

The Impact of Organic Waste and Used Cooking oil Transformation on Environmental Awareness: A Case Study In Padang City



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ABSTRACT: Improper management of organic waste has the potential to pollute the environment, attract pests, and contribute to greenhouse gas emissions. Additionally, indiscriminate disposal of used cooking oil can contaminate water and soil. Effective government policies aimed at managing waste into recyclable materials can significantly aid the economic development of local communities, particularly in the Pauh area of Padang City. This study aims to describe the implementation of organic waste management through biopores and the training of used cooking oil processing into aromatherapy candles for the Pauh community in Padang City. A qualitative approach was employed in this research, with data collection methods including Focus Group Discussions (FGD) and observations. FGDs were conducted through discussions with local neighborhood and community leaders (RW and RT) in Kapalo Koto, Pauh District, Padang City. Meanwhile, observations involved direct monitoring of the local environment in Kapalo Koto, Pauh District, Padang City. The primary data collected indicate the potential to reduce waste volume, enhance environmental awareness, and provide economic added value for the residents of Kapalo Koto, Pauh District, Padang City.

KEY WORDS: waste cooking oil, environment, transformation

INTRODUCTION

Kapalo Koto Subdistrict is one of the nine subdistricts in Pauh District, Padang City. Covering an area of 35.83 km², it is the largest subdistrict in Pauh District. In 2019, the population of Kapalo Koto was recorded at 10,046 people. Located near the Universitas Andalas campus, the majority of the residents in Kapalo Koto work as laborers, farmers, traders, and entrepreneurs. For healthcare services, residents typically visit the Pauh Community Health Center (Puskesmas Pauh). According to data from Statistics Indonesia (BPS) in 2019, Pauh District had six healthcare workers providing doctor services and 13 healthcare workers providing midwifery services. Accessing healthcare facilities is not a significant challenge for Kapalo Koto residents due to the availability of accessible transportation and the proximity of residential areas to healthcare centers. Therefore, distance is not a major barrier to obtaining healthcare services [1].

The Impact of Urbanization on Waste Management in Padang City

The increasing rate of urbanization has significant environmental impacts, particularly in the form of rising waste production. In Padang City, as in other major cities, the issues of organic waste and used cooking oil remain substantial challenges. Organic waste from food scraps and indiscriminate disposal of used cooking oil pose a serious threat to environmental health. Therefore, proper management efforts are essential to minimize negative impacts and transform this waste into valuable resources.

In tackling increasingly complex environmental issues, waste management has become a critical concern requiring special attention. Organic waste and used cooking oil are two types of waste that continue to grow in volume with population increases and evolving consumption patterns. Organic waste, such as food scraps and plant-based materials, constitutes the majority of household waste. Meanwhile, used cooking oil is often discarded carelessly after use, posing risks of soil and water pollution

The utilization and processing of organic waste and used cooking oil into economically valuable products can serve as an effective solution to mitigate their negative environmental impacts. Transforming organic waste and used cooking oil into useful products such as compost, biogas, biodiesel, or other innovations not only helps reduce waste but also promotes an eco-friendly circular economy.

DLAH Cirebon [2] describes used cooking oil as leftover frying oil that has been utilized to prepare food. This oil typically appears darker in color and emits a distinctive odor compared to fresh cooking oil. Although often regarded as waste, used cooking oil holds significant potential for recycling into various beneficial products.

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Challenges and Innovations in Urban Solid Waste Management

A major challenge frequently faced by urban solid waste management systems is the lack of financial resources. This issue often stems from insufficient dedicated government funding, low service fees that fail to cover full costs, unenforced tariffs, and the absence of data on the actual costs of services. This problem is widespread across the globe. For instance, in many Latin American countries, such as Argentina, municipal governments lack accurate knowledge of the true costs of solid waste management due to the absence of standardized methodologies or accounting systems [3]. Municipalities generally do not charge for waste services, and only a small portion of municipal funds is allocated to solid waste management. Argentina has undertaken efforts to calculate the total costs of its waste system to improve long-term sustainability. Under the World Bank-funded Integrated Solid Waste Management Project, the Secretariat for Environment and Sustainable Development (SAyDS) developed a tool known as the Urban Integrated Economic and Financial Matrix for Waste Management. This tool aids municipalities in understanding the real costs of services and the value of investments.

Amid these challenges, various innovations have emerged, leveraging organic waste and used cooking oil to create more valuable products. Examples include the transformation of organic waste into compost, liquid fertilizer, or biogas, as well as the utilization of used cooking oil as a raw material for biodiesel and soap production. These sustainable waste management practices reduce environmental impacts while generating economic value from materials previously deemed useless.

The transformation of organic waste and used cooking oil not only contributes to environmental management but also creates new opportunities for communities in the fields of economics and alternative energy. This approach aligns with the principles of a circular economy, where waste is converted into new resources, supporting environmental sustainability and enhancing human livelihoods. The growing complexity of environmental problems, particularly regarding domestic waste, is a serious concern in many cities, including Padang City. Organic waste and used cooking oil are two types of waste commonly produced by households, restaurants, and the food industry. If not managed properly, both can lead to environmental pollution. Decomposing organic waste without proper management generates methane gas, which contributes to global warming. Meanwhile, improperly disposed of used cooking oil can contaminate soil and water, threatening the health of ecosystems.

As part of its commitment to environmental care, the Padang City Government has made efforts to find innovative solutions to address these issues. The transformation of organic waste into compost and used cooking oil into alternative fuel or other value-added products is expected to reduce the negative impact on the environment. These waste management programs aim not only to reduce pollution but also to support the circular economy by transforming waste into new resources beneficial to the community.

Based on the above problems, this research is formulated with the question: "How is the implementation of the organic waste and used cooking oil transformation program by the Padang City Government, specifically in the Kapalo Koto area, Pauh District, as a form of environmental care? Additionally, what challenges are faced in the implementation of organic waste and used cooking oil management programs in Padang City?" This study aims to analyze the effectiveness and challenges of the organic waste and used cooking oil transformation program in Padang City, as well as to evaluate the extent to which the program has a positive impact on the environment and the community.

METHOD

This study employs a qualitative research design. Data collection techniques used include Focus Group Discussions (FGD) and observation. FGDs were conducted by facilitating discussions with local RW and RT members in the Kapalo Koto area, Pauh District, Padang City. Meanwhile, observation was carried out through direct observation in the surrounding environment of Kapalo Koto. Denzin & Lincoln (2009: 524) cite Gardner (1988) [9], who states that qualitative observation is used to understand the background with different functions: objective, interpretive interactive, and interpretive grounded. Qualitative observation freely explores concepts and categories in each event, subsequently giving meaning to the subjects of the study or observations. The data used in this research are primary data. According to Sugiyono [4], primary data refers to data directly obtained by the researcher, making the researcher the primary source. The data collection techniques employed are FGDs and observation. Irwanto, as cited in Istiyannah (2020), defines FGD as a process of gathering information about a specific phenomenon through group discussions. Observation is defined as the activity of recording phenomena with the help of various instruments and documenting them for scientific or other purposes (Hasanah, 2017).

RESULT

Used cooking oil is defined as oil that has been reused after frying, meaning it is oil that has been used for frying more than two or three times. "Consuming used cooking oil is harmful to health," said Dr. Ade Arsianti, S.Si, M.Si [5]. Used cooking oil is classified as household hazardous waste (B3). It contains various harmful chemical compounds, such as polycyclic aromatic hydrocarbons (PAHs), dioxins, and furans. These substances are carcinogenic (cancer-causing) and can damage organs if exposed to them for extended periods. In a similar vein, [6] mentions that used cooking oil contains compounds that can harm health. The use of used cooking oil also leads to the accumulation of fats, as the saturated fatty acids typically found in cooking oil—such as myristic acid,

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palmitic acid, lauric acid, and capric acid—can, when consumed in excess, increase cholesterol levels. These saturated fats undergo hydrolysis during digestion and are converted into molecules that accumulate as deposits in fat cells and tissues. In addition to harming the body, used cooking oil also harms the environment if disposed of improperly.



Image 1. Source: CNN Indonesia

Despite the health risks associated with the excessive consumption of used cooking oil, when processed properly, it holds various benefits and can serve as a new economic opportunity for communities. Here are some of the positive uses of used cooking oil:

1. **Laundry Soap:** Used cooking oil can be processed into soap with good cleaning properties.
2. **Additional Fertilizer:** After undergoing fermentation, used cooking oil can be turned into organic fertilizer.
3. **Lamp Oil:** Used cooking oil can be utilized as an alternative fuel for oil lamps.
4. **Floor Cleaner:** Used cooking oil can be processed into an effective floor cleaner.
5. **Aromatherapy:** Certain types of used cooking oil can be used as a base ingredient to create aromatherapy products.
6. **Poultry Feed:** Used cooking oil can be made into a supplement for poultry feed, enhancing growth.
7. **Biodiesel:** Used cooking oil can be converted into biodiesel, an environmentally friendly alternative fuel for diesel engines.
8. **Candles:** Used cooking oil can be transformed into candles with various scents.

By processing used cooking oil into these products, it not only prevents environmental damage from improper disposal but also provides new economic opportunities for the community.

Waste transformation refers to the process of converting waste into products that have both economic value and are environmentally friendly. Transforming organic waste into compost or liquid fertilizer, and used cooking oil into biodiesel, are concrete examples of applying this concept. In addition to organic waste, used cooking oil can also be transformed into biodiesel raw material. Biodiesel made from used cooking oil serves as a substitute for petroleum-based diesel because it is a renewable energy source and environmentally friendly.

This transformation process requires technological support and community involvement for sustainable management. Such initiatives have already been implemented by the community in Cilegon, Banten [7]



Selain masyarakat Kota Cilegon, masyarakat

Image 2. Source: Anatarafoto.com [7]

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In addition to the residents of Cilegon City, the people of Padang City, West Sumatra, have also transformed used cooking oil into an export commodity that creates new jobs, thereby supporting family economies. [8] Dicky Kurnia, the Chairman of the Minyak Saiyo Jelantah Sumbar Community, explained that used cooking oil is oil that is no longer usable and can pollute the environment if discarded carelessly. "For your information, used cooking oil is typically oil that has been used repeatedly and is no longer usable. Often, people dispose of this oil carelessly without considering the negative impacts of such disposal," he stated. Dicky further elaborated that used cooking oil can be processed into biodiesel, which is not only beneficial for the community but also helps reduce environmental pollution. "Therefore, we established a youth community dedicated to environmental care and addressing the improper disposal of used cooking oil by the public," he explained. He added that the community has collaborated with various parties, including municipal governments and the West Sumatra Environmental Agency. The activities of the Minyak Saiyo Jelantah Sumbar Community are shown in Figure 3 below.



Image 3. Saiyo Jelantah Oil Community of West Sumatra [8]

In addition to processed used cooking oil, organic waste can also be turned into economically valuable products. This has been implemented by [9] the community service team (Pengmas) of the Bina Desa Vocational Education Program, Universitas Indonesia (UI). Dewi Kartika Sari, S.E., Ak., M.S.Ak., CA., as the Head of the Bina Desa Vocational Pengmas Team, stated that the waste management training applied the 3R principles: Reduce, Reuse, and Recycle.

Reduce involves minimizing waste production as an initial step. This preventive effort aims to prevent waste accumulation. One way to do this is by using reusable shopping bags. "Next, Reuse means repurposing and reusing unused items to create new products. Finally, Recycle refers to processing waste into new items with added value," she explained.

This community service activity is illustrated in Figure 4 below



Figure 4. Community Service Activities by the Bina Desa Vocational Education Program, Universitas Indonesia (UI)

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The Padang City Government can implement methods for transforming organic waste and used cooking oil as efforts to preserve the environment through various approaches, including education, management programs, and collaboration with communities and local industries. The following are some methods that can be applied:

1. Processing Organic Waste into Compost and Liquid Fertilizer

- a. Household Composting: Training residents to process household organic waste into compost using methods such as composters or biopores.
- b. Liquid Fertilizer: Fermenting organic waste into liquid fertilizer, which can be applied to city parks or small-scale plantations. Benefits: Reduces the accumulation of organic waste at landfills, improves soil quality, and enhances plant fertility.

2. Biodigesters for Biogas Production

- a. Biogas from Market Waste: Utilizing large quantities of organic waste from traditional markets as the primary material for biogas production using biodigesters. This program can provide alternative energy for public facilities or be sold as a household resource.
- b. Community Use: Building small-scale biodigesters in densely populated areas to utilize organic waste as an affordable and eco-friendly energy source.

Benefits: Produces cost-effective, environmentally friendly alternative energy and reduces methane emissions from decomposing waste.

3. Recycling Used Cooking Oil into Biodiesel

- a. Collecting Used Cooking Oil from Households and Restaurants: The city government can provide collection points for used cooking oil at various locations, such as markets, restaurants, and households. This oil can then be processed into biodiesel.
- b. Collaboration with Local Industries: Engaging industries or small enterprises to manage used cooking oil into biodiesel, which can be used for government vehicles or sold as an alternative fuel.

Benefits: Reduces water pollution caused by the improper disposal of used cooking oil and creates a more environmentally friendly fuel alternative.

4. Environmental Education and Socialization Programs

- a. Awareness Campaigns on the Dangers of Used Cooking Oil: Organizing campaigns to educate the public on the health risks of reusing used cooking oil and its environmental impacts.
- b. Training on Organic Waste Management: Providing training to communities on utilizing organic waste for compost or alternative energy through workshops at the neighborhood or community level.

Benefits: Increases public awareness and involvement in environmental management efforts and fosters environmentally friendly habits.

5. Collaboration with Waste Banks and Local Entrepreneurs

- a. Waste Banks: Developing waste banks specifically for organic waste and used cooking oil, allowing the community to benefit through an incentive or reward system.
- b. Partnerships with Local Entrepreneurs: Collaborating with MSMEs and local entrepreneurs to process organic waste and used cooking oil as alternative raw materials for eco-friendly products.

Benefits: Creates new economic opportunities, expands collaboration networks, and optimizes sustainable waste management.

6. Monitoring and Evaluation of Programs

- a. Periodic Evaluations: Conducting regular evaluations to assess the effectiveness and impact of implemented programs and identify areas for improvement.
- b. Involvement of Academics and NGOs: Collaborating with academics and environmental NGOs to provide input and new innovations that can be implemented in the future.

Benefits: Ensures the sustainability and continuous improvement of environmental transformation programs.

In the Pauh District of Padang City, studies have shown that household waste management behaviors are crucial for effective waste handling. Training residents in processing household organic waste into compost using methods like composters or biopores can reduce waste accumulation at landfills, improve soil quality, and enhance plant fertility

CONCLUSION

The transformation of organic waste and used cooking oil is a concrete step in preserving the environment and supporting sustainability principles. Implementing this program in Padang City demonstrates that, with the involvement of the government and the community, especially the residents of Kapalo Koto Village in Pauh District, waste can be converted into valuable products.

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