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Commercialization of Campus Waste-Derived Product at UPN "Veteran" Jawa Timur

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ABSTRACT

Universitas Pembangunan Nasional (UPN) "Veteran" Jawa Timur is one of the state universities located in the Rungkut Madya-Gunung Anyar area, Surabaya, where various activities take place daily. Based on the types of activities, the sources of waste at UPN "Veteran" Jawa Timur are divided into two areas: waste from academic buildings, offices, and cafeterias, and waste from gardens and streets. About 70% of the waste generated by campus activities has the potential for recovery. Organic waste from garden sweeping, cafeterias, and other activities can be processed through composting. In addition to composting, there is currently another alternative method with better economic potential, one of which is turning it into eco-enzymes. Commercialization is understood as a process of developing new products from creative industries, making a product more valuable and commercially viable. In this article, commercialization is also understood as a comprehensive technology transfer process, starting from selecting raw materials for a product and continuing through the production process until the product is produced and reaches the end consumer. With the available and applicable processing technologies, it is hoped that this commercialization activity can assist in promoting the transformation of waste into furniture, home décor, and eco-enzymes by business groups. It includes designing commercial packaging for products and creating management and promotion schemes for processed campus waste products at UPN "Veteran" Jawa Timur.

Keywords: Commercialization, campus waste, circullar economy, waste-derived product

Introduction

Waste is one of the very complex and extensive issues in a city, and it is also found in the education sector (Fitria et al., 2016). Higher education institutions or campuses are one of the places that generate a high potential for waste in a city (Fadhilah et al., 2011). Higher education institutions constantly experience quantitative growth in buildings as well as in the number of staff and students. The more people and their various activities there are, the more waste is generated, and it comes in various forms (Purnaini, 2011). According to Law No. 18 of 2008 on waste management, waste generated by campuses falls into the category of household waste produced by commercial, industrial, special, social, public, and other areas. With the various types of waste produced, effective and efficient waste management is needed. However, waste management at present is still largely conventional, limited to collection, transportation, and disposal, often ending up in a Final Disposal Site (TPA) (Lestari, 2014).

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two areas: waste from academic buildings, offices, and cafeterias, and waste from gardens and streets. Waste generated from gardens and streets, such as leaves, is composted and managed by the Faculty of Agriculture. However, waste generated from academic buildings, offices, and cafeterias is not well managed and is only collected, transported, piled up, and then burned in open areas to reduce its volume. Burning waste can lead to the loss of certain nutrients, like carbon, and if done continuously, it can cause pollution in the surrounding environment (Mulyani, 2014). Based on research conducted by Citrasari et al. (2019) on campus waste at Campus C of Universitas Airlangga, about 70% of the waste generated has potential for recovery. Organic waste from garden sweepings, cafeterias, and other activities can be processed through composting. However, besides composting, there is another alternative method with better economic potential, one of which is turning it into eco-enzymes.

Converting organic waste such as vegetable and fruit leftovers into eco-enzymes is part of an effort to address waste through changes in behavior patterns and the application of sustainable economic principles (Ginting, 2020). The enzymes prepared have the potential to be a very effective method for waste management. This procedure is quite simple and practical for breaking down materials that can be decomposed by microorganisms in a series of steps. The end result is a filtrate rich in amino acids and acetic acid (Dhiman, 2017).

In addition to household organic waste and leaves, plastic waste also has economic value when sorted and sold to collectors. However, to increase the economic value of plastic waste, it can also be processed back into plastic pellets. Besides being converted into plastic pellets, there are currently several movements that turn plastic waste into value-added goods. Commercialization is understood as a process of developing new products from creative industries, making a product more valuable and commercially viable. In this article, commercialization is also understood as a comprehensive technology transfer process, starting from selecting raw materials for a product and continuing through the production process until the product is produced and reaches the end consumer (Prasetyo, 2017).

With the existing and applicable processing technologies, it is hoped that this commercialization activity can assist in promoting the transformation of waste into furniture, home décor, and eco-enzymes by business groups. This includes designing commercial packaging for products and creating management and promotion schemes for processed campus waste products at UPN "Veteran" Jawa Timur. It is expected that these activities will support stakeholders managing campus waste management and utilization to make use of the value of waste generated from campus activities. The goal is that the application of a circular economy is not only focused on better waste management through increased recycling but also involves a comprehensive set of actions across various economic sectors. This includes efforts to improve resource efficiency and reduce carbon emissions.

Material and Methods

Universitas Pembangunan Nasional Veteran East Java is one of the leading universities in East Java, established on July 5, 1959. The UPNVJT campus is located at Jl. Rungkut Madya No.1, Gn. Anyar, Kec. Gn. Anyar, Surabaya, East Java. The policy direction and development of UPNVJT encompass all aspects such as the Tri Dharma of Higher Education (Education and Teaching, Research, and Community Service), Organizational, Financial, Human Resources, Infrastructure, and Collaboration fields. Currently, UPNVJT has 8 faculties with more than 10,000 students and over 600 faculty, staff, and employees. With the large number of students, faculty, staff, and employees actively engaged on the UPNVJT campus, the amount of waste generated is directly proportional to the number of people involved.

The target of this Community Service activity is one of UPNVJT's programs that serve the Gunung Anyar area in Surabaya, including the UPNVJT campus itself. With the implementation of this commercialization activity, it is hoped that waste management, both current practices and those not

yet implemented, can be further developed and commercialized for optimal management. Below is documentation of the current waste collection and disposal conditions at UPNVJT.

Figure 1. Several points of waste storage and collection locations on the UPNVJT campus

Results and Discussion

The implementation phase will be carried out in the Community Service activities at UPNVJT Campus, including Analysis of the Potential for Commercialization of Waste Generated on the UPNVJ Campus. Which Conduct a literature study related to the composition of educational waste, conduct field surveys to identify economically viable waste potentials, record the types of waste with potential for management and commercialization, record the types of waste that are currently processed or managed, dan compile the types of waste and potential recycling options.

Production trial of waste-derived product

Production trial was done by a collaboration with Environmental Engineering Student of UPN "Veteran" Jawa Timur. They have done a trial production of liquid fertilizer from rice is put all the ingredients into a container. Add 4 liters of water, Leave the container open for fermentation for 3-5 days, If a strong odor is detected, fermentation has been successful. Rice MOL acts as a decomposer to break down organic materials. Before use, strain the Rice MOL and dissolve 1 liter of Rice MOL in 5 liters of water.

Trial production of eco-enzyme is preparing all the equipment and materials for making eco-enzyme (with a ratio of fruit and vegetable waste : sugar : water = 3 : 1 : 10). Cut fruit and vegetable waste into smaller pieces. Clean the container from soap residue or chemicals. Add all prepared ingredients. Stir well (can be done by hand as the ingredients are not hazardous). Close the container until harvesting time (90 days) and store it in a dry and cool place inside the house. Open the container lid every day for the first two weeks, then every 2-3 days in the third and fourth weeks, and once a week in the fifth and sixth weeks. Then, do not open until harvesting time. After 90 days, strain the eco-enzyme using gauze or a sieve.

Figure 2. In the making of eco-enzym from waste of campus canteen and compost

Figure 3. in the making of soap and candle from cooking oil waste from canteen

After trial on making product form waste the next step is Product Standardization. Product standardization includes preparing a module for processing waste into useful and economically valuable products. Creating a module on waste processing is one way to standardize the product. This ensures that the produced products are processed using the same methods and compositions to maintain quality.

Logo and packaging

Creation of Logo and Packaging for Commercial Products for branding. Branding is an essential component of product commercialization. The creation of an attractive logo is expected to attract and establish the product's image to build awareness. Therefore, the logo and packaging model for UPNVJT campus waste products are created. A good logo can establish a strong connection and build brand identity awareness, making it easier for customers to recognize and recall the product (Andriana et al., 2023).

Product promotion scheme

Development Scheme and Product Promotion is essentials in commercialization. Once the products to be developed are known, a product concept and marketing strategy need to be formulated to align with distribution methods, promotion types, and target markets. To support product promotion, a marketing concept with words, videos, images, and prototype product packaging should be prepared. From here, the business analysis stage will be planned with customer feedback and

experience evaluation. The final stage is commercialization with presentation and socialization to UPNVJT stakeholders regarding waste potential and the potential products produced.

Promoting waste-derived products from campus waste within the framework of a circular economy involves several key stages, each crucial for the success of the initiative:

1. Product Development and Innovation: The first stage focuses on research and development to create innovative, eco-friendly products using materials sourced from campus waste. This involves identifying waste streams with the highest potential for conversion and designing products that are both functional and sustainable. Collaborations with local artisans or sustainable design experts can also enhance the creativity and quality of the products.
2. Production and Quality Assurance: Once product prototypes are developed, it's essential to set up a reliable production process. This stage includes selecting the right manufacturing partners, ensuring quality control measures are in place, and establishing efficient production workflows. Consistency and high-quality standards are essential to gain consumer trust and loyalty.
3. Marketing and Promotion: Effective marketing is crucial to raise awareness and drive demand for waste-derived products. This involves creating a compelling brand identity that communicates sustainability and circular economy values. Promotional efforts can include showcasing success stories, product demonstrations, and highlighting the environmental benefits of choosing these products. Utilizing social media, campus events, and collaborations with sustainability-focused organizations can help amplify your message.
4. Distribution and Sales Channels: Consideration should be given to how and where these products will be sold or distributed. This could include setting up an on-campus store, collaborating with local retailers, or establishing an online presence. Accessibility is key to ensuring that your target audience can easily purchase these products.
5. Education and Engagement: In parallel with product promotion, it's vital to educate the campus community about the benefits of a circular economy and their role in it. Workshops, seminars, and informative materials can help individuals understand the environmental impact of their choices and the positive contribution they make by supporting waste-derived products.
6. Feedback and Continuous Improvement: Finally, actively seek feedback from customers and the campus community to identify areas for improvement. Use this input to refine both the products and the promotion strategy continually. By engaging in a feedback loop, you can enhance the sustainability of the initiative and foster a culture of continuous improvement within the campus community.

By following these stages, your campus waste-derived product promotion scheme can successfully integrate the principles of the circular economy, reducing waste and contributing to a more sustainable and environmentally responsible campus environment.

Figure 6. Liquid soap from cooking oil waste prototypes

Conclusion

In summary, this comprehensive initiative at Universitas Pembangunan Nasional "Veteran" Jawa Timur (UPN "Veteran" Jawa Timur) highlights the pressing issue of waste management within higher education institutions, which generate substantial waste due to increased activities and population growth. The existing waste management practices, primarily focused on collection and disposal, fail to address the potential for sustainable waste utilization. However, through innovative approaches and collaborative efforts, this project seeks to transform waste into valuable resources while promoting the principles of a circular economy. The study conducted a thorough analysis of waste generation on the UPN "Veteran" East Java campus, distinguishing between different waste sources and identifying areas for potential recycling and commercialization. By adopting eco-enzyme production, liquid fertilizer creation, and other techniques, the project demonstrates that waste, especially organic waste, can be converted into useful and economically valuable products. Furthermore, standardization of production processes ensures product quality and consistency.

The project recognizes the importance of branding and packaging in promoting waste-derived products, with the creation of a distinctive logo and packaging designs to establish product identity and recognition. The product promotion scheme outlined encompasses critical stages, including product development, quality assurance, marketing, distribution, education, and continuous improvement, all aimed at fostering a culture of sustainability and circularity on the campus. Ultimately, the project at UPN "Veteran" Jawa Timur illustrates a holistic approach to waste management and commercialization, not only reducing waste but also engaging the campus community and encouraging responsible consumption. Through these efforts, waste is transformed into valuable products, contributing to a more sustainable and environmentally responsible campus environment while aligning with the principles of the circular economy.

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