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Community Adaptation in Facing Environmental Pollution Challenges in the Industrial Designated Area of Lamongan Regency, East Java, Indonesia

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ABSTRACT

Industrial growth is an opportunity for economic growth, but also a challenge for the environment, especially pollution due to industrial waste. The purpose of the current research is to analyze community adaptation in facing the challenges of environmental pollution in industrial This research uses a qualitative method based on phenomenology. This study is located in is in Rejosari Village, Deket District, Lamongan Regency. The informants in this study consist of the main informant and supporting informants totaling 29 informants. Data collection included in-depth interviews, observations, and document studies. The validity of the data was tested using theoretical triangulation and source triangulation. The data analysis technique uses the interactive model of Miles & Huberman and Nvivo 12. Based on the results of the study, it shows that community adaptation involves several parties, namely the government, industry and society. The government manages and protects the environment, the industry conducts proper waste treatment plus a high level of public awareness of the environment. Collaborative Governance is used for the management of environmental pollution due to industrial waste

Keywords: Adaptation of Society, Environmental Pollution, Industry

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INTRODUCTION

Development is a planned social change that incorporates environmental insights, increased economic progress and welfare, and the modernization of high-quality human resources (Depi Pramana, 2017). Industrialization is strongly associated with the development process. The industrial sector is expected to overcome obstacles to the Indonesian economy (Hasan, 2014). The industrial sector can become a leading sector because it influences the development of other sectors, such as agriculture, trade, and services (Purnamawati & Khoirudin, 2019). The Indonesian people believe the industrial sector can improve the country's economy, so industry is a necessity in Indonesian territory. Based on this policy, the Lamongan Regency government prioritizes economic growth in the non-agricultural sector (Kurniasari, M., & Ariastita, 2014). Not only that, Lamongan Regency is one of the central areas of development in East Java, namely the Gerbangkertasusila Plus Area, which underwent a shift

from the primary to the tertiary sector from 2008 to 2012, with growth increasing every year (Kurniasari et al., 2014).

In 2018, according to the Central Statistics Agency of East Java, Lamongan Regency ranked ninth among all cities/regencies in the province by the number of medium- and large-sized companies. There are several reasons why investors are establishing an industry in Lamongan Regency. One of them is the geographical advantage, as Lamongan Regency is quite close to the capital city of East Java Province, Surabaya. This facilitates the easy flow of goods and services from Lamongan Regency to outside the East Java region, and, moreover, access to the outside the country is also quite wide open. Since 2004, approximately 21 industries have been operating along the Pantura road, with a total investment value of Rp. 12.738 trillion. These companies include the marine tourism industry, fertilizer industry, fish processing industry, shipbuilding industry, port management services, animal feed industry, oil and gas industry, and sugar industry.

The increasing industrial development contradicts the findings of research by Huda, Imam Arifa'illah Syaiful, Suwargany, and Melly Heidy (2017), who reported that the carrying capacity of agricultural land in Lamongan Regency is very superior, or in the first-class category. The macroeconomic condition of Lamongan, based on Gross Domestic Product (GDP), shows that the dominant sectors are fisheries, agriculture, and forestry, accounting for 33.86%. So, Lamongan Regency is known as the food barn of East Java because it has an agricultural area of 106,590 ha. However, the industry in Lamongan Regency has grown due to support from the Lamongan Regency government. Based on Mustopa's (2011) research, agricultural land, particularly rice fields, is vulnerable to land conversion. As in Rejosari Village, there has been a shift from agricultural land to industrial use.

There has been a change in land function in Rejosari Village from agricultural land to industrial, residential, and service land. This area is an urban fairy area, a suburban area that combines rural and urban elements. Rejosari Village is well-known for freshwater fisheries and has even been ranked second nationally. The industry will affect physical, environmental, and social conditions. Industrial activities not only have a positive impact but also have a negative impact (Nurkolis, 2015). Lamongan Regency's industrial activities have the potential for environmental pollution. The potential to degrade water quality stems from employees' domestic activities, production processes, industrial waste, and other activities. However, environmental pollution is less of a concern to community members.

Based on data from the Lamongan Regency Environmental Service (DLH), there were 14 environmental complaints in 2019: 8 environmental pollution complaints, 3 environmental damage cases, and 3 B3 waste cases. In 2018, there were 13 cases, and in 2017, there were 14 complaints. So, in 2018, there was a 7.69% increase in environmental cases. One example of a complaint of water pollution cases includes August 22, 2019, when Mr. Sutanji, a resident of Rejosari Village, Deket Ikan District, in Mr. Alim's pond, died allegedly due to seepage from drainage channels originating from PT. Bumi Menara Internusa (BMI). The complaint is caused by waste, a byproduct of industrial activities that can lead to environmental pollution.

Environmental pollution will increase as the population grows. The presence of industrial activities has attracted labor from outside and enabled them to settle in the vicinity, and population growth has led to the development of settlements where the quality and pattern of the environment cannot be separated from industry. Based on the Lamongan Regency RTRW, it is clear that current and future environmental problems stem from activities across various sectors, especially the industrial sector. Therefore, it is necessary to carefully consider environmental issues and address them. Based on this gap, Lamongan Regency is a food self-sufficiency area known as the food barn of East Java, with an agricultural area of 106,590 ha. However, it is required to improve economic growth in the non-agricultural sector, namely,

industry. Industrial development not only has an economic impact but also generates industrial waste that can pollute the environment (Ningrum, 2019). All of this is the result of human behavior through activities that treat nature as a commodity, needed only as a waste medium, and industrial activities, even though the environment is a finite resource that can be destroyed.

Based on the above background, it is evident that there is a mutual relationship among society, the economy, and the environment. There is a relationship between the community and the environment; people depend on the environment for life. On the other hand, the economic sector is the driving force of people's lives and continues to operate by providing goods and services. The community's role in the economic sector is to provide manpower and institutions to drive it. In addition, there is a relationship between the environment and the economy. The environment here is a natural resource (SDA) that is managed for economic activities. The management of natural resources in these economic activities produces reciprocity in the form of impacts that affect environmental conditions. So this is a challenge for the community to adapt to the environment that has changed due to economic activities.

METHOD

This research employed a qualitative phenomenological approach, focusing on individuals' subjective experiences. This research was carried out in Rejosari Village, Deket District, Lamongan Regency. The researcher chose the research location because the Rejosari area had undergone land use change from agriculture to industry, environmental pollution from industrial waste, and conflicts between the community and industry. Creswell (2016:4) notes that a qualitative approach is a research and understanding process based on methodologies for investigating and exploring meanings considered by individuals or groups to arise from a social phenomenon or human problem.

The researcher wanted to explain in depth the environmental pollution and the public awareness of pollution caused by waste, so that community adaptation could be found in addressing environmental pollution. Researchers build assumptions based on relevant theories and prior research to form a frame of mind. To test the researcher's basic assumptions, data were collected through in-depth interviews, observations, and document analysis. Before data analysis, a validity test is conducted. In this study, data validity was assessed through source and theoretical triangulation. This study uses three data sources, namely: informants, document studies, and phenomena. In this study, informants were selected using the purposive sampling technique. There are certain criteria for determining informants.

The informants used in this research are shown in Table 1.1.

Table 1.1 Selection of Informants

It	**Report**	**Informant Reasons for Choosing**
1	Environment Agency Lamongan Regency. 1.Head of the Lamongan Regency Environmental Service 2.Head of Supervision and Control 3.Head of Environmental Management Division	The Environment Agency has duties and authorities, including the implementation of control and supervision of pollution and environmental damage. Among them are water quality management and water pollution control activities, air quality management and air pollution control and so on.
2	Industri PT. BMI to obtain valid and accurate data about PT BMI in waste management and what contributions the PT BMI factory provides to the people of Rejosari Village	The industry that has the most influence on environmental pollution that occurs in Rejosari Village is the PT BMI industry which producing foul-smelling air pollution and water pollution into the river causing some farmers experienced crop failure.
3	Rejosari Village Government Apparatus 1. Head of Rejosari Village 2. Head of the Rejosari Village Planning Section.	Rejosari Village Government Apparatus Has valid and accurate data on the opinions and complaints of the people of Rejosari Village in the residential environment
4	The community of Rejosari Village by emphasizing certain criteria In order to elaborate more in-depth including: 1. Residents whose homes are close to the factory 2. Residents whose ponds are close to the factory	Because this community is right near the industry that has been in the industrial environment for a long time so that they know the changes that occur in the surrounding environment.

The interview data from the informants were transcribed and imported into NVivo 12 for processing and analysis using various query features. The results of field observations, in the form of photos and field notes, are also transcribed for processing and analysis in NVivo. Likewise, several documents serving as data sources are imported into NVivo for processing and analysis. The data analyzed are grounded in theory, leading to community adaptation to address environmental pollution caused by community-based industries. In addition, this study uses the Miles & Huberman (2009) interactive data analysis model. Data analysis is carried out continuously and repeatedly, starting from data reduction, data presentation, and verification.

FINDINGS AND DISCUSSION

Rejosari Village is a green land, surrounded by farms and rice fields in all directions. Most of the people make a living as farmers. The area of Rejosari Village is 282.2 Ha/m2. However, since 2013, the highly productive green land has been contested by factory companies from China, Taiwan, and elsewhere, which have obtained permission from the Lamongan Regency Government. Since then, many factories have been established in Rejosari Village, finally accommodating workers from outside Lamongan. Regency area. The industry is located in the Gajah Hamlet area, covering ±50 Ha. Many factors cause changes in land use in the village. There should be green land maintained, as it is agricultural land for food self-sufficiency. Irrigation flows must be paid more attention because

they are one of the impacts of waste disposal that flows into the irrigation stream. This affects the agricultural productivity of pond farmers in the village environment.

Industrial activities, in addition to impacting economic growth, also generate industrial waste. If the waste exceeds the assimilation power (neutralization ability) of the river body that has been contaminated with the waste, there will be a decrease in the water quality in the river body, which is used for several purposes, including raw materials for drinking water and agricultural irrigation in the aquatic environment, such as dams, rivers, and reservoirs. Most industry players and domestic activities in Lamongan Regency still use the river as a water body to receive liquid waste. These conditions also cause pressure and trigger environmental pollution, resulting in narrowing and siltation of the river body, eventually leading to a flood disaster because the river's carrying capacity is reduced, making it unable to accommodate and drain rainwater into the sea. Although there are many ways to overcome this problem, including chemical, physical, and mechanical methods.

Industrial activities, such as development, cause significant water pollution. Complaints about environmental pollution due to industrial activities were made by one of the residents of Rejosari Village. The industry is PT Bumi Menara Internusa Lamongan. The type of business carried out is fish processing. Industrial activities are located in Rejosari Village, Deket District, Lamongan Regency. This industry is built on a 53,946 m2 plot of land within an area of 140,763 m2. The factory produces frozen raw shrimp, frozen cooked shrimp, frozen flour shrimp, frozen crab, pasteurized crab, and frozen fish. Since 2017, PT Bumi Menara Internusa Lamongan has failed to comply with waste-disposal rules (Citra, 2018). Careless waste disposal and inadequate solid waste treatment systems lead to the spread of waste in the environment, posing a threat to the ecological system (X. Liu, 2020).

Environmental pollution caused by PT BMI is recurring. In 2018, the community held a demonstration, as shown in Figure 4.6. The community complained about the pungent smell allegedly caused by waste from PT Menara Internusa (BMI). The community was disturbed by the pungent smell like rotten shrimp. It had been running for three seasons, and the pungent smell of rain appeared. However, after improvements at the factory, especially in waste treatment, the smell was no longer unpleasant. But until now, the smell has been detected, especially in the direction the wind is blowing. The people of Rejosari Village have adapted to the environment. This is a consequence that the people of Rejosari Village must accept when a factory is established in the Rejosari Village area.

Most people in Rejosari Village are farmers, so they really need water for managing their rice fields. If the irrigation river used to irrigate rice fields becomes polluted, it will negatively affect fish farming. The people of Rejosari Village experienced harvest failure, especially the fish harvest. The fish died allegedly due to wastewater seepage. Under the agreement, the industry must replace it at the community's harvest price. To understand this complex interaction, there must be a government policy to change land use in rural areas, aimed at supporting community livelihoods, maintaining food security, and promoting sustainable resource use. Even though the community's agricultural land is close to the factory, it is hoped that the farming community will not experience difficulties in managing the land, thereby avoiding disruptions to the economy and farmers' food security (Kc & Race, 2020).

The community, under the auspices of the village government, formed a force by creating a communication forum comprising six village heads from the company's area, chaired by Radianto. The communication forum was established to facilitate communication among various parties, including the government and industry. The community agreed to hold a demonstration because their complaints or aspirations were not addressed by the industry. Not only through demonstrations, but the communication forum also complained to the Lamongan Regency government, including the DPRD Commission C and the DLH Lamongan Regency. Finally, DLH mediated to find a solution by bringing together the industry and the community. All elements involved include envoys from DLH Lamongan Regency, Lamongan Regency Economic Section, Joko as the Deket District Sub-district Head, Deket Police Chief with Babinkantibmas, Babinsa Deket District, Karno as BMI Public

Relations with their respective expert teams, including Septian from the waste treatment section, Toni from the expert team on the Environment, as well as HRD (Human Resources Department) BMI Lamongan Irna Farhani, Bakesbangpol Lamongan.

Based on the results of the community adaptation research, several parties are involved, namely the government, industry, and the community. The government manages and protects the environment, industry conducts proper waste treatment, and the public has a high level of environmental awareness. Government programs related to environmental management include 1) Requiring industries/business activities to report environmental documents to the Environmental Agency every 3 (three) months with the aim of controlling water pollution; 2) Socialization and guidance on water pollution control and environmental management for business actors and industry players 3) Optimization of supervision activities by paying attention to environmental law enforcement in the field of water pollution; and so on in accordance with the chapter that has been described earlier. Adaptation will remain possible despite environmental changes through cooperation among the government, the community, and the private sector to address environmental pollution caused by industry. This is a form of collective adaptation carried out together, each according to their responsibilities. Considering the challenges of the community adapting to environmental pollution that has both long-term and short-term effects (Cristescu & Gonzalez, 2019.

This collective adaptation is in accordance with the theory developed by Anthony Giddens, namely the Giddens Structure. The essence of this theory is that it rejects the idea that agents and structures exist in separate conditions. There is a complementary dialectical relationship between the structure and the agent. Giddens said that the core of the study of the social sciences does not lie in the experience of agents (individual actors) or structures (certain forms of unity), but in actions (social practices) that are regulated across space and time (Doncu, 2016). The relationship began with agents with strong environmental awareness taking the initiative to address waste treatment to improve environmental conditions. The efforts made by the agents are manifested in their actions, namely through demonstrations, improvements in waste treatment, and environmental management. These efforts have been responded to by the government, industry, and the community. So that, in the end, the entire community can solve the waste problem that causes environmental pollution. All community groups know and feel the benefits of their activities, which finally add enthusiasm and make them more aware and eager to improve. Environmental problems in Indonesia cannot be addressed solely through disaster rescue and response. Collective awareness is required to simultaneously protect the environment. Thus, more serious efforts are required to build and increase human awareness of the environment to prevent disturbances and the degradation of environmental quality (Wahyudin, 2017). Because environmental pollution and destruction pose a constant threat and a serious danger to life (Nazara, dkk 2024).

Facts prove that society in general lacks awareness that maintaining a green environment can have a very negative impact on various aspects of life (KLHK, 2021; Huda, 2022; Astuti, 2022). Problems related to damage to the green environment are currently very worrying (KLHK, 2021; Astuti, 2022). This condition has detrimental effects on several aspects of human life (Sukartini and Saleh, 2016; Tasurruni et al., 2019; Huda, 2022). First, loss of biodiversity. It is very important to process industrial waste. The most felt impact on society is the pollution of water flows around the population, which becomes waste, dark, and black with excessive intensity. If industrial waste is well managed by the company, it can be useful; otherwise, excessive wastewater intensity can fertilize agricultural land around the settlement. However, if wastewater continues to flow into settlements and the intensity is high, it not only affects the rice planted by residents but also public health (Nurdidiq, 2021). So, roles and relationships among stakeholders are needed for sustainable environmental management to support environmental conservation from a collaborative governance perspective (Berliandaldo, 2022). Figure 3. Collaborative Governance: Government, Industry, and Society: A role in management through collaboration, so that environmental pollution management runs effectively. One of these roles is the government's, because if environmental damage cannot be

controlled, it will cause disasters that will certainly be detrimental to the country and its population (Nugraha, 2021). It is hoped that the Collaborative Governance concept will be used in controlling industrial wastewater pollution, where collaboration is needed between actors, including the government, industrial players, and the community, working together in certain ways or processes, which will produce the right solution for controlling industrial wastewater pollution (Hapsari, 2020). Most recent studies on social movements assume that collective action carried out outside established institutions takes a position to challenge political authority or government. Within this framework, the conflict between the social movement and the government is inevitable. Nevertheless, it is possible for social movements to carry out their missions without conflicting with political authorities. In other words, social movements can collaborate with the government, for instance, on environmental protection (Wahyudi, 2022). The concept of Collaborative Governance is used to manage environmental pollution caused by industrial waste. Based on field data, there is collaboration among actors, namely the government, industry players, and the community. Collaborative Governance is the management of government by directly involving stakeholders outside the government, oriented to consensus and deliberation in each joint decision-making process, with the aim of making and implementing public policies and public programs (Ansell and Gash, 2008). Robertson and Choi (2012) explained that collaborative governance is a collective and equitable process in which each participant has authority over decision-making and stakeholders have equal opportunity to channel their aspirations into the process.

The adaptation of the people of Rejosari Village is evident in the increasingly beautiful, clean, and green environment. The community follows the Green and Clean program, owned by DLH Lamongan Regency. The implementation of the LGC program in Lamongan Regency has generally been effective (Anas, 2017). Rejosari Village has a communication forum that makes it easier for the community to coordinate with the government and industry to address environmental pollution. Because BMI's industrial activities are growing rapidly, causing environmental pollution from the disposal of industrial waste (Nafisah, dkk, 2021). The community immediately held demonstrations due to environmental problems caused by the industry. Now the community has begun to adapt to water and air pollution with several phases, namely (1) Self-awareness where people identify the symptoms of pollution that occur, and monitor the surrounding environment; (2) Participation, namely the community increases knowledge or confirms existing knowledge with new knowledge to solve doubts by participating in public consultations conducted by the industry or socialization of the DLH program; (3) Community coordination began to try new behaviors, namely creating a Communication Forum to facilitate coordination in the event of environmental pollution caused by industrial waste. Especially when conducting aidiensis to the industry and DLH; (4) Community adaptation to new behaviors after the previous three phases, namely awareness, new knowledge (participation), and attitude (coordination). Environmental degradation is the conversion of green land to commercial land. Community adaptation is going well because there is a good level of awareness supported by the structure that has been built. Based on the time space, community adaptation in dealing with environmental pollution is carried out in several phases, namely (1) Self-awareness, where the community identifies the symptoms of pollution that occurs, and supervises the surrounding environment; (2) participation, namely the community increases knowledge by participating in public consultations carried out by the industry and socialization of the DLH program; (3) Coordination, the community forms a communication forum to facilitate coordination in the event of environmental pollution caused by industrial waste. Especially when conducting hearings with industry and the government, (4) Community adaptation to carry out new behaviors in accordance with self-awareness, participation, and coordination while maintaining the surrounding environment. So that Collaborative Governance is used to manage environmental pollution caused by industrial waste.

CONCLUSION

This study shows that community adaptation to environmental pollution in Rejosari Village, Deket District, Lamongan Regency, involves the roles of the government, industry, and the community. The adaptation process is reflected in several interconnected phases: self-awareness in identifying and monitoring environmental pollution, participation in consultations and environmental socialization, coordination through the communication forum, and the adoption of new behaviors to maintain the surrounding environment. These efforts demonstrate that addressing pollution from industrial waste requires collective action and shared responsibilities. The government is expected to manage and protect the environment, industry to conduct appropriate waste management, and the community to maintain environmental awareness and participate in monitoring and coordination. Therefore, collaborative governance among these three parties is important for managing environmental pollution and supporting community adaptation to environmental changes.

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