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Utilization of plastic and fabric waste into economic valued products to minimize household waste

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Abstract. All human activities generally produce waste. If the waste production is very excessive, it will cause environmental problems, mainly inorganic waste because it requires very long time and cannot even be degraded naturally by nature. The purpose of this study is to describe the utilization of plastic waste and patchwork into economic value products in an effort to minimize household waste. This study uses descriptive qualitative methods, data collection is done by observation, interviews, and documentation. Based on the results of this study indicate that the use of plastic waste and cloth can be processed into various products of economic value in an effort to minimize household waste. In addition, it can increase public awareness of the environment. Plastic and fabric waste can be processed into various fashion and souvenir products.

1. Introduction

Living activities for human beings mostly produce waste. Excessive waste production can cause environmental problems. One of them is inorganic waste. Inorganic waste is a waste that can not be broken down by detripor organism. One contributor to the production of inorganic waste is household activities, such as detergents. Organic and inorganic waste contribute significantly large in environmental pollution [1]. A pollutant would have a bad impact on the environment. The forms of pollutant can be plastic, either plastic bottles or detergent packaging, food packaging, and patchwork fabrics home-based sewing business that is not being used. Of course, if the waste is simply dumped without further treatment, it would pose environmental problems.

These problems lead to a lack of environmental aesthetics, clogged drains can cause flooding, fire hazards, other environmental pollution which cause diseases transmitted by vectors [2]. So that, we need to attempt the process household waste to minimize household waste.

Based on the Law of the Republic of Indonesia Number 18 Year 2008 about Waste Management, In Article 1, paragraph 1 states that waste is defined as the rest of human daily activities and/natural processes in the solid form. In Article 2, paragraph 2 explained that household waste as referred to in paragraph (1) letter a) is derived from daily activities in the household, excluding specific feces and garbage. Furthermore, in Paragraph One of Article 20 of the Waste Reduction paragraph 1 explained that waste reduction referred to in Article 19 letters a), includes the following activities: a. manufacture of waste generation, b. recycling bins; and or / c. reuse waste [3].



Lack of awareness level and landfills, as well as the lack of enforcement against violators, becomes the bottleneck of the management of household waste. Some ways of managing household waste with a good management plan such as recycling, incineration, separation, composting and decomposition [4]. However, high levels of public consumption of the various products that will produce inorganic waste is not matched with a good garbage refinery.

One of environmental problems phenomenon that occur at this time is the accumulation of waste that can not be decomposed by nature such as plastic and wasted-fabric. One way that can be taken is to reuse leftover fabric products as the main material as manufacturing eco-fashion products [5]. But people especially housewives do not understand the use of waste plastics and fabrics that are not used.

There are several management that is not good because it can cause adverse effects on health. For example is the burning of waste that can cause air pollution and fire hazards wider [2]. According to Lebreton research and Andradý plastic waste management is wrong becomes a global concern. Based on these studies can be guessed that most plastic stand at around 91% which shows the river as a key channel for plastic into the sea [7]. So the selection of proper waste management methods need to be considered.

According to the staff of the PKK (the health crisis center) waste management by 3R (reuse, reduce, recycle) can be used as a solution to protecting the environment in a way that is very cheap and easy. 3R's concept can be applied by anyone every day. Reuse means reusing waste that still can be used or can function and reduce other means to reduce everything that may cause garbage. While recycling is the process of taking back the garbage or recycling into useful products [8]. Although not all people understand the concept of the 3R, there are some other who are able to manage plastic and wasted-fabric into economic valued products that will directly minimize household waste.

There are people who are able to re-process plastic and wasted-fabric into a variety of useful products. One of them is in the Kapuran, Grenden Village, Puger District, Jember, East Java, Indonesia. Some people can re-use the inorganic waste into useful items. According to the head of the field of hygiene and environmental management services (DLH) Jember district stated that the percentage of the amount of plastic waste about 16 percent of the amount of waste, which is about 1200 tons per day [9]. Therefore, it should be special handling related to inorganic waste, especially plastic waste.

The results showed that plastic waste has a danger for human survival, so the need for serious efforts by various parties to be able to manage. One of the activities that have the potential for plastic waste management by developing creative products and services [6]. This is based on researchers' experience that has been running the handmade business products by utilizing waste plastic and patchwork. In addition to economic value, it also can directly minimize waste and indirectly increase the environmental awareness of consumers to buy recycled products.

Some previous relevant researches show that plastic waste and patchwork can be used economically valuable products such as handicrafts, such as brooches and headpiece [10]. While Willis et.al based research shows that the need for an integrated solution to reduce waste. Through recycling, litter prevention, waste bins and program violations to reduce the burden of waste has a significant impact in reducing waste along the coast [11]. Based on the research of Purwaningrum explained that plastic waste can be processed into a variety of recycled products, energy, gas, and oil. Through the recycling of plastic waste, it can reduce plastic waste generated in the environment around [12].

Based on the description above, the purpose of this study was to describe the use of plastic and wasted-fabric into economically valuable products to minimize household waste. Therefore, the utilization of plastic and wasted-fabric can have a positive impact on the surrounding environment.

2. Method

This research is descriptive qualitative research with case study method or approach. The subjects were local creators or citizens who use plastic waste as the primary ingredients into products and fabric

crafts. The research was conducted in the hamlet Kapuran, Grenden Village, District Puger, Jember East Java, Indonesia. Collecting data in this study through observation, interviews, and documentation.

There are three craftsmen who make recycled-craft into various handicraft products. Two among them processed the plastic waste into various handicraft products, and one of the patchwork process that is not used or discarded into a variety of fashion products and souvenirs.

3. Research Result

Data of this study is the stages and the image of the patchwork and plastic products into economical valued handicrafts.

Plastic and fabric produced from household waste

In general, people do not yet know how to properly process household waste. Precisely in Kapuran, Grenden Village, Puger District, Jember Regency, East Java Indonesia every day produces organic and inorganic waste.

Organic waste such as livestock manure is usually processed into plant fertilizer, whereas inorganic waste was initially destroyed by burning or being dumped on farms or rice fields.



Figure 1. This burned plastic waste.



Figure 2. This thrown away and not used plastic.

Based on figures 1 and 2 show the lack of awareness of the environment. But after there are 3 (three) residents who take the initiative to process household waste in the form of plastic and cloth waste can reduce household waste generated every day. Through these activities the community indirectly has the awareness to separate organic and inorganic waste. Reducing inorganic waste can directly reduce the impact of environmental pollution.

Stages of plastic and fabric waste management into economically valuable products

Before becoming a variety of products that are ready to be used by the community, plastic and fabric

waste needs to go through several stages, as follows:

Table 1. Stages of plastic waste management and the fabric before it is processed into a various products.

| Stages | Plastic waste | Trash fabric |
|------------------|--|--|
| The first stage | Plastic waste collection comes from household waste | Fabric waste collection comes from household waste and tailors' home. |
| The second phase | Sorted plastic waste that is still good and physically fit for recycling into the product. | Wasted-cloth sorted which is still good and physically fit to be recycled into products. |
| Third phase | Group them by their shape and purpose, such as plastic bottles, plastic cups and plastic packaging. | Fabric waste is grouped according to fabric type, motif, color and size. |
| The fourth stage | Plastic waste that has been grouped according to their shape and purpose is then washed and cleaned of dirt. | The process of making products by craftsmen and tailors. |
| The fifth stage | Plastic waste is dried. | - |
| The sixth stage | The process of manufacture of products by craftsmen. | - |

Based on Table 1 above, it can be seen that there are six stages of plastic waste in the waste management process before it is processed into various handicraft products. Whereas the fabric waste shows that there are four stages. The difference in stages between plastic and cloth waste lies in the fourth stage. In the fourth stage, plastic waste still goes through the washing stage because generally the plastic waste comes from containers or food wrappers, then dried to remove washing water.

The process of making products made from plastic waste

After the process of managing, plastic waste is ready to process into various products, such as fashion products and souvenirs.

Table 2. Fashion products and souvenirs.

| Plastic garbage | Types of fashion products | Tools and used | Ways of making |
|-----------------|---------------------------|---|--|
| Plastic bottles | Brooch | Tools and materials are used among others as cap, shears, clip, glue burns, flannel, and beads. | The first step is to prepare the tools and materials needed. The second step, taken the lid of a used plastic bottle that has been cleaned. The third step, cut the bottom of the bottle cap. The fourth step, decorated with bottle caps, flannelette, and beads using fuel glue. The fifth step, the clip glued on the back of the cross |
| Plastic bottles | Bross ring | Tools and materials used include: lid, scissors, knife or razor blade, | The first step is to prepare the tools and materials needed. The second step, taken the lid of a used plastic bottle that has been cleaned. The third step, cut the edge of the circle of the bottle cap. The fourth step, then covered or wrapped with cloth tape or flannel |

| Plastic garbage | Types of fashion products | Tools and used | Ways of making |
|---|---------------------------|--|--|
| | | glue burns, flannel, fabric ribbon, patchwork and beads. | cloth using glue. The fifth step, decorated with various flower ornaments made of flannel and patchwork. |
| | Hairpin | Tools and materials used include: flops, plastic bottle caps, glue burns, and garnish | The first step, prepare the tools and materials needed. The second step, taken the lid of a used plastic bottle that has been cleaned. The third step, cut the bottom of the circle close the bottle. The fourth step, then decorated with various ornaments, then affixed to the hair clip. |
| | Bouquet or gift | Tools and materials used include: plastic bottles, scissors, knives or razor blades, accessories and decoration, glue fuel | The first step, the used plastic bottle is cut and taken the bottom. The second step, decorated using accessories and other decorations using fuel glue. The third step, each decoration that is attached is adjusted to the color and motif. |
| Packaging or plastic food wrap or detergent | Bag | Tools and materials used include: packaging or plastic food wrap, scissors, razor blades, glue, and garnish | The first step, the plastic packaging is cut in accordance with the pattern. The second step is then woven manually. The third step, arranged into a bag and given some decoration |
| Plastic cups drinks | Bag | Tools and materials used include: a plastic cup drinks, scissors, razor blades, and garnish wire | The first step, cut the lips of plastic cups. The second step, circle the lips of the plastic cup wrapped around the wire. The third step, the lips of the plastic cups that have been wrapped around are arranged into bags. |

Based on Table 2 above, it can be seen that inorganic waste in the form of plastic bottle waste, food packaging or plastic wrappers, and plastic cups requires a variety of process materials before they become goods that are ready for use and sale.

On average, plastic waste-based products are made manually using hands and very simple tools. The manufacturing process requires special skills and patience, making it easy for anyone to do. This can be an alternative for housewives to process their waste into goods that can be used again in different forms. Based on the experience of researchers who have a business in the field of crafts derived from used materials, this can be a profitable business potential.



Figure 3.The process of making a brooch from wasted-plastic bottle caps.



Figure 4.The process of making a ring brooch from waste plastic bottle caps.



Figure 5.The process of making hairpin from waste plastic bottle caps.



Figure 6.The process of making a bouquet of plastic bottles litter.



Figure 7.The process of making bags of food packaging waste.



Figure 8.The process of making a bag of trash plastic cups.

The process of making cloth products made from trash

After the process of managing, plastic waste is ready to process into various products, such as fashion products and souvenirs.

Table 3. Fashion products and souvenirs.

| This kind of waste cloth | Types of fashion products and souvenirs | Tools and used | Ways of making |
|---------------------------------|--|--|--|
| Patchwork | Brooch | Tools and materials used include: a patchwork of various motifs, sewing thread, needle and a safety pin brooch | The first step is cut by patchwork with length times width equal to 7×7 cm by 5 sheets. The second step, sewing patchwork to form flower petals. The third step, the chain forms flowers. The fourth step, sew a pin on the patchwork flower. |
| | Purse | Tools and materials used include: sewing machine, thread, needles, scissors, zippers, and patchwork, | The first step is cut patchwork according to wallet design. The second step, sewn using a sewing machine and sewn zippers. The third step, added the wallet decoration with manually sewn. |
| | Bag | Tools and materials used include: sewing machine, thread, needles, zippers, patchwork, bags and ornaments. | The first step is cut patchwork suit bag design. The second step, stitched using a sewing machine and sew a zipper. The third step, added embellishments bag with sewn manually. |
| | Mat | Tools and materials used include: sewing machine, thread, needles, scissors, and patchwork. | The first step is to cut the patchwork according to the desired mat design. The second step, sewn using a sewing machine. |

Based on table 3 above, it can be seen that inorganic waste in the form of fabric waste, packaging requires a series of processes before becoming goods that are ready to be used and sold. Based on the table it can be seen that fabric waste can be processed into various products such as brooch, purses, bags, and doormats.

The average plastic waste-based product is made manually by hand, very simple tools, and uses a sewing machine. So that in its manufacture requires a sewing machine. This can be an alternative for housewives to process waste into goods that can be used again in different forms. Based on the experience of researchers who have a business in the field of crafts derived from used materials, this can be a profitable business potential. Here is a picture of the process of making patchwork products.

**Figure 9.** The process of manufacture from waste fabric brooch.



Figure 10.The process of making purse of patchwork.



Figure 11.The process of making bags of patchwork.



Figure 12.The process of making a patchwork mat.

4. Discussion

Based on the results of data analysis obtained plastic waste and patchwork can be utilized as a product that has a high economic value. Based on the results of interviews with bag makers who use plastic waste have great potential in the business sector. A bag of small plastic cups can be sold for Rp 125,000, a medium size for Rp 150,000, while a large size can be sold for Rp 200,000. For bags made from plastic waste, food packaging can be sold at Rp 50,000 for a small size. Craftsmen usually process their own household waste and also come from community inorganic waste in the form of plastic and cloth waste.

Generally, every house will produce plastic waste every day, such as sachet food packaging, sachet coffee packaging, detergent packaging, plastic bottles, plastic cups, and so forth. Initially the community managed plastic and cloth waste by simply being burned or thrown away on the farm. However, after one of the residents has used the waste to become a useful product, it will directly minimize household waste. At present there are three craftsmen who use plastic and cloth waste into various handicraft products.

Overall the results of this study have supported previous research, namely research conducted by Anindita et al who explained that plastic and fabric waste can be utilized as a product in the form of handicraft products [10]. But there are differences, in Anindita's research the craft products are in the form of brose and headpiece. While in this research there are various kinds of products, which are 10 types of products originating from recycled plastic and fabric waste.

Furthermore the results of this study Wilis et al. also in line with the results of the study which concluded that one of them is the concept of waste recycling which can significantly reduce plastic waste [11]. The difference with this research is that this research is conducted in a domestic environment and the concept of recycling is already in the product manufacturing stage and has been applied. Whereas in the research of Wilis et al. More to analyze and success of the outreach program and the Australian government policy in reducing plastic waste along the coastline [11].

5. Conclusion and Suggestion

Based on the formulation of the problem and the proposed research hypothesis, as well as the results of research based on data analysis and hypothesis testing, it can be concluded that plastic and fabric waste can be utilized as a variety of economic value products that can directly minimize household waste.

The focus of this research is on the use of plastic waste and household cloth, so for future studies it is recommended that further research be developed. Through application in schools, so students can also understand how to manage waste from an early age well and can increase children's creativity.

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