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Perceptions of Industrial Waste Management in Coastal Communities of Biringkanaya, Makassar

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Abstract

This paper aims to explore an assessment of the perception held by the coastal communities of Biringkanaya particularly those in Makassar on industrial waste management on socioâ€'economic and enviromental impacts on livelihood. Employing the qualitative research design, participants included the community members, leaders and activists in environmental causes in the sampled area. The study shows that in the view of residents industrial waste poses a threat to their livelihood opportunities due to water pollution, depletion of aquatic life and soil pollution. The community also complained of nonimplementation of the environmental laws and standards, as well as the failure of the government to ensure corporations acted faithfully towards the environment. There has been some attempts such as Grass root initiative to fight the act in as much as widespread involvement is hampered by the 'failed trust in authorities and ''hopeless '' feeling among the population. This work adds to knowledge in this area because it fills a knowledge gap by examining personal narratives of people in communities impacted by industrial waste, especially those in the developing world. This has brought the issue of increased community participation in environmental management and protection, better compliance with laws, and better corporate sustainability. The research results of this study enlighten the multifaceted correlation between environmental degradation and socio-economic vulnerability of dependant coasts communities.

INTRODUCTION

Extensive growth of industries in urban centers has been an economic revolution but on the other hand, there has been exponential growth in environmental issues especially those to do with waste management. Thus, combined with the developed industrial waste mistreatment in coastal cities such as Biringkanaya Makassar, the removal of the ecosystem and the coastal sea is significantly worse (Azis et al., 2024). The industries are manufacturing industries, processing industries, and fishing industries, all of which discharge their solid and liquid wastes in the given region (Samputri & Safitri, 2020). Most of these coastal communities of Biringkanaya are involved in fishing and other related activities hence the impacts of industrial wastes on these community are of great concern in as much as environmental degradation and associated health complications are concerned (Haris, 2022). Management of

industrial waste is quickly emerging as a major challenge to societies residing close to coasts within the global society. Lack of Washington waste management leads to land pollution the release of hazardous materials, heavy metals, chemicals into the marine environment that may harm aquatic life, water, and human health (Siddiqua et al., 2022). Coastal ecosystems are mostly vulnerable to pollutants because they are transitional zones between land and sea and can therefore undergo ecologic alteration (Andersen et al., 2020). There is a relative inadequacy of waste management infrastructure in many developing areas, and this contributes to this problem, as illustrated in Makassar, where disposal of industrial wastes is usually channeled to rivers and coastal regions because of careless disposal and poor observation of the environmental laws (Batista et al., 2021). These effects include polluting the marine resources that most coastal people depend upon, whether through fishing or tourism (Häder et al., 2020).

Industrial waste management can be defined as the activity performed on collection, treatment, disposal of wastes released by industries. This becomes even more complicated in the context of coasts because the geographic environment is more sensitive, and the players include the community, industries, as well as government departments (Ducruet, 2020). Properly addressing the problems of waste disposal, their storage, and utilization are critical to the maintenance of the coastal zones and the continued functioning of industries and populations depending on those zones (Toimil et al., 2020). But as this research as discovered, waste management policies in many developing countries such as Indonesia are poorly implemented leaving the environment polluted and there is social conflict between industrial projects and the people (Gollakota et al., 2020).

Industrial waste has become another problem in Biringkanaya, Makassar where people living close to seas experience complications within their day-to-day live. Most of the industries in the district include some processing plants or small-scale factories that help the boost the economy of the district but add to the generation of wastes in the district (Owino & Ambuko, 2021). The analysis of existing literature has shown that the absence of proper waste disposal has also had a negative impact on the aquatic environment off the coast of the region, including its fisheries and water quality basins (Bui et al., 2020). Furthermore, the local communities express their dissatisfaction with the levels of industry and government disclosure on the disposal of waste through stating that they have been left with a sense of injustice (Imran et al., 2021).

Using qualitative study, it is essential to get an idea of the community standpoint regarding management of industrial waste for setting up control measures which are effective as well as acceptable. This study has also found low community participation, specially within developing areas, notably in waste management decisions even though they are the most impacted by industrial pollution (Liu et al., 2020). Where lives depend on natural resources such as those found in coastal areas, lack of proper management and regulation of industrial wastes poses risks of earning no income, lack of food and frequent sicknesses Andrews et al. (2021). Therefore, the place is desirable to make locals participate in decision-making processes, containing waste management, meaning that policies must address the issues of the local community (Huang et al., 2020).

Based on the literature review, Biringkanaya suggests that the local people consider industrial waste as an essential hostile with their life and draw, however, they are lack input on the decisions-making processes regarding the environment. Some of the common issues named by the residents are poor waste disposal, and poor enforcement of littering laws. In addition, working of industrialization and polluting the marine ecosystem has also lead to decrease in number of fishes, which are basic source of earning for many coastal people. The poor participation of communities in

waste management programs has led to rising social alienation between people, the business sector, and governmental institutions.

Combating industrial waste management issues in coastal communities such as Biringkanaya call for the following strategies: increasing participation, improving policies on industrial waste, and enhancing industrial practices (Surya et al., 2020). The following and latest studies suggest that the views of the local residents have to be taken into account when formulating environmental policies since the community involvement when implementing waste management policies can greatly improve the efficiency and endurance of the process. Also, engaging decision-makers and other users in a project to monitor or address waste can be fairer and more sustainable, avoiding unfairness and disadvantages with respect to the environment (Torkayesh et al., 2022).

This research aims to investigate the knowledge on management of industrial waste among littoral line communities in Biringkanaya, Makassar. It is designed to give an understanding of how these communities' regard the efficacy and limitations of current waste management practices, their participation in decision making and effects of industrial pollution on their lives and the environment. This study also extends the literature on the perceptions of the people in the destination with regard to industrial waste management and proffers some suggestion for local and nascent industrial waste management of coastal areas.

METHODS

In this research, the author used a cross-sectional quantitative research approach focusing on the perception of industrial waste management among the residents who live in the coastal communities of Biringkanaya, Makassar. The choice of the qualitative approach was in an effort to understand the experiences, perceptions and emotions of the members of the community regarding industrial waste and its impacts to their physical surrounding as well as economical activities.

The current study embraced a case study design in which Biringkanaya district was used as a single case study. This design was chosen because it enabled preoccupation with particular context factors that might come into play with regard to the residents' perceptions and experiences of the industrial waste management. The utilization of the case study method helped to establish a kind of approach in terms of how industrial waste impacted the people at the individual level and the society at large.

The target population in the current research was people living in industrialised areas of Biringkanaya who were either employing their abilities in industries or were on the receiving end of some industrial impacts. Random technique, but purposive criteria were applied to participants in the study. The participants had to be residents of the area for at least five years and to have personal knowledge or experience with industrial waste or its disposal. There were 20 participants ultimately surveyed, which involved community representatives, fishermen, the local environmental activists, among other residents who were considerably affected by industrial waste. The sample size was considered sufficient for data saturation, in which no new themes were discovered throughout data collection.

Questionnaires were administered in form of semi structured interviews and focus group discussions (FGDs). These methods were chosen because it enabled the participants to make their own opinion and perception on what they understand and needed the researcher to gain deeper insight. Interview data were also collected through individual interviews with 12 participants across the selected communities through the use of an interview guide that targeted questions on perceived source(s) of industrial waste, perceived impacts on the environment and the locals' livelihood,

and perceived involvement of the communities in managing the wastes. All the interviews took between 45 min and one hour and were recorded with the participants' permission. It included two Focus Group Discussions; one with four participants and another also with four participants. The FGDs facilitated a group discussion section which enabled participants to reflect on reception and actual experience and how the two phased answers would be. The discussions were conducted by the researcher and each lasted for about ninety minutes. These FGDs were also taped and later on precisely transcribed to have constant reference.

Data Analysis

The participants' narratives were analyzed thematically looking at the six phases highlighted by Braun and Clarke (2006). First, all interviews and focus group discussions were transcribed to include all the works spoken by the respondent. The transcripts were then reviewed and studied to get an initial sense of the results by the researcher. Next, initial codes were developed to recognize chunks of data about participant's perception on industrial waste management. These codes were grouped into themes since there were patterns and replicable ideas that were identified. These themes were discussed and refined for this analysis and collapsed into more general themes to capture the key concerns raised by the participants. Some topics that were fairly highlighted from the data gathered are as follows awareness of industrial waste, evaluation of environmental degradation, the effect of waste on livelihoods and social responses to initiative waste management. The results obtained here were further discussed by juxtaposing them with previous works related to industrial waste and environmental management of coastal populations.

To ensure the trustworthiness of the study, several strategies were employed: Purposive sampling was used in which a small portion of the participants already interviewed was shown the findings to confirm if their feelings were understood. Secondly, the convergence method was employed whereby both interviews and FGDs were used in order to cross check the results. Informat ion on participants and settings/sources of data was given and it made it easier for readers to know to what extent the results could generalize to similar contexts. Trial was made to keep an audit trail of the research process of collection and analysis decisions to maximize transparency and potential to replicate. In this study, reflexivity was done whereby the researcher analyzed any prejudice with a view of excluding them from the process of handling the results of the study. Also, to strengthen the findings, direct quotations from the participants have been employed while narrating details.

RESULTS AND DISCUSSION

Community Perceptions

Working on the coastal areas in Biringkanaya, the locals have been worning about the existence of industrial wastes in their environment. Interviews revealed that people have observed a tendency in the last decade to dump wastes in the water sources or in coastal regions that have negative effects on the environment as well as on income generating undertaking which depends on the water sources. Some of the community members considered industrial wastes as increasing in their threat to their physical well being, the physical environment and fishing activities. Some of them were in a position to indicate the locations where the industrial wastes had caused harm to the environment and others were hardly knowledgeable of what the industrial wastes were capable of doing to the environment.

The community had adequate knowledge of environmental degradation occasioned by industrial wastes although this knowledge was not deep-seated. Some of the effects were seen directly by many residents such as poluted waters which affected

the fish caught, and the wiping out of mangrove plants. One respondent, a local fisherman, noted:

> *"The water is no longer clear like it used to be. The fish are fewer, and the ones we catch sometimes have strange marks or look unhealthy."*

These direct observations of environmental damage were often tied to the community's dependence on natural resources for their livelihoods, making them acutely aware of changes in their surroundings.

However, not all residents fully understood the long-term implications of industrial waste on the ecosystem. Some lacked the scientific knowledge to connect industrial waste to broader environmental issues, such as biodiversity loss and water contamination. A local environmental activist stated:

> *"Many people see the waste, but they don't really know how it's affecting the plants and animals here. They just know that it's bad."*

This gap in knowledge highlights the need for more effective education and outreach programs to raise awareness about the consequences of industrial pollution.

Industrial waste has also had a significant impact on the livelihoods of residents, particularly those who rely on fishing and small-scale farming. Many fishermen expressed frustration over the declining fish populations, attributing it to pollution from nearby factories.

> *"We used to catch a lot of fish close to the shore, but now we have to go further out, and even then, it's not as good as before."*

The reduced availability of fish not only affected their income but also their food security, as fishing was a primary source of sustenance for many families. Similarly, farmers reported that the quality of soil and water had deteriorated, affecting crop yields. One farmer shared:

> *"The water from the streams used to be good for our crops, but now the plants don't grow as well. We think it's because of the waste from the factories."*

These changes in natural resources forced residents to adapt, often at a cost to their economic stability. Some fishermen and farmers had to seek alternative sources of income, while others struggled to maintain their traditional ways of life despite the challenges posed by industrial pollution. Despite the significant challenges posed by industrial waste, community participation in waste management initiatives has been varied. Some residents actively engaged in local environmental campaigns, organizing clean-up activities and advocating for stricter regulations on industrial waste disposal.

> *"We try to clean up the beaches as much as we can, but it's hard to keep up when the factories keep dumping waste."*

These grassroots efforts reflect a strong sense of environmental stewardship among certain members of the community, particularly those who have experienced the direct impacts of pollution.

However, other residents were less involved in waste management efforts, either due to a lack of awareness or a sense of helplessness in the face of large-scale industrial activities. Some felt that their efforts were insignificant compared to the power and influence of industrial companies.

> *"What can we do? Even if we clean up, the factories will just dump more waste. It feels like a losing battle."*

expressed a frustrated resident. This perception of powerlessness was compounded by a lack of support from local authorities, who were often seen as either ineffective or complicit in allowing industrial pollution to continue unchecked.

A recurring theme in the interviews was the community's perception of local authorities and the effectiveness of regulations related to industrial waste management. Many residents expressed skepticism about the ability or willingness of the government to enforce environmental regulations.

> *"The government talks about protecting the environment, but we don't see much action. The factories keep polluting, and nothing changes."*

This lack of trust in the authorities has led to feelings of frustration and disillusionment within the community. Some participants noted that there had been attempts by the government to address the issue, such as periodic inspections and the establishment of waste disposal regulations. However, these measures were often seen as insufficient or poorly enforced.

> *"We hear about new rules, but the factories keep doing what they want. It feels like the government is on their side."*

remarked one resident. This perception of regulatory failure has contributed to the community's sense of vulnerability, as they feel they lack both the resources and the institutional support to address the problem effectively.

The interviews revealed a strong desire for more comprehensive community engagement and education on industrial waste management. Many participants expressed a willingness to be more involved in efforts to combat pollution but felt they lacked the knowledge and tools to do so effectively.

> *"We need more information about what's happening and what we can do about it."*

said one community leader. There was a consensus that increased awareness and education could empower residents to take more proactive steps in addressing industrial waste issues. Additionally, several participants called for greater collaboration between the community, local authorities, and industrial companies to develop sustainable waste management solutions.

> *"The factories need to work with us, not against us. If we all work together, we can find a solution."*

suggested a resident involved in local environmental efforts. This call for collaboration reflects a broader recognition that effective waste management requires the active participation of all stakeholders, including the industrial sector, government, and the community.

Impact on Livelihoods

This study shows that industrial waste is a major issue for the coastal communities of Biringkanaya, and it has had a major social effect on those who depend on fishing and small-scale farming. Those are traditional occupations and for decades they have enable the sustainenance of the community practices and but now they are at risk due to increased pollution of the water and the surrounding lands of the sea coastal lines. Increase in Pollution and degradation of environment: majority of the respondents complained of decline in the quality and quantity of natural resources that raised a big issue basing on their ability to earn a living and survival. Community members' perceptions of industrial waste were also strongly associated with these feelable impacts on their economy.

The primary and possibly the biggest impact industrial waste had on the local fishing community was that of eradicating fish from the sea. The fishermen also complained

that through industrialization whereby chemicals are released in to the seas, fish had become scarce near the shoreline. The pollution did not only chase fish from their historical production areas, but influenced the health of the species in the water. One fisherman recounted:

> *“The fish we catch now are fewer, and they don’t look the same. Some have sores or odd colors, and we can’t sell those at the market.”*

This decline in fish stocks forced many fishermen to venture further into the open sea, incurring higher fuel costs and facing greater risks at sea. Despite these efforts, their overall yields remained much lower than before. A long-time fisherman explained:

> *"In the past, we could go out in the morning and come back with enough fish for the day. Now, even if we go far, the catch is not enough to feed our families, let alone sell at the market."*

This situation placed a significant strain on household incomes, with some fishermen having to take on additional jobs or reduce their reliance on fishing as their primary source of income.

Similarly, small-scale farmers in the region reported significant losses due to the contamination of water sources and soil degradation caused by industrial waste. The once fertile land, used for growing crops like rice, vegetables, and fruits, had become less productive over time. A farmer shared:

> *"We used to have healthy crops, but now the plants are weak, and the yield is much lower. The water we use for irrigation is polluted, and it shows in the crops."*

Industrial waste, often discharged into local rivers, had contaminated the irrigation systems that these farmers relied upon, leading to lower crop quality and yield. Many farmers indicated that they had noticed changes in the soil itself.

> *"The soil doesn’t hold water like it used to, and the plants don’t grow as strong,"*

another farmer noted. The loss of soil fertility, coupled with the pollution of water supplies, forced some farmers to abandon their fields or switch to less demanding crops, although these alternative crops were often less profitable. The result was a substantial reduction in agricultural output, which not only impacted farmers’ incomes but also affected local food security, as many residents depended on locally grown produce.

As a result of these challenges, many community members were forced to adapt their livelihood strategies to cope with the environmental and economic changes brought about by industrial waste. Some fishermen and farmers diversified their income sources by engaging in alternative occupations, such as small-scale trade, construction work, or taking up jobs in nearby towns. One resident explained:

> *"I used to rely only on fishing, but now I also work part-time at a local factory because the fish aren’t enough to sustain my family anymore."*

For some, these changes meant leaving their traditional occupations altogether, while others attempted to combine multiple sources of income. However, these alternative jobs often provided lower wages and less stability than traditional fishing and farming. A former fisherman turned construction worker said:

> *“It’s hard to leave fishing, but I had no choice. Now I work as a laborer when I can, but the pay is low, and the work is not always available. I still hope to return to fishing if things improve.”*

The shift away from traditional livelihoods not only impacted household income but also affected the social fabric of the community. Fishing and farming had long been integral to the community's identity and social structure. The decline of these occupations, driven by environmental degradation, resulted in a loss of cultural heritage and disrupted the community's way of life. One elder remarked:

> *"Our fathers and grandfathers were fishermen, and now many young people don't want to fish because it's no longer reliable. It's sad to see this change."*

The economic vulnerability caused by the decline in natural resources also exposed the community to greater health risks. Many residents noted that they could no longer afford basic necessities, including proper healthcare, due to their reduced incomes. Additionally, some fishermen and farmers expressed concerns over the potential health risks posed by the industrial waste itself. One resident pointed out:

> *"We see the waste, we smell it, and we live with it. We worry about what it's doing to our health, but we can't do much about it because we need to keep working."*

This economic and health vulnerability created a sense of powerlessness among the community, as they struggled to address the root causes of their problems. The lack of effective government intervention and the perceived complicity of industrial companies in worsening the environmental situation only deepened their frustrations.

Community Involvement

Thus, the authors conclude that the level of participation in the process of managing increasing interest in industrial waste among the Biringkanaya coastal community has ranged from active to passive due to feelings of powerless. They experienced the impacts of pollution affecting their lives and immediate environment yet their actions towards pollution have been influenced by a number of factors regarding their understanding of the presence of pollution. The following part expounds on the various types of participation in community noticed concerning the industrial waste issue.

Several members of the Biringkanaya community are involved in industrial waste problem through propaganda of environmentalism. Those people and small groups undertook clean up campaigns, awareness creation, and promoted petitions demanding that the industries be required to dump their wastes in a better way. Their participation was informed mostly by a commitment to the immediate environment and their hope to shield the community from any further losses. One community leader remarked:

> *"We can't just sit back and let the waste destroy our homes and our livelihoods. We have to take action ourselves, even if it feels like a losing battle sometimes."*

These local efforts have had limited success in mitigating the visible signs of pollution, such as cleaning up waste from beaches and waterways. However, activists recognized that their efforts were only temporary solutions to a much larger problem. As one volunteer explained:

> *"We clean up the beach, but a few days later, the waste is back. It's frustrating, but we keep doing it because we love this place, and we have to try to keep it clean."*

Despite the challenges, the persistence of these grassroots efforts highlights the community's resilience and commitment to protecting their environment, even in the face of overwhelming odds.

In addition to grassroots activism, there were some instances of community members engaging in formal waste management initiatives, often in collaboration with local authorities or environmental organizations. These initiatives typically involved education programs aimed at raising awareness about the dangers of industrial waste and training on how to manage waste more effectively at the household level. One resident, who participated in such a program, noted,

> *"They taught us how to sort our waste, recycle what we could, and dispose of the rest properly. It's a small step, but at least we're doing something to reduce the waste we create."*

While these programs provided valuable information and resources, many participants felt that they addressed only a small part of the problem. As one attendee of a community workshop remarked:

> *"The waste we generate in our homes is not the problem here. It's the factories dumping their chemicals into the water. We can do our part, but it won't solve the bigger issue."*

This sentiment reflected a broader frustration among the community that their individual efforts were insufficient to combat the industrial pollution that was the primary source of environmental degradation.

Despite the efforts of some community members, broader involvement in waste management initiatives was limited by several key challenges. One of the most significant barriers was the lack of trust in local authorities and industry leaders to effectively address the waste problem. Many residents felt that the government and corporations were either unwilling or unable to take meaningful action.

> *"We've heard promises from the government before, but nothing changes. The factories keep polluting, and the government turns a blind eye."*

This mistrust contributed to a sense of futility, with many community members believing that their efforts would not lead to real change. Another major challenge was the lack of resources and infrastructure to support more comprehensive community involvement. While some residents were willing to participate in waste management efforts, they often lacked the tools, funding, and organizational support necessary to scale up their activities. One community leader explained:

> *"We need more support from the government or NGOs to make a real difference. Right now, we're doing what we can, but it's not enough without proper equipment and funding."*

This lack of resources limited the community's ability to implement long-term solutions to the waste problem.

For many residents, the overwhelming scale of the industrial waste issue led to feelings of powerlessness and disengagement from waste management efforts. Some community members expressed a sense of resignation, believing that their actions would have little impact in the face of powerful industrial interests. One resident shared:

> *"We see the waste, we know it's bad, but what can we do? The factories are too big, and we're just small people."*

This perception of being powerless in the face of large-scale industrial pollution was a common theme in many interviews, particularly among those who had witnessed years of inaction from local authorities.

This feeling of helplessness was compounded by the economic pressures faced by many residents, particularly those whose livelihoods were directly affected by the

pollution. With limited income and resources, some community members prioritized their immediate survival needs over long-term environmental activism.

> *"I'd like to do more to help clean up, but I need to work to feed my family. We don't have the luxury to spend time on things that don't bring in money."*

This sentiment reflected the harsh reality faced by many in the community, where economic survival often took precedence over environmental concerns. Despite the challenges, there was a strong desire among community members for collaborative solutions that involved not only the community but also local authorities, industrial companies, and environmental organizations. Many residents believed that real change could only happen if all stakeholders worked together to address the root causes of the waste problem.

> *"The factories, the government, and the people – we all need to come together. If we don't, the waste will keep piling up, and it will destroy everything."*

This call for collaboration emphasized the need for a more coordinated approach to waste management, one that recognized the community's role as both victims and potential agents of change. Several participants suggested that industrial companies should take more responsibility for their waste and invest in cleaner technologies and better waste disposal practices.

> *"The factories make their money here, but they leave us with the waste. They need to do more to protect the environment that we all depend on,"*

This demand for corporate accountability reflected a growing awareness within the community of the need for systemic change in industrial waste management practices.

This study's outcomes unpack general and mixed consequences of industrial waste on Biringkanaya, Makassar, and fill a gap in literature on environmental management and community's reaction to industrial pollution. Past research has shown how industrial pollution has an impact on coastal environments and livelihood and social relations that rely on these in generating an income but few studies have done this relating to industrial pollution in the given regions and the livelihood dependence on the sea and aquatic life. The current study then fits the literature debate through elucidating a population-based understanding of the perceptions, barriers, and resilience mechanisms in the face of the hazardous effluence in Biringkanaya, while contributing theoretical and practical insights toward the management of industrial waste.

In the previous literature, industrial pollution is generally studied with respect to the environmental effects they bring about, including the emission of toxic gases, pollutive liquid effluents, and polluted land and water resources and the resultant ecological effects (Zhang et al., 2020; Rao & Yan, 2020; Li et al., 2020). Yet, unfortunately, there is a significant research void when it comes to understanding how the topics and threats impact the communities at the local level. Notably, there is limited literature on the daily realities of those coastal communities most affected by industrial waste pollution. This research fills that void by grounding the analysis in Biringkanaya to address how residents perceive industrial waste both as a threat to the environment and in relation to their work.

The findings of this study indicate that the impressions of community concerning industrial waste are mediated both by the direct and mediated experiences out of their day-to-day lives. Residents were clearly sensitive to the concrete manifestations of the pollution, for instance, polluted water and shrinking fish stocks but they employers' perceptions remained within a broader socio-economic perspective as realised by diminished prospects for living off the fish resource and the lack of action

from the authorities in passing more rigourous anti-pollution laws. These findings concord with Bodrud et al. (2020) who have found out that for a similar type of perception, socio-economic context plays a significant role. But this study extends the literature by showing how such perceptions are linked to certain livelihoods in coastal areas, thus filling a knowledge gap in literature on community based environmental management.

Another groundbreaking aspect of this research is the chance it provides to closely explore the relationship between industrial waste and coastal communities' livelihoods. Past studies have found the correlation between environmental degradation and economic risk in the communities that rely on the resources, especially in the developing nations, and such a role is definitive of Nguyen et al. (2023). Nevertheless, the present research contributes to understanding the effects of industrial pollution on the replacement of the conventional means of subsistence resources like fishing and farming in the site of Biringkanaya. This research established the fact that reduced fish stock, loss soil fertility and water pollution adversely affected income and food availability in the area.

This discovery is in conflict with previous works that give little attention to the social-economic consequences of industrial waste pollution though early findings were more inclined to Environmental ecological consequences of industrial wastes (Siregar, 2022). Besides the obvious reactions that have been noted in Pollution and Its Ecosystem Impact, this study cements the human and qualitative angle to pollution that afflicts those whose livelihood relies on products of the environment. Consequently, the study focus in these livelihood impacts fills a very valid gap especially in trying to understand the broader impacts of industrial waste on both ecosystems and the communities that are dependent on them.

The study also has implication in the existing body of knowledge on community participation in the management of environment through highlighting the factors providing activism and initiative towards the management of industrial wastes by the community. In line with previous literature, the present study adopted community participation as a critical component of environmental management programs on marginalized and resource-dependent communities (Hügel & Davies, 2020). Yet, there are no many studies focused on communities' experience regarding industrial waste and how their involvement affects environmental governance.

Pursuant to this study, community members in Biringkanaya are not very participative in environmental activism due to the inability to trust the government and perceived powerlessness of reversing industrialization. This is consistent with Msenge & Nzewi (2021), assertion that lack of trust in local authority and perceived governmental indifference reduces community participation in environmental conservation. However, this study shows that grassroots activists in Biringkanaya have not relented in continuing to take independent and collective initiatives on cleaning up projects and awareness bottom up. Thus, it can be said that completing the studied examples the present research contributes to the discussion regarding the community-based management of environment which shows that the inhabitants can both - be the sufferers of industrial pollution and the activists.

Other than explaining the community's responsibility towards industrial waste, this research work also captures the negligence of the local government and industries in managing the environmental and social consequences of pollution. This is because previous works recognise that weak governance and regulatory enforcement contributor to industrial pollution (Zhang et al., 2020) however limited literature explore on this regarding coastal communities in Indonesia. This study establishes that negligence and lenience in implementing environmental laws, coupled with poor

corporate governance, continue to permit the industrial wastes to affect the Biringkanaya community.

Some of the participants' comments included concerns on hostility and incompetence of government policies to take industrial companies to produces legal for polluting. The former has kept their enforcement weak, and due to this the residents have become disillusioned and think that the government is part of the problem as far as the environment is concerned. Another participant pointed out that, "It has been a while since we saw some action; nothing is as it was promised by the government." Unfortunately the factories continues to discharge waste and yet we feel the impact." This is consistent with research on the difficulty of implementing environmental laws across the global south particularly due to the dominant economic rationality (Percival etal., 2021).

CONCLUSION

Coastal communities in Biringkanaya, Makassar hold useful perceptions, challenges, and resilience concerning the industrial waste effects would be of significant use in this study. In focussing on the impacts on people's income, socio-economic losses of residents, andream largely understudied due to minimal state interference in environmental management, it fills gaps in knowledge on industrial pollution and community management. It points to the require for enhanced laws, enhanced corporate governance, and enhanced community engagement in order to fight the harms industrial waste inflicts on susceptible coastal residents.

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