

ENVIRONMENTAL POLLUTION AND URBANIZATION RESTORATION STRATEGIES IN KARAWANG REGENCY

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Abstract

This study aims as a model and to provide information to the public about what can be done to help restore environmental and natural conditions, especially in Karawang Regency. This research was conducted by conducting a literature review or literature study on several previous studies related to environmental and social problems in Karawang Regency. The result is Karawang Regency that has a relatively high population density and is one of the industrial areas in the province of West Java, with environmental problems, such as Water Pollution, Air Pollution, B3 Waste, and Solid Waste, Natural Disasters, Damage to Land, Forest, and Soil Resources, Damage to Coastal and Marine Ecosystems, Legal Compliance and Facilitation of Environmental Disputes, Institutions, and Monitoring Facilities Environment, Institutions, and Facilities for Monitoring Environment, Waste, and Urbanization. The strategies that can be done to restore environmental conditions in Karawang Regency, among others; Environmental quality improvement; Wise exploitation of natural resources to maintain environmental harmony and balance; Development of science and technology in environmental management; Improved environmental management performance in business and industry; Creating responsive and alert community participation; Building a community that cares about the environment (green society concept); Increase the effectiveness of implementing environmental regulations; Build an environmental clearing hall; and Strategies for handling and controlling the urbanization of the family planning village.

Keyword: environment, strategies, environmental management, urbanization.

I. INTRODUCTION

Karawang Regency is an area with a high population density and is included in the room with the most significant industrial area in Indonesia. Based on data from BPS (Central Statistics Agency) in 2020, the population in Karawang Regency reached 2.37 million people, with a population density between 308 people/km² to 4456 people/km² (Figure 1). Although industrial activities positively impact the economy, they still have a negative impact, one of which is environmental problems. Pollution and environmental damage can cause disasters for the surrounding community, leading to a decrease in the quality of life and the health of the human body and soul (Hidayati et al., 2020).

To overcome these environmental problems, the government of Karawang Regency has made several efforts to keep the ecological conditions in good condition with the current population. One of these efforts is to establish a policy carried out to preserve the environment in Karawang Regency, namely by implementing several strategies to restore environmental conditions that have been polluted and damaged in Karawang Regency.

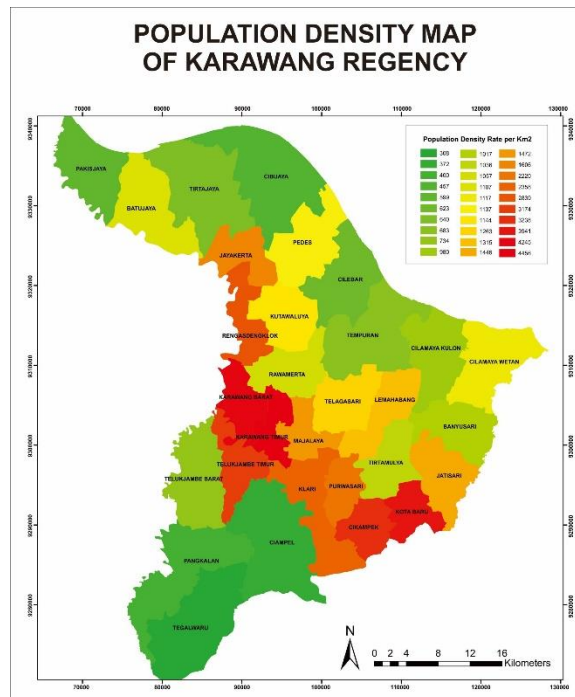


Figure 1. The Population Density Map of Karawang Regency, which shows that the central part of the Karawang area is densely populated, shown in red on the map. Otherwise, areas with moderate to low populations are shown in yellow to green on the map.

Before determining the right strategy to restore environmental conditions in Karawang Regency, the local government identifies various types of sources of damage and pollution that occur, both due to community activities and industrial activities. Among the environmental damage and decay that occurs, among others, are water, air, and soil pollution, damage to coastal and marine areas, garbage, to droughts that arise due to climate change (Yousif et al., 2018)

In this case, the Department of Environment and Hygiene (DLHK) of Karawang Regency applies several rules and activities that will carry out to restore environmental conditions. One of the efforts made by the government is increasing the effectiveness of implementing regulations related to the environment, educating the public, and helping to build facilities that support people to care more about their environment. These efforts are carried out by local governments and apply to the entire

community, one of which is by forming a community that is aware of the environment. This study aims as a model and to provide information to the public about what can be done to help restore environmental and natural conditions, especially in Karawang Regency.

II. METODEDES

This research was conducted by conducting a literature review or literature study on several previous studies related to environmental and social problems in Karawang Regency. Literature studies are carried out by reviewing related journals to collect data from various sources such as books, journals, the internet, and other sources. In this study, most of the data were collected from articles from the Google Scholar page, most of which were published nationally and internationally.

III. RESULTS AND DISCUSSION

Karawang Regency is known as a densely populated area and is an active industrial area. The density of population and the presence of industrial areas cause various environmental problems that disrupt human activities. Among several environmental problems in Karawang Regency are Garbage, Water Pollution, Air Pollution, Waste, Environmental Disasters, Damage to Resources, Damage to Coastal and Marine Ecosystems, Legal Arrangements, and so on (DLHK, 2019).

a. Water pollution

Water pollution that occurred in Karawang Regency has been measured and tested in a government-owned laboratory. There are six dominant pollutant parameters whose concentrations in water bodies or rivers have exceeded the Quality Standard Threshold Value (NAV), namely (1) Dissolved Oxygen (DO), (2) Ammonia (NH₃N), (3) Sulfide (H₂S), (4) Iron (Fe), (5) Biological Oxygen Demand (BOD₅), and (6) Chemical Oxygen Demand (COD) (Sholeh et al., 2018). The pollution indicated to occur in water bodies or rivers in Karawang Regency is organic pollution, solids pollution, nutrient pollution, heavy metal pollution, and thermal (heat) pollution (Sholeh et al., 2018). Water pollution occurs both in groundwater, water and river flow, to the sea and coastal areas, in industrial waste, solid waste, and human waste (Khumaidi et al., 2019)

b. Air pollution

The density of population generally affects the amount of transportation in an area. The transportation sector contributes to air pollution by 60% - 70% compared to the industrial sector in the form of exhaust gases from chimneys, contributing to pollution of 10% - 15% (DLHK, 2019). Meanwhile, the rest of the air pollution comes from household activities, burning garbage, forest fires, etc. The primary sources of pollution in the Karawang Regency are caused mainly by human activities, both from movable and immovable sources. The number of motorized vehicles in the Karawang Regency is directly proportional to the increase in residents each year. Both motorized vehicles use gasoline, and motor vehicles use diesel fuel (Rarasati & Octoria, 2018).

c. Hazardous Waste and Solid Waste

There are about 2000 large and small industries in Karawang Regency, and almost all produce B3 waste (DLHK Karawang Regency, 2020). Most of this B3 waste is in the form of used oil and solvents. In addition, the high level of population density also causes high piles of waste, both industrial and household waste (Hutgalung & Senjaya, 2021). This waste is collected in landfills, and some of it escapes and enters the sea.

d. Natural disasters

In recent years, natural disasters that have the potential to occur in Karawang Regency are floods, which hit several sub-districts. This flood disaster-damaged rice fields, ponds, settlements, buildings and public facilities, and road and irrigation infrastructure (Riadi, 2019). In addition to flooding, Tidal Waves (Rob) also often occur in Karawang Regency, resulting in about 25 villages belonging to 9 sub-districts being submerged in water. Tidal waters occur due to the destruction of mangrove forests along the coast of Karawang Regency, which serves as a breakwater and waves barrier. The destruction of mangrove forests in the Karawang Regency occurs due to land clearing for ponds or rice fields, which then causes the area covered by vegetation to decrease so that the quality of soil resources for water conservation purposes decreases. In the dry season, groundwater reserves are reduced, so it is not uncommon for some areas in Karawang Regency to experience drought in the long dry season. Indirectly, this event is directly related to Global Warming reciprocally. The area of rice fields that were submerged in water due to the flood disaster reached 21,071 hectares, brackish water and freshwater ponds covering 966 hectares, school buildings 76 units, worship facilities 39 units, and settlements 24, 770 units, and Damage to road infrastructure reached 133, 625 Kilometers (DLHK, 2019)

e. Damage to Land, Forest and Soil Resources

The most significant land cover is for rice fields, which reaches more than 53% of the area of Karawang Regency, which is 94,311 Ha. The smallest land cover area is for plantations, which is only 0.2% of the area of Karawang Regency (only 432 Ha). In Ciampel, the most comprehensive land cover is dry land, amounting to 4,868 Ha (about 2.8% of the Karawang Regency area (DLHK, 2019)). This large amount deserves the Government's attention to manage it, considering that one sub-district contributes the most significant dry land. Land for forest is only found in 8 (eight) sub-districts, from the largest to the smallest, namely: Tegalwaru (an area of 5,637 ha), Ciampel, Pangkalan, Telukjambe Barat, Telukjambe Timur, Batujaya, Tirtajaya, and Cikampek (16 ha). With a total forest area of 14,524 Ha (only about 8.3% of the area of Karawang Regency), the Karawang Government still needs to work harder in increasing forest area because forests are an essential barometer that can affect climate (Ramadhanty et al., 2019)

f. Damage to Coastal and Marine Ecosystems

Soil texture on the coast of Karawang Regency is mainly classified as humus sand, so it is susceptible to abrasion (Setiabudi & Maryanto, 2020). Because of its small particle size, it is easily carried away by ocean currents. The sand texture is only a small part, namely Pakisjaya Beach, so Pakisjaya Beach is more resistant to abrasion, but on the other hand, accretion often occurs. The Kawarawang Regency area has a relatively low potential for coral reef development. Coral reefs that can still be observed can be found in the off-shore area of Pasir Putih, in the Cilamaya Kulon sub-district. It is estimated that the area of coral reefs in this area is around 1,878 ha. Half of the total area is in a badly damaged condition (Fachruddin et al., 2020). The potential position of this coral reef is about 2 miles from the beach, with a depth of 38 meters. Other potential coral reef areas are located around the coast of Ciparage, Tempura District, with an area of 131 hectares. In addition, the coastal area of Sukajaya Village, Cilamaya Kulon District, is also a potential area for coral reefs with an area of 82.07 hectares (Fachruddin et al., 2020). However, in the two areas above, the status of coral reefs is in a condition of severe damage (dead). Karawang Regency has several locations of mangrove forests located in nine sub-districts, including Pakisjaya, Batujaya, Tirtajaya, Cibuaya, Pedes, Cilebar, Tempuran, Cilamaya Kulon and Cilamaya Wetan sub-districts. Mangrove forests with a tremendous colonial potential are located in the sub-districts of Tirtajaya, Cibuaya, Cilebar and Cilamaya. While in the other seven sub-districts only local, only a few trees remain (DLHK, 2019).

g. Legal Compliance and Facilitation of Environmental Disputes

Public complaints related to environmental management during 2016 were recorded in the DLHK of Karawang Regency as many as 30 complaints, consisting of 5 types of complaints; 20 complaints of water pollution, five complaints of air pollution, four complaints of B3 waste and one complaint of environmental damage. Of the 30 public complaints, their status has been handled and followed up by DLHK and related parties (DLHK, 2019).

h. Environmental Monitoring Institutions and Facilities

Until now, there are 3 (three) PPLH and 1 (one) Planner. The Office is expected to assign more Technical Functional Positions to handle technical issues in particular in the future. In terms of facilities, Karawang Regency does not yet have an accredited environmental laboratory. Currently, the environmental laboratory is still applying for accreditation by the existing conditions (DLHK, 2019).

i. Waste

The level of waste management service in Karawang Regency based on the level of waste transportation to the Final Processing Site (TPA) is 20%, where the total waste generation in Karawang Regency in 2017 is 8,716.33 m³/day, while the waste generated is transported to the Jalupang TPA based on observations. October 2017 amounted to 1,575.59 m³/day with the density of waste in the TPA of 206.75 kg/m³, then the load of waste transported to the TPA was 326 tons/day (Hutgalung & Senjaya, 2021). One of the public services in serving the community to manage the waste produced by each household is the existence of waste management at the TPA. In terms of this service, good performance from waste management officers is very much needed so that waste management can be carried out effectively and more efficiently—however, the limited facilities and infrastructure available cause waste management to be ineffective. Complete and adequate infrastructure and facilities at the stage of collection, transportation and location of the TPA are equipment that can support the running of waste management activities from the producer to the final processing stage.

j. Urbanization

Population growth due to urbanization in Karawang is almost the same as natural population growth (birth rate). The annual population growth rate in the granary area is 3.6%. This figure puts the area's growth rate on par with the capital city. The largest population in mining areas always comes from natural growth or births, reaching 60,019 people in 2017. The population who were immigrants in the same year was only 15,489 people. However, estimates show that the additional immigrant population will be doubled. Indeed, many migrants do not report to the authorities when they migrate and settle in the Karawang government area. The newcomers who initially did not appear were only trying to stay in Karawang. However, in the end, they settled in the city of Pangkal Perjuangan because they had a better life than at home. The migrants then settled in Karawang, but they did not have an identity card (KTP) for the Karawang area. They do it because their hometown is not too far from Karawang, like Subang and Indramayu. The urban population growth rate is basically out of control because there are no regulations that prohibit Indonesian citizens from living and earning a living in areas other than their areas of origin. Karawang population average age. They deliberately seek profit in areas that are developing into big cities.

KARAWANG REGENCY ENVIRONMENTAL RECOVERY STRATEGY

1. Environmental quality improvement

To restore environmental conditions in an area, some strategy is needed to accelerate improving the quality of the environment can be achieved (DLHK, 2019). The most important thing to do is improve the environmental pollution control system, in this case, water, air, soil, marine ecosystems

and biodiversity (Akhirul et al., 2020). Specifically, the efforts that must be made are to reduce the pollutant load from the source that causes it. As an example of a polluter from industry, monitoring, monitoring and law enforcement must be carried out to increase the compliance of industry players with regulations related to environmental aspects. In addition, testing facilities for environmental quality must also be further improved to detect in detail the area or area that has been polluted so that it can be planned as an environmental rehabilitation program for the future. From the strategies described above, it is expected to improve the quality of the environment, with the following objective targets that the government in Karawang Regency must carry out:

- a. Improved water quality
- b. Improving air quality in urban areas;
- c. Reducing the amount of area that is polluted
- d. Improve the function of the laboratory for testing processes related to environmental aspects to control pollution and environmental damage.

2. Wise exploitation of natural resources to maintain environmental harmony and balance

The concept of sustainable development is a concept that can be done so that the balance between economic, environmental and social aspects can be maintained. Conservation and protection of the environment must continue to be encouraged to manage natural resources wisely and responsibly as one of the conservation efforts carried out is to carry out a green belt area program that aims to withstand the damage caused by coastal abrasion and as well an effort to preserve coastal ecosystems. In addition, conservation of water resources can also be carried out to increase water reserves through an integrated reforestation pattern based on community empowerment and the application of soil and water conservation techniques to reduce surface runoff and develop reservoirs, both natural and artificial.

In addition, every development carried out must also include environmental management considerations by taking into account strategic environmental studies and environmental carrying capacity. This will later affect determining the direction of regional policies by referring to environmental regulations such as RPPLH, KLHS, AMDAL and UKL/UPL.

3. Development of science and technology in environmental management

An easily accessible and quality information system can be one of the factors that can help restore the environment. In determining an environmental problem, it is sometimes challenging to find accurate and quickly found data. So with this convenience, it is hoped that all strategic plans can be started by mapping through data from an official information system that has been well managed (Akhirul et al., 2020)

4. Improved environmental management performance in business and industry

It is no secret that the business world and industry are some of the causes of environmental pollution that occurs in an area. Therefore several things must be done in order to be able to contribute to environmental restoration efforts, including:

- a. Implementation of Environmental Pollution Control Management (EPCM), Proper, Prokasih and Superkasih Programs in environmental management in the business and industrial world
- b. Develop the performance of the AMDAL Commission so that a certified AMDAL appraisal commission can be issued and can issue recommendations
- c. Developing environmental, economic policy instruments that can support the success of environmental management.

5. *Creating responsive and alert community participation*

Preparedness is very much needed during society to reduce the negative impact on the environment or living things when a disaster occurs, especially in areas prone to disasters.

The efforts that can be made to achieve this, among others:

- a. Increase public understanding and awareness of disasters through a massive approach or socialization program
- b. Conducting training or drills in order to increase knowledge and skills on disaster mitigation and adaptation to climate change impacts

6. *Building a community that cares about the environment (green society concept)*

Awareness of the importance of environmental sustainability is a vital instrument in restoring and preserving the environment. Because it starts from this awareness which will later produce destructive or conservative behavior. Therefore, awareness of the environment is needed in every order that exists in society. The scope of this green society concept includes:

- a. Increasing green society in schools, government, business, & society;
- b. Increasing cooperation in environmental control through the concept of partnership with all environmental management actors
- c. The achievement of various program breakthrough efforts in the context of increasing environmental awareness.

7. *Improving the effectiveness of implementing environmental regulations*

Action and firmness are needed in implementing the existing regulations related to the environment to be said to be effective. In addition, it is also necessary to increase legal compliance in the environmental field for the community, the business world, and the government so that it becomes guidance when there are environmental disputes that occur by environmental policies. Then the understanding and legal awareness of the community regarding efforts to handle and resolve environmental disputes also needs to be improved so that no one else feels aggrieved (Akhirul et al., 2020)

8. *Build an environmental clearing hall*

The concept of this clearinghouse is to develop environmental data and information in an area so that a complex environmental information database is available. Then it is developed into an environmental clearinghouse system in the area.

9. *Urbanization Management and Control Strategy*

To overcome the problems of urbanization, several efforts and strategies can be carried out by the Karawang Regency Government, including :

1. Establishing an IP2K Population (Karawang Association of Writers and Observers). IP2K consists of writers and observers who are concerned for civilization in the future, especially the problems that currently exist due to uncontrolled population control.
2. Establishing a "Kampung Keluarga Berencana". With the concept of a family planning village, it is hoped that it will control the birth rate and population growth in Karawang Regency.
3. Increasing the compliance of immigrant communities regarding population administration, known as justice operations carried out by the Civil Registration Office of Karawang Regency.

4. Enforcement and implementation of the Regional Regulation of Karawang Regency Number: 1 of 2009 concerning the Implementation of Population Administration explicitly to all levels of society
5. Re-evaluate related to the technical regulations of the Karawang Region No. 1 of 2011 concerning employment, which requires companies in Karawang to accept more workers from Karawang.

IV. CONCLUSION

Karawang Regency is an area that has a relatively high population density and is one of the industrial areas in the province of West Java. These conditions will, of course, have a severe impact on the environmental conditions in this area. The environmental problems that arise today are Water Pollution, Air Pollution, B3 Waste, and Solid Waste, Natural Disasters, Damage to Land, Forest, and Soil Resources, Damage to Coastal and Marine Ecosystems, Legal Compliance and Facilitation of Environmental Disputes, Institutions, and Monitoring Facilities. Environment, Institutions, and Facilities for Monitoring Environment, Waste, and Urbanization.

From the description of the problems above, it is necessary to take strategic steps that must be carried out by all parties who contribute and are involved in being able to help restore environmental conditions in Karawang Regency. Collaboration from all these stakeholders is needed so that the efforts made can be sustainable and not temporary. The strategies that can be done to help restore environmental conditions in Karawang Regency.

All interested parties must carry out the above strategies. They must be involved so that the common goal of creating environmentally sound development in the Karawang Regency can be realized. Suppose this can be learned, of course, in the future. In that case, Karawang Regency will become an area with economic solid fundamental resilience but with proper environmental conditions and sustainability. Karawang Regency becomes an ideal Regency not only for its people but also for flora, fauna, and other living things, which is in it.

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