ADMINISTRATIVE AUTHORITY IN ENVIRONMENTAL POLLUTION CONTROL FOR PUBLIC HEALTH PROTECTION

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ABSTRACT

This research analyzes the effectiveness of preventive legal instruments in preventing environmental pollution that potentially harms public health. Using a qualitative literature study method with content analysis approach to legislation and legal literature, this research finds that normatively preventive instruments such as licensing, quality standards, AMDAL, supervision, and administrative sanctions have been comprehensively designed to protect public health. However, a wide implementation gap causes these instruments to lose their effectiveness. Weak human resource quality, conflicts of interest in government, poor inter-agency coordination, hampered public participation, weak sanction enforcement, budget constraints, corruption practices, chaotic spatial planning, and weak integration of health aspects are the main factors in the failure of the prevention system. Consequently, environmental pollution that harms public health continues to occur. This research implies the need for institutional capacity building and integration of health aspects in every preventive instrument. Future environmental law reform must focus on strengthening implementation, not merely perfecting norms.

Keywords: Preventive Instruments, Environmental Pollution, Public Health, Legal Implementation, Law Enforcement, Environmental Licensing, AMDAL.

INTRODUCTION

Industrial development and rapid population growth in recent decades have brought significant economic progress. However, this progress is often overshadowed by negative impacts on environmental quality. Poorly managed factory waste, increasingly dense vehicle emissions, and excessive exploitation of natural resources are common sights in many regions (Madan & Suri, 2023). This phenomenon shows that economic development often goes hand in hand with increased pressure on the environment, requiring more serious attention from various parties (Dahar et al., 2022). The accumulation of these various anthropogenic activities is slowly but surely reducing the carrying capacity of the environment. Rivers that were once clear are now polluted with domestic and industrial

waste (Satria, 2020). The air in big cities is filled with harmful particles that exceed the threshold. This degradation of environmental quality is not merely an aesthetic problem, but a real threat to the sustainability of life (Madan & Suri, 2023).

The decline in environmental quality is closely correlated with an increased risk to public health (Umar et al., 2024). Water pollution causes the spread of diarrhea, cholera, and heavy metal poisoning. Air pollution triggers acute respiratory disorders, chronic obstructive pulmonary disease, and even cancer. Soil pollution due to the accumulation of toxic chemicals can poison plants and food sources. Poor environmental quality directly affects human health, especially for communities living near sources of pollution (Khayru et al., 2024). Communities living near industrial areas or waste disposal sites are often the most vulnerable (Umar et al., 2024). They have to bear a double burden, namely the loss of environmental comfort and the threat of serious health problems. This situation shows a failure to manage the risks of pollution before the impact spreads and claims victims.

Efforts to combat environmental pollution have so far been mostly repressive, i.e. actions taken after pollution has occurred (Rumambi, 2023). Legal proceedings only commence when there are complaints from the community or when the damage is clearly visible. This approach has fundamental weaknesses because it is reactive and often requires a long time to prove. The cost of environmental restoration that must be borne by the state or companies is also much greater than the cost of prevention (Puniasih & Prakoso, 2022). Therefore, various modern policy approaches have begun to emphasize the importance of preventive measures from the outset as a more effective step in controlling environmental risks (Hidayat et al., 2024). Moreover, the health losses experienced by the community are permanent and cannot be restored to their original state. A child who grows up with developmental disorders due to lead exposure cannot be restored to their original condition simply by receiving material compensation. A repressive approach is clearly insufficient to protect the fundamental interests of the public. Therefore, attention has shifted to the importance of preventive legal instruments as the front line in protecting the environment and public health. Preventive instruments are designed to work before damage occurs, with mechanisms that compel or encourage any potentially polluting activity to implement control measures early on. These instruments include various tools, such as the obligation to conduct an Environmental Impact Assessment, emission and effluent quality standards, strict licensing procedures, and routine monitoring of compliance. The existence of these norms is expected to build an effective early warning system, so that potential hazards can be identified and neutralized before they turn into public health disasters.

However, the fundamental question that arises is to what extent these preventive legal instruments are truly effective in practice. Does the existence of strict regulations automatically guarantee that pollution will not occur? Empirical reality shows that environmental pollution continues to occur even though the legal framework is complete. It is still common to find companies operating without valid environmental permits, or

with permits but violating the established quality standards. This shows that the existence of regulations alone is not enough if it is not followed by a commitment to consistent implementation and supervision (Farhoq et al., 2024). The monitoring process by officials is often hampered by limited resources and authority. Weak law enforcement against administrative violations further exacerbates the situation, as it creates a bad precedent that violating preventive provisions does not carry any significant risk (Muryati et al., 2022). These conditions form the basis for the need for a critical review of the effectiveness of existing preventive legal instruments.

Environmental pollution that is harmful to public health continues to occur, indicating serious problems with the prevention system that has been established (Maruf, 2021). The existing legal framework does not seem to function as an effective filter. The licensing process is often carried out in a purely procedural and administrative manner, without any substantial evaluation of the potential risks that will be caused. Environmental Impact Assessment documents are sometimes prepared only to meet formal requirements, rather than as planning instruments that are actually used to minimize negative impacts. In fact, good environmental policies should be able to adapt to social dynamics and community needs in order to remain relevant and effective in the long term (Halizah & Mardikaningsih, 2022). As a result, business activities that should have been prevented from the outset due to their high risk are given the green light to operate. The gap between the rules on paper and their implementation in the field is very wide and difficult to bridge.

The second major problem relates to the weak enforcement of preventive norms. Instruments such as environmental quality standards and waste management obligations are continuous in nature, meaning they must be complied with throughout the entire operational cycle of an activity. However, the monitoring mechanisms to ensure this compliance are very limited. The number of environmental inspectors is not proportional to the number of companies that must be monitored (Mustafa & Fauzi, 2022). The low frequency of inspections provides opportunities for businesses to commit violations covertly. In practice, suboptimal waste management is also often influenced by low awareness and collective responsibility among the various parties involved (Djaelani, 2022). Even when violations are detected, the administrative sanctions imposed often do not have a deterrent effect. Light fines or the rare revocation of permits makes the cost of compliance seem more expensive than the cost of violating the law. This problem shows that the strength of preventive law lies not only in the quality of the norms, but also in the ability of institutions to ensure that the norms are obeyed.

Research on this topic is particularly important at this time because pressure on the environment is intensifying in line with accelerated economic development. The government is aggressively promoting investment and ease of doing business to create jobs and growth. Various deregulation policies have been issued to cut licensing procedures that are considered complicated (Prasetyaningsih et al., 2022). Ease of doing business is a laudable goal, but it must not come at the expense of environmental

protection and public health. Maintaining a balance between economic development and environmental sustainability requires wise policies and the application of sustainable technology and environmental management (Hariani & Al Hakim, 2022). In situations like this, the power of preventive instruments must be strengthened, not weakened. Otherwise, we will see an increase in new pollution cases that sacrifice public health in the name of economic efficiency. This review is necessary to find a balance between ease of doing business and public protection guarantees.

Public awareness and demands for a healthy environment continue to increase. The public is now more critical and has wider access to information. Pollution cases exposed by the media quickly trigger public protests and lawsuits. The public no longer only demands compensation after falling ill, but also begins to question why pollution can occur and why the prevention system has failed (Listiyani et al., 2018). This public pressure has encouraged the government and the business world to take environmental risk management more seriously (Imanika & Rohman, 2022). However, without systemic improvements to preventive instruments, public pressure will only result in short-term, case-by-case solutions. A comprehensive academic understanding is needed to design a structured and sustainable strengthening of the prevention system, so that public health protection does not only depend on immediate reactions, but on a robust system design.

This study aims to critically analyses the effectiveness of the normative design of preventive legal instruments in preventing environmental pollution that impacts public health and to identify the structural and cultural factors that cause weak implementation in the field. The theoretical contribution of this study is to enrich the body of environmental law, particularly in the development of a theory of preventive law enforcement oriented towards the protection of the right to health. In practical terms, the results of this study are expected to provide input for legislators and law enforcement officials in designing more effective regulations and oversight policies. The recommendations produced can be used to strengthen the licensing system, improve the quality of oversight, and formulate more equitable sanctions, so that pollution prevention efforts can run optimally for the realization of a healthy environment for the entire community.

METHODS

This research was conducted as a qualitative literature study relying on in-depth analysis of legal documents and literature. This approach was chosen because the objective of the research was to understand the meaning, structure, and internal logic of preventive legal norms, rather than to test hypotheses using numerical data. As emphasized by Beins (2017), qualitative research focuses on the exploration and interpretation of complex phenomena in their natural setting, which in this case is the legal system and its practices. The use of library sources such as legislation, court decisions, and academic literature allows researchers to build a rich understanding of how preventive instruments are

designed and how they should operate. Patten (2016) also underlines that literature research is a valid method for examining theoretical and historical concepts without the need for direct field data collection. Thus, this approach allows for a systematic and structured analysis of legal texts, which are the main sources of information.

Research materials were collected through a systematic literature search from various sources. Primary sources consist of environmental legislation, while secondary sources include textbooks, law journals, scientific articles, and previous research reports relevant to the topic of pollution prevention. Documentation techniques were used to collect and organize these materials. Patel and Patel (2019) explain that in literature research, clarity of search protocols and inclusion criteria is essential to maintain data quality and relevance. Therefore, the search focused on literature discussing preventive legal instruments, environmental law enforcement, and the relationship between pollution and public health. Crowther and Lancaster (2012) add that a multi-source approach allows for theoretical triangulation to strengthen the validity of the findings. All collected materials were then organized based on the main themes formulated in the research questions.

Data analysis in this study used a qualitative content analysis approach to legal documents. The analysis process began with data reduction, which involved selecting and focusing on materials relevant to the research questions. Next, the materials were presented in the form of a systematic narrative before conclusions were drawn. Gagnon (2010) emphasized the importance of a deep understanding of context when analyzing documents, as the meaning of a text cannot be separated from the purpose for which it was created. An interpretive approach is used to understand the intent of the lawmaker and the logic behind the norms created. Fowler (2013) is better known for his survey method, but the principle of caution in drawing inferences from data is also relevant here. Researchers must ensure that their interpretations are based on strong textual evidence. Scheurich (2014) reminds us that research methodologies always contain certain philosophical assumptions. In this study, the basic assumption is that legal reality can be understood through the interpretation of texts and the discursive practices that surround them.

RESULTS AND DISCUSSION

Normative Design of Preventive Legal Instruments in Public Health Protection from Environmental Pollution

Preventive legal instruments in Indonesia's environmental legislation are designed as a first line of defense against pollution. This normative design reflects the awareness of lawmakers that the costs of prevention are much lower than the costs of restoration and compensation for public health. Ma'ruf (2018) emphasizes that environmental law in Indonesia has accommodated various prevention mechanisms through licensing, quality standards, and supervision. This normative framework was developed with the aim that every business activity with the potential to cause negative impacts on the environment

must undergo a rigorous evaluation process before operating. This preventive approach is important because environmental damage that has already occurred is often difficult to restore quickly and requires enormous costs (Mardikaningsih & Hariani, 2021). This evaluation process requires the initiators of the activity to predict the possible impacts and design control measures. Thus, public health is placed as a primary consideration in every administrative decision related to the environment.

Environmental licensing is the most fundamental preventive instrument in Indonesia's environmental legal system. Every business or activity that is required to have an Environmental Impact Analysis or Environmental Management and Monitoring Efforts must obtain an environmental permit before the activity begins. Lestari and Djanggih (2019) explain that the urgency of licensing law lies in its function as a control instrument that gives the government the authority to reject or approve an activity based on considerations of its environmental impact. An environmental permit is not merely an administrative document, but a binding administrative decision with legal consequences. The permit specifies the requirements and obligations that must be fulfilled by the permit holder during the operational period. These requirements are designed to ensure that potential pollution can be controlled from the outset, thereby significantly minimizing risks to public health.

Environmental quality standards are the next preventive instrument, serving as technical standards for measuring permissible environmental quality. The government sets water, air, and soil quality standards based on scientific considerations of safe thresholds for human health and the environment. Nugraha, Handayani, and Najicha (2021) argue that the role of environmental law in preventing damage and pollution is highly dependent on the existence of clear and measurable quality standards. These standards also provide clear guidelines for business actors to design production processes that do not cause excessive impact on the environment (Nuraini et al., 2021). These standards serve as a reference for the business world in designing waste treatment technologies. Quality standards also serve as parameters in routine monitoring conducted by the competent authorities. If the monitoring results show that the effluent or emissions released into the environment exceed the specified thresholds, this is an early indication that the production process has caused a risk of pollution. Thus, quality standards enable early detection of potential hazards to public health.

Environmental Impact Analysis as a preventive instrument has special characteristics due to its anticipatory and comprehensive nature. EIA requires project initiators to conduct in-depth studies on various aspects of impact, including impacts on public health. Efendi, Rato, and Soetijono (2023) link the precautionary principle in environmental management to the EIA instrument, whereby scientific uncertainty should not be a reason to delay preventive action. In the EIA document, the initiator must identify components of public health that are potentially affected, such as drinking water quality, ambient air quality, or noise levels. Based on this identification, a specific environmental management

and monitoring plan is developed. This plan becomes a legally binding document after being integrated into the environmental permit. The EIA thus compels business actors to think long-term about the consequences of their activities on the health of local residents.

Environmental monitoring is a preventive instrument that is continuous and sustainable. After the permit is issued and activities commence, the government is obliged to conduct monitoring to ensure compliance with all requirements listed in the permit and environmental documents. Oktora (2023) highlights the role of the government in environmental damage from an administrative perspective, where monitoring is key to detecting deviations early on. Effective monitoring requires the support of competent human resources and a good organizational management system so that any potential violations can be immediately identified and followed up (Mardikaningsih, 2024). The monitoring mechanism is carried out through direct inspections, monitoring of periodic reports from companies, and testing of environmental samples in laboratories. If indications of violations are found, supervisors are authorized to issue written warnings or recommendations for corrective action. Effective supervision will prevent minor violations from developing into major pollution that is harmful to public health. Therefore, the quality of supervisory human resources and the adequacy of the budget are determining factors in the success of this instrument.

Administrative sanctions in the normative design of environmental law are positioned as preventive instruments to enforce compliance. Types of administrative sanctions include written warnings, government coercion, license suspension, and license revocation. Machmud (2017) distinguishes between preventive and non-judicial repressive measures in the enforcement of administrative law by the executive. The application of these sanctions shows that environmental law is not only intended to punish, but also to encourage business actors to improve their environmental management practices before the damage becomes more severe (Mahmud et al., 2023). Government coercion is a concrete action that can be carried out directly, such as sealing or stopping production machines that violate regulations. The threat of these sanctions is expected to have a deterrent effect so that business actors will think twice before violating regulations. Administrative sanctions have advantages over criminal sanctions because the process is faster and simpler. In the context of pollution prevention, speed of response is crucial to stop potential damage before its impact spreads.

Community participation in environmental management is also designed as a preventive instrument that strengthens the early warning system. Communities living near business sites have direct access to daily changes in environmental quality. The law gives the public the right to object to planned activities, access environmental information, and report suspected pollution to the authorities. Community involvement in environmental monitoring can also expand the scope of monitoring that the government is not always able to carry out fully (Nuraini et al., 2022). Yoga (2023) states that community involvement is crucial to the success of early detection of pollution. The community can

serve as the eyes and ears of the government in the field, where resources are limited. Thus, the normative design of Indonesian environmental law recognizes the community as an active subject in prevention, not merely an object to be protected. This recognition strengthens the participatory monitoring system, which has the potential to reach areas that are difficult to monitor formally.

Preventive legal instruments also include the obligation of business managers to conduct independent environmental monitoring and report the results periodically. These periodic reports serve as evaluation material for the government to assess a company's environmental management performance. Afra (2023), in his analysis of the effectiveness of administrative environmental law enforcement, emphasizes the importance of independent reporting mechanisms as a form of corporate responsibility. In addition, environmental data transparency is also an important factor in enabling the public to know the extent to which companies are fulfilling their environmental protection obligations (Mamesah et al., 2024). This reporting obligation creates a documentation trail that can be used to trace a company's compliance history. In the event of pollution, previous reports can be used as evidence of whether the company has made adequate prevention efforts or has neglected its obligations. This normative design also embodies the principle of transparency, as certain reports are accessible to the public. Thus, social pressure can be an additional factor that encourages voluntary compliance.

The harmonization of various preventive instruments in Indonesia's environmental legal system is designed to complement and reinforce each other. Environmental permits cannot be issued without an adequate EIA or UKL-UPL. Supervision cannot be carried out effectively without clear quality standards. Administrative sanctions cannot be imposed without evidence of violations from the results of supervision. Ma'ruf (2018) notes that the interconnection between these instruments forms an integrated control system. If one component is weak, the other components are expected to cover for this weakness. For example, if formal supervision is limited, community participation can fill the void. If self-reporting is neglected, spot checks can catch violations. This integrated design shows that lawmakers understand the complexity of pollution prevention and have designed layered solutions.

Preventive legal instruments are also aimed at protecting communities that are vulnerable to the effects of pollution. Various technical regulations set stricter standards for densely populated areas, residential areas, and protected areas. Lestari and Djanggih (2019) emphasize that public health considerations must be a priority in every licensing decision in densely populated areas. The minimum distance between industrial sites and residential areas, for example, is determined based on pollutant dispersion calculations and potential health impacts. Similarly, ambient air quality standards are set taking into account sensitive groups such as children and the elderly. This normative design reflects the recognition that the right to a healthy environment is a fundamental right of every citizen without exception. The state is present through

legal instruments to ensure that economic interests do not sacrifice the most vulnerable groups.

The public health dimension is explicitly integrated into various preventive instruments through environmental health risk assessments. In preparing an EIA, the initiator is required to conduct a study of potential health hazards that may arise, such as respiratory diseases due to emissions or poisoning due to toxic waste. Adack (2013), in his study on the impact of tofu factory waste pollution, shows that health impacts are often only realized after the community has been exposed for a long time. Therefore, the EIA requires early identification of exposure pathways and at-risk populations. The results of this assessment then form the basis for establishing public health programmers, such as regular health checks for local residents or the provision of health facilities. Thus, the normative design of preventive instruments does not only stop at the prevention of physical pollution, but also includes the prevention of specific health impacts.

The administrative law enforcement mechanism in the normative design gives the government broad authority to take preventive action without waiting for pollution to occur. Government coercion can be exercised when there are violations of permits or other legal obligations. Machmud (2017) explains that these non-judicial preventive measures are discretionary executive powers but must still be based on legislation. In practice, government coercion can take the form of temporary cessation of activities, relocation of sources of pollution, or clean-up of poorly managed waste. These measures are highly effective in preventing further impacts because they can be implemented immediately after a violation is detected. The normative design that grants this authority demonstrates the seriousness of lawmakers in prioritizing preventive measures over punitive measures after damage has occurred.

Economic instruments in environmental law are also beginning to be integrated as part of a preventive approach. Fiscal incentives are given to companies that implement environmentally friendly technologies or manage waste properly. Conversely, disincentives such as levies or administrative fines are imposed on companies that exceed quality standards. Nugraha, Handayani, and Najicha (2021) mention that this economic approach complements the command-and-control approach that has been dominant so far. Economic considerations are a rational factor that encourages business actors to comply with environmental regulations. The high cost of waste treatment can be offset by tax incentives. Conversely, the risk of large fines makes violations unprofitable from a business perspective. This normative design, which combines legal and economic instruments, creates structural incentives for sustainable voluntary compliance.

Environmental management institutions at the central and regional levels are designed to carry out preventive functions in a coordinated manner. The Ministry of Environment, provincial agencies, and district or city agencies have authorities regulated by laws and regulations. Oktora (2023) highlights the importance of coordination between institutions in preventing environmental damage. The normative design regulates a clear

division of authority, for example, the authority to issue permits for certain activities lies at the central level, while operational supervision is the responsibility of the regions. With a clear division, it is hoped that there will be no overlap of authority or gaps in supervision. Strong institutions are a prerequisite for the effective functioning of all preventive instruments. A good normative design must be followed by adequate institutional capacity to implement it.

The overall normative design of the preventive legal instruments above shows that, conceptually, Indonesia's environmental legal framework has been developed quite comprehensively. From planning through environmental impact assessments, control through licensing and quality standards, supervision by the government and the community, to enforcement through administrative sanctions, all aspects of prevention have been regulated. Ma'ruf (2018) asserts that the environmental law aspect in Indonesia has normatively met international standards in terms of pollution prevention. However, a perfect design on paper does not guarantee effectiveness in the field. The critical question that arises is why, with such a comprehensive set of instruments, environmental pollution that is harmful to public health continues to occur. The answer to this question must be sought in the implementation and enforcement of the law at the empirical level. Well-designed instruments lose their meaning if they are not implemented consistently and with integrity.

The Gap in the Implementation of Preventive Legal Instruments and the Factors Contributing to It

The normative design of preventive legal instruments described above faces serious challenges when it comes to implementation. The gap between what is written in regulations and actual practice in the field is an undeniable fact. Simplified licensing procedures have the potential to compromise the quality of environmental assessments (Febriyanti et al., 2021). Rivers polluted by industrial waste, deteriorating urban air quality, and communities complaining of health problems are clear evidence that prevention mechanisms are not working as they should. The question that then arises is what factors cause this conceptually sound instrument to fail at the implementation level. The answer to this question requires an honest examination of government practices, business behavior, and community participation. Implementation failures are never caused by a single factor, but rather are an accumulation of various weaknesses that reinforce each other.

The quality of human resources in environmental management institutions is a fundamental issue that affects the entire chain of pollution prevention. The EIA evaluation process, permit issuance, and field supervision require adequate technical competence in various fields such as chemistry, biology, environmental engineering, and public health. Amiq (2013) emphasizes that the quality of administrative law enforcement officials greatly determines the effectiveness of preventive instruments. The reality in many regions shows that the number of environmental supervisory officials is very limited,

while their educational backgrounds are not always in line with the tasks they carry out. As a result, EIA document evaluations are often carried out as a formality without the ability to identify fundamental technical weaknesses. Field supervision is limited to administrative checks because officers do not have the knowledge to assess the effectiveness of waste treatment technology. This weakness in human resources renders all preventive instruments meaningless, turning them into mere bureaucratic rituals that have no significant preventive power.

Structural problems in the form of conflicts of interest within local government exacerbate implementation gaps. Local government heads have considerable authority over the issuance of environmental permits, but at the same time they also have an interest in attracting investment and increasing local revenue. Economic pressures often override environmental considerations in decision-making (Nurlaily & Supriyo, 2022). Environmental permits are issued quickly without careful evaluation because companies are seen as sources of revenue and employment. District heads or mayors are reluctant to impose strict sanctions on polluting companies for fear that they will move to other areas. This situation is exacerbated when there are personal or political ties between local officials and company owners. In such situations, preventive instruments that are supposed to protect the community instead become a means of legalizing activities that are actually high-risk to public health. Regional autonomy, which should bring public services closer to the people, has instead created unhealthy competition between regions to attract investment at the expense of environmental standards.

Weak coordination between agencies with authority over the environment has created space for violations to continue. Environmental permits do not stand alone but are integrated with sectoral permits such as industrial business permits, location permits, and nuisance permits. Sectoral egos often hinder effective pollution control (Agustanti et al., 2023). The environmental agency issues environmental permits with certain requirements, but the industry and trade agency issues business permits without referring to these requirements. Pollution monitoring becomes overlapping or non-existent because each agency considers it to be the authority of another agency. This poor coordination creates legal loopholes that businesses exploit to avoid their environmental management obligations. As a result, potential pollution is not detected early because no agency consistently conducts integrated monitoring. This fragmented monitoring system renders prevention efforts ineffective.

Community participation, which is expected to be the most effective form of monitoring, faces various structural obstacles. Communities living near industrial sites should be the most effective monitors because they directly experience the impacts of pollution. Zamantha and Irfan (2022) found that communities often do not know the reporting procedures or do not dare to report due to economic pressures. Environmental documents such as AMDAL and environmental permits are difficult for the general public to access because they are not widely published. The technical language used in these documents is

also difficult for ordinary citizens to understand. As a result, the community only reacts when the health impacts are already visible, such as the emergence of skin diseases, respiratory disorders, or fish deaths in rivers. At that point, pollution has already occurred and prevention efforts have lost their meaning. Community participation that only emerges after damage has occurred is no longer preventive but reactive. In fact, community involvement from the planning stage is crucial to detect potential problems early on.

The enforcement of administrative sanctions for violations of preventive instruments is very weak in practice. Administrative sanctions such as warnings, government coercion, and revocation of licenses are rarely imposed consistently. Amir (2013) argues that the reluctance to impose administrative sanctions is due to various non-technical considerations. Officials are reluctant to impose sanctions because they are concerned about being sued in administrative court or accused of being hostile to the business world. The procedure for imposing administrative sanctions is also considered complicated and time-consuming, while the pressure to resolve issues quickly is enormous. As a result, minor violations are left unpunished, and serious violations only receive verbal warnings without any meaningful legal consequences. Delta et al. (2023) note that this indecisiveness creates a bad precedent that violating environmental regulations carries no significant risk. Companies then ignore their waste management obligations because the cost of compliance feels more expensive than the risk of sanctions. The loss of this deterrent effect makes preventive instruments lose their coercive power.

Budget constraints for environmental monitoring are a classic obstacle that has never been resolved. Effective monitoring requires transportation costs to remote locations, costs for collecting and testing samples in laboratories, and costs for maintaining monitoring equipment. Tinambunan and Erlianto (2022) in their comparative study show that the allocation of the environmental budget in Indonesia is much lower than in neighboring countries. Environmental agencies in many districts are only able to inspect a small fraction of the companies that are required to be monitored. Wastewater sampling is not carried out routinely due to limited laboratory operating funds. As a result, monitoring is only carried out on large companies that are easily accessible, while medium and small companies, which are far more numerous, escape attention. In fact, the accumulation of pollution from small and medium-sized businesses is often as great as that from large industries. These budget constraints prevent the optimal and equitable implementation of monitoring as a preventive measure.

The integration of public health aspects into preventive instruments remains very weak at the implementation level. Although, normatively, EIA and environmental permits should consider health impacts, in practice this aspect is often overlooked. Sumiaty et al. (2024) state that health impact assessments require complex methodologies and involve competent health personnel. In EIA evaluation practices, health aspects are often only discussed in general terms without adequate epidemiological studies. Post-operation monitoring focuses more on physical and chemical parameters, while public health

parameters such as morbidity rates are rarely measured. As a result, pollution can continue for a long time without its health impacts being detected, and when these impacts do emerge, it is difficult to prove a causal relationship with specific business activities. The failure to integrate health aspects causes preventive instruments to lose the dimension of human protection, which should be their main objective. Public health becomes only an additional consideration, not the core of the prevention system.

The practices of corruption, collusion, and nepotism in the processing of environmental permits are the most destructive forms of integrity failure. Environmental permits, which should be issued based on objective technical evaluations, can in practice be obtained through back channels in exchange for certain rewards. Herlina and Duana (2022) reveal that bribery in environmental licensing is one of the biggest obstacles to pollution prevention. This condition shows that the success of environmental protection does not only depend on written rules, but also on the integrity of the parties who enforce these rules (Oluwatoyin & Mardikaningsih, 2024). EIA documents that should indicate significant negative impacts can be passed after negotiations with unscrupulous officials. Companies that do not meet technical requirements still obtain permits because they have connections with officials. These practices not only violate the law but also destroy the credibility of the entire prevention system. The public loses trust in government institutions, while compliant businesses feel disadvantaged because they have to compete with companies that obtain permits illegally. Corruption in environmental permitting is a betrayal of the mandate to protect public health as mandated by law.

Weak spatial planning has resulted in land use conflicts that are difficult to resolve with conventional preventive measures. Preventive measures will be effective if clear zoning has been established from the outset regarding which areas may be developed for industry and which areas must be protected as residential or conservation areas. Yuniati and Hamidah (2021) found in their research that many cases of pollution were caused by industrial locations that were too close to residential areas due to chaotic spatial planning. Immature spatial planning often leads to conflicts of interest between economic development needs and environmental protection (Nurmalasari & Nuraini, 2021). Land use changes are often made sporadically without assessing environmental carrying capacity. Areas designated as industrial zones in spatial plans may already be inhabited by residential areas, or vice versa. When industries operate and cause pollution, the communities that have lived there longer become victims. These spatial conflicts are difficult to resolve because they involve deeply rooted interests. Preventive instruments such as the Environmental Impact Assessment (EIA) cannot correct structural and fundamental spatial planning errors.

Coordination between the central and regional governments in environmental management is still far from harmonious. The decentralization of environmental management authority to regional governments has not been accompanied by adequate capacity and commitment in all regions. Febriyanti et al. (2021) observed that the

centralized Job Creation Law has actually created new problems in coordination. The central government has national standards and policies, while local governments have implementation authority that is often exercised with different interpretations. Companies operating in several regions face different supervisory standards, creating legal uncertainty. On the other hand, companies that move from regions with strict supervision to regions with lax supervision can continue to pollute without hindrance. This inconsistency undermines the overall effectiveness of preventive instruments because businesses can choose locations with the weakest law enforcement. Public health protection then depends on where people live, rather than on equal legal guarantees across the country.

The legal culture of society and the business world do not yet fully support voluntary pollution prevention efforts. Awareness that a clean environment is a basic right and a shared responsibility is still weak in various segments of society. Zamantha and Irfan (2022) found in their study that communities living near illegal gold mines actually defend business owners because they receive short-term economic benefits. The business world often views environmental compliance as a cost burden, rather than a long-term investment for business sustainability. Waste management is carried out merely to meet administrative requirements, not because of an intrinsic awareness of the importance of protecting the environment. A legal culture that is permissive of minor violations creates an environment conducive to the development of larger violations. Changing the legal culture requires a long time and consistent education, while environmental damage continues every day. This weakness in legal culture is the most difficult factor to overcome because it concerns values that are deeply ingrained in society.

The use of technology in environmental surveillance and monitoring systems is still very much behind. In the digital age, environmental monitoring should be carried out in real time through automatic sensors and online reporting systems. Tinambunan and Erlianto (2022) note that Singapore and Malaysia have developed continuous water and air quality monitoring systems whose data is accessible to the public. Technological developments actually open up great opportunities to improve the effectiveness of environmental monitoring if optimally utilized by the government and business actors (Radjawane et al., 2022). In Indonesia, monitoring systems are still manual and sporadic. Companies report their own waste quality data without adequate independent verification. Sampling is carried out several times a year, while pollution can occur at any time. The absence of continuous monitoring technology makes early detection of pollution very difficult. Pollution is only detected when it has already caused a tangible impact, such as when thousands of fish die or when local residents fall ill. At that point, the preventive function has failed completely. Investment in monitoring technology should be a priority, but in practice it is always constrained by budgets and changing political priorities.

The integration between preventive instruments and public health insurance systems is almost non-existent. Environmental pollution and public health are two sides of the same

coin that cannot be separated, but in institutional practice, they are managed by different sectors. Sumiaty et al. (2024) highlight that public health data, which can be an early indicator of pollution, is not integrated with environmental early warning systems. Health agencies record increases in certain diseases, but this information does not reach environmental agencies to be followed up as an indication of pollution. Health checks for workers and communities around industrial sites are not structurally required in preventive instruments. As a result, pollution can go undetected for a long time, while communities continue to be exposed and their health slowly deteriorates. This weak cross-sector integration causes preventive instruments to lose their main function, which is to protect human health from the threat of environmental pollution.

Legal certainty becomes expensive due to frequent and poorly planned regulatory changes. Environmental law in Indonesia has undergone quite dynamic changes, especially with the introduction of the Job Creation Law, which simplifies various licensing procedures. Nurlaily and Supriyo (2022) argue that overly rapid changes create uncertainty for the business world and law enforcement agencies. Companies find it difficult to adapt to new requirements whose implementation guidelines are unclear. Supervisory agencies also do not yet fully understand the new authorities and procedures that must be implemented. During this transition period, supervision has become lax and many violations have gone unpunished. Regulatory changes, which are ideally intended to improve the system, have in practice created a supervisory vacuum that has been exploited by irresponsible businesses. Regulatory stability is actually necessary so that preventive instruments can be implemented consistently and build long-term compliance.

Protection for supervisory officials and whistleblowers is virtually non-existent in government administration practices. Officials who dare to impose sanctions or revoke the licenses of polluting companies often face political pressure or even physical threats. Amir (2013) notes that the courage of officials to enforce environmental laws is not matched by adequate legal protection. Public participation in reporting environmental violations should be supported by a strong protection system so that the public does not feel afraid to convey important information (Nurmalasari & Mardikaningsih, 2022). People who report pollution are also vulnerable to intimidation from companies. Criminalization of environmental activists and reporting citizens still frequently occurs in various regions. This creates a climate of fear that discourages many parties from getting involved in pollution prevention efforts. In fact, without the courage to report and take action, preventive instruments will never be effective. Strong legal protection for law enforcement officials and reporting citizens should be a priority in environmental management system reform. As long as there is no guarantee of safety for those who dare to enforce the rules, pollution will continue unabated.

The gap in the implementation of preventive legal instruments is caused by an accumulation of interrelated and mutually reinforcing problems. Weak human resources, conflicts of interest, poor inter-agency coordination, hampered community participation,

weak enforcement of sanctions, budget constraints, low integration of health aspects, corrupt practices, chaotic spatial planning, uneven central-regional coordination, a permissive legal culture, technological backwardness, weak cross-sectoral integration, regulatory uncertainty, and the lack of protection for officials and whistleblowers all contribute to the failure of the pollution prevention system. No single factor stands alone as the sole cause. Therefore, improvement efforts cannot be carried out partially, but require a comprehensive approach that addresses all problematic aspects. A perfect normative design will mean nothing if it is not supported by adequate implementation capacity and the integrity of all stakeholders. The protection of public health from the threat of environmental pollution ultimately depends on successfully bridging the gap between the law on paper and the law in action.

CONCLUSION

Preventive legal instruments in Indonesia's environmental law system have been designed normatively and comprehensively through mechanisms such as licensing, quality standards, environmental impact assessments, monitoring, and administrative sanctions. Conceptually, this design places public health as a primary consideration in every administrative decision related to the environment. However, the wide gap between the normative design and its implementation in the field has caused these instruments to lose their effectiveness. Various issues such as poor quality of human resources, conflicts of interest within the government, poor coordination between agencies, hampered community participation, weak enforcement of sanctions, budget constraints, corrupt practices, and weak integration of health aspects are the main causes of the failure of the prevention system. As a result, environmental pollution that is harmful to public health continues to occur even though the legal framework is complete.

The findings of this study imply the need to reorient environmental law policy to focus not only on improving norms but also on strengthening institutional capacity and human resources. The failure of implementation shows that a legalistic approach alone is not sufficient to ensure the effectiveness of pollution prevention. In practical terms, this implies that the government needs to allocate adequate budgets for monitoring, strengthen coordination mechanisms between agencies, and develop protection systems for law enforcement officials and reporting members of the public. In addition, integrating public health aspects into every preventive instrument must be a priority so that human protection truly becomes the core of the environmental management system.

Further research is recommended to conduct empirical studies in areas with high levels of pollution in order to gain a more concrete understanding of the dynamics of preventive instrument implementation. A socio-legal approach can be used to uncover cultural and structural factors that are not covered by normative analysis. For policymakers, it is recommended to immediately conduct a comprehensive evaluation of the environmental licensing and supervision system by involving community and academic participation.

Strengthening the capacity of environmental supervisors, utilizing real-time monitoring technology, and consistently enforcing administrative sanctions should be priorities in future environmental law reforms.

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