et al., 2024).

One approach that can be applied in waste management is the 3R concept (Reduce, Reuse, and Recycle) (Eldo et al., 2024). This concept emphasizes efforts to reduce waste at

the source (reduce), reuse items that are still usable (reuse), and process waste into useful products (recycle) (Auliani, 2020). The application of the 3R concept is considered effective in reducing the volume of waste that ends up in landfills, while also encouraging environmentally friendly behavior among the academic community (Santoso et al., 2021).

However, in reality, the implementation of 3R-based waste management on campus is often not optimal (Budilaksono et al., 2021). Lack of awareness and participation among the academic community, limited facilities and infrastructure such as separate trash bins, and the absence of an integrated waste management system are some of the obstacles (Komarudin et al., 2023). In addition, the habit of disposing of waste without sorting it and the high use of disposable products are still common on campus (Wati et al., 2021).

Given these conditions, waste management efforts that apply the 3R principle at STIKes Karsa Husada Garut are very important. These efforts are not only aimed at reducing the amount of waste, but also at increasing the awareness and concern of the academic community about the importance of protecting the environment (Halid et al., 2022). Through education, the provision of adequate facilities, and the active involvement of students, lecturers, and educational staff, 3R-based waste management is expected to be sustainable.

With the implementation of waste management through the 3R concept at STIKes Karsa Husada Garut, it is hoped that the campus can become an example of an educational institution that cares about the environment. Additionally, the implementation of the 3R concept aligns with health values, as a clean and waste-free environment supports the creation of healthy and comfortable conditions (Christian, 2024). Therefore, research or studies on waste management efforts using the 3R concept at STIKes Karsa Husada Garut are important as a foundation for planning and developing more effective and sustainable waste management policies.

METHOD

This study was conducted using qualitative research methods by observing and collecting information about the research object (Aziza, 2025). The study was conducted by observing and analyzing the behavior of people in the environment of STIKes Karsa Husada Garut. The study analyzed the effectiveness and suitability of waste separation (Hidayat, 2020).

The data source was obtained by observing the compliance of STIKes Karsa Husada Garut residents in disposing of organic and inorganic waste and the effectiveness of waste separation carried out at STIKES KHG. The research used direct observation as a method of data collection in the STIKES KHG environment at Semarang State University. This direct observation method was carried out by observing the waste management at STIKes Karsa Husada Garut and its suitability in implementation.

Qualitative research methods were used to understand certain phenomena. These phenomena can be in the form of behavior, actions, perceptions, actions, or conditions described in words that describe the actual conditions. Research using qualitative methods has three stages, namely the description, reduction, and selection stages. The description stage is carried out by describing the information obtained based on what is seen, heard, and felt. The reduction stage is the process of reducing or minimizing the information obtained to focus only on specific issues. The selection stage is the stage of breaking down the issues to be more focused and detailed. At the selection stage, an in-depth analysis of the focus of the issues is carried out. In this study, the description stage was carried out by describing the information obtained based on the observations that had been made.

The information obtained was in the form of the behavior of faculty residents in disposing of waste, the effectiveness of waste separation, and waste management at STIKes Karsa Husada Garut. The second stage was the reduction stage. The researchers reduced and sorted the information needed for the study.

The final stage was the selection stage. In this study, the problem was analyzed, and an in-depth analysis of the focus of the waste management problem was conducted.

A literature review was also conducted in this study. The literature review was conducted as a source of information to determine proper waste management and separation. The literature was also used to compare whether waste management at STIKES KHG was appropriate.

RESULTS AND DISCUSSION

Waste is a complex issue with many aspects, including socioeconomic, health, and environmental aspect (Javourez et al., 2021). Landfills should be provided to dispose of non-recyclable waste (Rafeinia, 2024). Data shows that various waste products generated from human activities are transported directly to landfills and disposed of there. As a result, landfill conditions are worse than they should be, especially in large cities. Various problems arise from this condition, especially those related to the environment and health. Before 2020, Indonesia was known as the second-largest producer of plastic waste in the world. The government has issued a policy on plastic use in response to growing concerns about pollution caused by plastic waste. The community still handles other waste by burning it in open, uncontrolled areas, which can be dangerous and pollute the environment (Marlinda et al., 2025).

This is in line with the objective of this study, which is to review the suitability and effectiveness of waste management through waste separation at STIKes Karsa Husada Garut. The method used in this activity is an educational approach to the community (Lungguh Perceka et al., n.d.). Waste is divided into two types: organic waste and inorganic waste. Organic waste, or waste that is easily decomposed, comes from food scraps, vegetable scraps, fruit peels, fish and meat scraps, and garden waste (grass, leaves, and twigs) (Andini et al., 2022). Inorganic waste, or waste that is not easily decomposed, includes paper, wood, cloth, glass, metal, plastic, rubber, and soil. Some benefits of

waste are as compost/organic fertilizer and as biogas. Meanwhile, waste processing can be done in several ways, namely reuse, which is using certain types of waste that can still be used [reuse of used bottles] (Anggraeni & Sasono, 2025).

Reduce is an effort to reduce everything that can cause waste and reduce existing waste (Risa et al., 2025). Recycle (recycling), which involves using certain types of waste to produce more useful items (recycling organic waste into compost). Replace means to substitute, and in this context, it refers to replacing items with environmentally friendly alternatives (Ilyas et al., n.d.).

According to (Tanahomba et al., 2024), waste management begins with separating different types of waste to facilitate the management process. Waste is divided into three categories: organic waste, inorganic waste, and hazardous and toxic materials (B3). Organic waste is waste that comes from living things, including humans, animals, and plants (Ilmi, 2020). Waste consists of dry waste and wet waste. Inorganic waste is waste produced from non-living materials that cannot be decomposed by nature. B3 waste is waste that contains toxic or hazardous materials that can damage the environment and endanger human health (Karim et al., 2022).

Waste management in the STIKes Karsa Husada Garut is carried out by separating waste types. This can be seen from the availability of trash bins in the faculty environment. These trash bins are differentiated based on type, namely organic and inorganic. Efforts to separate waste begin with the awareness of students and faculty members to dispose of waste according to type. Mixed waste will be difficult to manage properly and will only accumulate without a solution (Hendra et al., 2024).

Tabel 1. Observation Result Table

Picture	Description
	Organic and inorganic waste bins at Campus 2 of STIKes Karsa Husada Garut
	Organic waste bins that contain not only organic waste but also mixed with inorganic waste

a. Waste Sorting Techniques

Waste sorting based on type is divided into two categories: organic waste and inorganic waste. Organic waste is waste that comes from nature and is easily decomposed (Sulistiyowati et al., 2024). However, even though organic waste is easily decomposed, if it is not managed properly, it will also pollute the environment. Organic waste rots easily and will cause odors and can pollute the environment. One way to manage organic waste is to turn it into compost, which can be used to fertilize plants. This is beneficial and reduces environmental pollution (Chauhan et al., 2022).

The second type of waste is inorganic waste, which is waste that is difficult to decompose and takes hundreds of years to decompose. Examples of inorganic waste include plastic, paper, bottles, and cans (Muda, n.d.). These items are difficult to decompose but are widely used in everyday life. Waste from inorganic waste can be managed into handicrafts or more useful items. By managing this inorganic waste, we can reduce the supply of waste on earth and increase income because the handicrafts made from inorganic waste can be sold and generate profits. In addition to utilizing inorganic waste for handicrafts, we can also reduce its use, for example, by bringing tumblers or drinking bottles instead of using disposable plastic cups, replacing tissues with handkerchiefs, reducing the use of paper, and several other efforts (Widyarsana et al., 2024).

Sorting techniques for service levels and areas, as well as operational strategies including storage, collection, transfer, and transportation of waste, as well as waste processing and sorting, are all included in the waste sorting procedure. From the time of waste collection to the final disposal of waste, waste sorting and recycling activities are carried out as much as possible (Sembiring, 2025).

Waste separation techniques begin with waste containment, followed by waste collection, waste transportation, waste transfer, waste processing and sorting, and final waste disposal. From the waste collection site to the final disposal site, sorting and recycling are carried out as much as possible (Setiajaya et al., 2023).

b. The Purpose of Waste Sorting

The purpose of waste sorting is to facilitate further management. Waste that has been sorted by type is easier to process (Septiani et al., 2021). For example, inorganic waste such as plastic bottles or cans can be recycled into crafts that have commercial value and are useful for everyday life. In addition to facilitating waste management, waste sorting also aims to reduce air pollution caused by the accumulation of mixed organic and inorganic waste. One way to manage waste is by sorting it, which is beneficial for humans. By sorting waste based on type, recyclable waste is easier to collect without having to search for it among piles of organic and inorganic waste, while organic waste easily decomposes, producing an unpleasant odor if not handled or managed immediately. Therefore, waste is sorted based on type (Sriagustini & Nurajizah, 2022a).

There are three types of waste in waste management: organic waste, inorganic waste, and hazardous waste (Hutagaol et al., 2020). The purpose of waste sorting is to make it easier to recycle waste based on its type. Waste classified as B3 is waste derived from hazardous and toxic materials, including broken glass, medical waste, and manufacturing waste. A product will eventually be made from B3 waste through a recycling process (Sriagustini & Nurajizah, 2022b).

From a different perspective, the purpose of maintaining waste sorting is to increase public knowledge and awareness of the environment and encourage the more responsible use of sustainable and ready-to-use products. Therefore, rather than adding to or reducing the workload of the community, this activity aims to increase public knowledge about waste management and assist TPS3R in accelerating composting efforts (Wulandari & Candra, 2022).

c. Waste Recycling Process

After waste is separated, it can be processed through several stages in the recycling process. Separation is the initial stage in the recycling process. To dispose of waste properly, it needs to be separated based on type. For example, plastic, paper, metal, and organic waste must be separated before disposal. Once separated, waste can be placed in boxes or containers according to type. After separating and storing the waste, it will be sent to the nearest recycling center or given to scavengers or collectors of used goods (Salsabila & Hartono, 2024).

In an effort to better manage plastic waste, it is important to separate it based on color and type. The sorting process is also carried out based on type. For example, water bottles are separated into plastic bottles, labels, and caps. After being separated and sorted, plastic waste is then crushed into smaller pieces to facilitate the processing. Once crushed, plastic waste can be turned into various new products such as bags, pencil cases, and so on (Jauhariyah et al., 2022).

To carry out this processing, it is necessary to use specially designed technology and machinery. By recycling waste, we can reduce the amount of waste that ends up in landfills. This will help reduce soil, water, and air pollution. In addition, recycling also has other benefits such as conserving available natural resources and creating business opportunities and employment for many people (Rahman et al., 2020).

The 3R method - Reduce, Reuse, and Recycle - can also be applied to the waste recycling process. Reduce is an initiative to reduce waste by changing consumptive lifestyles, particularly by changing the behavior of individuals who produce waste (Ghaffar et al., 2021). This approach can be summarized as an effort to modify behavior to reduce the amount of products and resources used.

The community must be made aware of this initiative and be willing to change their behavior (Bambang et al., 2025). Using refillable products, minimizing the use of materials that produce a lot of waste, and choosing recyclable packaging are some ways to reduce daily activities. Reuse also refers to efforts to reuse materials so that they do not end up as waste without being processed first. Some examples include reusing old buckets as flower pots, reusing plastic wrappers as creatively shaped shopping bags, turning plastic cups or bottles into spice containers, and turning newspapers into wrapping paper. Reducing paper consumption, reusing product packaging for the

same or alternative uses, and separating paper waste and plastic bags are examples of everyday reuse activities. The next step is recycling, which involves converting materials that are no longer useful into usable materials after undergoing a lengthy processing procedure. For example, kitchen waste can be converted into compost, and broken glass can be recycled into glasses, plates, and other items. Cans can be turned into pencil holders, buckets, ladles, sandals, and other items can be made from plastic pieces. Choosing recyclable materials and turning used items from organic waste into more valuable materials are two ways to apply the principle of recycling in everyday life (Zulfa et al., 2022).

By recycling waste, we can create various products that have high benefits and economic value. There are several products produced through the recycling process, the following are some examples. First of all, let's talk about handicrafts. By utilizing waste such as used bottles, plastic, leaves, paper, and the like, we can turn them into beautiful handicrafts that have high selling value. Some examples include bags, pencil cases, flower vases made from plastic bottles, and so on (Wong et al., 2022).

Next, let's discuss materials that can be recycled. Organic and inorganic waste has the potential to be processed into recycled materials that are useful. Some examples include paper pulp, compost, biogas production, products made from plant residues, animal feed additives, and so on.

Next, let's discuss household products. Plastic waste can be turned into various functional household products, such as baskets made from plastic straws, plant pots from plastic bottles, wallets from snack wrappers, plastic sandals, and many more. All four are recyclable items. Plastic waste that is not processed into new products can become practical and easy-to-use recycled items in everyday life. Some examples include cloth shopping bags, recyclable plastic products, and many others. Recycling efforts contribute to reducing the amount of waste disposed of in landfills, thereby reducing pollution of the soil, water, and air. Additionally, recycling reduces the use of sustainable natural resources and provides benefits in terms of business opportunities and employment for many individuals (Rehulina & Rowa, 2025).

d. Waste Management at STIKes Karsa Husada Garut

Waste management at STIKes Karsa Husada Garut is carried out by separating different types of waste. Waste separation is done by providing different types of trash bins scattered throughout the faculty environment. These trash bins consist of organic and inorganic waste bins. The provision of different types of trash bins is intended to separate waste and facilitate its management.

Based on observations, the implementation of waste separation has not been optimal. Both organic and inorganic waste are mixed together. Trash bins labeled "organic" do not only contain organic waste, but are mixed with inorganic waste, mostly plastic. This occurs due to a lack of awareness among students in disposing of waste according to its type. Once full, the waste is collected and transported without being separated by type. This does not demonstrate good waste management, and the waste will only end up in a landfill. This indicates the ineffectiveness of separating waste by type and the availability of different types of trash bins. (Surya & Noor, 2020).

d. Benefits of Waste Separation

Waste separation in waste management provides several benefits in everyday life. Waste separation can conserve the use of natural fuels, which are limited in availability because they depend on the availability of fossil fuels (liquid, solid, and gas) in the Earth's crust, where the formation process takes a long time. There are several benefits of natural resources, namely: Energy and fuel sources, such as petroleum. Power plants, such as petroleum and solar energy. The benefits for humans of conserving natural resources in daily life include: preventing large-scale exploitation of nature, thereby preserving nature; preserving nature creates a balanced environment that is comfortable for humans to live in; conserving natural resources can prevent global warming (Hasibuan, 2023).

According to Fathiyah et al. (2023), waste sorting has several benefits, including facilitating waste recycling, maintaining environmental cleanliness, and improving public health. After understanding the benefits

of waste sorting, learn how to manage waste using the three Rs: reduce, reuse, and recycle, which means reducing the amount of waste produced. Reducing the use or purchase of food or goods that will produce non-biodegradable waste is known as “reducing.” For example, a person can start using a tumbler or drinking container from home instead of buying bottled water in plastic packaging. Reusing is the act of using existing items again; one example is turning used paint cans into flower pots. Recycling is the process of turning waste materials into new products. Some examples are turning plastic bottles and cans into piggy banks and using plastic straws to make flower decorations.

e. Challenges in Waste Management

The obstacles in waste management are the accumulation of too much waste and the lack of sorting. Unsorted waste is difficult to process because each type of waste requires different methods of management. In addition, waste processing requires considerable capital. The obstacle in waste management at STIKes Karsa Husada Garut is the behavior that reflects the students' attitude towards environmental awareness. An example of inappropriate behavior by students at Semarang State University is littering in hidden places such as flower pots and gutters, as well as burning waste, which can cause air pollution. These waste management challenges are caused by the lack of sanitation facilities such as landfills, a shortage of sanitation workers, and a lack of attention to the environment (Rahayu, 2021).

Waste management currently faces many pressures, mainly due to the large amount of waste produced by STIKes Karsa Husada Garut students, both as producers and consumers. This is in line with (Zuraidah & Zulfi, 2022) opinion, which states that this problem is becoming increasingly complex with the continued application of the old management paradigm that relies on collection, transportation, and disposal activities that require an increasingly large budget over time (Sutoyo et al., 2020).

f. The impact of waste at STIKes Karsa Husada Garut

Waste that is left unattended for a long period of time can become toxic. According to the Directorate General of Waste, Waste and Hazardous Materials Management, it has the responsibility to formulate and implement policies, coordinate policies related to waste, hazardous materials, and hazardous waste. Because of this, the students of STIKes Karsa Husada Garut began to take action to maintain and manage waste in the STIKes Karsa Husada Garut environment. One example of a small activity that illustrates the environmental awareness movement carried out by STIKes Karsa Husada Garut students is that most students have begun to sort waste according to type, namely inorganic and organic (Nufus et al., 2024).

Inorganic waste is waste that cannot be decomposed naturally, such as plastic, cans, metal, iron, tissue, paper, and others. Meanwhile, organic waste is waste that can decompose naturally, such as leaves and food scraps (Harimurti et al, 2020). Waste that is left for a long time can also cause unpleasant odors, leading to air pollution. Therefore, an activity was carried out by one of the heads of the environmental science study program at STIKes Karsa Husada Garut, namely a tree planting activity participated in by all STIKes Karsa Husada Garut students. This tree planting activity has a positive impact, namely absorbing carbon dioxide, which then produces oxygen and helps clean the air pollution from unpleasant odors.

CONCLUSION

Based on our observations, we can conclude that waste management through the process of separating organic and inorganic waste is very important to address environmental, health, and economic issues related to waste. Although waste management efforts are carried out at STIKes KHG, observations show that its implementation is still poor. The STIKES KHG community must be educated about disposing of waste according to its type.

Waste management is beneficial for reducing the impact of environmental pollution and supporting the waste

management system. Our discussion also shows the importance of applying the 3R (Reduce, Reuse, Recycle) concept in everyday life to reduce the amount of waste produced. The process of recycling waste into various products has economic and environmental benefits. The importance of waste management is also reflected in the objectives of waste management in mathematics and natural sciences. However, the report shows that students' understanding and awareness of waste sorting needs to be improved to achieve good waste management. In addition, we also show the benefits of waste management in reducing the use of natural resources and preserving the environment.

Therefore, the implementation of better waste sorting policies and increased public awareness, especially among STIKES KHG students, is considered important to achieve sustainable waste management that has a positive impact on the environment.

As for the suggestions we can offer to increase the awareness of students and faculty members regarding waste management, there are several steps that need to be taken. First, it is necessary to organize more intensive education and outreach programs, involving the active participation of the entire faculty community. This will enable faculty members to understand their role in maintaining environmental sustainability through simple actions such as waste separation. Furthermore, it is urgent to evaluate and improve the waste management system at the STIKES KHG. The active involvement of waste management staff at the faculty also needs to be increased to ensure that waste separation is carried out consistently and effectively. A good system will contribute positively to the success of the waste separation program at STIKES KHG. In addition, collaborating with relevant parties, such as the government, can be a strategic step in supporting more efficient and sustainable waste management. Cooperation with relevant agencies can help provide better facilities and infrastructure for waste management, including more adequate recycling facilities. The government can also provide policy support that encourages environmentally

friendly waste management practices. With the implementation of these measures, it is hoped that waste separation at STIKes Karsa Husada Garut will not only be a formal policy, but also a culture practiced by the entire faculty community. Thus, the faculty can set an example in maintaining environmental sustainability and make a positive contribution to global efforts to address waste and pollution issues.

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