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Public Perception of Circular Economy Implementation in Household Waste Management

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Abstrak: Household waste production continues to increase with population growth, urbanization and consumptive lifestyles, contributing significantly to total global waste. This trend indicates not only an increase in the quantity of waste, but also the complexity of its management, especially in urban areas. The circular economy concept offers a sustainable solution by utilizing the principles of recycling, waste reduction, and resource reutilization. This research explores the community's perception towards the application of circular economy in household waste management through descriptive qualitative method. The results showed that most communities understand the basic principles of circular economy, but the implementation of this practice is still constrained by the lack of education and supporting infrastructure. High environmental awareness is proven to contribute to the active participation of the community, while limited resources in rural areas hinder the equitable implementation of this concept. Collaboration between the government, private sector and communities is needed to improve infrastructure and provide sustainable education programs. This study confirms that the paradigm transformation of circular economy-based waste management is not only able to reduce the environmental burden, but also create new sustainable economic opportunities. The results of the study are expected to serve as a basis for policy development that supports the implementation of circular economy more widely and effectively.

Keywords : Circular Economy; Household Waste Management; Public Perception



INTRODUCTION

Household waste production has increased significantly due to population growth, urbanization, and changes in a more consumptive lifestyle. Data from the World Bank (2022) shows that globally, domestic waste accounts for about 45% of total solid waste, with estimated waste production reaching 2.01 billion tons per year and projected to increase to 3.40 billion tons by 2050 (Artamevia, 2023). In Indonesia, the Ministry of Environment and Forestry (KLHK) reported that domestic waste dominates the total waste by 65%, with organic and plastic waste dominating. This trend indicates not only an increase in the quantity of waste, but also the increasing complexity of its management, especially in urban areas. Without innovative and sustainable approaches, accumulation in landfills can pose a serious threat to environmental sustainability and public health.

Furthermore, the environmental impact of uncontrolled waste production is becoming increasingly evident. Research by Malihah et al (2023) highlights that global waste is being managed unsafely, causing soil, air and water pollution, and contributing to climate change through methane gas emissions from landfills. This situation is exacerbated by waste management policies that tend to be reactive rather than preventive, as well as low community participation in sorting and processing waste at the source. For this reason, a paradigm shift is needed in household waste management that does not only focus on disposal, but also on reduction, reutilization, and recycling, as offered in the circular economy concept. This approach not only reduces the burden on landfills, but also opens up new opportunities in a sustainable resource-based economy.

The circular economy concept offers solutions that focus on resource efficiency and waste reduction through a sustainable approach. According to Islami (2022), the circular economy aims to reduce waste by 80% compared to linear economic models that rely

on landfill. In the context of household waste management, circular economy principles such as recycling, reutilization, and reduced consumption not only reduce the burden on the environment, but also create new opportunities in terms of business innovation and employment. For example, organic waste management through composting methods not only produces high-value organic products, but also strengthens local food security. In the long run, this contributes to reducing dependence on limited new raw materials and focusing on reusing existing resources.

However, the implementation of the circular economy in household waste management faces significant challenges, especially regarding public awareness and participation. According to the Ministry of Environment and Forestry in 2018, the low level of environmental literacy and understanding of the circular economy concept is still a major obstacle in the community (Wiranti et al., 2023). In addition, inadequate infrastructure and inconsistent policies in supporting the implementation of circular economy also slow down the transformation. Therefore, there is a need for closer collaboration between the government, academia, private sector, and the community to comprehensively educate and implement the circular economy. Thus, circular-based household waste management can have a significant positive impact on environmental sustainability and a sustainable economy.

The implementation of circular economy in household waste management requires the active role of the community as the main actors responsible for waste management from the initial stage to recycling. According to Septiana et.al (2024), people who have a good understanding of circular economy principles tend to be more active in sorting, reducing, and recycling their waste. However, studies show that there is still a gap in the level of awareness and understanding of the community regarding the benefits of circular-based waste management. This low awareness is due to the



lack of access to comprehensive information and the lack of massive education programs from the government and community organizations. Therefore, it is important to develop sustainable education programs to raise public awareness of the importance of circular waste management, which not only contributes to waste reduction, but also improves quality of life and ecosystem balance.

In addition, community participation in the circular economy also requires the support of adequate infrastructure and supportive policies. According to Lasaiiba (2024), many regions are facing challenges in implementing circular economy due to the lack of high-tech waste management facilities such as digital technology-based recycling facilities or large-scale composting methods. Limited infrastructure makes it difficult for communities to separate and manage waste properly, which ultimately reduces the effectiveness of circular economy implementation. Therefore, there is a need for collaboration between the public and private sectors in developing facilities and policies that strengthen the implementation of the circular economy, which also includes directly empowering communities in this process.

Although more and more people are realizing the importance of circular economy-based waste management, the main challenge lies in how to turn these perceptions into concrete actions. According to UNESCO (2023), there is still an imbalance between the understanding of circular economy theory and practice in the field (Salsabila et.al. 2024). Many individuals may understand the concept in general, but have not fully engaged in its implementation due to lack of access to adequate infrastructure or the absence of sufficient incentives to support behavior change. Therefore, in-depth research on people's perceptions can provide important insights into the social, economic, and cultural barriers that hinder the widespread adoption of the circular economy.

In addition, in-depth empirical studies can help identify best practices that have been successfully implemented in specific communities. Several regions in Europe have successfully adopted circular economy principles in household waste management through direct community engagement, innovative technology implementation, and strong regulatory support (Wirjawan & Choandi, 2024). Adopting a similar approach in Indonesia requires a better understanding of the local context, as well as strategies tailored to the needs and challenges of communities in each region. Therefore, empirical research will provide a solid foundation for designing effective and sustainable solutions in the context of circular economy-based household waste management.

METHOD

A suitable research method to explore community perceptions of circular economy implementation in household waste management is descriptive qualitative method. This method allows researchers to deeply explore the views, experiences, and attitudes of communities related to circular economy-based waste management practices. In this research, in-depth interviews with 30 respondents from various backgrounds will be used to understand how communities understand and respond to the concept of circular economy. Participatory observations will also be conducted to directly observe how waste management practices in the daily environment, as well as to identify factors that influence community engagement. Additional literature study and document analysis will be used to strengthen the data obtained, thus providing a more comprehensive picture of the challenges and opportunities in implementing circular economy at the community level. With this approach, the research will provide detailed and contextualized insights into the social, cultural, and infrastructural aspects that influence the implementation of circular economy in household waste management.



RESULTS AND DISCUSSION

1. Community Perception of the Circular Economy Concept in Housewold Waste Management

A. Understanding the Concept of Circular Economy

The community's understanding of the circular economy concept shows that the majority of respondents understand the basic principles which include recycling, waste reduction, and resource reutilization. However, while this understanding is quite good in general, many still experience difficulties in applying the practices in their daily lives. This is due to the lack of education on circular economy and the lack of adequate waste management facilities. One respondent, Irwan, said,

"We know the importance of recycling, but facilities like a well-organized landfill aren't available in our neighborhood."

In many communities, facilities such as landfills or recycling centers are often not large enough or well-organized, hindering efforts to implement a circular economy. A study conducted by Affandi et al (2024) showed that these infrastructure limitations reduce the efficiency of the recycling process and increase the amount of unmanaged waste.

In addition, the lack of access to comprehensive information on how to properly manage waste is also a major challenge. Another respondent, Rani, said that

"Even though we already understand the principles of the circular economy, we still have difficulty knowing concrete steps in separating organic and inorganic waste."

The lack of ongoing socialization and outreach on circular economy practices exacerbates the situation, making it difficult for people to adopt environmentally friendly habits. In addition, individual awareness factors also influence how people manage waste. According to research, people who are less informed will tend to overlook the importance of sustainable waste management. Therefore, increased education through social media, seminars, and public campaigns are needed to improve people's understanding and engagement in the circular economy.

To overcome these challenges, it is important to improve adequate waste management infrastructure and expand collaboration between the government, private sector and communities. Collaboration between relevant parties is expected to create more effective solutions to support the implementation of circular economy. In an interview with Deni, an environmental activist, he stated that.

"Collaboration between the government and the private sector can improve waste management facilities that are still limited, so that people can more easily participate in circular economy practices."

With good cooperation, existing facilities can be improved and education can continue, so that the community is able to apply circular economy principles effectively and sustainably.

B. Scattering in Circular Economy Implementation

Implementing a circular economy faces a number of challenges that need to be addressed. One of the main obstacles is the lack of access to environmentally-friendly infrastructure. According to Dr. Dewi, an environmental expert,

"The lack of adequate recycling facilities makes the waste management process more difficult and less efficient."



Inadequate infrastructure means that a lot of waste cannot be optimally treated, so it ends up in landfills without a process that can support a circular economy. In addition, low environmental awareness is also an inhibiting factor. Mr. Andi, an environmental activist, stated.

"There are still many people who do not understand the importance of reducing waste through sorting or recycling."

The lack of environmental education makes people less engaged in efforts to create a more sustainable economic system. In addition, limited government support has also slowed down the development of the circular economy. According to research by Mukhlis (2024), the lack of budget allocation and strict regulations has slowed down the development of environmentally friendly infrastructure. Under these conditions, a close synergy between the government, the community, and the private sector is needed to raise awareness, improve infrastructure, and encourage policies that are more supportive of the implementation of a sustainable circular economy.

Improving access to environmentally-friendly infrastructure is an important first step to accelerate the implementation of circular economy. Infrastructure such as segregated landfills and recycling facilities can streamline the waste management process, so that waste that can be reprocessed can be maximized. In addition, there is a need for more vigorous environmental education to raise public awareness about the importance of reducing waste and supporting recycling. As stated by Dr. Dewi,

"Without sufficient awareness, the implementation of the circular economy will only become a difficult concept to implement in society."

Support from the government is also needed, both in the form of strict regulations and adequate budget for the development of environmentally friendly infrastructure.

Without commitment from all parties, including the community and the private sector, the circular economy is difficult to develop optimally. Therefore, stronger collaboration between all elements of society is needed to create an ecosystem that supports a sustainable economic system.

In facing these challenges, it is important for all parties to move together. The government needs to provide greater encouragement through supportive regulations and adequate budget support. The private sector can play an active role in developing more efficient recycling technologies, while communities must increase their awareness and participation in waste management. With strong synergy between the government, community, and private sector, the implementation of circular economy can be an effective solution to reduce waste and improve environmental sustainability.

C. Differences in Perceptions Between Urban and Rural Areas

This research shows that people in urban areas have a better understanding of the circular economy compared to people in rural areas. This was revealed through interviews with several respondents in urban areas who stated that they were already familiar with the practices of waste recycling, material reuse, as well as the application of renewable energy. One of the urban respondents, Mrs. Dwi, said,

"We have been running recycling programs in our communities for a long time. With facilities available such as waste banks and environmental education programs, it is easier for us to understand the importance of reducing waste."

The interviews support the finding that urban communities have better access to resources that support the circular economy, including education and technology that enable more effective implementation.



In contrast, communities in rural areas tend to face greater challenges in understanding and applying circular economy concepts. According to an interview with Mr. Surya, a farmer in the village, he stated,

"We do not have adequate waste management facilities. Every organic and inorganic waste is still often burned or thrown into the environment."

This shows that the lack of infrastructure facilities such as landfills and waste treatment technology makes it difficult to implement the circular economy. The interview shows that the lack of education supported by relevant institutions is a major obstacle in improving rural communities' understanding of the concept.

Circular economy itself is an economic approach that aims to reduce waste and maximize resource utilization through concepts such as recycling, reuse, and resource efficiency. The theory is supported by a systemic approach that integrates environmental, social, and economic aspects to create sustainability. Previous research, as revealed by Kristianto & Nadapdap (2021), shows that implementing a circular economy requires adequate infrastructure, access to technology, as well as public understanding of the economic and ecological benefits of this system. In the context of urban communities, the existence of infrastructure such as waste banks and environmental education programs are key elements in supporting the implementation of a circular economy. This is in line with accessibility theory which states that the availability of facilities and resources affects the ability of individuals and communities to participate in sustainable practices (Msengi et al., 2019).

To address this gap, there is a need for closer cooperation between the government, private sector, and local communities. An interview with Mr. Wahyu, an environmental activist, confirmed the importance of cross-sector collaboration. He stated,

"We need support from various parties, both in the form of training, counseling, and providing facilities that are in accordance with the needs of rural communities."

Furthermore, this gap can be analyzed through sustainable development theory, which emphasizes the importance of integrating social aspects in the development process. As stated by Hanum & Endah (2024), sustainable development requires a cross-sectoral approach that takes into account local needs and empowers communities through education and active engagement. In this case, scientific discussions show that this kind of collaboration can accelerate the process of circular economy adaptation in areas that still lack facilities and education. Therefore, measures such as infrastructure strengthening, continuous education, and implementation of community empowerment-oriented programs are necessary to ensure inclusive circular economy practices across the region. Overall, the adaptation of circular economy in rural communities requires evidence-based interventions that integrate technical, educative, and collaborative aspects to ensure long-term success. This research provides important insights on how a community participation-based approach can bridge the gap between urban and rural communities in circular economy implementation.

2. Factors Affecting Community Participation in Circular Economy Implementation

A. Environmental Awareness

Environmental awareness plays an important role in encouraging communities to actively participate in adopting circular economy principles. Communities that have high awareness tend to be more active in managing waste sustainably, such as sorting organic and inorganic waste and supporting the reuse of recycled materials. According to an interview with one of the community leaders,



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"High environmental awareness makes people more concerned about environmental impacts and they are more active in recycling activities."

Scientific studies support this finding, stating that communities with high levels of environmental awareness show increased participation in various environmental programs that focus on waste management.

Most communities with high environmental awareness show more active participation in various waste management activities, both individually and in groups. They not only separate organic and inorganic waste, but also engage in community waste management activities, such as the waste bank program that has been implemented in some areas. A study mentioned that,

"Active community participation in sustainable waste management is closely related to a better understanding of environmental impacts."

This shows how high environmental awareness affects people's behavior patterns in managing waste. In addition, such participation also encourages collaboration between the community and the government to develop better solutions in waste management. As awareness increases, communities become more proactive in adopting more environmentally friendly technologies and methods in recycling waste. With better support from the government and a deeper understanding of the importance of the circular economy, it is expected that community participation will continue to increase over time.

However, even though environmental awareness is high, there are still some people who do not understand the long-term impact of waste management on the environment.

"Even though I have sorted the waste, I am not really sure if the impact is really

big," said one of the respondents in an interview.

Scientific studies show that this lack of understanding is due to the lack of adequate environmental education and lack of access to information related to effective waste management. Therefore, increasing environmental awareness needs to be supported by broader and deeper education programs to strengthen community participation in the circular economy.

B. Dukungan Infrastruktur dan Fasilitas

The support of adequate infrastructure and facilities is instrumental in increasing community participation in the circular economy. In an interview with one of the community leaders, he stated,

"With the existence of segregated waste disposal facilities and easily accessible recycling centers, people are more likely to be actively involved in waste management."

This statement is supported by research showing that communities with access to facilities such as segregated waste disposal sites were able to reduce waste that ended up in landfills by 30%, compared to communities without such facilities. In addition, available recycling facilities assist communities in separating recyclable materials, such as plastic, glass and metal, thus increasing the effectiveness of the waste management process.

Organized waste management programs also have a significant impact on community participation. According to research conducted by Sofyan & Solfema (2024), training and education programs that involve communities in waste management can increase their awareness and involvement in circular economy practices. In the program, the community was taught about the importance of sorting waste from its source, which then motivated them to care more about the



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environment. In addition, program participants showed an increase in engagement in recycling activities to reach 50% within six months. This shows that in the absence of education and training programs, community participation in the circular economy is likely to be limited, hence the need for support from various community-based initiatives.

Conversely, the lack of adequate infrastructure is one of the main challenges in implementing circular economy. As stated by one of the respondents in the interview,

"We have difficulty in implementing circular economy principles because of the lack of facilities such as segregated waste landfills and recycling facilities in our environment."

Scientific studies reinforce this finding by showing that people living in areas without such facilities tend to have lower participation in active waste management, with only around 20% routinely sorting their waste. Therefore, more serious attention is needed towards the development of infrastructure that supports better waste management to increase community participation in supporting circular economy principles holistically.

C. Peran Pemerintah dan Program Edukasi

The government plays an important role in supporting circular economy-related policies and education programs, especially to encourage increased community participation. Through various initiatives, such as training, socialization campaigns, and incentives, the government can help people understand and apply circular economy principles in their daily lives. Incentives such as reduced waste disposal fees, rewards for individuals or communities that are active in recycling activities, or subsidies for businesses that implement environmentally friendly technologies have been proven effective in increasing public awareness and engagement (Anaroga et.al, 2024; Nugraha et.al., 2024). For example, the

"Bank Sampah" program in some parts of Indonesia has successfully educated communities on the importance of sorting waste and utilizing waste for economic value. However, significant challenges remain, especially in areas with limited access to waste management facilities and education programs. Lack of resources and infrastructure in remote areas often hinders the equitable implementation of the circular economy (Susanto & Hermina, 2024). In addition, information gaps and lack of technical support make it difficult for communities in certain areas to actively participate. Collaborative efforts between the government, private sector, and community organizations are needed to overcome these obstacles. With an integrated approach, the circular economy has great potential to create a more sustainable environment and support community welfare (Rahmawati, 2024).

The government's role in supporting circular economy policies is crucial to create a conducive environment for community participation. Programs organized by the government, such as waste management training, socialization through social media, and economic-based incentives, have had a positive impact on community awareness and engagement in circular economy practices. In an interview with one of the training participants, he stated.

"This program helps us understand how to manage waste more efficiently and sustainably, so that we can actively contribute to protecting the environment."

However, significant challenges remain, especially in areas with limited access to resources and education. Rural or border areas often experience difficulties in accessing these educational programs, which leads to low levels of community participation in circular economy practices. In an interview with a community leader in a remote area, he revealed,



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"It is difficult for us to get training or facilities that support good waste management, so public awareness of the importance of recycling is still low."

Scientific research reinforces these findings by showing that areas that receive less attention from the government have significantly lower participation rates compared to areas that already have adequate support.

In addition, the lack of coordination between the government and the community is also a major challenge in supporting the implementation of the circular economy. The lack of effective communication makes people less aware of existing policies and programs, thus affecting their participation rate. Therefore, further efforts are needed from the government to ensure that education programs and circular economy incentives are equally accessible to all levels of society, without exception.

CONCLUSIONS

Based on research conducted on public perception of the concept of circular economy in household waste management, it can be concluded that the majority of people understand basic principles such as recycling, waste reduction, and resource reuse. However, there are a number of challenges, such as a lack of adequate education and facilities, that hinder the effective implementation of the circular economy. In addition, high environmental awareness has been proven to have a positive effect on community participation in circular economy practices. Collaboration between the government, the private sector, and the community is urgently needed to improve infrastructure and increase education to support the implementation of a sustainable circular economy. The difference in perception between urban and rural areas is also obvious, where people in urban areas have better access to resources that support the circular economy compared to rural areas. The importance of the government's role in providing education programs and infrastructure support is key to

expanding community participation in sustainable waste management

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