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IMPLEMENTATION OF WASTE REDUCTION POLICIES AND SWEDISH ZERO WASTE MANAGEMENT IN INDONESIA TO REALIZE RESPONSIBLE CONSUMPTION AND PRODUCTION SDGS

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Abstract

This research aims to analyze the implementation of waste reduction and Swedish zero waste management policies in Indonesia to realize SDGS-responsible consumption and production. This research uses qualitative methods with descriptive analysis, the data sources obtained come from journals, websites, Twitter, and other social media. Data analysis techniques use Nvivo 12 Plus analysis techniques. The research results show several examples of the adoption of zero waste practices from Sweden in Indonesia, namely trash cans, which were inspired by "pantbanken" in Sweden, composting, and reusing used goods. The implementation of Zero Waste in Indonesia is also guided by the policies that have been established by the government regarding the reduction of waste in realizing SDGs point 12, namely Ensuring Sustainable Consumption and Production Patterns, is still in the early stages but several initiatives have emerged in various regions such as waste banks, Zero Waste communities, Zero Waste businesses. However, there are still obstacles to implementing Zero Waste in Indonesia, including a lack of public awareness, lack of infrastructure, low industry participation, and economic challenges.

Keywords: *Policies, Zero Waste, Lifestyle, SDGs.*

INTRODUCTION

The amount of waste produced today is influenced by population and living standards; the more advanced and prosperous a society is, the more waste it produces. The availability of land for final disposal sites (TPA) while the growth in waste volume occurs in a geometric series. Because it is unable to accommodate existing waste, this reduces the life of the landfill. Lack of technology and inadequate infrastructure, especially in developing countries like Indonesia, make the waste problem very complicated.

Indonesia faces a major waste management problem. With a large population and increasing urbanization, the volume of waste has increased dramatically. The main problems faced include inadequate waste management infrastructure, consumer habits that still use single-use products, and low recycling rates. According to the data found, Indonesia is one of the largest producers of plastic waste in the world, with most of the plastic waste not being managed properly. Indonesia is in fifth place as a country that contributes plastic waste to the Pacific Ocean, with total waste produced of 56.3 million tons per year. Most plastic waste in Indonesia ends up being thrown into the ocean, polluting the environment and organisms in the sea (Assyifa Eka Putri, 2023).

"KEMENKO PMK - National Waste Management Information System (SIPSN) data from the Ministry of Environment and Forestry (KLHK) for 2022, input from 202 districts/cities throughout Indonesia, states that the amount of national waste stockpiles has reached 21.1 million tons. Of the total national waste production, 65.71% (13.9 million tons)

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can be managed, while the remaining 34.29% (7.2 million tons) has not been managed well. The government, both central and regional, will continue to strive for and implement collaborative and persuasive policies and programs between stakeholders for proper waste management by prioritizing circular economic principles where there is an increase in economic benefits from waste. Collective awareness and community involvement in waste management is a form of social capital to create a clean culture as part of the identity and character of Indonesian society. "The Clean Indonesia Movement, as one of the pillars of the 5 National Mental Revolution Movements (GNRM), is expected to become a collaborative social movement that contributes to developing people's mental awareness and understanding of waste problems and moves to take part in waste management" (Coordinating Ministry for Human Development and Culture, 2023).

Garbage accumulation is one of the most common problems in metropolitan areas, especially in urban areas in Indonesia. Waste will continue to pile up due to the increase in population and community needs. If it is not processed properly, waste will produce piles that endanger the environment and every aspect of life. This has become a significant problem and even a cultural problem. According to research by the World Economic Forum, Indonesia is currently the second largest waste producer in the world after China (World Economic Forum, 2020).

The Zero Waste International Alliance defines “Zero Waste” as the responsible production, consumption and reuse of all goods, packaging and materials without polluting the environment by disposing of them on land, water or air (Bella Dwi Hastuti, 2021). Rather, it refers to preserving all resources through restoration as well as other waste. One approach to reducing pollution related to waste in the air, water and land is to implement a zero-waste system to overcome the problem of plastic waste. by using three techniques, namely turning waste into something valuable through recycling, burning waste to produce electricity, and mixing the remaining ash from burning with other building materials to replace sand in construction projects. Local settings serve as the foundation for sophisticated architectural visualization tools. This strategy uses high-tech architectural design for both the exterior and interior, along with reused waste materials to reduce waste through teaching (Carrico & Kim, 2014). Various high-tech architectural standards showing how waste management can be used to educate local residents can be found.

The Indonesian government has begun taking steps to support the implementation of the zero waste concept through various regulations and policies aimed at managing waste more effectively and sustainably. Republic of Indonesia Government Regulation Number 27 of 2020 concerning Specific Waste Management. This regulation focuses on reducing plastic waste, building infrastructure, and utilizing waste for energy. Introduce obligations for manufacturers to reduce packaging and facilitate more sustainable waste management. Through this regulation, it strengthens the implementation of zero waste in Indonesia. Establish a waste management hierarchy that includes reduction, reuse and recycling as top priorities. This regulation provides a clear framework for minimizing waste production and promoting zero waste practices in society.

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Zero waste lifestyle is a waste-free lifestyle which aims to reduce or even eliminate the production of waste that cannot be decomposed or recycled. There are several basic principles of a zero waste lifestyle, including: refuse, reduce, reuse, recycle (Sukmaniar et al., 2023). Zero waste also has benefits for the environment, such as avoiding negative impacts, conserving natural resources, saving money on single-use items, and encouraging a more minimalist and sustainable lifestyle. Some examples of a zero waste lifestyle that can be implemented at home include using cloth shopping bags or baskets when shopping, avoiding buying products with excessive packaging, buying items in large quantities (if possible) to reduce packaging, and many more.

According to PP no. 81 of 2012 concerning household and other waste management, waste management includes the processes of sorting, collecting, transporting, processing and disposing of waste, this waste management system aims to reduce waste sources (ATSDR, 2012). Indonesia continues to handle waste using archaic collection, transport and disposal methods. The waste management methods currently implemented are still not ideal, and there is still a lack of commitment and social awareness regarding waste management and its impacts. Referring to Law no. 18 of 2008 concerning Waste Management in the Business World, sanitary landfill systems are currently used in waste dumps, but open landfill systems are still in actual use. This is because no costs are incurred to prevent the installation of a sanitary landfill system (Directorate General of Spatial Planning, Department of Public Works, 2020).

Sweden is renowned for its extraordinary waste management achievements. They apply the zero waste concept which focuses on reducing the waste produced from the start. The waste management hierarchy in Sweden prioritizes waste prevention, followed by reuse, recycling, and finally energy processing from waste. Zero waste management is in line with the SDGs goals related to responsible consumption and production (SDG 12). By reducing waste, Indonesia can save natural resources, reduce greenhouse gas emissions, and contribute to more sustainable development.

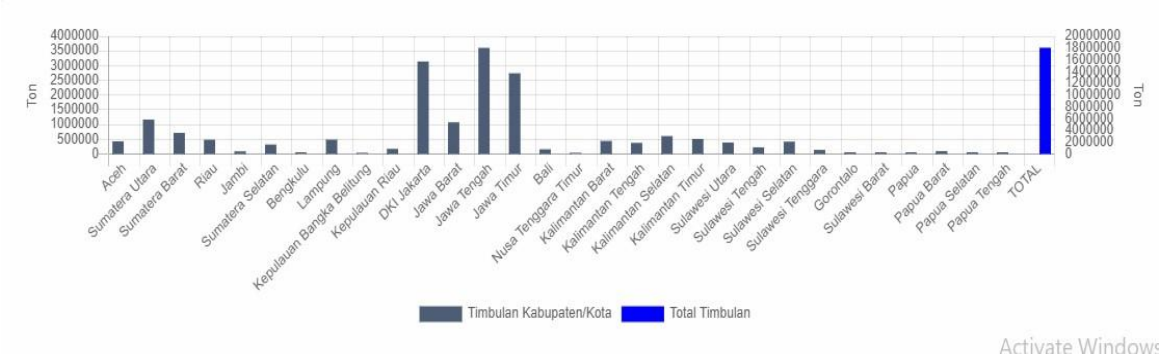

Figure 1. Graph of Provincial Waste Generation in Indonesia in 2023 (Source: SIPSN)

Based on the table above, it can be concluded that the handling of waste accumulation in several provinces in Indonesia is still at a very high rate, therefore the government must pay more attention and take concrete steps in dealing with the waste problems that still occur.

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One step that can be taken is adopting the Swedish waste management method. Waste in Sweden is processed through three steps, firstly filtering and separating the waste water, the results of the first step will be chemically processed and produce biogas from sediment, and finally, converting waste and nitrogen into nitrogen gas using special bacteria. This method is known as Waste to Energy WTE (Mita Defitri, 2022).

The adoption of zero waste in Indonesia faces several challenges such as lack of public awareness, inadequate waste management infrastructure, and a culture of consumerism which is the main obstacle. Indonesia has the opportunity to implement zero waste by developing public education programs, improving waste management infrastructure, and encouraging innovation in waste management. Collaboration between government, society and the private sector is very important to realize zero waste in Indonesia.

Based on the background above, the focus of this research is to explore how the zero waste management model that was successfully implemented in Sweden can be adapted in Indonesia, as well as how these steps can support the achievement of SDGs related to responsible consumption and production. It is hoped that this analysis will provide insight and practical recommendations to improve the waste management system in Indonesia with a more sustainable and effective approach.

LITERATURE REVIEW

Zero Waste Theory

Zero waste is an effort to encourage individuals to minimize waste with an integrated approach to maintain ecosystem sustainability (Bernadette et al., 2022). By using indicators, namely:

1. Waste Management Infrastructure
2. Government Policy
3. Public Awareness

The SDGs are a continuation of the eight MDGs which aim to reduce extreme poverty from 2000 to 2015. According to the UN, the SDGs are a joint global plan to end extreme poverty, reduce inequality and safeguard the planet by 2030 (Sophia Bernadette, Bertha Yunita Permatasari, 2022).

Zero Waste Concept

Zero waste is a market for basic needs until the following year. Zero waste is also a lifestyle and requires a process to live it (Asteria & Heruman, 2016). Zero waste is improving sustainability and environmental suitability which aims to be visionary, economical, efficient and moral of the zero waste movement (Cahyono & Budi, 2021).The zero waste concept is able to utilize inorganic waste into useful products that have economic value. To fully implement the zero waste concept, people's perceptions of waste management and consumption must change along with changes in individual behavior (Mesjasz-Lech, 2019).

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Life Style Waste

Lifestyle waste is a type of waste that results from people's lifestyles and consumption habits. This waste generally includes: product packaging, disposable items, electronic items, other items such as household furniture, toys, and other items that are no longer used. Lifestyle waste also has several characteristics, namely: difficult to recycle, increasing rapidly, dangerous for the environment. The negative impacts of lifestyle waste on the environment include pollution, climate change, and threats to wildlife. However, there are several solutions to reduce lifestyle waste, namely: reducing consumption, choosing environmentally friendly products, reusing items that can still be used, recycling and composting (Nurjamiludin et al., 2024).

SDGs point 12 Responsible Consumption and Production

Responsible Consumption and Production aims to ensure sustainable consumption and production patterns. The point is to encourage the efficient use of natural resources and minimize negative impacts on the environment due to human activities. Some of the specific targets in SDGs Point 12 include: reducing food waste along the food chain, achieving sustainable development, and utilizing resources effectively by 2030. Reducing global food waste per capita at the retail and consumer level. Achieve environmentally friendly management of chemicals and all forms of waste throughout the life cycle. By 2030, encourage the business world to implement sustainable practices. Educate consumers about sustainable lifestyles and encourage them to purchase sustainable products and services (Bernadette Dian Nugraheni, 2018).

To achieve this goal, there are several principles that must be followed by The 5 R's, namely refuse, reduce, reuse, recycle and compost. Implementation of SDGs 12 has several benefits such as conserving natural resources for future generations, reducing air, water and land pollution, preventing climate change, improving public health, creating new jobs in the environmental and recycling sectors. Even though it has many benefits, implementing SDGs Point 12 also faces challenges due to changes in consumer and producer behavior that require time and education, limited waste management and recycling infrastructure, initial costs for implementing sustainable production practices which are sometimes higher.

METHOD

A qualitative approach and descriptive analysis were used in this research. Providing a comprehensive description or explanation of a phenomenon, event, or item without using quantitative measurements is the goal of this type of qualitative research. not only relying on statistical data and numbers, this research aims to gain a thorough understanding of the subject matter. The aim of this research is to analyze the implementation of Swedish zero waste management in Indonesia to realize SDGs responsible consumption and production. The data sources obtained came from journals, web sites, Twitter and other social media. The data analysis technique uses Nvivo 12 Plus via the Crosstab feature. This method is a series of activities related to methods of collecting library data, reading and taking notes, and managing research materials.

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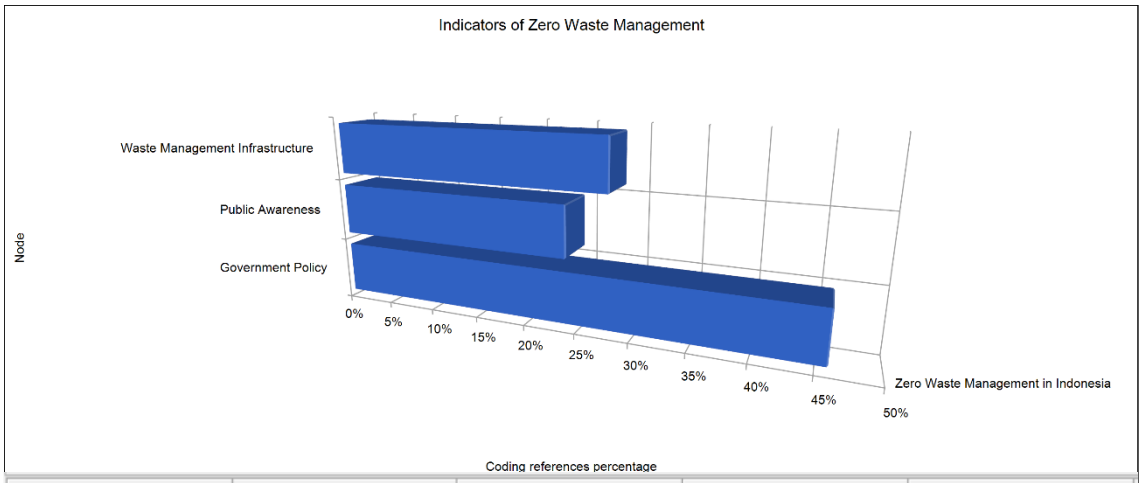
RESULTS AND DISCUSSION

Contents Results and Discussion



	Government Policy	Public Awareness	Waste Management Infrastructure	Total
Zero Waste Management i...	46.79%	24.77%	28.44%	100%
Total	46.79%	24.77%	28.44%	100%

Figure. Indicators of Zero Waste Management, (Data Processed by Researcher Using NVIVO 12 Crosstab Feature, 2024)

Waste Management Infrastructure

The graph above shows that in zero waste management in Indonesia, the first indicator, namely waste management infrastructure, accounts for 28.44% of waste management. This still needs to be addressed due to the lack of education at all levels of society. Waste management in Indonesia is still carried out using techniques that do not combine upstream and downstream factors or harmonize technical and financial components. Even though almost all regions have adopted the open landfill concept, some still focus on landfill or downstream waste management. Waste is piling up in landfills because some of them have started the process of moving them to sanitary landfills but still do not have a comprehensive plan to process or reduce waste upstream. In addition, compared to landfills with open dumping and sanitary procedures, state-of-the-art systems that use thermal and non-thermal processes still produce relatively small reductions in waste volume. Even deadly disasters such as landslides are still caused by the accumulation of waste in landfills.

Many locations in Indonesia, especially outside big cities, still have minimal waste management infrastructure. With a very large and growing population, Indonesia produces enormous amounts of waste every day. Due to inadequate waste management systems, landfilling is a quick solution to the problem. On the surface, landfill appears to be a cheap solution, but it has significant long-term social and environmental implications. This practice is indirectly detrimental because of the negative impact on public health, decreased property values around the landfill, and the costs of repairing ecosystems damaged by soil and water

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contamination. In addition, much of the economic potential of waste is wasted, including employment opportunities and value-added opportunities through recycling and composting.

Local capabilities are critical, especially in terms of providing adequate infrastructure. In many locations, waste management infrastructure such as collection points and recycling facilities is still relatively minimal or uneven. Communities find it very difficult to actively participate in waste management programs, including recycling or sorting, without adequate infrastructure.

Public Awareness

The graph above shows that the public awareness indicator is 28.44% in terms of public awareness and participation in waste management. This problem has several root causes. First, the big obstacle is the lack of understanding and access to information regarding the zero-waste principle. Low level of awareness of the need to change behavior to protect the environment, as well as low level of understanding in certain areas. This shows that the general public is still not aware of the need to enforce zero waste regulations. Waste management projects still have very minimal community participation. As a result, product reuse, waste segregation at source, and waste reduction are less successful. Implementation of these environmental policies is significantly hampered by the general public's ignorance about the zero waste approach and the importance of waste management. Community awareness and participation is still far from expectations. In addition, regulations that ignore environmentally friendly waste management cause an increase in environmental pollution (Achmad, 2024). Simple household initiatives can start the process of implementing Zero Waste to maintain sustainability in the future. Reducing waste through the use of reduce, reuse and recycle principles is very important.

A comprehensive review of the low level of public awareness regarding waste management and the role played by local governments in increasing public participation and awareness shows the interdependence between various factors, including government accountability, infrastructure constraints, law enforcement, and education. This analysis underscores the importance of community participation and examines the impact of local government capacity on overall waste management success. An important element in sustainable waste management is increasing public awareness. The low public awareness of waste management in Indonesia is caused by several things, including because many people still do not know the benefits of recycling, the impact of improper waste management on the environment, and how to sort waste. Waste management education is not well coordinated, rarely carried out, or only targets certain community groups.

Therefore, many people are not aware of the direct impact of their daily behavior related to waste on the environment and public health. Then the community's lifestyle can have an impact on efficient waste management. Littering, using single-use plastic, and not throwing away trash are common in many areas. This shows that community norms are not enough to encourage more environmentally friendly behavior. Behavior change takes time, and often requires role models from the wider community or from the surrounding environment. Recycling centers and waste banks are examples of waste management

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facilities that support, but are often difficult to access. Waste is still transported in many places without being sorted, and there are not many facilities for recycling or composting. Because there is no clear and easy-to-use system for sorting household waste, misunderstandings arise among the community.

Government Policy

The graph above shows that in the government policy indicator the percentage is 46.79%. In this regard, the government has ensured that there is binding legal certainty regarding policies governing waste management in Indonesia as stated in the following regulations: Law Number 18 of 2008 concerning Waste Management is one of the laws and regulations containing regulations on waste management in Indonesia, Law Number 32 of 2009 concerning Environmental Management and Protection, Government Regulation Number 81 of 2012 concerning Management of Household Waste and Household-like Waste, Regulation of the Minister of Environment No. 13 of 2012 which outlines the standards for implementing 3R in TPA, Regulation of the Minister of Public Works of the Republic of Indonesia Number 03/PRT/M/2013 concerning Provision of Waste Infrastructure and Facilities for Handling Domestic Waste and Similar Types of Waste (Nurcahyo & Ernawati, 2020).

Local governments are responsible for waste management in accordance with applicable regulations, but successful implementation depends on community involvement. However, local governments sometimes lack the resources needed for infrastructure, law enforcement, education, and good planning. This can be a barrier to increasing community knowledge and participation in waste management (Lu et al., 2021). A thorough examination of the role of local governments in waste management shows significant barriers, especially in terms of limited resources and community involvement. Although local governments are required to manage waste in accordance with applicable regulations, community involvement is essential for effective waste management. However, many regions struggle with resources for planning, law enforcement, infrastructure, and education. These limitations can make it difficult for communities to learn about waste management and participate in it.

Adoption of Swedish Zero Waste in Indonesia

Indonesia is currently facing significant challenges in waste management as a result of its population and economic growth. Inspired by Sweden's success in implementing the zero waste idea, Indonesia continues to incorporate the best practices from the Scandinavian country to achieve the same goal. Sweden and Indonesia both emphasize the importance of waste prevention in achieving zero waste management. This is achieved through the use of environmentally friendly products, the implementation of supportive policies, and public education and awareness campaigns.

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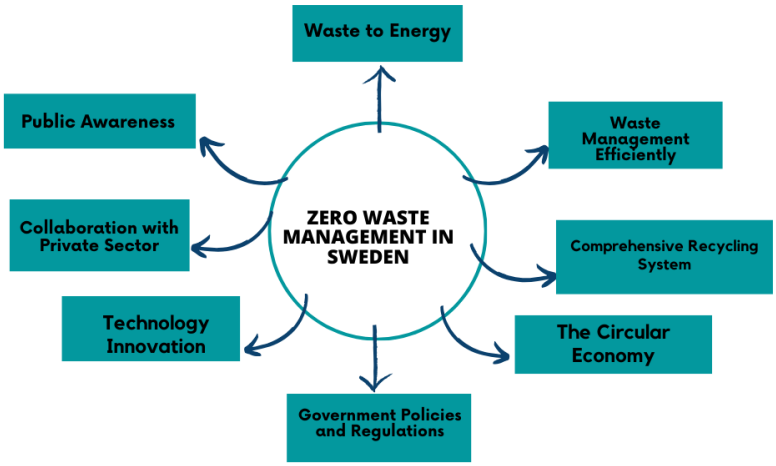

Figure 4. Zero Waste Management in Sweden, (Mind Map processed by, Researcher, 2024)

Sweden is one of the countries that is a pioneer in implementing the concept of zero waste. The goal of zero waste is to produce as little waste as possible through recycling, reusing goods, and reducing waste. One country that has a high success rate in waste management is Sweden. They practice a waste to energy (WTE) policy, which involves processing waste to produce energy that can be used later. WTE can be an alternative when throwing waste into landfills is no longer a solution. In addition to managing waste accumulation, WTE can reduce carbon emissions and offer a cheap source of energy. Sweden's waste management system is very efficient. In Sweden, 99% of household waste is recycled or put to better use through various techniques, including waste to energy, composting, and recycling. In Sweden, less than 1% of waste goes to landfill. In Sweden, all municipalities are required to ensure that certain household waste is recycled or disposed of. This includes waste categories such as organic waste, food, bulky waste, residual waste, and hazardous household waste that is not covered by extended producer responsibility. It is up to the municipality to control how they handle their waste. About 40% of cities manage their waste management within a municipal organization, while 60% collaborate with other cities. Municipal corporations, joint political entities, and municipal associations are some of the ways this collaboration occurs. Private companies handle the majority of waste collection and processing in many cities.

However, there are some differences in its implementation in the field, due to different conditions and contexts such as infrastructure, where Sweden has a more advanced and adequate waste management infrastructure than Indonesia, the level of public awareness in Sweden is generally higher towards the environment than in Indonesia, the involvement of businesses in the private sector in Sweden is more active in supporting zero waste practices than in Indonesia Trash bins, modeled after the Swedish “pantbanken”, or waste banks, make it easy for everyone to exchange recyclable waste for cash or other products. These are just a few examples of how Sweden applies zero waste principles in Indonesia. In

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addition, composting and reusing used goods are common practices in Sweden and Indonesia, where this is done by many MSMEs and communities. Although there are many similarities and ideas that can be taken from Sweden, there are still several obstacles that Indonesia must overcome before it can fully adopt zero waste management. These include low public knowledge about zero waste and its benefits, lack of infrastructure, and limited resources.

Implementation of Zero Waste in Indonesia in realizing SDGs

Indonesia, with the fourth largest population in the world, is not free from the problem of mounting waste. This is a major challenge in environmental management. The Zero Waste concept is present as a potential solution to realize the Sustainable Development Goal (SDGs) point 12, namely "Ensure sustainable consumption and production patterns". Sustainable Development Goal (SDG) 12 is "Ensure sustainable consumption and production patterns." Reducing the negative impacts of excessive and inefficient production and consumption on the environment is the goal of this goal. Moving from an incremental to a preventative approach Although nations differ in their enthusiasm for enforcing environmental rules, they all share a commitment to continuous development. The approach's goal is to gradually lower the severity of difficulties (Greyson, 2007).The principles of sustainable production and consumption center on effective resource management, minimizing waste, and ensuring that goods produced and consumed cause the least damage to the environment.

Zero Waste is a concept that aims to minimize or even eliminate waste produced. This is done through several steps, such as: Reduce, which is reducing the use of unnecessary goods and services. Reuse, which is reusing items that can still be used. Recycle, which is recycling waste into new items. Refuse, which is refusing to use disposable items. Rot, which is converting organic waste into compost (Mori-Clement, 2019). In order to achieve SDG point 12, Zero Waste is still being implemented in Indonesia, but several projects have been launched in various areas. Here are some examples: Waste banks are organizations that help communities to conserve and sell sorted waste.

Waste banks have been implemented throughout Indonesia and have proven successful in increasing community involvement in waste management. Communities dedicated to implementing a zero-waste lifestyle are known as Zero Waste Communities. Typically, these communities plan workshops, clean-up projects, and educational events. Zero Waste Business: More and more companies are implementing zero waste practices, such as adopting environmentally friendly packaging and reducing plastic use. To further help achieve SDG Point 12, Zero Waste is also implemented in Indonesia through providing packaging-free products, encouraging customers to shop in their own containers to reduce plastic waste, converting organic waste into plant-friendly compost, recycling items that are still in good condition to avoid waste, and many more. Education and public awareness initiatives are also needed to raise public awareness of the importance of implementing zero waste.

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The implementation of the Zero Waste concept in Indonesia is an important step in supporting the Sustainable Development Goals (SDGs), especially in achieving goals related to the environment, health, and sustainable development (Mesjasz-Lech, 2019). The Zero Waste concept aims to reduce waste production to a minimum or even zero point, by maximizing reuse, recycling, and reducing waste from the source.

Barriers to Zero Waste Implementation in Indonesia

Indonesia is implementing the Zero Waste concept to improve waste management. However, there are still several obstacles that must be overcome, such as the lack of public awareness in reducing waste. Many people are not aware of the benefits of the zero waste concept. Conventional practices such as pollution and overuse are still common. Not all regions have the same infrastructure to manage waste sustainably, including efficient recycling programs and organic waste processing. Low industry involvement and lack of government support Many companies still produce their products with a lot of packaging and little involvement from the sector. Many companies still produce products that require a lot of packaging and are not beneficial to the environment.

One way to reduce waste in Indonesia is to implement zero waste regulations in businesses that produce a lot of waste. Implementing a zero waste system requires a lot of costs, especially in terms of waste management and public awareness campaigns. Inadequate funding and adequate technology to enable a Zero Waste program. Collaborative efforts from various stakeholders are needed to overcome these obstacles, including: The government must educate and provide information to the public about Zero Waste, as well as develop the necessary infrastructure to facilitate the implementation of Zero Waste. As businesses and sectors must incorporate the Zero Waste concept into their operations, the private sector can also play a role. In addition, the community must also change their way of life by integrating the Zero Waste idea into their daily lives.

CONCLUSION

Based on the research results, it can be concluded that Zero Waste is the responsible production, consumption, and reuse of all goods, packaging, and materials without polluting the environment by throwing them on land, water, or air. To achieve this goal, there are several principles that must be followed The 5 R's namely refuse, reduce, reuse, recycle Rot (Compost). Some examples of the adoption of zero waste practices from Sweden in Indonesia are trash bins, inspired by "pantbanken" in Sweden, composting and reusing used goods. The implementation of Zero Waste in Indonesia in realizing SDGs point 12, namely Ensuring Sustainable Consumption and Production Patterns, is still in its early stages, but several initiatives have emerged in various regions such as waste banks, Zero Waste communities, Zero Waste businesses. However, there are obstacles in the implementation of Zero Waste in Indonesia, including lack of public awareness, minimal infrastructure, lack of government support, low industry participation and economic challenges. In facing these challenges, efforts are needed from the government, private sector and society.

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