

Impact Analysis of Environmental Law Policy on Cirebon Coastal Communities in Climate Change Adaptation

Adelia Putri MAHARDEKA¹, Siwi WULANDARI², Rosiana MAGFIRRO³

^{1,2,3}Faculty of Law, Swadaya Gunung Djati University, Indonesia

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Corresponding Author:

Adelia Putri Mahardeka

Email:

www.adeliaputrim@gmail.com

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Abstract:

Purpose:

Cirebon's coastal communities face intensifying climate change impacts, such as sea level rise, coastal abrasion, and natural disasters, which threaten their socio-economic resilience. However, the implementation of this policy still faces various challenges, including overlapping regulations, weak law enforcement, and lack of community participation in the policy formulation process.

Methodology:

This research uses a qualitative approach with a case study method to evaluate the effectiveness of environmental law policies in supporting the social adaptation of Cirebon's coastal communities. Data were collected through in-depth interviews with affected communities, government officials, and policy experts, as well as analysis of related legal documents.

Findings:

The results showed a gap between policies and factual conditions in the field, especially in inter-agency coordination, resource allocation, and community access to environmental justice.

Implication:

This study emphasizes the need for environmental law policy reform that is more adaptive, ecologically just, and oriented towards empowering coastal communities in the face of climate change.

INTRODUCTION

Climate change has become a global challenge that has broad impacts on various aspects of life, including the environment, social, and economy. Indonesia, as an archipelagic country, faces high risks due to climate change, especially in coastal areas such as Cirebon. The impacts include sea level rise, coastal abrasion, extreme weather, and threats to the fisheries and agriculture sectors that are the economic foundation of coastal communities. The uncertainty of these environmental conditions further exacerbates the socio-economic vulnerability of communities that depend on natural resources, so that environmental legal policies are needed to accommodate their adaptation needs.

Cirebon is experiencing significant climate change, as indicated by the increase in average annual temperature and abrasion intensity in its coastal areas. Based on data from the Meteorology, Climatology and Geophysics Agency (BMKG), the temperature in the Cirebon coastal area has increased by around 0.2°C-0.4°C per decade in the last 30 years. In addition, coastal abrasion that reaches 2-3 meters per year at some points causes land shrinkage and threatens residential areas. This phenomenon not only affects physical infrastructure, but also the fisheries and agriculture sectors, which are the main sources of livelihood for the community. In facing these challenges, the role of environmental law regulations and policies is crucial to ensure the sustainability of coastal ecosystems and community welfare.

Although the government has issued various policies related to environmental protection, their implementation in the regions often encounters obstacles. Regulations such as Law No. 32 of 2009 on Environmental Protection and Management and Law No. 27 of 2007 on Management of Coastal Areas and Small Islands provide the legal basis for mitigation and adaptation to climate change. However, at the local level, obstacles such as limited resources, lack of coordination between agencies, and low community participation in policy formulation make the effectiveness of these regulations still far from optimal. The gap between national policy and implementation at the local level needs to be addressed so that environmental policies truly impact coastal communities.

In the context of decentralization, local governments have a strategic role in translating national policies into implementation at the local level. However, in many cases, a lack of capacity and resources makes policy implementation often suboptimal. Therefore, this research will highlight the importance of synergy between various actors in ensuring that environmental policies can be effective. It is hoped that this research can contribute to the development of more effective and adaptive legal policies to climate change in the future, especially for coastal areas in Indonesia. With an approach based on ecological justice and community participation, more inclusive and sustainable environmental policies can be realized to ensure the socio-economic resilience of coastal communities to the impacts of climate change.

METHODS

This research used a qualitative approach with a case study method to evaluate the effectiveness of environmental law policies in supporting the social adaptation of Cirebon coastal communities to the impacts of climate change. This approach was chosen to gain an in-depth understanding of the dynamics that occur between environmental legal policies and the socio-economic response of coastal communities to climate change. This research is descriptive analytical, where the data collected will be analyzed in depth to understand how environmental law policy functions in the context of social adaptation of Cirebon coastal communities. The research is conducted in the Cirebon coastal area which is the main focus of this study, considering that the area is vulnerable to climate change impacts such as sea level rise, coastal abrasion, and natural disasters. The research will pay attention to the principles of research ethics, including maintaining the confidentiality of informants' identities, seeking written consent before interviews, and ensuring that the data obtained is only used for research purposes. With this approach and method, it is hoped that the research can provide a comprehensive picture of the effectiveness of environmental law policies in facing climate change challenges in coastal Cirebon and provide recommendations for policy improvements that are more adaptive and inclusive.

RESULTS AND DISCUSSION

The Importance of Environmental Law Policy in Facing Climate Change in Coastal Communities.

Climate change that occurs globally has a broad impact on various aspects of life, including social, economic and environmental welfare. The impact felt can be very significant, especially in coastal areas that are very vulnerable to climate change. Coastal communities, which depend on the fisheries, agriculture and tourism sectors, face serious threats from increasing global temperatures, rising sea levels, changing weather patterns and more frequent natural disasters.

This phenomenon greatly affects coastal communities whose lives depend on the fisheries, agriculture and tourism sectors, which are now feeling the impact directly. One clear example is in Cirebon, which is one of the coastal areas that has great economic potential, but is very vulnerable to the impacts of climate change. Sea level rise caused by global warming threatens coastal areas, exacerbates coastal erosion, and increases the risk of tidal flooding, which is becoming more frequent. On the other hand, other areas around Cirebon are also vulnerable to

droughts that occur due to increasingly erratic rainfall patterns, which can damage agricultural yields and cause water scarcity.

These extreme and unpredictable weather changes have a direct impact on the main economic sectors of coastal communities. In the fisheries sector, for example, rising seawater temperatures and worsening pollution are causing damage to the marine ecosystems in which many species of fish live. Extreme weather such as strong winds and storms also add threats to the safety of fishermen and damage their fishing gear. In the agriculture sector, uncertainty in rainfall causes crop failures and threatens food security. Similarly, in the tourism sector, which relies heavily on natural attractions, unstable weather conditions reduce the number of tourists and damage existing natural tourism areas.

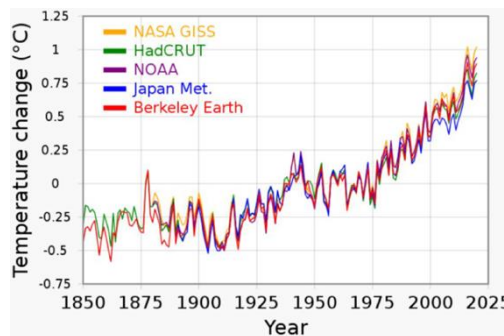


Figure 1. Scientific consensus on climate change

Therefore, appropriate and effective environmental law policies are essential in protecting coastal ecosystems and the communities that depend on them. One effective environmental law policy to address the impacts of climate change is ecosystem-based coastal area management. Coastal areas have a vital role in maintaining ecosystem balance and supporting the lives of coastal communities. Coastal ecosystems such as mangroves, coral reefs, and mangrove forests serve as natural protection from the impacts of climate change, such as coastal abrasion, tidal flooding, and sea water intrusion that occurs due to sea level rise.

At the national level, Indonesia has established several environmental legal policies related to coastal management and climate change, such as Law No. 32 of 2009 concerning Environmental Protection and Management and Law No. 27 of 2007 concerning Management of Coastal Areas and Small Islands. In addition, Indonesia has also ratified the Kyoto Protocol and Paris Agreement that bind countries to reduce greenhouse gas emissions and adapt to climate change.

While these policies provide a clear legal framework for environmental management, implementation in the field, particularly in coastal areas, often encounters various obstacles. One of the main challenges is the lack of coordination between government agencies, both at the central and local levels. For example, although there are regulations governing the protection of coastal areas, implementation is often hampered by a lack of trained human resources (HR) and limited budgets. In Cirebon, as in many other coastal areas, there is often an overlap of authority between local and central government regarding coastal area management, which makes policies less effective.

Rehabilitation and protection of these ecosystems can reduce the negative impacts of climate change on coastal areas. For example, mangroves have the ability to sequester carbon, stabilize shorelines, and provide important habitat for a variety of marine species. Healthy coral reefs also serve as coastal protection from large waves and storms. Therefore, legal policies that promote mangrove and coral reef rehabilitation are essential for strengthening the resilience of coastal areas to climate change.

However, the implementation of these ecosystem-based management policies often faces major challenges. Many policies have not been fully accepted or understood by coastal communities, who sometimes feel that these policies hinder their livelihoods. For example, policies to protect mangroves by prohibiting mangrove forest destruction activities without offering adequate economic alternatives can generate resistance from communities that depend on these natural resources. Therefore, it is important for the government to involve communities in the planning and implementation of ecosystem-based coastal management policies. Community empowerment in natural resource management and education about the benefits of ecosystems. In addition to ecosystem-based coastal area management, environmental law policies are also very important in managing natural resources sustainably.

Environmentally-friendly water, agriculture and energy management play an important role in strengthening the resilience of coastal communities to the impacts of climate change. Erratic changes in rainfall patterns due to climate change can cause droughts or floods that harm coastal communities, especially those dependent on agriculture and fisheries. Therefore, sustainable natural resource management policies are essential to mitigate the impacts of climate change. Water resources are one of the essential elements in the lives of coastal communities, both for daily needs and for the agricultural sector. Climate change can cause instability in rainfall patterns, leading to drought or flooding. For this reason, sustainable water management policies are needed to ensure the sustainability of water supply for coastal communities.

Good water management includes protection of water resources, improved water use efficiency, and effective drainage management to reduce flood risks. It should also involve efficient irrigation technologies in the agricultural sector, as well as water quality management that can reduce pollution from industrial waste or garbage discharged into the sea. Effective implementation of water management policies will help coastal communities adapt to climate change, which can reduce dependence on unstable water supplies.

The agricultural sector in coastal areas is highly vulnerable to climate change, especially with regard to rainfall uncertainty and rising temperatures. To address this, environmentally friendly agricultural management policies are essential. This policy includes the application of efficient and sustainable agricultural technologies, such as organic farming, agroforestry, as well as the use of crop varieties that are resistant to climate change. In addition, these policies should also encourage good soil management practices to prevent land degradation, which often occurs due to excessive use of fertilizers and pesticides.

The implementation of environmentally friendly agricultural policies can not only improve food security in coastal communities, but can also reduce negative impacts on the environment. For example, agriculture that prioritizes biodiversity can increase ecosystem resilience to external disturbances, such as natural disasters or climate change. This policy will also support the achievement of sustainable development goals, especially Climate change is also caused by increased greenhouse gas emissions, most of which come from burning fossil fuels. Therefore, environmental legal policies that support the development of renewable energy are essential to reduce the impact of climate change. The use of renewable energy, such as solar, wind and biomass energy, can reduce dependence on environmentally damaging fossil energy resources.

In coastal areas, the utilization of renewable energy is particularly relevant. For example, solar energy can be utilized to meet the energy needs of coastal communities that are often limited by conventional energy supplies. In addition, the development of renewable energy can also open up new opportunities for coastal communities to develop a sustainable local economy. Therefore, policies that encourage the development of renewable energy in coastal areas need serious attention from the government.

While existing environmental law policies are highly relevant for managing climate change impacts, their implementation often faces obstacles at the local level. One of the main challenges is the lack of coordination between government agencies at different levels, both central and local. For example, policies related to coastal management often overlap in authority between local and central government, which hinders policy implementation. In addition, the lack of community participation in environmental management is also a major

obstacle. Coastal communities are often not actively involved in policy planning and implementation, even though they are the most affected by climate change.

Therefore, it is crucial for the government to involve the community in every stage of the policy, from planning to evaluation. Empowering coastal communities through education and training on the importance of sustainable natural resource management will increase the effectiveness of environmental law policies.

The Importance of Coastal Community Participation in Environmental Management. Coastal communities in Cirebon are highly dependent on coastal ecosystems, which provide important natural resources for their livelihoods, such as fisheries, agriculture, and tourism. However, the increasingly evident impacts of climate change, such as sea level rise, coastal abrasion, as well as unpredictable extreme weather, have threatened the sustainability of these ecosystems. In facing these challenges, the participation of coastal communities in environmental management is very important. Through community empowerment, ecosystem-based management, and the development of environmentally friendly livelihood alternatives, we can create a system that not only protects coastal ecosystems but also improves the welfare of the people who depend on them.

Cirebon's coastal communities have long relied on coastal natural resources to fulfill their daily needs. Fishermen, farmers, and tourism businesses are groups that mostly depend on natural products, such as fish, shrimp, coconut, and other marine products. Coastal ecosystems including mangroves, coral reefs and seagrass beds play an important role in supporting the sustainability of these economic sectors. Mangroves, for example, serve as a natural barrier that prevents coastal erosion and protects marine habitats, while coral reefs provide a home for a variety of fish species that are a major source of income for fishermen.

However, access to natural resources and the impacts of climate change have threatened the sustainability of these coastal ecosystems. The rise in sea temperature and sea level caused by global warming has caused mangrove forests to be lost, while coastal abrasion is expanding. As a result, Cirebon's fishermen and coastal farmers face diminishing natural resources that they can rely on for their livelihoods. Climate change is also causing increasingly erratic rainfall, which exacerbates droughts or floods, threatening agricultural yields as well as food security in coastal areas.

The active participation of coastal communities in environmental management is critical to creating effective and relevant policies. Local communities have a wealth of knowledge and experience on sustainable ways of managing natural resources, often passed down through generations. Therefore, coastal communities should be involved in every stage of planning and implementation of environmental management policies, both at the local and national levels.

In Cirebon, community participation in coastal ecosystem management can start by involving them in mangrove rehabilitation and coral reef protection programs. For example, local fishermen can be involved in the mangrove rehabilitation process by planting mangrove seedlings in erosion-affected areas, while coastal farmers can be involved in polluted land restoration efforts. By involving the community in these conservation efforts, they will feel a sense of responsibility towards environmental sustainability and will be more motivated to maintain the sustainability of the ecosystem.

In addition, the public also needs to be involved in decision-making related to regulations that affect their lives, such as fishing restrictions or rules governing land use in coastal areas. The success of environmental policies heavily depends on the active participation of the community in formulating and implementing these policies. Without their support and involvement, existing policies tend to be ineffective and may even exacerbate the challenges faced by coastal communities. Empowering coastal communities is a crucial step in ensuring the sustainability of natural resource management. This empowerment can be achieved through education and training that enhances the community's capacity to manage the environment sustainably. One important form of empowerment is providing education on the importance of mangrove and coral reef conservation. With a better

understanding of the long-term benefits of these ecosystems, coastal communities will become more aware of the importance of environmental preservation and be more willing to engage directly in conservation efforts.

One of the key steps in empowering coastal communities is to provide intensive education on environmental issues, such as the impact of climate change and the importance of sustainable management of natural resources. Cirebon coastal communities need to gain a better understanding of how certain methods, such as wiser management of marine resources and ways to reduce the impact of climate change, can improve their quality of life and the sustainability of natural resources. Intensive counseling on environmental issues is an aspect that cannot be separated from efforts to empower coastal communities. This empowerment is not only related to providing knowledge, but also to changes in behavior and perspective towards natural resources, especially those related to coastal ecosystems. The coastal communities of Cirebon, who largely depend on natural products, need to understand that they are not only users of natural resources, but also protectors and managers of the environment. Therefore, effective outreach can be a bridge to open the insight of coastal communities about ways they can manage their natural resources sustainably, as well as how their actions can reduce the impact of climate change.

Apart from providing an understanding of the impacts of climate change, education must also emphasize the importance of wise and sustainable management of natural resources. Coastal natural resources, such as mangrove forests, coral reefs and other marine resources, must be managed carefully so that they remain sustainable and can be utilized in the long term. One of the main challenges in managing coastal natural resources is overexploitation which can cause ecosystem damage. This counseling must also be adapted to the local context and community culture. For example, in promoting mangrove conservation, it is important to introduce local values associated with mangrove trees, which are often considered a symbol of protection by many coastal communities. If people are informed about sustainable ways to manage natural resources and provided with environmentally friendly alternatives, they will be more likely to actively participate in conservation and environmental management programs.

A relevant example in Cirebon is mangrove conservation. Mangroves have a dual role as protecting beaches from abrasion, living places for various fish species, and producing oxygen which is very important for marine ecosystems. Educating coastal communities about the long-term benefits of mangrove conservation needs to be carried out by exploring local values that exist in community culture. In many coastal areas, mangrove trees are often revered as protective symbols and guardians of environmental sustainability. Therefore, aligning conservation approaches with local values respected by communities will increase their sense of ownership of the conservation program.

Apart from that, education about the importance of using environmentally friendly fishing techniques and wiser management of marine resources must also be part of the outreach. Destructive fishing techniques, such as the use of fish bombs or fishing gear that damages coral reefs, can cause permanent damage to marine ecosystems and threaten the survival of coastal communities that depend on fisheries. Education regarding environmentally friendly fishing techniques, such as the use of environmentally friendly nets or sustainable fish farming, must be introduced to the public as a safer and more profitable alternative in the long term.

One important aspect of empowering coastal communities is offering environmentally friendly alternative livelihoods. In many cases, coastal communities still depend on unsustainable methods of exploiting natural resources due to a lack of knowledge or other more profitable options. Therefore, extension must also include information about economic opportunities that can be implemented without damaging the environment.

Ecotourism is an alternative livelihood that is very relevant for coastal communities in Cirebon. By utilizing coastal natural resources, such as mangrove forests, beaches and coral reefs, communities can develop tourism potential which not only has a positive impact on their economy, but also contributes to environmental conservation. This counseling regarding ecotourism must be equipped with knowledge about how to manage natural tourist destinations wisely, including how to organize tourist visits, reduce negative impacts on the

ecosystem, and develop supporting businesses such as homestays and local products based on natural potential. It is important to ensure that coastal communities are given training and skills in managing ecotourism businesses. This training can include basic knowledge regarding tourism management, marketing, as well as training in providing environmentally friendly services.

In an effort to preserve nature and ensure the sustainability of ecosystem-based tourism, the active participation of coastal communities is a very crucial element. Coastal communities in Cirebon, who live side by side with nature and are very dependent on natural products, have great potential to act as environmental guardians. However, as has been stated, even though community participation is very important, there are various challenges that must be faced to ensure that the policies created are effective and can work in the long term. For this reason, strategic steps are needed that not only involve the community, but also all related parties, including the government, non-governmental organizations (NGOs), and the private sector.

The main challenge in implementing coastal community participation is the lack of effective coordination between the government, NGOs and the communities themselves. In many cases, policies set by the government often do not take into account local knowledge and the specific needs of coastal communities. Even though the aims of these policies are good, in reality these policies are not always successful in achieving the desired results due to a lack of community involvement in the planning and implementation process.

For example, in mangrove conservation policies, policies are often made without considering the traditional methods used by communities to maintain the sustainability of coastal ecosystems. The people of Cirebon, who have a close relationship with nature, can provide valuable insight into the ways they have long used to manage natural resources. If the government and related institutions do not involve them actively in planning, the policy may not be accepted or even rejected by the community. This shows the importance of more intensive and collaborative dialogue between the parties involved.

To overcome this challenge, the first step that must be taken is to create a more inclusive dialogue between government, NGOs, coastal communities and other stakeholders. This process can start by involving communities in the policy planning stage, where they can provide input and ideas regarding the best ways to preserve coastal ecosystems while still improving their welfare. Through discussion forums or regular meetings, the community can share local knowledge and their experiences in facing environmental challenges. In this way, the resulting policies will be more relevant and in line with specific needs and conditions that exist at the local level.

Therefore, there needs to be increased capacity and understanding among stakeholders about the important role of coastal communities in environmental management. The government and NGOs must be more proactive in educating the public about the benefits of conservation and sustainable management. On the other hand, the public must also be encouraged to actively participate in the policy process so that they feel ownership and responsibility for the implementation of the policy. Another challenge that is often faced in managing coastal natural resources is limited resources and funds at the local level. Many community empowerment and conservation programs are hampered due to a lack of available funds to support their implementation. On the other hand, many coastal areas have limited budgets, making it difficult to allocate sufficient funds for environmental management programs.

To overcome this, it is very important to optimize the use of village funds or special allocation funds that can be used to support conservation activities involving the community. Central and regional governments need to ensure that available funds are used efficiently to support activities that have a direct impact on nature conservation and empowerment of coastal communities. Apart from that, transparent and accountable fund management is also very important so that the public can see the real impact of the funds they allocate.

The use of village funds, for example, can be directed to support community initiatives in managing coastal ecosystems, such as mangrove forest rehabilitation, environmental education, and the development of community-based ecotourism businesses. In this way, existing funds are not only used for physical development, but also to

create sustainable and environmentally friendly solutions. If these funds are managed well, there will be a synergy between community economic empowerment and environmental preservation, which in turn will provide long-term benefits.

One alternative livelihood that can be provided to coastal communities is the development of ecotourism. Ecotourism is a form of tourism that aims to preserve nature and increase environmental awareness, while at the same time providing economic benefits for local communities. In Cirebon, which has a coastline rich in biodiversity, the potential for ecotourism is enormous. Community-based ecotourism programs can be an effective way to preserve nature, as well as provide alternative income for coastal communities.

However, ecotourism development cannot be done haphazardly. It requires careful planning and wise management to ensure that tourism does not damage the ecosystem. In this case, the participation of coastal communities is the main key. Communities must be empowered to manage tourist destinations, promote existing biodiversity, and provide educational experiences for tourists regarding the importance of protecting the environment. Thus, ecotourism is not only a profitable alternative livelihood, but also a tool to spread awareness about the importance of nature conservation. Effective education regarding the importance of environmental conservation must be an integral part of the strategy for empowering coastal communities. This outreach does not only focus on information about coastal ecosystems, but also on practical ways that communities can take to maintain the sustainability of natural resources. For example, communities can be given training on appropriate conservation techniques, sustainable ways of fishing, and environmentally friendly waste management.

Environmental education must be provided to all levels of society, from children to adults. This educational program can be carried out through various methods, such as workshops, training, or teaching in local schools. The more people are aware of the importance of environmental conservation, the more likely they are to actively participate in conservation programs.

In facing the challenges of climate change and preserving coastal ecosystems, the participation of coastal communities in Cirebon is the main key to the success of environmental management programs. With intensive dialogue between the government, NGOs and coastal communities, as well as optimizing the use of village funds and other local resources, management of coastal natural resources can run more effectively. Apart from that, the development of ecotourism and community empowerment in environmentally friendly management of natural resources can be a sustainable alternative to improve the economic welfare of the community. Environmental outreach and education adapted to local culture are also very important to create awareness and active participation in preserving coastal nature. With these steps, the sustainability of ecosystem-based tourism can be maintained and bring long-term benefits to coastal communities in Cirebon

CONCLUSION

This research reveals that existing environmental legal policies are not yet fully effective in supporting the social adaptation of Cirebon coastal communities to the impacts of climate change. Even though Indonesia has established various policies related to the protection and management of coastal areas, the implementation of these policies still faces various challenges. The gap between existing policies and conditions in the field, overlapping authority between agencies, and the lack of community participation in decision making are the main factors that hinder the success of these policies. The importance of ecosystem-based coastal area management, including mangrove and coral reef conservation, must be the main focus in environmental legal policies. Coastal ecosystems have a vital role in protecting coastal communities from the impacts of climate change, but their management requires active participation from communities who depend directly on these natural resources. In this context, empowering coastal communities through education, training, and providing alternative environmentally friendly livelihoods is very important to increase their awareness and involvement in environmental management.

In addition, to create more effective policies, improvements are needed in coordination between government agencies, strengthening law enforcement, as well as utilizing technology and funds that can support conservation programs. The government needs to pay more attention to coastal communities' access to environmental justice and the resources needed to implement sustainable coastal management policies. Overall, environmental legal policies that are more adaptive, ecologically just, and involve the community in every stage of decision making will be very influential in increasing the socio-economic resilience of Cirebon coastal communities to the impacts of climate change. Therefore, more inclusive and coordinated policy reforms and implementation are urgently needed so that coastal communities can survive and develop in facing the challenges of climate change

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