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CITIZEN PARTICIPATION IN RECYCLING COOKING OIL TO FOSTER A CIRCULAR ECONOMY PROGRAM

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ABSTRACT

5000 to 15000 liters of used cooking oil contaminate soil and water. The cooking oil is wasted in the water flow and settles on the ground. Therefore, it is needed to overcome environmental problems. Citizen participation is required to support the circular economy program to overcome environmental issues. This study aims to investigate the used Cooking Oil and identify stakeholders who will play a role in supporting the recycling of used Cooking Oil. This qualitative research involves collecting and analyzing non-numerical data to understand concepts, opinions, or experiences. The results of this study are 1. Most of the citizens still throw the used cooking oil in inappropriate places 2. Seven stakeholders are needed to support Citizens in Participation in Cooking Oil Recycling: Palm Oil Industries, Biofuels Industries, Eco-Rewards, Collectors, Social Media campaigns, Head of RT, and national and local Government regulators. The collaboration among the stakeholders will determine the success of the recycling program. In addition, this research contributes to the knowledge base in nurturing citizen participation in a circular economy.

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1. INTRODUCTION

Indonesia is one of the biggest waste contributor countries in the world [1]. Based on data from the Ministry of Environmental Health and Environment in 2021, households are the number one producer of the highest waste in Indonesia, with 34.33%. Waste in Indonesia is dominated by organic waste, as much as 62%, 6% paper, 10% plastic waste, and 22% other waste, such as glass and metal [2]. Organic waste is the most common type of waste produced by Indonesia. An effort to properly utilize and place used cooking oil can reduce the percentage of organic waste in Indonesia [3]. Cooking oil is used in homes and restaurants. Household in Greater Jakarta uses approximately one liter of cooking oil per week. If the cooking oil is not suitable for use, it will become waste if disposed of in the wrong place [4].

Used Cooking oil is dumped in the gutter and will inevitably end up in rivers, lakes, or the sea. This is in line with the report from the DKI Jakarta Regional Environmental Management Agency, which Ahmad Syarifuddin quoted as Executive Director of the Committee for the Elimination of Leaded Gasoline to the greeners team in 2016, the health of water bodies in Jakarta only reached 3% [5]. Dirty water in Jakarta is affected by the high discharge of cooking oil waste into waterways [6]. There are 5000 to 15000 liters of used cooking oil in the water flow and settle on the ground. The contents of the cooking oil waste affect the balance of the ecosystem in water bodies [7].

Several organizations are working to overcome the problems caused by the used cooking oil. The Rumah Harum Collector is one of the organizations that facilitates a group of people in Depok to process used cooking oil into laundry soap [8]. Another positive thing is that they can help the economy of their members. In addition, there is a prosperous collector, and they are an organization located in Jagakarsa

Village, Jagakarsa District, South Jakarta City. People who exchange used cooking oil will get new cooking oil. This movement should follow by many people.

In 2019 TNP2K and Traction Energy Asia recorded cooking oil in Indonesia on a national scale. Overall, cooking oil consumed is 16.2 million kiloliters. About 40-60% of the oil is finished and then becomes used cooking oil. In 2019, used cooking oil produced around 6.5-9.7 million kiloliters. However, only 3 million kiloliters of used cooking oil can be collected from the 16.2 million oil consumed [9]. The purpose of compiling used cooking oil is to process it into products for everyday life. Therefore, recycling used cooking oil into new products reduces the potential for environmental pollution. However, disposing of cooking oil carelessly in water areas such as rivers can increase Oxygen Demand and Biological Oxygen Demand. As a result, the water's surface is covered by oil, preventing sunlight from entering. Then it impacts the sustainability of living things, water, and soil in these waters [10].

There are three groups of waste ([11]). The first type is organic waste, which can be naturally decomposed, such as leaves, vegetable scraps, and fruit scraps. The second type is inorganic waste which cannot be decomposed naturally, such as Plastics, cans, and Styrofoam. Inorganic waste is often also referred to as dry waste [12]. Finally, the third type of hazardous waste contains toxins or harmful compounds [13].

Indonesia produces 151,921 tons of waste per day [14]. The solid waste produced by each Indonesian population is 0.85 kg per day. 20% of the waste generated is not disposed of in its place. Among other types of solid waste, plastic is the type of waste that is a concern for most people. This is caused by the long process of decomposition of waste and its destructive impact on the environment. According to Liniarti et al., in 2019, most of the collectors in Yogyakarta only implemented 3R activities to manage plastic and paper. The Lintas Winongo collector is a facility for people in the Bumijo sub-district, Yogyakarta, to distribute used cooking oil waste. Not only collecting cooking oil from households, but the Lintas Winongo collector also collects used cooking oil from restaurants and hospitals [15]. One liter of used cooking oil costs IDR 2,000-3,000, and the collector sells it to factories for IDR 4,000-4,500. Before being sold to factories, the collector filtered the used cooking oil using cloth [16]. This research would reveal the gap in the used Cooking Oil disposal and identify stakeholders who will play a role in supporting the recycling of used Cooking Oil

2. METHOD

2.1 Type and Data Source

Pancoran Barat is one of the villages in Pancoran District, South Jakarta. Pancoran Barat is an area with a dense population. In almost every West Pancoran, it is easy to find food vendors, whether it be heavy meals or snacks. The crowded houses in West Pancoran are filled with families or people from Jakarta and nomads. In Pancoran Barat, many boarding homes accommodate immigrants who work in Jakarta or students who study in Jakarta.

2.2 Population, Sample, Analysis, and Sampling

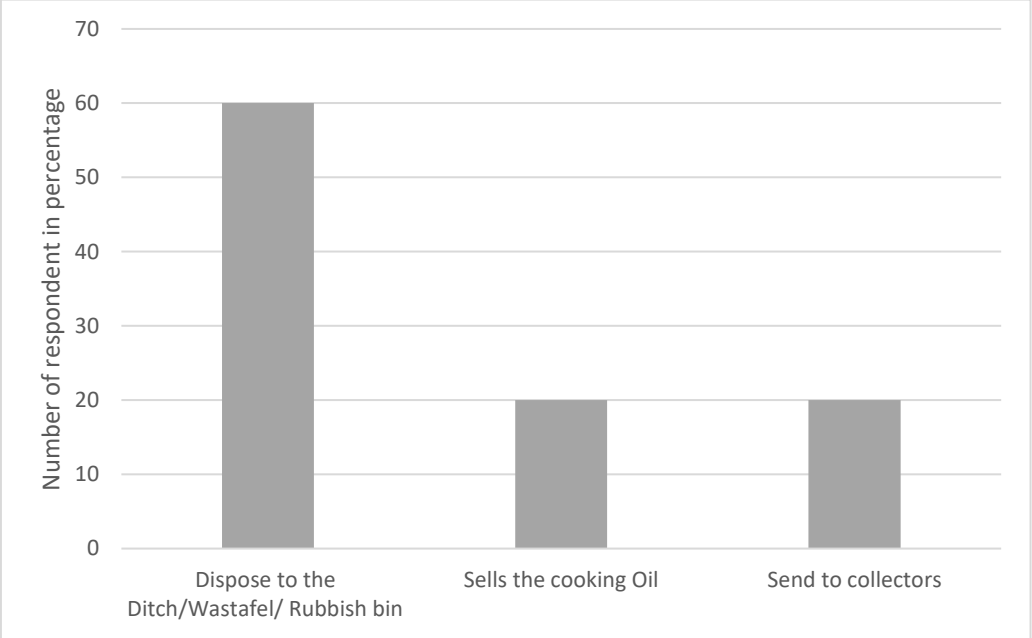
This study uses qualitative methods, involves collecting and analyzing non-numerical data to understand concepts, opinions or experiences. Data analysis using multiple linear regression. In regression analysis, the dependent variable is influenced by quantitative variables according to the scale and qualitative variables. Researchers chose forty people randomly in the West Pancoran area. There are three types of respondents: food sellers, homemakers, and students living in boarding houses. The researchers chose these people to see their point of view as users of cooking oil and producers of used cooking oil.

3. RESULT AND DISCUSSION

3.1 RESULT

The interview with five respondents from different backgrounds answered three questions. From the answers, it is implied that five respondents, as representatives of the community in Pancoran Barat, know Bank Sampah and are interested in delivering used cooking oil to Bank Sampah. They are even more motivated when they know they will be rewarded. However, they did not find any collectors in their community. They can search for collectors on any social media platform, but they may not realize they can do it. They can be members of a collector that is open to the public.

What do you do with the used cooking oil reservoir?



Graph 1. Respondent toward used cooking oil

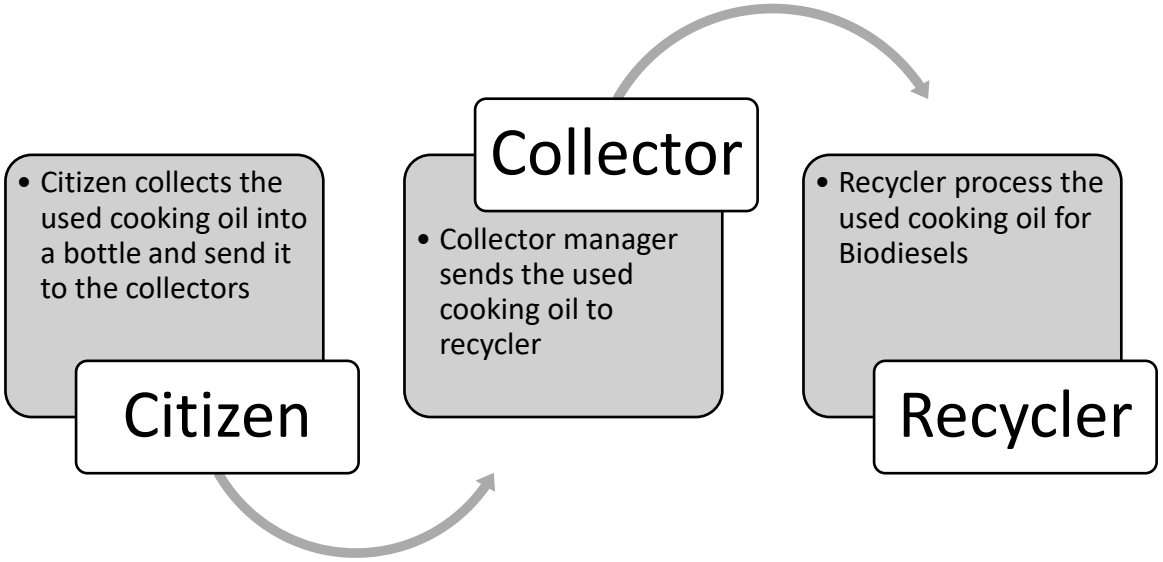
Graph 1 shows most of the respondent collects the used cooking oil in a plastic bag and throws it into a Ditch, wasteful, and rubbish bin. The second group of respondent collects the used oil cooking and sells it. Finally, the third group of respondent collects the used cooking oil.The Collectors is one alternative that can be applied by village administrators in the use of used cooking oil to improve environmental health. Based on an interview with one of the orange officers, the head of the city has made an effort to collect used cooking oil. The PKK organization also carries out activities under the authority of city supervision in processing used cooking oil. However, most people in Pancoran Barat have not received information about collecting used cooking oil. Therefore, it is necessary to disseminate evenly to every level of society. Consequently, it would be better if the kelurahan made a collector and promoted it to the community. Furthermore, the community is involved in processing used cooking oil, and from the processing results, they can generate profits.

3.2 Discussion

A circular economy protects materials in circulation for as long as possible. A circular economy uses a systems-focused on commercial activities that are recovering by strategy, allowing resources used

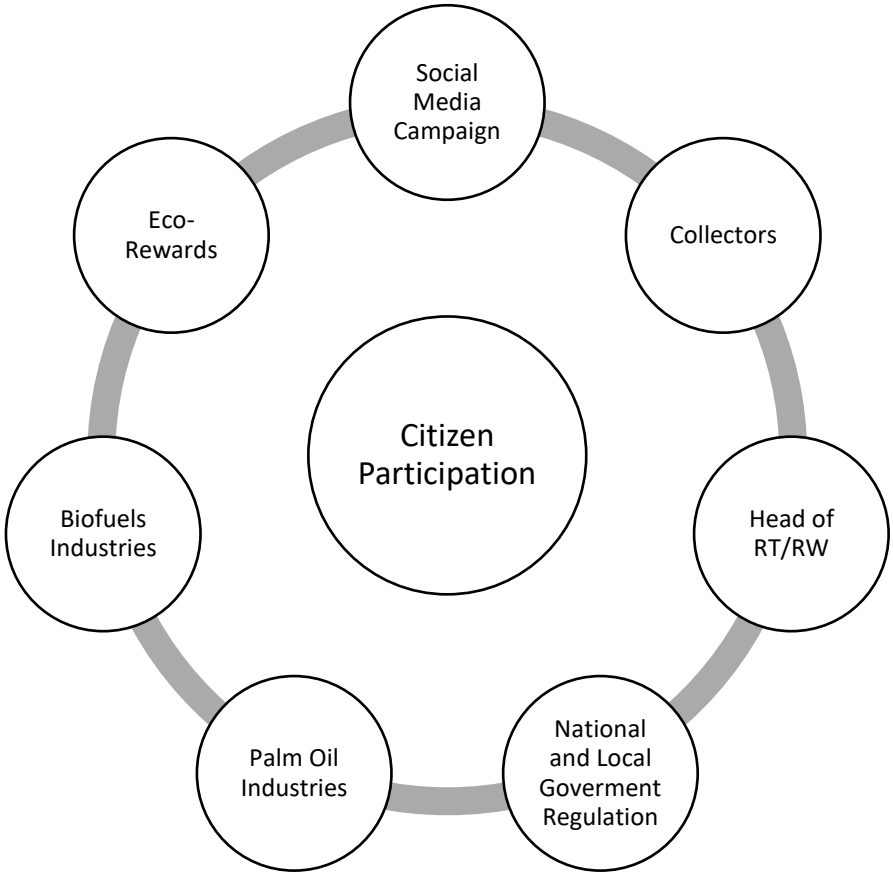
in such processes and activities to maintain their maximum value through the more significant design of resources and systems [17]. It is a change to the model in which resources are extracted, made into commodities, and then become trash. Instead, a circular economy lowers raw material use, redesigns materials to be fewer resources, and retakes "waste" as a supply to produce new materials [18], [19].

Citizens disposed of used cooking oil in trash cans, 39% in gutters, 6% on the ground, and 4% gave it to domestic workers. This shows the lack of public awareness in Jabodetabek about the harmful effect of used cooking oil on the environment [20].



Graph 2. The supply chain flow in used cooking oil

Used cooking oil can be processed into several more valuable products [21]. One of them, used cooking oil, can be processed into biodiesel. Biodiesel is a fuel that can replace diesel [22]. Processing used cooking oil into biodiesel is estimated to positively impact the economy, health, and environment. In addition to reducing the potential for environmental pollution, processing used cooking oil into biodiesel minimizes the frequency of non-renewable natural resources processed into diesel [23]. In addition, used cooking oil can also be made into laundry soap [24]. The cooking oil used by most Indonesians is palm-based. Palm oil is classified as vegetable oil or oil derived from plants. The fat content in used cooking oil allows used cooking oil to be processed into laundry soap [25]. Three significant sources produced used cooking oil: household, restaurant, and industry.



Graph 3. 7 Stakeholders Supporting Citizen Participation Program in Used Cooking Oil

Seven components need to be considered for supporting community participation in the circular economy of used cooking oil waste:

1. Palm Oil Industries: producing margarine, vegetable fat, food oil, cooking oil, and specialist fats. It is also used to make derivatives for industrial use: fatty acids, soaps and cosmetics, industrial soaps, inks, resins, and methyl esters [26].
2. Biofuels Industries: processing waste to energy products for uses in biomass industries [27].
3. Eco-Rewards: offers rewards and incentives for schools, businesses, and communities to encourage residents [28].
4. Collectors: collect used cooking oil from citizens. Collectors are anyone who commits to Social Entrepreneurship.
5. Social Media Campaign: reach the target audience, engage with current and potential customers, create brand loyalty, increase website traffic, and drive sales [29].
6. Head of Rt: carry out socialization tasks to the community about the cooking oil recycle program and coordinate with collectors [30].
7. National and Local Government Regulation: regulations at the national and local levels are needed. The ministry of environment and forestry will draw up rules at the national level. At the same time, the governor can make regulations at the regional level and assisted by the relevant agencies [31], [32].

Citizen collaboration in a circular economy involves a group of people sharing their ideas and skills to achieve a common goal [33]. Working collaboratively, instead of individually, helps improve productivity and gives employees a sense of purpose in the organization. This collaboration will reduce soil and river pollution. In addition, the community also gets additional income from goods that have not been valuable so far.

4. CONCLUSION

Based on the research results and discussion described previously, it is concluded that used cooking is disposed of in inappropriate places. Therefore, stakeholders must collaborate to support citizens for recycling programs, such as Recycling Palm Oil Industries, Biofuels Industries, Eco-Rewards, Collectors, Social Media campaigns, Head of Rt, and National and Local Government Regulation.

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