

Analysis of Community Social Capital Inclusiveness Towards Waste Pollution Prevention by Shrimp Farming Company: A Case Study of Waste Pollution in Pasir Kuning Beach Area

Herdiyanti^{1, *}, Reko Dwi Salfutra², and Julia³

¹ Department of Sociology, Faculty of Social and Political Sciences, Universitas Bangka Belitung, 33172, Bangka, Bangka Belitung Islands Province, Indonesia

² Department of Law, Faculty of Law, Universitas Bangka Belitung, 33172, Bangka, Bangka Belitung Islands Province, Indonesia

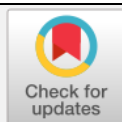
³ Department of Accounting, Faculty of Economics and Business, Universitas Bangka Belitung, 33172, Bangka, Bangka Belitung Islands Province, Indonesia

* Corresponding Author: herdiyanti@ubb.ac.id

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ABSTRACT

Sewage pollution originating from the activities of shrimp farming companies in the Pasir Kuning Beach area raises serious concerns about its impact that damages the environment and disrupts the balance of the ecosystem. This research aims to understand and analyze the inclusiveness of social capital in local communities as an effort to prevent sewage pollution. Using a qualitative approach, this research conducted in-depth interviews with community members in the Pasir Kuning Beach Area. Respondents were selected based on criteria that ensured a balanced representation of various community groups, and secondary data was used to provide a broader context. The research findings highlight the central role of social capital in shaping relationships, trust, and cooperation among communities. The implications include developing more effective sewage pollution prevention strategies and providing a foundation for understanding community contributions to coastal ecosystem conservation. The focus on social capital inclusivity as a catalyst for positive change demonstrates the determination of local communities to overcome the negative impacts of shrimp farming activities. In the context of Bangka Belitung, which is affected by the mining sector, this research is significant in efforts to reduce environmental damage. It is hoped that these findings provide valuable insights for stakeholders in formulating sustainable solutions that support the ecology and well-being of local communities in the future.

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1. Introduction

Environmental pollution has extended beyond national borders and rapidly become a global crisis, garnering international attention. This phenomenon is not confined to a particular region but poses worrisome challenges to global ecosystems. Globally, environmental pollution creates an urgency for all humankind to reflect upon and take action (Rieuwerts, 2017; Singh & Singh, 2017). In understanding the root of this issue, we identify three key elements that provide critical dimensions to the global environmental pollution problem. Firstly, industrial waste stands as a significant contributor to global pollution. Waste from various industrial sectors permeates the environment, forming burdens detrimental to ecosystems and causing long-term impacts that are difficult to address (Bhatia, 2017; Shah, 2022). Subsequently, the primary focus is directed towards plastic waste, which creates impacts on both marine and terrestrial ecosystems (Ball & Halsall, 2023; de Souza Machado et al., 2018; Jambeck et al., 2018; Sarker et al., 2020). Awareness of the dangers of plastic waste continues to rise worldwide, prompting calls for concrete actions to address this issue before further damage occurs. Meanwhile, climate change acts as a hindrance to our efforts to address global pollution issues. Global warming, climate fluctuations, and ecological disasters increasingly complicate environmental preservation efforts, exacerbating ecosystem vulnerabilities to pollution (Sarangi, 2023; Wang & Gu, 2021).

Furthermore, the impact of pollution on biodiversity has become a critical concern. Global biodiversity faces serious threats, and various forms of pollution have disrupted ecosystem balance, causing damage to the natural habitats of various species (Sarangi, 2023). Increasing acidity levels in water, contaminated soil, and exposure to toxic chemicals further endanger flora and fauna that heavily rely on balanced environmental conditions (Masindi & Muedi, 2018; Mishra et al., 2019). Direct impacts on species and populations paint a grim picture. Various regions worldwide have witnessed accelerated species extinctions due to the direct impacts of pollution (Hooper et al., 2012; Talukder et al., 2022). A significant decline in the survival of certain species underscores the urgency of environmental protection.

Coastal ecosystems, as vital elements of global biodiversity, face serious threats from environmental pollution. Coastal areas support marine and terrestrial life, and pollution impacts have far-reaching implications (Sheaves, 2009). Environmental pollution creates significant impacts in the context of interconnectedness with coastal areas. Coastal ecosystems are vulnerable to environmental changes as they are the meeting point between terrestrial and marine ecosystems. Pollution, primarily from human activities such as industry and agriculture, enters these ecosystems, creating detrimental pressures.

Threats to ecological balance are one of the serious consequences of pollution in coastal areas. Toxic chemicals, industrial waste, and plastic pollution enter coastal environments, threatening the natural balance of ecosystems (Ball & Halsall, 2023; Vikas & Dwarakish, 2015). Highly important natural resources such as wetlands and mangrove forests affected by pollution directly impact flora and fauna, which rely heavily on this ecological balance.

The coastal ecosystem is a primary buffer in providing natural resources for local communities. Disturbances to the ecological balance in coastal areas have widespread impacts, including fishermen and coastal communities relying on this ecosystem for their livelihoods

and daily lives. Coastal areas possess stunning natural beauty and are critical in maintaining global ecological balance. Essentially, coastal areas are a crucial buffer between two major ecosystems, land and sea. This function encompasses highly important ecosystems, including natural protection from storms and natural disasters and providing essential habitat for unique flora and fauna. Coastal areas are not merely aesthetically appealing regions but also places that play significant economic and social roles. Understanding coastal areas' economic and social significance is crucial to illustrating the close relationship between ecological sustainability and human well-being.

The economic role of coastal areas encompasses various aspects, but the main focus is on fishing communities. These communities heavily rely on coastal resources for their livelihoods, and coastal areas provide the foundation for the sustainability of their livelihoods. From fish catches to other natural resources, coastal areas function as indispensable sources of life. Additionally, coastal areas also provide significant social support to local communities. Communities residing around coastal areas often have strong cultural ties to their environment. Therefore, the sustainability of coastal areas not only represents protecting the environment and preserving a rich and diverse cultural heritage.

Preserving coastal areas is not devoid of challenges requiring deep understanding and effective actions. The main challenge coastal areas face is anthropogenic pressure from human activities. Rapid urbanization, industrial expansion, and intensive farming practices are the primary factors contributing to coastal area degradation. The increase in population leading to urbanization triggers land transformations, resulting in the loss of natural habitats and increasing the risk of coastal ecosystem damage (Akhtar et al., 2021; Burak et al., 2004; Seifollahi-Aghmiuni et al., 2022). Besides anthropogenic pressure, climate change poses an additional threat that needs to be addressed in coastal area preservation efforts. Recognizing climate change and global temperature rise as key determining factors increases pressure on coastal area sustainability. Climate change affects weather patterns, causes sea level rise, and alters coastal ecosystem structures. This can jeopardize ecosystem sustainability and lead to the loss of critical habitats for various species.

Despite significantly contributing to the global fisheries sector, the shrimp farming industry faces critical scrutiny regarding its environmental impacts, particularly in the context of waste pollution. The shrimp farming industry, which has grown rapidly to meet global demand for fisheries products, is often associated with harmful waste discharge into surrounding waters. Shrimp farming processes, including artificial feed and chemicals, produce organic waste and toxic chemicals that can damage aquatic ecosystems (Dauda et al., 2019; Gräslund & Bengtsson, 2001). The Gulf of Thailand, renowned for its coastal beauty, also bears witness to the negative impacts of the rapidly expanding shrimp farming industry. Recent studies have shown that waste from shrimp farms, especially residual feed and organic waste, has increased nutrient levels in the gulf waters. This phenomenon has resulted in uncontrollable algal blooms, threatening the sustainability of coral reef ecosystems and disrupting traditional fishing activities, which are the primary livelihood sources for coastal communities (Cheevaporn & Menasveta, 2003; Wattayakorn, 2006). Along the coast of Peru, Pérez et al. have provided in-depth insights into the impact of shrimp farming on the balance of marine ecosystems (Pérez et al., 2020). This study noted a decrease in the population of several important marine invertebrate species crucial for the local food chain. An increase in pollution levels and changes in seabed structure were also identified as direct outcomes of shrimp farming activities. This research highlights the negative impacts on biodiversity and emphasizes the urgency to reassess existing farming practices.

Cases of waste pollution from shrimp farms can also be found locally, such as in rivers in Indonesia. Harianja et al. stated that shrimp farm waste, carried by river currents, creates a significant pollution burden in river ecosystems (Harianja et al., 2018). This condition harms the sustainability of river biodiversity and has health impacts on communities relying on these rivers for water sources and other natural resources. Social capital is an effort to combine social strengths within a community, built by individuals or groups referring to social structures considered efficient and effective in achieving individual and/or group goals (Lawang, 2004). The concept of social capital emphasizes the importance of relationships among individuals. By building and maintaining these relationships, they can collaborate to achieve common goals and overcome difficulties more efficiently, thus enabling smooth cooperation.

The concept of social capital highlights the importance of social networks, norms, and trust among individuals and groups in achieving common goals, especially in the increasingly urgent context of environmental preservation. Social capital is a collection of resources individuals own and includes social relations built within society. In environmental conservation efforts, the inclusivity of social capital is key to activating active participation from various parties, from local communities to higher-level stakeholders. Environmental sustainability is the responsibility of governments or international institutions and a joint effort with the community. This inclusivity creates broader engagement in conservation efforts and strengthens community capacity in dealing with pollution impacts that often involve various dimensions, whether economic, social, or ecological.

Bangka Belitung Province, with a land area of 16,424 km², a sea area of 65,301 km², and a population of about 1.43 million spread across seven districts/cities, reflects religious and ethnic diversity in its community life patterns (Badan Pusat Statistik Provinsi Kepulauan Bangka Belitung, 2018). The main characteristic of diverse communities, as stated by Susan, is the diversity of social identities, such as religious, ethnic, and professional diversity, as well as various social groups with unique self-definitions different from other groups (Susan, 2012). Pasir Kuning Beach in Air Lintang Village is an attractive tourist destination with its beautiful natural panorama. The uniqueness of this beach lies in its golden yellow sand, which is rarely found. Additionally, the beach offers calm and gentle waves, making it a magnet for tourists who want to enjoy a peaceful atmosphere and stunning views. With a coastline of about one kilometer and surrounded by two headlands at its ends, Pasir Kuning Beach has a captivating curved shape.

Beautiful rock formations are scattered along the coastline, adding a charming natural aesthetic. At one corner of the beach lies a large rock that intriguingly resembles a giant frog. This rock is known as “Batu Mengkatak” and holds an interesting local legend. It supposedly embodies a prince, with the surrounding yellow sand being his daughter. Additionally, near Pasir Kuning Beach, there’s a small island called “Pulau Semambung,” accessible by walking during low tide. The beach also holds a mystical allure that leaves a unique impression on visitors. Pasir Kuning Beach is not just an ordinary tourist destination; it also holds deep cultural values and local wisdom. It’s a place where the people of Air Lintang Village conduct the traditional “Perang Ketupat” ritual. This ritual is a cultural heritage of the Bangka Belitung community, continuously preserved and upheld. The significance of the Perang Ketupat tradition is that it carries messages of unity, cohesion, and cooperation in community life. It reflects the local community’s wisdom in maintaining a harmonious relationship between humans and nature.

However, the beauty and significance of Pasir Kuning Beach are threatened by a serious issue. Green waste pollution caused by shrimp farming activities has turned the color of the

beach water green, endangering the marine ecosystem and the livelihoods of local fishermen. This situation has attracted the attention of the community, fishermen, environmental activists, and local governments to work together to preserve the beach's importance for the local community and tourists. By the end of 2022, the community reported these changes due to the activities of private shrimp farming companies. Besides harming the coastal ecosystem, the impact is also felt by fishermen who are hindered from fishing due to the polluted water conditions. Fishermen, environmental activists, and local governments are working to address this issue, including resistance from the community against shrimp farming companies.

Previous studies by Latumahina et al. provide relevant insights into the application of social capital in the development of coastal areas (Latumahina et al., 2020). This research found that the application of social capital in Maluku involves structured community organization patterns, the development of trust and norms among coastal community groups, and the formation of efficient networks for coordination in developing coastal areas towards tourist destinations. Groups such as tourism awareness groups (Kelompok Sadar Wisata or Pokdarwis) and Village-Owned Enterprises (BUMDes) are the dominant subjects in applying this social capital. Marfai et al. highlight that adaptive capacity, particularly social capital, plays a crucial role in disaster recovery and adaptation enhancement (Marfai et al., 2015). This research illustrates the importance of social capital in addressing environmental challenges and can inspire climate adaptation efforts at the community level.

This study will investigate how the concept of social capital can be applied to prevent waste pollution in Air Lintang Village. This research focuses on strengthening social capital efforts to prevent waste pollution caused by shrimp farming activities in Air Lintang Village, particularly around Pasir Kuning Beach. The research will investigate the impact of social capital in facing waste pollution challenges and its implications for the local community in Air Lintang Village, especially in the area around Pasir Kuning Beach. Research questions include how social capital shapes inclusivity in responding to waste pollution prevention situations at Pasir Kuning Beach and the role of social capital in fostering positive cooperation and reducing negative impacts from shrimp farming activities on the ecosystem and fishermen in Air Lintang Village. The research methods used in this study are designed to respond to the complexity of waste pollution issues amidst actively engaged communities. This research will employ an in-depth qualitative approach, including interviews with key stakeholders in the Pasir Kuning Beach area, to understand the dynamics of social capital involved in pollution prevention efforts.

The importance of this approach is reflected in the context of waste pollution, which involves various social, economic, and ecological dimensions. By directly involving stakeholders, this method will provide an opportunity to hear various perspectives, understand policy dynamics, and detail practical steps that can be taken to enhance the inclusivity of social capital.

This study has theoretical, practical, and policy implications. Theoretically, this research is expected to contribute to understanding the role of social capital in the context of waste pollution prevention in coastal areas. The study is expected to develop an understanding of how to enhance the inclusivity of social capital to achieve environmental conservation goals. Practical implications of this research include the development of strategies and interventions to enhance social capital and inclusivity in waste pollution prevention efforts in Air Lintang Village. Lastly, policy implications can guide governments and relevant institutions to integrate the concept of social capital into planning and implementing environmental policies in coastal areas.

2. Literature Review

2.1. Pollution in Coastal Areas

Coastal ecosystems encompass the border between land and sea and play a central role in preserving global biodiversity and providing various ecosystem services. Unfortunately, coastal areas have also become a focal point in the context of environmental pollution. Several critical aspects related to pollution in coastal areas need further examination. Coastal areas naturally attract humans for various activities, ranging from industry to tourism. However, due to their close connection with human activities, these areas become highly vulnerable to pollution impacts. Industrial activities, agriculture, and settlements around coastal areas can significantly pressure ecosystems (Liu et al., 2020; Tonelli & Tonelli, 2020; Zhou et al., 2020). Studies by Brown et al. and Coelho et al. provide in-depth insights into the complexity of interactions between pollution and coastal ecosystems (Brown et al., 2019; Coelho et al., 2013). Pollution from various sources, including industrial waste, agriculture, and domestic waste, enters coastal ecosystems and creates widespread impacts. This process can trigger imbalances in biogeochemical cycles and cause significant changes in biological community structure.

Pollution in coastal areas threatens biodiversity and the overall ecological balance. Toxic chemicals, organic waste, and additional nutrients can cause changes in the physical and chemical properties of water, altering ecosystem dynamics. This can lead to excessive algae growth, oxygen depletion in the water, and habitat loss for certain species (Carpenter et al., 2011). Coastal areas also experience the impacts of climate change, especially through sea-level rise. Sea-level rise associated with global warming can lead to tidal floods and coastal erosion (IPCC, 2020). The increasing intensity of tropical storms, often affecting coastal areas, can exacerbate pollution impacts.

Local communities living around coastal areas are often highly dependent on the natural resources provided by these ecosystems. Pollution can threaten traditional livelihoods such as fishing, aquaculture, and tourism, resulting in significant economic and social impacts on coastal communities. The impacts of pollution in coastal areas are local and have global consequences. Changes in carbon and nitrogen cycles in coastal areas can affect the global climate balance and seawater quality (Yan et al., 2021). Therefore, preserving coastal areas is essential to support global ecological sustainability.

2.2. Waste Pollution from Shrimp Farming Industry

The shrimp farming industry is known for releasing much organic waste and toxic chemicals into its surrounding waters. These wastes may include leftover feed, fertilizers, and shrimp farm chemicals used in cultivation practices. The accumulation of such waste can lead to increased nutrient levels in the water, triggering uncontrolled algae growth and resulting in eutrophication (Anh et al., 2010; Cheevaporn & Menasveta, 2003; Granada et al., 2016; Wattayakorn, 2006). Waste pollution can damage the structure and function of ecosystems, especially when toxic chemicals reach levels harmful to marine organisms. Mangroves, seagrasses, and coral reefs, which play crucial roles in coastal ecosystems, may be threatened by increased nutrient and toxic substance content. Waste pollution from shrimp farms not only threatens ecosystems but also the livelihoods of local fishermen. Fishermen relying on traditional fishing around Pasir Kuning Beach face serious obstacles due to polluted water conditions. This poses a direct economic threat and challenges the sustainability of traditional livelihoods.

2.3. Local Wisdom as a Lifesaver

Tensions among groups intensify when faced with differing interests between in-groups and out-groups in the context of this research. The main question is how these differences can be transformed into positive energy for the groups in Air Lintang Village, particularly regarding the issue of waste pollution from shrimp farming industries around Pantai Pasir Kuning. In its application, local wisdom is defined as the values and norms of the local community that can serve as the foundation for environmental conservation efforts. The wise values inherent in local wisdom can guide responding to waste pollution challenges and building solidarity among community members (Marfai et al., 2015). Specifically, local wisdom can be a means to develop sustainable environmental conservation strategies, foster trust among community members, and enhance active participation in waste pollution prevention activities.

2.4. The Concept of Social Capital in Environmental Conservation

Social capital is a crucial foundation in environmental conservation efforts, creating a framework involving social networks, norms, and trust to achieve common goals (Lawang, 2004). In environmental conservation, the concept of social capital becomes an effective instrument in addressing various challenges faced by ecosystems and their communities (Marfai et al., 2015). Social capital emphasizes the importance of solid social networks among individuals, groups, and communities in the context of environmental conservation. With these networks, communities can work together to understand, prevent, and address various environmental issues (Marfai et al., 2015). Strong social networks can strengthen coordination and collaboration in maintaining ecological balance. The concept of social capital also includes the formation of shared environmental norms. These norms represent unwritten rules that communities follow to protect their living environment (Fathy, 2019). The existence of these environmental norms can serve as the moral and ethical basis that shapes positive behavior in environmental management and conservation.

Trust is a key element in the concept of social capital. In environmental conservation, trust creates the basis for strong cooperation among various stakeholders involved (Fathy, 2019; Marfai et al., 2015). This trust builds mutual relationships, which are key to success in addressing the complex and large-scale challenges faced by the environment. The application of social capital can make a positive contribution to addressing environmental issues. When social networks, environmental norms, and trust are effectively applied, communities can be more responsive to environmental changes and more efficient in implementing sustainable practices. The inclusivity of social capital is important in the context of environmental conservation. Environmental sustainability is not only the responsibility of governments or international institutions but also involves active community engagement. By involving various parties, including local communities, social capital creates broader involvement in conservation efforts and strengthens the community's capacity to cope with environmental impacts.

2.5. Social Capital

The theory of Social Capital has become relevant in the social sciences, attracting the attention of many social scientists, including renowned figures like Pierre Bourdieu and Putnam. Putnam, in particular, played a significant role in developing the concept of social capital. He defined social capital as a set of horizontal relationships among individuals, communities, and societies, formed by "civil engagement networks" regulated by norms as a form of productivity for communities. In his research, Putnam concluded that social capital

reflects interconnected norms and networks. The basic assumption of social capital, according to Putnam (Field, 2010), involves two aspects: firstly, the existence of networked relationships with interrelated norms, and secondly, their mutual support as efforts for the success of individuals involved in these networks. Putnam highlighted the importance of coordination, communication, and trust in building mutual trust among members of society or communities.

In the context of this research, the concept of social capital becomes the focus for assessing its inclusivity in efforts to prevent waste pollution on the Pasir Kuning Beach in the Air Lintang Village. Social capital is considered a valuable social resource in preserving local cultural values and maintaining them amidst the challenges of globalization. Collaboration and trust among residents can build strong emotional ties, both within and outside the community.

3. Research Methodology

This descriptive study provides a detailed overview of the dynamics of forming social capital inclusivity efforts to prevent waste pollution in the Pasir Kuning Beach area, Air Lintang Village. The research method applied is qualitative analysis. According to Creswell, the descriptive qualitative research approach not only discusses general cases of social phenomena but also focuses on describing specific things seen from the perspectives of “why” and “how” (Creswell, 2010). This approach allows for exploring as much information as possible related to waste pollution dynamics at Pasir Kuning Beach. The descriptive qualitative approach also outlines various forms of conservation and government efforts to support initiatives undertaken by the community. This research will investigate in-depth how communities strive to achieve livelihoods amidst modernization and globalization, particularly through managing and developing natural resources. This approach allows researchers to describe not only surface-level social behaviors but also behaviors that may be hidden behind apparent actions. The research location is focused on Pasir Kuning Beach, Air Lintang Village, West Bangka Regency, Bangka Belitung Islands Province. The location selection is based on its relevance to the issues under investigation.

The primary data sources in this research are obtained through in-depth interviews. To collect the required data, this research uses the interview technique as the information collection method. Interviews are conducted with various parties who deeply understand the dynamics of forming social capital inclusivity in Air Lintang Village, especially in the Pasir Kuning Beach area. The respondent groups interviewed include:

- a) Community leaders, such as village heads and village officials who, understand the community's life development in the area.
- b) Residents around Pasir Kuning Beach to obtain direct perspectives from residents involved in waste pollution prevention efforts.
- c) Fishermen are the primary stakeholders related to ecological conditions around Pasir Kuning Beach.
- d) Air Lintang Village officials need to understand the role of local governments in supporting community initiatives related to environmental conservation.
- e) West Bangka Environmental Agency is a relevant institution that can provide policy perspectives and support for waste pollution prevention efforts.
- f) Air Lintang Village Bhabinkamtibmas members who can provide insights into security and order in the context of environmental conservation efforts.

The interview technique used is in-depth interviews, where questions in the guide focus on specific aspects, such as community empowerment through utilising natural resources. The

interview process starts with conversations with community leaders and stakeholders and continues simultaneously with interviews with village officials and relevant local government officials. Primary data collection also involves Focus Group Discussions (FGDs) with stakeholders and community leaders involved in conflicts in Air Lintang Village. This approach is expected to produce comprehensive and in-depth data on community efforts to achieve social capital inclusivity for waste pollution prevention in the area.

Data analysis techniques in this research adopt the purposive sampling method, an approach to select information sources according to the researcher's needs to obtain representative data. This approach is intended to ensure that the information obtained reflects a diversity of relevant perspectives. After obtaining the data, analysis is carried out to simplify information into a format that is easier to read and interpret. The data analysis process in this research is based on inductive analysis methods. This approach involves field observations and empirical experiences gained from interviews. The collected data is then organized into field facts needed to formulate conclusions. Inductive analysis allows researchers to explore patterns and relationships in data without a pre-established conceptual framework. Thus, the conclusions drawn can reflect the reality observed and found in the context of this research. This approach is expected to provide a comprehensive and in-depth overview of the dynamics of social capital inclusivity efforts in waste pollution prevention at Pasir Kuning Beach, Air Lintang Village.

This research follows the principles of research ethics by maintaining the privacy and security rights of informants and ensuring integrity and objectivity in the use of resources and data. By following this procedure, it is hoped that the research can make a meaningful contribution to understanding social capital inclusivity in the context of waste pollution prevention at Pasir Kuning Beach.

4. Results and Discussion

Mining activities serve as the main source of livelihood for the people of Bangka Belitung, especially those residing in rural areas. It cannot be denied that mining activities bring significant financial benefits to the community in supporting their economy.

4.1. History of Shrimp Farming Companies

This section will further delve into the history of shrimp farming companies in the Pantai Pasir Kuning area, Bangka Belitung, and their impact on the environment and the welfare of the surrounding community. Shrimp farming activities are the backbone of the economy in rural areas of Bangka Belitung. Despite providing significant financial benefits, the negative impacts caused by these activities have become a major concern, especially after the establishment of shrimp farms in the Pantai Pasir Kuning area. Since the commencement of shrimp farming activities, environmental pollution has become a critical issue the local community faces. The uncontrolled discharge of shrimp farm waste into the sea has led to significant changes in seawater quality around Pantai Pasir Kuning. The once-clear seawater has turned greenish-black, and foam on the water's surface has increased.

These adverse effects are visual and have serious consequences for marine life and human health. The unpleasant odor of shrimp farm waste creates an unclean and unhealthy environment. Furthermore, the decrease in the number of beach visitors indicates that the community is aware of the health and environmental risks posed by shrimp farming activities. Information obtained from village government officials indicates that shrimp farming companies began operating in 2019. Initially, the land was owned by the surrounding

community but was later purchased by shrimp farming companies. Five shrimp farming companies are operating in the area, namely CV Mitra Jaya Mandiri, CV Jaya Terus, PT Aqua Culture, CV Sumber Budidaya Laut, and CV Tambak Indo Harmonis.

Interviews with the local village chief revealed that the presence of shrimp farming companies has both positive and negative impacts. On one hand, these companies provide prosperity to the community and reduce unemployment rates. However, the negative impact of shrimp farm waste raises serious concerns among the community.

To increase village revenue, the presence of shrimp farming companies is seen as a solution. The village chief stated that community members working as employees of shrimp farming companies receive significant additional income. The increase in village revenue is expected to contribute positively to local economic development. However, environmental impact and community welfare considerations must be recognized as integral parts of economic development. This necessitates careful planning and wise policy implementation to balance economic growth and environmental conservation.

4.2. Social Capital Elements of Air Lintang Village Community

4.2.1. Community Participation of Air Lintang Village in Preserving the Sea and Addressing Shrimp Farm Waste Pollution

The community of Air Lintang Village plays a crucial role in preserving the sea and addressing shrimp farm waste pollution. This process begins with an initial lack of awareness, but through changing perceptions and visible adverse effects, the community and village authorities take the initiative to tackle this issue. Initially, the people of Air Lintang Village might have been indifferent to the adverse effects caused by shrimp farm waste. This condition could be attributed to insufficient information or understanding about the potential dangers posed by the disposal of shrimp farm waste into the sea.

However, change occurs as the community starts to see and feel the adverse effects of shrimp farm waste pollution on the surrounding environment. Changes in the seawater's colour, foam's presence, and unpleasant odor serve as tangible signs indicating a serious problem. Community awareness begins to rise as they understand the connection between preserving the sea and their well-being. In addressing the issue of shrimp farm waste pollution, the community, together with village authorities, does not remain passive. They take the initiative by holding discussions. These discussions serve as forums for collective discussion and decision-making involving the community, village authorities, and other relevant parties.

During these discussions, the community expresses their demands to shrimp farm companies. They emphasize the importance of compliance with government regulations and request that these companies conduct Environmental Impact Assessments (EIA). These demands reflect the community's desire to involve the companies in preventing waste pollution. The community urges shrimp farm companies to adhere to the standards set by the government. This includes strict regulation of waste disposal methods, production capacity, and other aspects that can minimize negative impacts. Furthermore, the request for an EIA aims to analyze the potential impacts of company activities on the surrounding environment. EIAs provide a scientific basis for making wiser decisions in managing environmental impacts.

4.2.2. Trust as the Main Pillar in Combating Shrimp Farm Waste Pollution in Air Lintang Village

Mutual trust among the residents of Air Lintang Village plays a crucial role in maintaining well-being and combating shrimp farm waste pollution. This trust forms a strong foundation for cooperation in addressing environmental issues. Trust is a key factor in shaping integrity and harmony within the community. The people of Air Lintang Village trust each other, which serves as a solid basis for achieving shared prosperity. Trust enables the creation of a supportive social environment where each individual feels valued and responsible for communal life.

This trust is closely related to awareness of shared responsibility in addressing shrimp farm waste pollution. Understanding that pollution will adversely affect the livelihoods of fishermen serves as a strong motivation to tackle this issue collectively. Trust exists at the interpersonal level among individuals and encompasses trust in the capabilities and seriousness of village authorities and relevant parties in addressing environmental issues. The trust among the residents of Air Lintang Village fosters motivation to unite and collectively address shrimp farm waste pollution. Awareness of interdependence among each other, especially regarding the livelihoods of fishermen, drives them to confront this issue together. The trust catalyzes the creation of effective and efficient cooperation in pollution prevention efforts. Trust also plays a crucial role in forming healthy and supportive interpersonal relationships. In the context of shrimp farm waste pollution, strong relationships between the community, village authorities, and shrimp farm companies are key to achieving sustainable solutions. Trust in Air Lintang Village is a response to problems and an asset for change. This trust instills hope that they can achieve significant positive changes in preserving the environment and improving quality of life together with strong cooperation.

4.2.3. Community Collaboration in Addressing Shrimp Pond Waste Pollution

Collaboration serves as the cornerstone in the efforts of the Air Lintang Village community to address shrimp pond waste pollution despite encountering several challenges, particularly from less transparent shrimp pond companies. This collaboration involves active participation from the community, village officials, and shrimp pond owners. Despite the lack of transparency from the pond companies, the community and village officials strive to bridge this gap. The success of this collaboration lies in active participation and collective awareness to resolve environmental issues. Although collaboration exists, implementing Environmental Impact Assessments (EIA) and Wastewater Treatment Plants (WWTP) still shows deficiencies. This is evident from pollution in the Pasir Kuning Beach area. Challenges such as the lack of transparency from shrimp pond companies remain a major obstacle in achieving waste management standards in line with government regulations.

Despite the challenges, community collaboration in Air Lintang Village, village officials, and shrimp pond owners are directed towards enhancing EIA and WWTP implementation. By forming open discussion forums, it is hoped that pond owners can better understand the urgency of compliance with permit standards and proper waste management. In addition to internal collaboration, the Air Lintang Village community collaborates with the government and related agencies, such as the Department of Marine and Fisheries. This collaboration is expected to further support addressing shrimp pond waste pollution issues. As a regulator, the government plays a crucial role in enforcing regulations and encouraging companies to operate in an environmentally friendly manner.

Efforts to prevent shrimp pond waste pollution through this collaboration must be strengthened to achieve sustainability. The Air Lintang Village community needs to continue urging pond owners to increase transparency and compliance with environmental regulations. Collaboration can be strengthened through education, training, and participatory approaches to enhance awareness and shared responsibility.

4.2.4. Social Capital of Air Lintang Village

Preventing shrimp pond waste pollution in Air Lintang Village involves various aspects of the community's social capital, which can be divided into three typologies:

1) Social Bonding

Social bonding in Air Lintang Village is the primary force shaping interpersonal relationships. These connections are closely linked to familial values, ethnic unity, and religious identity, creating a social environment like a big family. In a community with more closed relationships, social interactions are not just random encounters but repeated meetings that deepen the bonds between individuals and groups. The importance of shared backgrounds emerges as a strong, cohesive element. Ethnic and background similarities create a foundation for solidarity, shared interests, and productive cooperation. Continuous interactions within the same social circle strengthen mutual trust among community members, making social bonding a strong, cohesive force in Air Lintang Village's social dynamics.

In the context of preventing shrimp pond waste pollution, social bonding finds tangible expression in the community's collective concern. Awareness of the impact of pollution on livelihoods, health, and the environment motivates the community to unite in problem-solving. High moral responsibility among residents drives active participation in regular discussions and consultations. Open discussion spaces foster an atmosphere where individuals feel facilitated to raise issues, seek solutions, and plan prevention efforts. Strong social bonding also provides a solid foundation for implementing waste pollution prevention policies. Through unity, shared interests, and effective cooperation, the Air Lintang Village community urges shrimp pond companies to comply with government permits and conduct Environmental Impact Assessments (EIA). Thus, social bonding serves as an internal community cohesive force and becomes a dynamic force in collectively safeguarding their environment. Through unity, shared interests, and effective cooperation, strong social bonding demonstrates that Air Lintang Village possesses valuable social capital. The presence of these values serves not only as a foundation for internal harmony but also as a driving force for engaging in collective solutions to increasingly complex environmental challenges.

2) Social Bridging

Social bridging reflects the dynamics of modern social relationships in Air Lintang Village. Horizontal social interactions, particularly with communities or individuals outside the local scope, are integral to how the community navigates existing differences. Differences, whether ethnic or religious, are overcome by forming connections with other individuals or communities, creating broader and more open networks. Horizontal social interactions bring about changes in the community's perception of differences. Social bridging encourages the community to look beyond characteristic differences and be open to variations among them. As a universal form of social capital, social bridging emphasizes every individual's right to access connections with external parties. Equality in this right creates space for everyone to make connections, express opinions, and participate in collective initiatives. Weaknesses within the Air Lintang Village community serve as learning moments to reconcile differences. Social

bridging is not only a means of seeking assistance from external parties but also a way to seek information and opportunities. The community's openness to receiving assistance and seeking collective solutions demonstrates an inclusive and self-reliant attitude in building social capital.

In preventing shrimp pond waste pollution, social bridging contributes to shaping collective perceptions of shared responsibility. Openness in seeking information, accepting assistance, and building connections with external parties is crucial to prevention strategies. Success in involving communities outside the local scope is a strong indicator of the strength of social bridging as social capital in Air Lintang Village.

3) Social Linking

Social linking reflects relationships between individuals with different backgrounds or outside the local community in Air Lintang Village. These relationships provide communities with access to collaborate with groups or organizations outside the local community, which can contribute resources and support to create significant change. At the local level, the Air Lintang Village community forms partnerships and cooperates with various parties outside the community. The community establishes relationships with institutions with power and authority, including the Provincial Government, districts, local police, and the Department of Marine and Fisheries. This cooperation reflects joint efforts to address shrimp pond waste pollution issues that have troubled the community. Through social linking, the Air Lintang Village community leverages relationship networks to gain greater support and resources. Collaboration with external parties demonstrates the community's commitment to participating in environmental problem-solving efforts. When facing shrimp pond waste issues, relationships with government agencies and relevant institutions become key to overcoming obstacles and pursuing sustainable solutions. Social linking creates broad relationship networks and strengthens the community's role in obtaining the necessary resources to create positive change. By collaborating with external parties, the Air Lintang Village community can secure support and policies that support shrimp pond waste pollution prevention measures. As part of social capital, social linking illustrates the community's ability to connect with external forces that can help achieve common goals.

These three typologies of social capital work together, forming a strong foundation for the Air Lintang Village community's efforts to prevent shrimp pond waste pollution. Social bonding maintains internal harmony, social bridging bridges differences, and social linking opens the door to broader cooperation.

5. Conclusion

This research provides an overview of shrimp farming activities in Pasir Kuning Beach, Bangka Belitung, which have significant impacts, particularly in the context of waste pollution. Although providing financial benefits to the community, this activity also negatively impacts the environment and the welfare of the surrounding communities, as reflected in the changes in seawater quality, unpleasant odors, and a decrease in the number of beach visitors. The crucial role of the Air Lintang Village community in preserving the sea and addressing shrimp pond waste pollution becomes the main highlight. Although initially, they may have been less concerned, awareness of the negative impacts prompted them to take the initiative. Active participation in discussions is a key step in emphasizing the need for companies to comply with permit standards and conduct Environmental Impact Assessments (EIAs).

The trust built among the Air Lintang Village community is the main foundation of their efforts to address shrimp pond waste pollution. This trust serves as a driver for them to unite in

facing challenges, especially in protecting the livelihoods of fishermen threatened by pollution. This trust is interpersonal and includes trust in the village authorities and related parties. Collaboration among the Air Lintang Village community, village authorities, and shrimp farming companies, despite facing obstacles from the companies, emerges as a valuable social capital. Although the implementation of EIAs and waste treatment facilities needs to be strengthened, this collaboration is aimed at increasing awareness and transparency of companies in managing waste more effectively. Collaboration with the government and related institutions is also a key to garnering further support.

Based on the findings of this research, several suggestions can be proposed to enhance efforts to prevent shrimp pond waste pollution:

- 1) Shrimp farming companies need to improve the implementation of EIAs and waste treatment facilities to reduce the impact of waste pollution. Stakeholders, including the government and related institutions, can provide guidance and support throughout this process.
- 2) Shrimp farming companies are expected to be more transparent about their operational practices. This transparency will aid in better understanding and supervision by the community and the government.
- 3) Environmental education and training programs need to be strengthened to empower the community with knowledge and skills related to pollution prevention. This will increase awareness and the community's ability to preserve the sea.
- 4) Collaboration with external parties, including research institutions and environmental NGOs, can help obtain additional resources and expand efforts to prevent shrimp pond waste pollution.

Further research can be conducted to delve into the following aspects:

- 1) Studying the long-term economic impacts of shrimp farming activities, including both positive and negative aspects, especially related to the welfare of local communities.
- 2) Assessing the effectiveness of existing environmental policies and suggesting changes or improvements to strengthen environmental protection.
- 3) Developing sustainable waste management models for shrimp farming companies as practical guidelines for environmentally friendly practices.

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7. Declaration of Conflicting Interests

The authors have declared no potential conflicts of interest concerning this article's research, authorship, and/or publication.

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About the Authors

1. **Herdiyanti**, obtained her Master's degree from Universitas Indonesia in 2016. The author is an Assistant Professor at the Department of Sociology, Faculty of Social and Political Sciences, Universitas Bangka Belitung, Indonesia.
E-Mail: herdiyanti@ubb.ac.id
2. **Reko Dwi Salfutra**, obtained his Master's degree from Universitas Jambi, Indonesia, in 2010. The author is an Assistant Professor at the Department of Law, Faculty of Law, Universitas Bangka Belitung, Indonesia.
E-Mail: dwisalfutra@gmail.com

3. **Julia**, obtained her Master's degree from Universitas Diponegoro, Indonesia, in 2015. The author is an Assistant Professor at the Department of Accounting, Faculty of Economics and Business, Universitas Bangka Belitung, Indonesia.
E-Mail: saputrajulia07@gmail.com