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EFFECTIVENESS OF GOVERNMENT REGULATION NUMBER 22/2021 IN CONTROLLING AIR POLLUTION FROM BRICK-MAKING INDUSTRY

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ABSTRACT

The phenomenon of air pollution caused by the brick-making industry has become a pressing environmental issue demanding resolution. Various studies have shown that emissions from the brick-kiln process contribute significantly to the decline in ambient air quality in industrial areas and their surroundings. This study aims to evaluate the environmental impacts of brick-kiln operations and to assess the effectiveness of government policy implementation in controlling air pollution from the industrial sector. This study adopts a normative and empirical research paradigm as its primary methodological framework. A qualitative approach is used because of its ability to facilitate in-depth exploration of phenomena in the natural environment, with the researcher acting as the primary instrument for data collection and analysis. The result of this study are brick-kiln operations in Mekarmulya Village cause significant air, noise, and land degradation impacts, with the community gradually normalizing pollution due to weak regulatory oversight and limited institutional capacity in enforcing environmental policies for micro-enterprises. The study concludes that ineffective environmental governance and limited institutional capacity have allowed the micro-scale brick-kiln industry in Mekarmulya Village to cause significant pollution and land degradation, highlighting the need for the implementation of adaptive, socially aware, and inclusive environmental policies for the informal sector.

A. INTRODUCTION

The growth of small and medium-scale manufacturing industries in Indonesia has been rapid in recent decades. One sector experiencing significant growth is the brick industry, which serves as the backbone of the supply of construction materials for national infrastructure development. The industry generally operates with simple technology and relies on traditional combustion processes using organic fuels such as wood, rice husks, or other fossil fuels.[1]

Empirical evidence shows that brick production has caused complex environmental problems, particularly in terms of air pollution. The firing process, a crucial step in brick production, produces exhaust emissions containing various hazardous pollutants, including carbon monoxide, sulfur dioxide, nitrogen oxides, and fine particulate matter. This situation is exacerbated by the brick industry's location, which is generally located in residential areas, so the impact of air pollution is directly related to people's daily activities.[2]

Air pollution from the brick kiln industry has become an urgent environmental issue that requires resolution. Various studies have shown that emissions from the brick kiln process contribute significantly to the decline in ambient air quality in and around industrial areas. The negative impacts are not limited to ecological aspects but also have implications for public health, economic productivity, and sustainable development.[3]

The phenomenon of air pollution from the brick industry is relevant because it significantly contributes to the decline in air quality, threatens public health, and hinders sustainable development. Its impacts include ecological problems, health issues such as respiratory problems, and reduced economic productivity, necessitating urgent solutions for environmental protection and public well-being.

The complexity of the problem becomes even more apparent when examining the regulatory aspects and their implementation in the field. Although Indonesia has a comprehensive legal framework for environmental protection and management, effective law enforcement against air pollution

[1] Khofifah Indah dan Cahaya Permata, "Tanggung Jawab Pelaku Usaha Batu Bata Terhadap Perbaikan Lingkungan Hidup Perspektif Fatwa MUI No. 22 Tahun 2011 (Studi Desa Jambur Padang Matinggi Kabupaten Mandailing Natal)," *Tinjauan Hukum UNES* 6, No. 1 (2023): 2046.

[2] Dzahabiyyah Dwi Putri Ridayanti, Khambali Khambali, and Hadi Suryono, "Risiko Paparan Debu/Particulate Matter (PM2, 5) Terhadap Kesehatan Masyarakat (Studi Kasus: Tempat Pembuatan Batu Bata Di Desa Kaloran, Kecamatan Ngronggot, Nganjuk)," *Jurnal Penelitian Kesehatan" Suara Forikes" (Jurnal Riset Kesehatan "Forikes Voice")* 13, no. 2 (2022): 437.

[3] I. Komang Agus Edi Suryawan, I. Nyoman Gede Sugiartha, and I. Nyoman Sutama, "Pertanggungjawaban Pidana Terhadap Pencemaran Lingkungan Di Indonesia," *Jurnal Interpretasi Hukum* 2, no. 1 (2021): 59. See too, Ali Raza and Zulfiqar Ali, "Impact of air pollution generated by brick kilns on the pulmonary health of workers," *Journal of Health and Pollution* 11, no. 31 (2021): 2109.

caused by the brick industry still faces various challenges.[4] Limited supervisory resources, low business awareness, and weak inter-agency coordination complicate air pollution control efforts.[5]

The regulation under analysis is Government Regulation Number 22 of 2021 concerning the Implementation of Environmental Protection and Management, which regulates environmental permits, air quality protection, and administrative law enforcement. However, the gap between legal norms (das sollen) and actual practice (das sein) is evident in weak oversight, low business awareness, and a lack of inter-agency coordination, hampering the effectiveness of air pollution control in the brick industry.

The national legal framework has expressly regulated environmental pollution through various legislative instruments. Law Number 32 of 2009 concerning Environmental Protection and Management in Article 1 number 14 defines environmental pollution as the entry or introduction of living creatures, substances, energy, and/or other components into the environment by human activities so that they exceed the established environmental quality standards.[6]

This definition identifies three key elements that must be met to categorize an activity as environmental pollution. First, there must be a material element in the form of the entry of certain substances, energy, or components into the environment. Second, there must be the involvement of human activity as a causal factor. Third, there must be exceeding environmental quality standards established by the competent authorities.[7]

More specific regulations regarding air pollution are outlined in various implementing regulations, including Government Regulations and other technical regulations that establish ambient air quality standards. These standards serve as objective parameters for assessing the level of air pollution and determine the legal obligations of business actors to control emissions resulting from their industrial activities.[8]

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[4] Magdariza, "Pengaturan Hukum Lingkungan Internasional Terkait Pencemaran Udara Akibat Kebakaran Hutan Dalam Perspektif Hukum Islam," *Prosiding Nasional Hukum Aktual Hukum Internasional Dalam Perspektif Islam*.

[5] Novy Yandari Nurlaily dan Agus Supriyo, "Pertanggungjawaban Korporasi Dalam Kasus Pencemaran Lingkungan Hidup," *Media Hukum dan Syariah* 3, no. 3 (2022): 255. See too, M. K. Saha, S. J. Ahmed, A. H. Sheikh, and M. G. Mostafa, "Impacts of Brick Kilns on Environment around Kiln areas of Bangladesh," *Jordan Journal of Earth & Environmental Sciences* 12, no. 3 (2021): 84.

[6] Gilda Ditya Asmara, *Perbedaan Nilai Ape Antara Pekerja Pembuat Batu-Bata Dan Petani Di Desa Sitimulyo Piyungan Bantul*, (Surakarta: Perpustakaan Uns, 2012), 34.

[7] Afidatul Muadifah, *Pengendalian Pencemaran Lingkungan Hidup* (Malang: Media Nusa Kreatif, 2019), 78. See too, Muhammad Arham Parvez, Irfan Ahmad Rana, Adnan Nawaz, and Hafiz Syed Hamid Arshad, "The impact of brick kilns on environment and society: a bibliometric and thematic review," *Environmental Science and Pollution Research* 30, no. 17 (2023): 48636.

[8] Adi Harmanto, *Pengaruh Paparan Debu Terhadap Kapasitas Fungsi Paru Pekerja Pembakaran Batubata Di Kecamatan Kebakramat Karanganyar*, (Surakarta: Universitas Sebelas Maret, 2012), 35. See too, Tamaulina Br Sembiring, Yaumil Adli, Muhammad Muqsith Lubis, Rio Aginta

The principle of environmental responsibility adopted in the Indonesian legal system emphasizes that every business actor has an obligation to prevent and address environmental pollution and damage. This obligation is absolute and cannot be transferred to another party, in line with the application of the principle of strict liability in environmental law.[9]

Institutional aspects also receive special attention in environmental regulation. The government, both at the central and regional levels, has the authority and responsibility to supervise, enforce the law, and coordinate environmental protection efforts. This division of authority is intended to ensure the effective implementation of environmental policies at all levels of government. Based on the background and normative framework mentioned above, this research focuses on two main questions. The first question examines how air pollution control regulations are established in Government Regulation Number 22 of 2021 concerning the Implementation of Environmental Protection and Management. The second question examines the effectiveness of the government's role in controlling air pollution caused by brick industry activities in Karawang Regency.

Previous research such as that conducted by Edi Suryawan,[10] has largely discussed the impacts of air pollution and the environment on the brick industry, as well as related regulations. However, a gap that has not been widely addressed is the effectiveness of inter-agency coordination and community involvement in the supervision and implementation of environmentally friendly technologies at the small- and medium-scale business level. The current study highlights the importance of a multi-stakeholder collaborative approach and the adaptation of green technologies to reduce emissions and increase the sustainability of the brick industry, in line with theories of environmental governance and sustainable technological innovation.

This study aims to comprehensively analyze the problem of air pollution caused by the brick kiln industry from an environmental law perspective. Specifically, this study aims to evaluate the environmental impact of brick kiln operations and to assess the effectiveness of government policy

Ginting, and Adillah Fajar Siddiq, "Penegakan Hukum Terhadap Pelaku Pidana Yang Melakukan Pencemaran Lingkungan," *Journal of Mandalika Social Science* 2, no. 1 (2024): 96.

[9] Izarul Machdar, *Pengantar Pengendalian Pencemaran (Pencemaran Air, Pencemaran Udara, Pencemaran Kebisingan)* (Yogyakarta: deepublish, 2018), 55. See too, Vina Rahmawati, Ade Luvita Hayat, and Aldi Salam, "Analisis Dampak Pencemaran Udara Terhadap Kesehatan Masyarakat Di Perkotaan," *SEMAR: Jurnal Sosial dan Pengabdian Masyarakat* 2, no. 3 (2024): 19.

[10] I. Komang Agus Edi Suryawan, I. Nyoman Gede Sugiartha, and I. Nyoman Sutama, "Pertanggungjawaban Pidana Terhadap Pencemaran Lingkungan Di Indonesia," *Jurnal Interpretasi Hukum* 2, no. 1 (2021): 61. See too, Muhammad Baharul Iman and Fara Syafira, "Analisis Peraturan Pemerintah Nomor 22 tahun 2021 Terkait Fly Ash & Bottom Ash." *Proceeding Masyarakat Hukum Kesehatan Indonesia* 1, no. 01 (2024): 285.

implementation in controlling air pollution from the industrial sector. The results of this study are expected to provide theoretical contributions to the development of environmental law, particularly in the aspect of controlling air pollution from small and medium-scale industries. Practically, this study can serve as a reference for the government in formulating more effective policies to address air pollution from the brick kiln industry, as well as providing guidance for business actors in fulfilling environmental obligations in accordance with statutory provisions.

B. RESEARCH METHODS

This study adopts a normative and empirical research paradigm as the primary methodological framework. A qualitative approach was chosen due to its characteristics, which allow for in-depth exploration of phenomena in natural settings, with the researcher acting as the primary instrument for data collection and analysis. This paradigm facilitates a comprehensive understanding of complex aspects that cannot be measured numerically. The tradition of qualitative research in the social sciences emphasizes the importance of participatory observation of research subjects in their natural environments. This approach allows researchers to establish direct interactions with informants using language and terminology familiar to them, resulting in a more authentic and contextual understanding.[11]

A fundamental characteristic of qualitative methodology lies in its ability to generate rich descriptive data, both in the form of written and verbal narratives obtained from research subjects. Furthermore, observations of behavior and social interactions are important data sources that provide a holistic picture of the phenomena being studied. Qualitative methods are particularly relevant for uncovering unique dimensions of social and environmental impacts that are difficult to measure using quantitative instruments. This approach facilitates in-depth exploration of the perceptions, experiences, and meanings constructed by actors involved in the brick industry.

The geographic focus of this research is the brick industrial area located in Mekarmulya Village, West Telukjambe District, Karawang Regency. This location was selected based on the significant concentration of brick industrial activity in the area, as well as accessibility for intensive observation and data collection. The research subjects included various stakeholders related to the issue of air pollution from the brick industry, including business operators, the surrounding community, and government officials responsible for environmental management.[12]

[11] Zuchri Abdussaman, *Metode Penelitian Kualitatif* (Makassar: Syakir Media Press, 2021), 20.
[12] Abdul Fattah Nasution, *Metode Penelitian Kualitatif* (Serdang: Harva Kreatif, 2023), 134.

The data collection strategy in this study combined several techniques to obtain comprehensive and valid information. Participatory observation was systematically conducted at the brick industry site to directly observe the production process, environmental conditions, and impacts on the surrounding area.

In-depth interviews were used to gather information from various primary sources, including officials from the Karawang Regency Environmental Agency. These interviews were designed to gain in-depth perspectives on policies, implementation, and challenges in controlling air pollution in the brick industry sector. The combination of these two data collection techniques allowed for information triangulation, which increased the validity and reliability of the research findings and provided a more complete picture of the phenomenon under study.

C. DISCUSSION

1. Air Pollution Control Regulations According to Government Regulation Number 22 of 2021 Concerning the Implementation of Environmental Protection and Management

Ecosystem transformation is a common phenomenon in environmental dynamics, where environmental systems undergo continuous change, both naturally and as a result of human activity. Biological responses to these changes exhibit temporal differences, with short-term adaptation mechanisms through nervous system activation and behavioral changes, while long-term exposure causes structural and functional changes associated with the life cycles of living organisms.[13]

The composition of air, as a constantly changing system, exhibits inhomogeneities influenced by temperature, air pressure, and local environmental conditions. Air pollution has detrimental effects on both biological and non-biological components, with small airborne particles disrupting sunlight, which can lead to changes in Earth's surface temperature due to increased atmospheric reflectivity.[14]

Air quality regulations follow two standard approaches: ambient air quality and industrial emission limits. Legal regulations stipulate that emissions of certain pollutants are permitted up to thirty times the ambient air quality, assuming the ability to be diluted by the atmosphere. However, the effectiveness of this dilution depends on the underlying atmospheric conditions

[13] Sukanda Husin, *Penegakan Hukum Lingkungan: Edisi Revisi* (Jakarta: Sinar Grafika (Bumi Aksara, 2020), 46.

[14] Nina Hernawati, *Pencemaran Udara Dan Implikasinya Pada Anak Jalanan* (Bandung: Indonesia Emas Group, 2022), 35. See too, Intan Sekar Arum, I. Gusti Ayu Ketut Rachmi Handayani, and Fatma Ulfatun Najicha, "Pertanggungjawaban Indonesia Terhadap Pencemaran Udara Akibat Kebakaran Hutan dalam Hukum Internasional," *Justitia Jurnal Hukum* 5, no. 1 (2021): 25.

and the density of the emission source. If saturation occurs, the environment's ability to absorb pollution will gradually decrease.[15]

Air pollution can be defined as the accumulation of physical and chemical substances in the air that exceeds natural levels, so that they can be scientifically detected and cause adverse effects on human health, other living things, and inanimate objects. Another definition states that pollution is a change in the composition of the air due to the entry of substances from within and outside the environmental system.[16]

Air pollutants can arise through three main pathways: mechanical erosion, gasification, and combustion involving high heat. Of these, combustion is the primary pollutant contributor and therefore a major concern in efforts to control industrial pollution. The impacts of this pollution include a reduced quality of life, depletion of natural resources, and threats to the stability of economic and environmental systems.

The brick industry is a crucial sector supporting development and infrastructure needs. The production process uses clay as the primary ingredient, and many still employ traditional methods of drying and firing under sunlight at controlled temperatures. The use of this traditional technology has complex environmental impacts.

The impact of the brick kiln in Mekarmulya Village, West Telukjambe District, Karawang Regency, that we observed was air pollution caused by smoke from the brick kiln. The primary fuel used for the kiln is wood scraps from factories, pallets, construction waste, or other wood scraps. According to the brick kiln owner, the impact wasn't particularly disruptive to the surrounding community, but initially, local residents were bothered by the smoke.

Over time, the local community became accustomed to this, as the lio (a pyramid-shaped building with a tiled roof and low walls used for traditional brick kiln production) is not too close to residential areas; more precisely, it's located in the middle of rice fields. This helped local residents become less disturbed and accustomed to the air pollution caused by the smoke from burning bricks. However, this can have detrimental health effects for anyone who inhales it.[17]

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[15] Indang Dewata dan Yun Hendri Danhas, *Pencemaran Lingkungan* (Depok: PT. RajaGrafindo Persada-Rajawali Pers, 2023), 57.

[16] Supriyadi Supriyadi dan Helfa Septinar, "Kerusakan Lingkungan Akibat Industri Batu Bata Di Desa Pangkalan Benteng Sebagai Sumber Pembelajaran Ilmu Pengetahuan Sosial (Geografi) Di MTs Guppi Sukamoro," *Jurnal Swarnabhumi: Jurnal Geografi Dan Pembelajaran Geografi* 3, no. 2 (2018): 136.

[17] Farista Octa Dwi Anggunia, "Upaya Hukum Masyarakat Yang Terkena Dampak Pencemaran Udara Akibat Pembakaran Sampah Domestik (Studi Kasus Desa Sumbersuko Kecamatan Dampit Kabupaten Malang)," *Dinamika* 30, no. 1 (2024): 8946.

The smoke from burning bricks also makes the surrounding environment less fresh. Furthermore, the ash left over from the kiln and bricks that failed during firing can be reused to temporarily patch holes, according to the business owner. Other impacts of the brick-making business include noise from the brick-making machines and the waste from digging the soil in the rice fields, the primary raw material for brick-making. Digging creates deep holes that eventually lead to waterlogging and uneven ground surfaces.

According to Dzahabiyyah et al.[18], the firing process in brick production uses various types of wood waste, such as factory waste, used pallets, construction project residue, and other wood biomass. The source stated: "The main materials used for firing are wood waste from factories, pallets, project residue, or wood waste from anywhere."

This diversity of fuel sources results in variations in composition and pollution levels. From an environmental law perspective, this practice potentially violates Article 20 paragraph (1) of Law Number 32 of 2009, which requires every business to take measures to prevent environmental pollution. The use of mixed waste without proper treatment can result in emissions exceeding the thresholds stipulated in applicable ministerial regulations.

It was found that there had been a social adjustment from the community to the ongoing air pollution. The source explained: *"Initially, local residents were bothered by the smoke. Over time, the local community began to get used to it." This adjustment was reinforced by the location of the burning (lio) in a rice field area: "the lio location is in the middle of the rice fields,"* so it is "not too close to residential areas." However, the source acknowledged that "this will have a negative impact on the health of anyone who inhales it."

In terms of legal compliance, this situation indicates a potential violation of Article 13 of Law Number 32 of 2009 concerning the obligation to maintain environmental quality. Although there have been no direct complaints from the community, the decline in air quality still constitutes a violation of environmental standards, which can be subject to administrative sanctions as stipulated in Articles 76 to 83.

The study revealed a variety of interrelated environmental impacts. The source cited a decline in air quality: "the surrounding environment becomes less fresh." Furthermore, it found that the use of kiln residue and failed bricks

[18] Dzahabiyyah Dwi Putri Ridayanti, Khambali Khambali, and Hadi Suryono, "Risiko Paparan Debu/Particulate Matter (PM2, 5) Terhadap Kesehatan Masyarakat (Studi Kasus: Tempat Pembuatan Batu Bata Di Desa Kaloran, Kecamatan Ngronggot, Nganjuk)," *Jurnal Penelitian Kesehatan" Suara Forikes" (Jurnal Riset Kesehatan "Forikes Voice")* 13, no. 2 (2022): 438. See too, Siti Mariyam, "Kebijakan Pengawasan Terhadap Produk Umkm Sebagai Upaya Perlindungan Pada Konsumen," *Hukum Dan Dinamika Masyarakat* 15, no. 1 (2018): 46.

as patching materials for damaged roads: "the ash left over from the kiln and bricks that fail during the firing process can be reused to patch holes."

Other impacts include noise from "the noise of brick-making machines," and soil degradation from "the waste from digging up soil in rice fields as the main raw material," which results in "quite deep holes that eventually flood" and "uneven ground surfaces."

Based on field findings, the authors state that the brick industry at the research site operates within an unclear jurisdiction and requires immediate oversight. Although not directly causing social conflict, activities that cause air pollution, noise, and land degradation may violate various environmental regulations.

Article 69 paragraph (1) letter h of Law Number 32 of 2009 authorizes local governments to oversee business compliance with environmental permits.[19] In this regard, the Karawang Regency Government is obliged to monitor and enforce the law against such violations. Furthermore, Article 71 paragraph (1) states that the minister, governor, or regent/mayor must oversee business compliance with laws and regulations concerning environmental protection. Implementing this provision is crucial to ensuring the sustainability of the brick industry.[20]

The authors recommend a comprehensive approach to environmental management, combining law enforcement with capacity building for industrial actors. The use of waste as fuel can be optimized through the implementation of clean combustion technologies in accordance with emission standards. This study highlights the phenomenon of the "Environmental Adjustment Paradox" in rural communities, where social adjustment to ongoing pollution creates a false sense of security, thus ignoring long-term health risks and environmental damage. This paradox suggests that the absence of public opposition does not necessarily mean that conditions are environmentally acceptable, so that intervention by authorities is necessary to ensure environmental protection, even without public pressure. These findings contribute to the development of environmental sociology theory in the context of industrial development in rural areas and can form the basis for formulating preventive environmental policies in traditional industrial areas.

[19] Hanna Niken Julia Sihotang, "Tindak Pidana Pencemaran Lingkungan Terkait Pelanggaran UU No. 32 TAHUN 2009 tentang PPLH," *Skylandsea Profesional Jurnal Ekonomi, Bisnis dan Teknologi* 2, no. 1 (2022): 119.

[20] Undang-Undang Nomor 32 Tahun 2009 Tentang Perlindungan Dan Pengelolaan Lingkungan Hidup. Retrieved in July 13, 2025. jihttps://peraturan.bpk.go.id/details/38771/uu-no-32-tahun-2009. See too, Krismiyarsi Krismiyarsi, "Rekonstruksi Kebijakan Mediasi Penal Dalam Penyelesaian Perkara Kecelakaan Lalu Lintas Jalan Raya," *Spektrum Hukum* 17, no. 2 (2020): 245.

2. The Effectiveness of the Government's Role in Controlling Air Pollution Caused by Brick Industry Activities in Karawang Regency

Government institutions play a crucial role in addressing air pollution issues through the implementation of comprehensive environmental governance. Success in reducing air pollution depends heavily on the government's ability to formulate, implement, and evaluate environmental policies that address the complexities of environmental degradation.[21] The modern environmental governance paradigm emphasizes the importance of an integrated policy approach that combines legal regulatory measures, economic incentives, and community engagement.[22]

The government's strategic role in environmental protection includes developing a comprehensive regulatory framework, effective law enforcement mechanisms, and strengthening the capacity of business actors. The government serves as the primary regulator setting environmental standards, a facilitator providing technical assistance and financial incentives, and an educator raising environmental awareness at the grassroots level.[23]

The environmental regulatory framework is implemented through various policy instruments, including strict regulations, market mechanisms, and voluntary approaches. Establishing emission standards is a key strategy in industrial pollution control, based on scientific risk assessments, economic impact analyses, and consultation with relevant stakeholders.[24]

Industrial emission standards follow a quantitative threshold approach, determining the maximum permissible levels for specific pollutants, based on environmental quality and public health protection objectives. This process involves a thorough evaluation of environmental impacts, health risks, and the feasibility of available technologies, and is periodically reviewed to ensure their relevance and effectiveness.[25]

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[21] Assytha Salsabila, "Upaya Hukum Terhadap Pencegahan Atas Pencemaran Udara Akibat Aktivitas Pembangkit Listrik Tenaga Uap Di Indonesia," *Beleid: Journal of Administrative Law and Public Policy* 3, no. 1 (2025): 61. See too, Hanna Niken Julia Sihotang, "Pertanggungjawaban Pidana Terkait Tindak Pidana Pencemaran Lingkungan," *Jurnal Ekonomi, Sosial & Humaniora* 2, no. 11 (2021): 95.

[22] Royana Anandra Putri, Aries Prasetyo, and Vincentius Supriyono, "Kejadian ISPA Di Sekitar Industri Genteng Atau Batu Bata Di Desa Bogorejo, Kecamatan Barat Kabupaten Magetan," *JPKM: Jurnal Profesi Kesehatan Masyarakat* 4, no. 1 (2023): 14.

[23] Clara Ignatia Tobing, *Hukum Pencemaran Lingkungan* (Tangerang: Literasi Nusantara Abadi Grup, 2023), 332. See too, H. Zuchri Abdussamad, and M. Si Sik., *Metode penelitian kualitatif,* (Makassar: CV. Syakir Media Press, 2021), 24.

[24] Rahadian Reza, Pipid Ari Wibowo, and Avicena Sakufa, "Hubungan Kadar Debu Total Dengan Kejadian ISPA Pada Pekerja Home Insudtry Batu Bata Di Desa Dukuh Bendo Magetan," *JIIP-Jurnal Ilmiah Ilmu Pendidikan* 5, no. 8 (2022): 2942.

[25] Agung Nurzaman, "Analisis Dampak Pabrik Bata Merah Terhadap Kualitas Udara Dan Tingkat Kebisingan Di Desa Cicantayan Kabupaten Sukabumi" (Sukabumi: Phd Thesis, Nusa Putra University, 2024).

Economic instruments in environmental policy include tax incentives, subsidies, and grants to encourage the use of clean technologies. Environmentally friendly fiscal policy combines sanctions for polluting activities with a reward system for those who comply with regulations, creating an economic framework that aligns business interests with environmental protection goals.[26]

Based on information from a source from the Karawang Regency Environmental Service, Ms. Melie Rahmawati, ST, MPSDA, as Head of Environmental Regulation Arrangement, the government's role in tackling environmental pollution is reflected in Government Regulation Number 22 of 2021 concerning the Implementation of Environmental Protection and Management. This regulation includes key provisions regarding environmental approval; protection and management of water, air, and sea quality; environmental damage control; management of hazardous and non-hazardous waste; provisions regarding guarantor data for environmental function restoration; environmental information systems; guidance and supervision; and the application of administrative sanctions.[27]

Environmental law enforcement and oversight are carried out to ensure that provisions in the planning stage of a business and/or activity are implemented in accordance with established regulations. Any deviation from the obligations stipulated in the environmental approval, which is part of a business permit or government approval, will result in legal consequences. This law enforcement is based on the principle of ultimum remedium and begins with the application of administrative sanctions. Furthermore, technical provisions regarding environmental approval are also stipulated in Regulation of the Minister of Environment and Forestry Number 5 of 2021 concerning Procedures for Issuing Technical Approvals and Operational Feasibility Letters in the Field of Environmental Pollution Control.[28]

According to Supriyadi and Helfa,[29] companies producing air pollution are required to have chimneys with specific requirements, including how to

[26] Suksmerri Suksmerri Erdinur Erdinur, Mukhlis Mukhlis, Sari Arlinda, and Lili Oktia Pratiwi, "Analisis Risiko Gangguan Saluran Pernafasan Pada Kegiatan Pembuatan Batako Di Ud. Fatimah, Kota Padang," *Sulolipu: Media Komunikasi Sivitas Akademika Dan Masyarakat* 23, no. 1 (2023): 156.

[27] Peraturan Pemerintah Nomor 22 Tahun 2021 Tentang Penyelenggaraan Perlindungan Dan Pengelolaan Lingkungan Hidup. See too, Farista Octa Dwi Anggunia, "Upaya Hukum Masyarakat Yang Terkena Dampak Pencemaran Udara Akibat Pembakaran Sampah Domestik (Studi Kasus Desa Sumbersuko Kecamatan Dampit Kabupaten Malang)," *Dinamika* 30, no. 1 (2024): 8948.

[28] Peraturan Menteri Lingkungan Hidup Dan Kehutanan Nomor 5 Tahun 2021 Tentang Tata Cara Penerbitan Persetujuan Teknis Dan Surat Kelayakan Operasional Di Bidang Pengendalian Pencemaran Lingkungan.

[29] Supriyadi Supriyadi dan Helfa Septinar, "Kerusakan Lingkungan Akibat Industri Batu Bata Di Desa Pangkalan Benteng Sebagai Sumber Pembelajaran Ilmu Pengetahuan Sosial (Geografi) Di MTs Guppi Sukamoro," *Jurnal Swarnabhumi: Jurnal Geografi Dan Pembelajaran Geografi* 3, no.

install them, in a manner that is essential for air quality. Every company with a new or existing chimney must obtain a permit and undergo a study to determine whether the chimney complies with future planning regulations. After complying with the regulations, the Environmental Agency issues technical approval for the chimney construction. Within two months of construction, the company must submit an Operational Feasibility Test to determine whether the results are satisfactory. If the results are satisfactory, the Environmental Agency can issue a certificate of feasibility for operation; if the results are not satisfactory, the company is required to repair the chimney. The government (the Environmental Agency) can assist with chimney construction, but those who can receive assistance must have a business license; without a business license, the government cannot assist.

Furthermore, regarding the brick kiln business we observed and consulted with the Environmental Agency, pollution from the brick kiln process did not have any significant consequences. This is because the brick kiln still uses natural wood, and the kiln is located in the middle of a rice field and not too close to residential areas.

Regarding the brick kiln business permit, the Environmental Agency does not require one, as the brick kiln is a small-scale enterprise (*Usaha Mikro dan Kecil*/UMK), a source of livelihood for the village residents, and the resulting pollution is not fatal. The role of the Karawang Regency government in addressing the pollution caused by the brick kiln in Mekarmulya Village, West Telukjambe District, is as follows:

a. The Environmental Agency can assist in the construction of chimneys, as companies that produce air pollution are required to have chimneys with certain provisions, and how to install them in a manner that is essential for air quality. However, those who can be assisted must have a business license; without a business license, the government cannot assist. In the construction of chimneys, they must be equipped with air pollution control facilities, supporting facilities and safety devices, and install monitoring measuring devices that include volume flow levels and flow rates for each chimney.
b. The Environmental Agency monitors ambient air quality, indoor air quality, mobile source emissions, stationary source emissions, and other disturbance levels. The Environmental Agency conducts testing against air quality standards. This testing involves conducting experiments and research on samples of the objects being tested. This testing is intended to determine whether pollution and environmental damage are present.

2 (2018): 138. See too, Buyung Pangestu Supardji, Moch Rio Basyari Supari, and Listyananda Luchfi Permana Mujiat, "Pengaruh Sampah Terhadap Berbagai Aspek di Tulungagung," *Yudhistira: Jurnal Yurisprudensi, Hukum dan Peradilan* 1, no. 1 (2023): 60.

c. The Environmental Agency takes further action based on the results of environmental monitoring, particularly in the air sector, and summarizes the results of previous monitoring conducted by relevant agencies.

The author argues that the classification of the brick industry as a micro, small, and medium enterprise exempt from environmental permit requirements creates a legal vacuum that could weaken environmental protection. The statement that the impact of pollution "does not have fatal consequences" contradicts Article 22 paragraph (1) of Law Number 32 of 2009 which states that "every business and/or activity that has a significant impact on the environment must have an AMDAL." Even if having an AMDAL is not mandatory, Article 23 requires businesses to have an UKL-UPL. Thus, the total exemption from environmental studies has the potential to violate the precautionary principle as stated in Article 2 letter f of Law Number 32/2009.

Interviewee testimony indicates a discrepancy between technical provisions and their implementation. The requirement to have chimneys applies only to large-scale industries, but not to brick businesses classified as MSEs. This creates a double standard that potentially violates the principle of fairness in environmental protection as stipulated in Article 15 of Law Number 32/2009.[30]

Article 69 paragraph (1) authorizes regional governments to establish environmental policies at the regional level, including establishing additional obligations to ensure compliance, even for relatively small businesses. Article 63 paragraph (1) affirms that "everyone has the right to a good and healthy environment," as part of human rights. Therefore, MSE classification cannot be used as an excuse to ignore environmental quality that affects public health. Article 65 paragraph (1) also states the public's right to education, information, participation, and fairness in environmental protection. This demonstrates the government's obligation to provide comprehensive information about the pollution risks of the brick industry, regardless of the scale of the business.

3. Recommendations for Balanced Environmental Regulation Reform

The authors recommend implementing a multi-layered environmental management approach, distinguishing between large and small industries while ensuring compliance with minimum environmental standards. This approach allows for respect for the economic realities of MSEs without compromising environmental protection by simplifying procedures and improving technical assistance. Implementation of Article 70 concerning "community participation" can be optimized through community-based

[30] Raynaldo Kurniawan, Ricky Tratama, and Rita Mulyani, "Analisis Perlindungan Hukum Dalam Penyelesaian Masalah Lingkungan Berkelanjutan di Indonesia Ditinjau Dari UU NO. 32 Tahun 2009 dan Paris Convention," *Jurnal Hukum Indonesia* 5, no. 1 (2025): 23.

environmental monitoring, involving residents in assessing and reporting on the environmental quality surrounding brick industries.

The results of this study reveal a fundamental contradiction in the environmental regulatory system that requires serious attention. When micro-enterprises are exempted from environmental regulations solely based on their size, this creates loopholes that can harm the environment as a whole. What is interesting about this finding is how the cumulative impact of thousands of small businesses can produce pollution equal to, or even exceeding, large industries. Imagine, if a thousand small food stalls dispose of waste carelessly, the total impact could be far more severe than a single large factory with a waste management system in place.

This paradox actually highlights a fundamental flaw in how we view environmental responsibility. Regulations tend to focus on "who's big" rather than "what's the impact." However, the principle of environmental justice should protect communities from pollution, regardless of the perpetrator. These findings pave the way for the development of a more sophisticated regulatory approach. Rather than granting blanket exemptions to micro-enterprises, governments need to design systems that still allow economic access while ensuring environmental responsibility. This could be done through incentive systems, technical assistance, or collective arrangements for waste management. Ultimately, sustainable development requires a careful balance between inclusive economic growth and environmental protection. This kind of research provides an empirical basis for designing policies that are not simply pro-growth or pro-environment, but that effectively integrate both.

D. CONCLUSION

An environmental impact assessment of brick kilns in Mekarmulya Village reveals the complexity of environmental issues in the micro-enterprise sector that have previously gone unnoticed. The study identified three main dimensions of impact: air pollution from combustion smoke, noise pollution from production activities, and land degradation due to raw material extraction. The most significant finding is the phenomenon of social adaptation to pollution, where initial complaints gradually transform into acceptance and normalization of polluted conditions. This adaptation process creates a "blind spot" in environmental impact evaluations, as the reduction in complaints does not reflect improvements in environmental quality, but rather a decrease in community sensitivity to pollution. Physical environmental damage, such as water basins and land surface deformation due to excavation, indicates irreversible long-term impacts. This demonstrates that a small-scale business does not automatically mean minimal environmental impact, especially when operated sustainably without adequate mitigation. This study emphasizes the

urgency of integrating a sociological approach in environmental impact assessments. Evaluations that rely solely on physical-ecological parameters can overlook the social dynamics that determine the level of community resistance to pollution. The normalization of pollution by the community can be an indicator of poor environmental governance at the local level. The policy implications of these findings are the need to redesign pollution control instruments that focus not only on large industries but also accommodate the unique characteristics of the informal sector. Regulatory approaches must consider the socio-economic aspects of local communities while maintaining adequate environmental protection standards.

The implementation of environmental pollution control in the field reveals a significant gap between the established regulatory framework and the reality of its implementation. Although Government Regulation Number 22 of 2021 and Ministerial Regulation Number 5 of 2021 provide a comprehensive framework for environmental protection, including environmental approval mechanisms and air quality control, in practice, cottage industries such as brick makers still operate outside the reach of formal oversight. Real-world conditions demonstrate that micro-scale businesses tend not to be registered in the environmental permitting system, thus operating without technical approval or operational feasibility certificates. Weak regional government oversight capacity, limited resources, and the complexity of identifying informal businesses are key factors contributing to this regulatory gap. Under applicable legal norms, every business activity with the potential to pollute the environment, including the cottage brick industry, should have environmental documents and operational permits commensurate with its risk level. An integrated electronic licensing system (Online Single Submission) is designed to facilitate regulatory access for businesses, including MSMEs.

Ideally, regional governments should be able to identify, assist, and supervise all business activities that impact the environment in their jurisdictions. The approach that should be implemented is a combination of firm enforcement and capacity building for micro-enterprises, so that compliance with environmental regulations can be achieved without hindering productive economic activity. This gap between actual and ideal conditions indicates the need for reformulation of environmental policy implementation strategies. A one-size-fits-all approach to environmental regulation has proven ineffective in reaching the informal sector. Innovation is needed in the design of policy instruments that are more adaptive to the characteristics of micro-enterprises, such as simplified environmental assessments, collective compliance mechanisms, or incentive-based regulation.

These findings enrich the academic discussion on the implementation gap in environmental policy, particularly in the context of multi-level

governance in developing countries. This study demonstrates that the effectiveness of environmental regulation is determined not only by the quality of the legal framework but also by the institutional capacity to operationalize these rules at the grassroots level.

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