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Community Perceptions of The Challenges and Opportunities of Building an Eco-Industrial Park

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Abstract

This research aims to find out the community's perception of the challenges and opportunities of building an eco-industrial park. This research uses a qualitative approach with data collection methods through interviews. The sample of this research is in gen-Z with accidental sampling method so that a sample of 116 respondents was obtained. The results showed that some people understand the importance of maintaining ecological balance in various industrial activities in the hope of reducing waste. However, regarding the eco-industrial park (EIP), there are still people who do not fully understand the concept of EIP and how to implement it. The EIP concept provides the benefit of encouraging innovation and resource efficiency. Support from the government, industry, academics, researchers, and the general public is still needed in order to jointly build an industrial park with the EIP concept.

Kata kunci: Eco-Industrial Park, Community Perception, Industrial

1. Introduction

Climate change and environmental degradation have become global issues that have become pressing for industry, government and the general public. Climate change refers to long-term changes in temperature and weather patterns either naturally occurring or due to human activity. World Bank (2023), co2 emission data in 2017 reached 34.6 (kt) and increased in 2018 to 36.56 (kt). This situation shows the amount of carbon emissions generated from various things so that various methods, strategies, policies, and awareness from various parties are needed so that it does not continue to increase. The increase in carbon emissions, the occurrence of land degradation, water and air pollution forces us to look for sustainable solutions in managing industrial activities. World Bank data (2023) shows that in 2019, carbon emissions declined to 35.47 (kt) and in 2020 the decline was high enough to reach 33.56 (kt). This shows that the decline in carbon emissions was caused by a variety of things including perceptions of the long-term impacts of carbon emissions, land degradation, and so on.

Carbon emissions, land degradation, and other environmental damage can be caused by various factors including economic development that does not go hand in hand with the environment. On the other hand, sustainable development should be able to create ecological balance. Development must have an impact on comprehensive welfare, not only oriented towards economic growth but paying attention to aspects of environmental quality which ultimately affect the level of quality of life of the community (Farhan, 2021). Regarding land degradation, in Indonesia it is always increasing in size. In 1968 it was reported that land degradation was 20 million ha, in the 90s it was 40 million ha, and in 2008 it reached 77 ha. Degraded land in agricultural cultivation areas became critical such as damaged, barren, and bald covering 18 million ha and in 2003 reached 23.2 million ha. The impact of this degraded land can be a source of disaster and can even play a role as a factor in accelerating global warming (Wahyunto & Dariah, 2014). According to Utami (2019) egradation can occur due to climate change and climate change can occur due to human activities such as industry.

Activities in the industrial sector are activities with great development and can provide benefits in the Indonesian economy and even become one of the sectors contributing greatly to gross domestic product over the past ten years. But on the one hand, industrial activities can create waste that pollutes the environment, whether solid, liquid, or waste that pollutes the air (Wibowo et al., 2023). Even According to Hidayat (2018), Setiawan (2020), dan Andarini et al., (2016), sometimes the rapid growth of industry almost always results in a decrease in

environmental quality. Sometimes there are even conflicts between the industry and the community regarding welfare gaps and the potential for environmental pollution due to industrial activities.

One concept that has emerged as a response to these challenges is the concept of an eco industrial park (EIP). The eco industrial park concept will combine various principles of sustainability and green economy in the management of industrial estates. The goal is to reduce negative impacts on the environment and increase resource efficiency. An industrial area with the concept of an eco-industrial park is an industrial community or a group of industries in a shared area with all industries working together to improve environmental, economic and social performance through collaboration related to environmental and resource management (T. Setiawan et al., 2020).

The concept of eco-industrial park (EIP) is an industrial system that is planned to exchange materials and energy in order to minimize the use of raw materials and energy, waste and build a sustainable economy which prioritizes maintaining ecology and building social relationships between industry players (Prasetya, 2007); (Sumitro, 2015); (Sulistyaningsih & Kulsum, 2024). However, the EIP concept is not only about reducing emissions or managing waste, but includes optimizing resource use, improving energy efficiency, and establishing industrial symbiosis. Related to symbiosis in the EIP concept is the process where waste is not disposed of but can be used as raw material by other industries. This is a good symbiosis because it can reduce production costs and increase competitiveness. This situation is because waste from other industries can become industrial raw materials which ultimately creates a more closed and efficient cycle.

The application of the eco-industrial park is not without a view such as how to view the industrial area and manage it. The application of the area with the concept of eco-industrial park can also not only be done by one party but the need for cooperation from various parties and from various scientific fields to create an area that really provides benefits to the economy and benefits to the environment. Social, economic, and environmental aspects must be applied simultaneously so that parties such as the government, entrepreneurs, and the general public work together to realize a sustainable industrial area.

Looking at other challenges, these relate to the initial costs of creating an eco-industrial park such as the high initial cost of building infrastructure that supports the principles of an eco industrial park. This investment is related to waste treatment facilities, renewable energy systems, and various environmentally friendly infrastructure. Although in the early stages of this industrial concept there are high initial costs, in the long run, this can result in savings and provide greater economic benefits due to efficiencies and reduced operational costs. Not only that, there are technical challenges such as the implementation of green technology and environmentally friendly practices that require specialized knowledge and skills that are not necessarily possessed by all industries. This is because in the eco-industrial park concept, every industry in the area has a symbiotic relationship that is mutually beneficial so that the knowledge and skills of human resources are needed to support it. This means that support from academics or research institutions is needed to provide science and technology-based solutions that can be applied in the field.

Regarding the government side, support for implementing eco-industrial parks is very important related to policies and regulations that encourage sustainable industrial practices including strict environmental law enforcement in order to become the main driver for industry to create industrial concepts with the EIP model. However, it is not enough for the government alone to provide support. If the government provides support but the industry and the community do not, then this concept is difficult to implement. Various parties including the government, industry, society, academics and researchers must work together so that this concept can be implemented properly. Adopting this model and implementing it well can lead to carbon reduction, efficient waste management, and reduced dependence on finite natural resources. In fact, if this concept is implemented well, the relationship between companies in the industrial area will create a more cooperative and collaborative communication.

The positive impact of the eco-industrial park concept if implemented will provide benefits for various parties. However, community perceptions and knowledge related to this concept have not been fully maximized. It can be seen that not all people understand the concept of eco-industrial park which is shown from the knowledge that is not maximized, there are still people who are not critical regarding environmental issues around the industry, and do not understand the community regarding how to implement the concept. The importance of community understanding to create an eco-industrial park concept area is because community support is one of the factors that support its implementation. This research aims to explore the challenges and opportunities in building an eco-industrial park. By understanding community perceptions, it is hoped that in-depth insights can be obtained regarding how to develop a sustainable industrial area from the community's side.

Industry is an activity that processes raw materials, semi-finished materials, or finished goods into goods that have value (Wachadah et al., 2023). The industrial sector is a strategic sector in the national economy due to its ability to address employment issues. In the development process, this sector is a priority sector because it has a 'leading sector' role for other sectors (Veriyanto & Yasin, 2023). The rapid growth of the industry in the global and domestic markets has led to competition and various risks (Julianto & Suparno, 2016). In general, the existence of industry can help the national economy, but on the one hand, industry also has various risks that must be considered. One of the impacts of the development of industry is the impact on the environment both pollution, shrinking the area of tropical forests, melting ice sheets at the north and south poles, thinning the ozone layer, pollution, and others (Bisyafar et al., 2023).

Eco-Industrial Park (EIP) is an industrial estate development concept that prioritizes environmental friendliness in all fields. This concept is a sustainable concept to maintain the stability of natural resources into the future. Eco-Industrial Park is an industrial area or an area in which there are various industries that prioritize protecting the environment. This concept gathers various factories and service businesses in one area that unites economic, environmental and social. The application of EIP can reduce damage to the environment through effective waste management, low emissions, and efficiency in energy use. The goal of EIP itself is that economic activities and industrialization can still be carried out but pay attention to environmental aspects, resources, and sustainable economic life (Rambe et al., 2024).

2. Research Methods

This research is qualitative research to understand phenomena, experiences, or understand concepts through the collection and analysis of non-numerical data (Sugiyono, 2017). This method will focus on in-depth exploration and interpretation. In the research conducted, quantitative research methods were carried out by collecting data through interviews with respondents.

The population is a whole group of individuals, objects, or phenomena that are the focus of this study, including all elements or attributes set by the researcher as inclusion criteria (Ahyar et al., 2020); (Sugiyono, 2017); (Priadana & Sunarsi, 2021). The population in this study is all people in Lampung Province because the Lampung region is the gateway to Sumatra and according to Purwanto (2023) is a strategic province because it is a gateway across two pending economic regions namely Sijori (Singapore, Johor, and Riau) and the national market center (Jakarta), as well as western West Java. This research will focus on generation Z (gen-Z) considering that this generation grows up with wide access to information and tends to get information related to the environment more easily. Moreover, this is the generation that will dominate the workforce in the future. Then the research sample is a small group of parts of the population to be observed and analyzed. The sample in this study will use the accidental sampling method so that a sample of 116 samples is obtained.

3. Results and Discussion

3.1. Results

The research found that in human activities such as industry, it is necessary to understand the paradigm of nature. Respondents explained that any human activity that does not pay attention to this can cause damage to nature and ultimately make the next generation unable to enjoy nature. Some respondents also explained that in managing nature, there needs to be limits imposed so as not to damage the environment. People feel that industries that pay attention to the environment can reduce pollution and waste. However, the research also found that there are respondents who do not understand how cooperation between industry, government and the community must go hand in hand. The community knows this but does not understand more deeply and sometimes the perception of one individual to another is different.

Opportunities regarding building environmentally friendly industrial estates are quite potential in the midst of increasing population and community needs. If the domestic demand for goods and services increases, then industry can be present to fulfill this. Unfortunately, the research found that people also understand that this cannot happen instantly and even requires a lot of money to make the area formed.

The results of research related to community views regarding the opportunity to build an eco-industrial park, the community realizes that its development is an effort to create a new concept in studying industry and its impact on the environment. Not only that, the research found that its development would be able to encourage the progress and development of the community regarding innovation and creativity in terms of environmentally sound

industry. One respondent stated that there is a need to implement policies that favor economic development but on the one hand, these policies can be accepted and implemented by industry players and accepted by the general public. This shows that government support requires support from various parties, including industry, the general public, and so on, so that they go hand in hand so that the goals of an environmentally sound industry can be implemented.

The research found that the majority of respondents agreed in building an eco-industrial park, but respondents realized that building it was not an easy matter. This is because building an industrial area with minimal waste requires cooperation from various industrial fields to work together to form a mutually beneficial symbiosis. If the support for building an eco-industrial park is only from one sector, it will take longer to reach an area with a variety of industries where all raw materials and waste can be processed which ultimately does not produce waste.

Respondents stated that the eco-industrial park concept is a good concept because the area prioritizes the common good in the long term. Moreover, cooperation between companies can make things more efficient. However, out of 116 respondents, there are still many who do not understand the concept of eco-industrial park and how to create the concept to be implemented in an area. There are still some respondents who understand the concept of environmentally sound industry as limited to waste management so as not to pollute the environment or land use that does not damage nature. While the concept of eco-industrial park, in addition to waste, the eco-industrial park area will get efficiency related to raw materials because the hope is that waste can be processed into raw materials for one or several industries in it.

3.2. Discussion

Research using qualitative methods to explore the perceptions of the community, especially generation Z, regarding the opportunities and challenges in building an eco-industrial park shows that some respondents understand the importance of maintaining ecological balance in industrial activities to reduce pollution and waste. However, the research also found that many respondents do not fully understand how the concept of eco-industrial park can be implemented effectively and how the cooperation between industry, government, and community should go hand in hand. Interviews found that people agreed that eco-industrial parks can provide long-term benefits and provide benefits in order to encourage innovation and creativity in environmentally sound industries.

The application of eco-industrial parks in relation to community perceptions shows that respondents realize that building an eco-industrial park is not something that can be done easily because it requires the support of various parties. Moreover, it requires high start-up costs for eco-friendly infrastructure and strong policy support from the government. However, there are many challenges in changing people's perceptions and existing industrial practices especially the need for knowledge and the need for specialized skills in green technology implementation. Support from various parties is needed such as academics, researchers, and the community so that it is not only industry and government that play a role in building an eco-industrial park.

Overall, this research reveals that although there is already good awareness and support regarding the concept of building an eco-industrial park, further efforts are still needed in socialization because the community does not fully understand this concept. Then, strengthening in terms of human resources through education and training is needed to design an eco-industrial park. Increasing human resources here is in the hope that the community will better understand this concept so that building an eco-industrial park can be done with full support from various parties. Moreover, its application is something that provides positive benefits to create an industrial area that is more efficient, environmentally friendly, and provides long-term economic benefits without damaging the environment. However, what needs to be underlined is the commitment and cooperation of all related parties.

4. Conclusion

This research found that community awareness and knowledge are important to maintain ecological balance related to industrial activities. This is because the research still found that people do not fully understand the concept of eco-industrial park and understand what its application is like. Research conducted on generation Z revealed that eco-industrial parks have the potential to provide great benefits in reducing pollution, increasing resource efficiency, and encouraging environmentally sound innovation. However, the application of this concept certainly faces challenges both from the community side, where not all people understand it. Moreover, another challenge is that there must be cooperation between industry, government, society, and academia to build this concept so that it can be implemented. Regarding the community, socialization and education efforts need to be carried out in order to increase public understanding and participation so that public understanding of this concept increases and ultimately reduces the challenges in implementing and building an eco-industrial park.

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