

Area-based Medical Waste Management Issues in A Sustainable Environmental Perspective

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Abstract

Medical waste, which includes toxic and hazardous waste, is generated from activities that occur in health facilities and has the potential to transmit various disease-causing agents. Therefore, medical waste must be managed in accordance with the principles of area-based management. This research is a doctrinal legal research project that employs a combination of primary, secondary, and tertiary legal materials. The methodology for collecting legal materials involves a document study that incorporates both a statute and analytical conceptual approaches. The results and discussion demonstrate the unavailability of land for the management of medical waste, including toxic and hazardous materials. This situation compels healthcare facility management to form collaborative relationships with medical waste management companies specialising in the disposal of toxic and hazardous waste. Consequently, the management of medical waste at area-based healthcare facilities remains unfulfilled.

Keywords: Medical Waste; Management; Sustainable Environment.

Abstrak

Limbah medis (limbah B3) pada dasarnya merupakan limbah hasil proses kegiatan yang terjadi di fasilitas kesehatan yang sifatnya sangat potensial dapat menularkan berbagai bibit penyakit. Sehingga limbah medis (limbah B3) perlu untuk dikelola dengan baik dengan prinsip pengelolaan berbasis wilayah. Penelitian ini merupakan penelitian hukum doktrinal dengan menggunakan bahan hukum primer, sekunder dan tersier. Teknik pengumpulan bahan hukum dilakukan dengan studi dokumen dengan pendekatan perundang-undangan dan pendekatan analisis konseptual. Hasil dan pembahasan yaitu adanya ketidaktersediaan lahan untuk membuat pengelolaan limbah medis (limbah B3) sehingga menjadikan fasilitas pelayanan kesehatan harus menjalin kerjasama dengan perusahaan pengelola limbah medis (limbah B3) dalam hal pengelolaannya. Sehingga berdasarkan hal tersebut masih belum dapat mewujudkan pengelolaan limbah medis (limbah B3) fasilitas pelayanan kesehatan berbasis wilayah.

Kata Kunci: Limbah Medis; Pengelolaan; Lingkungan Berkelanjutan.



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A. INTRODUCTION

Maintenance of good health is of great importance to all members of society. In Indonesia, the right to health is enshrined in the nation's founding principles, as outlined in Pancasila and the 1945 Constitution of the Republic of Indonesia.¹ The government is committed to pursuing continuous development across all sectors of society, including the health sector.² When individuals are unwell, they often seek care at health service units such as hospitals or community health centres. During the course of treatment, various methods are employed, including the administration of injections, the provision of medication, and other forms of therapy, which inevitably generate waste products.

Hospital waste can be defined as a form of waste resulting from the processes undertaken within a hospital environment, which has the potential to transmit a variety of disease-causing agents.³ This is due to the fact that hospitals are one of the primary means of maintaining and improving public health.⁴ Hospitals comprise not only treatment centres and doctors' offices, but also a number of other units, including operating theatres, laboratories, pharmacies, administration, and waste management as well as disposal facilities. From these conditions, it can be postulated that hospitals have the potential to pollute the environment and spread disease transmission to a significant extent.⁵ Management of medical waste is distinct from that of domestic or household waste. Disposal of medical waste collected by hospitals is not permitted in domestic waste disposal sites; instead, it must undergo a treatment process prior to disposal. Furthermore, the improper management of waste can result in environmental contamination and public health risks.

From a legal standpoint, managing medical waste is regulated by the Indonesian Minister of Environment and Forestry's Regulation No. 56 of 2015, which details the procedures and technical standards for handling hazardous and toxic waste as well as waste from health service facilities. Additionally, Regulation No. 6 of 2021 further outlines the protocols and criteria for managing such waste. Proper medical waste management requires active participation from the government. This is due to the fact that a specific category of waste, namely medical waste, is explicitly prohibited from being disposed of in landfills. Medical waste, as defined in this context, encompasses all waste generated by hospitals. It is of significant concern that the misuse of this medical waste could have dire consequences for the health of individuals in the general population. It is therefore imperative that medical waste is managed in an appropriate

¹ Masrudi Muchtar, Abdul Khair, and Noraida, *Hukum Kesehatan Lingkungan (Kajian Teoritis dan Perkembangan Pemikiran)* (Yogyakarta: Pustaka Baru Press, 2016), <https://opac.perpusnas.go.id/DetailOpac.aspx?id=1140459>.

² Ria Wierma Putri et al., "The Paradox of the International Law Development: A Lesson from Covid-19 Pandemic Management," *Lex Scientia Law Review* 7, no. 1 (2023), <https://doi.org/10.15294/lesrev.v7i1.61999>.

³ Muhammad Khoirul Huda and Emmilia Rusdiana, "Penegakan Hukum Pencemaran Lingkungan Limbah Medis di Kabupaten Mojokerto," *Novum: Jurnal Hukum* 8, no. 2 (2021): 1–11, <https://doi.org/https://doi.org/10.2674/novum.v0i0.36026>.

⁴ - Rofiaty, Try Noviyanti, and Angga Dwi Mulyanto, "Pengaruh Knowledge Management Terhadap Inovasi, Implementasi Strategi Dan Kinerja Organisasi (Studi Pada RS Lavalette Malang)," *Ekonomi Bisnis* 20, no. 1 (2015): 16–21.

⁵ D. P. Risky Vidika Apriyanthi and Ni Putu Rahayu Artini, "Gambaran Pengetahuan Pemulung terhadap Limbah Medis Padat di TPA Suwung," *Bali International Scientific Forum* 1, no. 1 (2020): 43–47, <http://ejournal.unbi.ac.id/index.php/BISF/article/view/122>.

manner. In this context, this research examines the issue of area-based medical waste management from an environmental sustainability perspective.

B. METHOD

This research employs a doctrinal research method⁶, utilising primary legal materials derived from legislation and regulatory frameworks, secondary legal materials drawn from pertinent literature, journal articles and written works, and tertiary legal materials encompassing dictionaries.^{7,8} The legal materials were collated through document studies.⁹ Additionally, this research employs a range of approaches, including the statute approach and the analytical conceptual approach.¹⁰

C. RESULTS AND DISCUSSIONS

1. Regulations on Medical Waste

Hospitals are institutions that generate a considerable amount of waste, including that of a pathological, radioactive, pharmaceutical, and chemical nature.¹¹ The issue of waste is a significant challenge in the contemporary era. In accordance with Article 1, Point 2 of the Minister of Environment and Forestry Regulation No. 56 of 2015, the term ‘waste’ is defined as the residue of a business and/or activity. One category of waste is medical waste, which is a highly hazardous material and requires stringent regulation to mitigate the risk of environmental contamination and adverse health effects. In accordance with Article 1, Point 1 of the Regulation of the Minister of Health of the Republic of Indonesia Number 18 of 2020 concerning the Management of Medical Waste in Area-Based Health Service Facilities, medical waste is defined as the waste product of health service medical activities.

Medical waste can be classified into several categories, including that which is hazardous or toxic, as found in hospitals. The principal categories of medical waste generated in hospitals are as follows: The categories of medical waste include the following: (1) infectious waste; (2) body tissue waste (pathology); (3) cytotoxic waste; (4) chemical waste; and (5) radioactive waste.¹²

It is imperative that medical waste is processed in an appropriate manner. This is in accordance with the stipulations set forth in Article 3, paragraph 1 of the Indonesian Minister of Health Regulation No. 18 of 2020. This article states that in order to minimise the risk of environmental pollution and health impacts, and to optimise the management of medical waste from healthcare facilities in a given area, area-based management of medical waste from healthcare facilities is conducted. In accordance with Article 1, Point 3 of the Indonesian

⁶ Peter Mahmud Marzuki, *Penelitian Hukum* (Jakarta: Kencana Pranada Media Group, 2008).

⁷ Soerjono Soekanto and Sri Mamudji, *Penelitian Hukum Normatif: Suatu Tinjauan Singkat* (Jakarta: PT Raja Grafindo Persada, 2007).

⁸ Tunggul Ansari and Setia Negara, “Normative Legal Research in Indonesia: Its Originis and Approaches,” *Audito Comparative Law Journal (ACLJ)* 4, no. 1 (February 2, 2023): 1–9, <https://doi.org/10.22219/ACLJ.V4I1.24855>.

⁹ Setyo Yuwono Sudikni, *Pengantar Karya Ilmiah* (Jakarta: Aneka Ilmu, 1983).

¹⁰ Marzuki, *Penelitian Hukum*.

¹¹ Ni Made Tia Erlinda Sukadewi, Ni Putu Widya Astuti, and Ni Luh Utari Sumadewi, “Efektivitas Sistem Pengolahan Limbah Cair di Rumah Sakit Bali Med Denpasar Tahun 2020,” *Higiene: Jurnal Kesehatan Lingkungan* 6, no. 3 (2020): 114–20, <https://journal.uin-alauddin.ac.id/index.php/higiene/article/view/15781>.

¹² Sukadewi et al.

Minister of Health Regulation No. 18 of 2020, medical waste management is defined as the process of managing medical waste from healthcare facilities in an area, with all stages conducted in accordance with regional needs and capabilities.

Article 59 of Indonesian Law No. 32 of 2009 on Environmental Protection and Management stipulates that any individual or entity that generates hazardous and toxic waste is obliged to assume responsibility for the management of that waste. In the event that an individual or entity is unable to carry out waste management on their own, the management is to be transferred to another party that has a licence in accordance with the provisions of laws and regulations.

Article 59 reads as follows:

- a. Those who generate hazardous or toxic waste must take responsibility for its safe handling;
- b. Hazardous and toxic waste brought into the Unitary State of the Republic of Indonesia must follow designated waste management procedures. These requirements apply to the generation, transportation, circulation, processing, and storage of hazardous and toxic waste that has expired.
- c. If an individual is unable to manage hazardous and toxic waste alone, the obligation will be shifted to other parties.
- d. To manage hazardous and toxic waste, seek a permission from the appropriate minister, governor, regent, or mayor.
- e. The permission issued by the minister, governor, or regent/mayor must include environmental requirements for hazardous and toxic waste managers to follow.
- f. The decision to award a licence must be announced.
- g. Government regulations will develop further provisions for managing hazardous and toxic waste.

The management of medical waste (hazardous and toxic waste) created from healthcare facilities is aimed to limit the amount of medical waste produced as much as possible, with the ultimate goal of reaching zero waste.¹³ This is achieved by lowering and/or removing the harmful and/or toxic qualities of the waste. In accordance with Article 2 of the Indonesian Minister of Health Regulation No. 18 of 2020, Healthcare facilities are required to use proper medical waste management techniques. Given the foregoing, it is expected that hazardous and toxic waste from healthcare facilities will be managed in each region using the proximity concept. This method implies that the closer waste management is to its source, the lesser the associated risk and the less expensive the charges.

In accordance with Article 3 of the Indonesian Minister of Health Regulation No. 18 of 2020, the objective of area-based management of medical waste from healthcare facilities is twofold: firstly, to minimise the risk of environmental pollution and health impacts; and secondly, to optimise the management of medical waste from healthcare facilities in a given area. This approach is designed to prevent the misuse of hazardous and toxic medical waste

¹³ Twinkle, Manju Mehta, and Jatesh Kathpalia Jatesh, "Safe Hands, Safe Earth: Prioritizing Security and Sustainability in Medical Waste Management," *Advances in Research* 25, no. 4 (June 13, 2024): 132–39, <https://doi.org/10.9734/AIR/2024/V25I41090>.

from healthcare facilities, thereby reducing the potential for adverse effects on the environment and human health. In accordance with Article 3 of the Regulation of the Indonesian Minister of Environment and Forestry No. 56 of 2015, healthcare facilities are defined as facilities that are required to be registered with the relevant agency responsible for health. This encompasses the following types of facilities: (1) community health centres; (2) health service clinics or similar; and (3) hospitals. This is consistent with the concept of responsibility, which in this context is a form of responsibility for public health and the environment as a response to the legal consequences arising from activities carried out by healthcare facilities.

In this case, the local government offers managerial support to healthcare facilities that are unable to manage their medical waste efficiently. This support is provided through the creation of regional technical implementation units, regional-owned enterprises, and/or by forming agreements with private entities, all in accordance with applicable regulations.

The management of hazardous and toxic waste in healthcare facilities is governed by the Indonesian Minister of Environment and Forestry Regulations No. 56 of 2015 and No. 6 of 2021. According to Article 4 of Regulation No. 56 of 2015, the term 'hazardous and toxic waste' includes various types of waste, such as:

- a. waste with infectious characteristics;
- b. sharps;
- c. pathological waste;
- d. expired chemicals, spillages, or remaining packaging;
- e. radioactive waste;
- f. cytotoxic waste;
- g. medical equipment containing heavy metals; and
- h. gas cylinders or pressurised containers.

In accordance with Article 6, paragraph (3) of the Regulation of Indonesian Minister of Environment and Forestry No. 56 of 2015, the segregation of hazardous and toxic waste is conducted in the following manner: (1) The separation of hazardous and toxic waste is based on its type, group, and/or characteristics; and (2) the containerisation of hazardous and toxic waste is according to its group. In contrast, Article 4, paragraph (2) of the Indonesian Minister of Environment and Forestry Regulation No. 6 of 2021 outlines the classification of hazardous and toxic waste based on a number of characteristics, as follows “Explosive, flammable, reactive, infectious, corrosive; and/or toxic.”

Storage of hazardous and toxic waste in accordance with the stipulations set forth in Article 7, paragraph (2), of the Regulation of Indonesian Minister of Environment and Forestry No. 56 of 2015 is conducted in the following manner:

- a. The storage of hazardous and toxic waste in a designated waste storage facility;
- b. The storage of hazardous and toxic waste in containers that are specifically designed for such materials, classified according to their respective groups;
- c. The use of colour coding on each packaging and/or waste container, according to the characteristics of the hazardous and toxic waste; and
- d. The provision of symbols and labels on each packaging and/or waste container of hazardous and toxic waste, indicating its specific characteristics.

The storage of medical waste (including hazardous and toxic waste) must be conducted in a manner that allows for the clear differentiation between one type of waste and another. In this instance, the differentiation can be determined by the colour of the packaging, waste container and symbols displayed on the packaging or waste container. With regard to this matter, the relevant legislation is set forth in Article 7, paragraphs (2) and (3), of the Indonesian Minister of Environment and Forestry Regulation No. 56 of 2015, which states:

- a. The colour of packaging and/or containers of hazardous and toxic waste, as referenced in paragraph (2), letter c, is as follows “Red as radioactive waste, yellow as infectious waste and pathological waste, purple as cytotoxic waste, and brown as expired chemical waste, spillage, or remaining packaging, and pharmaceutical waste.
- b. The symbols used on packaging and/or containers of hazardous and toxic waste, as referenced in paragraph (2) letter d, are as follows:
 - 1) radioactive: used for radioactive waste;
 - 2) infectious: used for infectious waste; and
 - 3) cytotoxic: used for cytotoxic waste.

The types of hazardous and toxic medical waste generated by the healthcare facility must be adjusted to the waste type, packaging and symbols on the waste type packaging, and must not be mixed. This is regulated in Article 51, paragraph (3) of the Regulation of Indonesian Minister of Environment and Forestry No. 6 of 2021, which states that any person who generates hazardous and toxic waste is prohibited from mixing hazardous and toxic waste that they keep. The division is intended not only to help medical workers distinguish between dangerous and toxic waste, but also to improve security and safety. It is hypothesized that combining medical waste may cause undesirable responses and pose concerns to the environment and human health.

Article 68, paragraph (1) of the Indonesian Minister of Environment and Forestry Regulation No. 6 of 2021 states that medical waste, which is classified as hazardous and toxic waste, shall be packaged in accordance with the necessary packaging criteria. The aforementioned sections of the article concern the packaging of hazardous and toxic waste medical waste, which must correspond to the following regulatory criteria:

- a. The packaging must be made of metal or plastic materials capable of containing hazardous and toxic waste in accordance with the characteristics of such waste.
- b. The packaging must be capable of confining the hazardous and toxic waste within it.
- c. The packaging must have a robust cover to prevent spillage during storage, transfer, and/or transport.
- d. The packaging must be in a non-leaking, non-rusting, and non-damaged condition.

In the event that used packaging of hazardous and toxic waste is to be utilised, the provisions set forth in Article 68, paragraph (3) of the Indonesian Minister of Environment and Forestry Regulation No. 6 of 2021 must be adhered to. These include:

- a. The category and/or characteristics are identical to those of the preceding hazardous and toxic waste.
- b. The category and/or characteristics are compatible with previously packaged hazardous and toxic waste.

- c. The packaging of the used hazardous and toxic waste has been cleaned, and the waste itself may be of a different type and/or possess different characteristics.

Once waste has been sorted and packaged, healthcare facilities, including hospitals, community health centres and clinics, are obliged to store hazardous and toxic waste and have a temporary storage site for hazardous and toxic waste prior to further processing. This is in accordance with the stipulations set forth in Article 51, paragraph (1) of the Indonesian Minister of Environment and Forestry Regulation, which states that any individual or entity responsible for the generation, collection, harvesting, processing, or storage of hazardous and toxic waste is obliged to comply with the requisite storage standards. The storage of such waste is carried out in a manner that ensures its manageability, prevents contamination with other waste, safeguards against any potential dangers and avoids any adverse environmental impact.

2. Area-based Medical Waste Management Issues in A Sustainable Environmental Perspective

Achieving a sustainable environment involves reaching a balance where development within a specific area is aligned with preserving environmental integrity, while also considering the safety, capabilities, well-being, and quality of life for both present and future generations living in that area.¹⁴ This aligns with the guidelines proposed at the 1972 Stockholm Conference (UN Conference on the Human Environment), which advocate incorporating environmental factors and the concept of carrying capacity into development processes, thereby laying the foundation for eco-development principles.¹⁵ A central goal of sustainable development is to strengthen the role of nature and environmental stewardship within the development process. This drives the Indonesian government to prioritize tackling environmental concerns, such as the management of hazardous and toxic medical waste, ensuring that it is handled according to localized principles and in a way that prevents environmental contamination.

In accordance with the pertinent legislation, any individual or entity that generates, collects, harvests, processes, or hoards hazardous and toxic waste is legally required to store such waste. Consequently, healthcare facilities, including hospitals, community health centres and clinics, are required to store medical waste (i.e. hazardous and toxic waste) and must have a temporary storage site for the medical waste. As set forth in Article 51, paragraph (1) of the Indonesian Minister of Environment and Forestry Regulation No. 6 of 2021, any individual or entity that generates, collects, harvests, processes, or stores hazardous and toxic waste is legally obligated to do so. This signifies that healthcare facilities, including hospitals, community health centres, and clinics, are legally obligated to store and must possess a temporary storage site for hazardous and toxic waste.

The storage of medical waste comprising hazardous and toxic substances generated by healthcare facilities must comply with the standards set out in Article 52 of the Indonesian Minister of Environment and Forestry Regulation No. 6 of 2021. The following provisions are to be adhered to:

¹⁴ R.M. Gatot P. Soemartono, *Hukum Lingkungan Indonesia* (Jakarta: Sinar Grafika, 1996).

¹⁵ Siti Sundari Rangkuti, *Hukum Lingkungan dan Kebijakan Lingkungan Nasional*, 2nd ed. (Surabaya: Airlangga University Press, 2000), <https://opac.perpusnas.go.id/DetailOpac.aspx?id=415048>.

- a. Hazardous and toxic waste must be stored in a manner that is protected from rain and covered;
- b. The storage area must have a watertight floor;
- c. Symbols and labels indicating the presence of hazardous and toxic waste must be displayed;
- d. Hazardous and toxic waste must be packaged using metal or plastic packaging;
- e. The packaging must be capable of confining the hazardous and toxic waste to remain inside the packaging;
- f. The packaging must have a strong cover to prevent spillage during transfer and/or transport;
- g. The packaging must be in a condition that is not leaking, not rusting, and not damaged.

Furthermore, the storage facilities for hazardous and toxic waste, as outlined in Article 58 of the Indonesian Minister of Environment and Forestry Regulation No. 6 of 2021, may take the following forms:

- a. buildings;
- b. tanks and/or containers;
- c. silos;
- d. waste piles; and/or
- e. waste impoundment ponds.

Subsequently, the waste is transferred to a temporary storage area, where it is then processed. As set forth in Article 128 of the Indonesian Minister of Environment and Forestry Regulation No. 6 of 2021, one of the medical waste treatment processes for hazardous and toxic waste that may be employed is incineration or burning. Such processes are conducted with the aid of facilities such as chimneys and air pollution control equipment. These facilities must comply with the requisite standards, as specified in Article 131, paragraph (1) of the Indonesian Minister of Environment and Forestry Regulation No. 6 of 2021 specifying that the facilities must relate to the following standards: (1) emission quality standards; (2) combustion efficiency standards; and (3) destruction and removal efficiency standards.

It is imperative to consider that the medical waste treatment process of hazardous and toxic waste by incineration or combustion, as outlined in Article 129, paragraph (1) of the Indonesian Minister of Environment and Forestry Regulation No. 6 of 2021, must adhere to the specified location requirements. The aforementioned location requirements are as follows:

- a. The site must be free from flooding or, alternatively, it must be equipped with technology for environmental protection and management;
- b. The site must be located in an industrial area or, alternatively, it must be designated as an industrial area in accordance with the relevant legislation, for the processing of hazardous and toxic waste; and
- c. The site must be situated at a safe distance. Hence, the following criteria must be met:
 - 1) The site must be situated at least 150 metres from a main or toll road.
 - 2) The site must be situated at least 300 metres from residential areas, trade, hospitals, health services, social activities, hotels, restaurants, religious and educational facilities.

- 3) The site must be situated at least 300 metres from the rising tide line of the sea, rivers, tidal areas, lakes, swamps, and springs.
- 4) A distance of 300 metres must be maintained from protected areas, including nature reserves and protected forests.

In light of the aforementioned considerations, it becomes evident that certain regions encounter significant challenges in establishing suitable locations for the treatment of hazardous and toxic medical waste. The unavailability of land in accordance with the safe distance specifications set forth in Article 129, paragraph (1), of the Indonesian Minister of Environment and Forestry Regulation No. 6 of 2021 represents a significant contributing factor to this condition. The lack of suitable facilities and infrastructure in densely populated areas has resulted in the responsibility for the treatment of hazardous and toxic medical waste generated by health service facilities being left to the relevant parties.

The potential for public health and safety concerns to arise is heightened in densely populated areas when medical waste management development is undertaken. The incineration process for the treatment of hazardous and toxic medical waste produces outputs in the form of residues. In accordance with Article 133, paragraph (1) of the Indonesian Minister of Environment and Forestry Regulation No. 6 of 2021, the treatment of waste will result in the generation of the following by-products: a. incinerator fly ash; b. incinerator bottom ash; and c. treatment residue (flue gas). In accordance with the stipulations set forth in Article 133, paragraph (1), of the aforementioned regulation, the incineration process gives rise to the generation of pollutants and fine particles. Therefore, this is also a factor to be taken into account in the case of a hazardous and toxic medical waste treatment site being located in a densely populated area. Inhalation of such pollutants has the potential to have a significant adverse impact on human and animal health, with the possibility of resulting in air pollution.¹⁶ Furthermore, the potential for adverse events at the hazardous and toxic medical waste treatment site to impact the residents of the densely populated area is a significant concern.

The unavailability of land on which to construct a facility for the management of hazardous and toxic medical waste has resulted in healthcare facilities being compelled to collaborate with external hazardous and toxic medical waste management companies.¹⁷ Some healthcare facilities enter into agreements with third parties for the management of such medical waste. Once the hazardous and toxic medical waste has been stored in a temporary storage site at each healthcare facility, it is subsequently transported or managed by a third party that has secured the necessary license for the transportation and management of that specific type of medical waste.

It can be reasonably asserted that healthcare facilities that generate hazardous and toxic medical waste are duly equipped to manage it in an appropriate manner. Such facilities include hospitals, community health centres, and clinics that engage in collaborative endeavours with

¹⁶ Ann Karakurkchi et al., "Development of an Approach to Improvement the Protection of the Population in Protective Buildings of Civil Protection in the Conditions of Air Pollution by Toxic Chemical Agents," *Technology Audit and Production Reserves* 1, no. 3(63) (February 28, 2022): 6–11, <https://doi.org/10.15587/2706-5448.2022.253650>.

¹⁷ Muktar Oladapo Raji and Adeniyi Ganiyu Adeogun, "Healthcare Waste Management: An Overview," *ABUAD Journal of Engineering Research and Development (AJERD)* 7, no. 1 (March 31, 2024): 14–27, <https://doi.org/10.53982/AJERD.2024.0701.02-J>.

third parties. Such third parties are responsible for the transportation and management of medical waste, including that which is particularly hazardous or toxic, which could otherwise have a detrimental impact on the environment and human health. A number of private hazardous and toxic medical waste management companies that collaborate with healthcare facilities are listed below: (1) PT Triata Mulia Indonesia (Gresik, East Java); (2) PT WASTEC International (Jakarta); (3) PT PRIA (Putra Restu Ibu Abadi) (Mojokerto, East Java); and (4) PT Sagraha Satya Sawahita (Banyuwangi, East Java).

Given the constraints of medical waste management based on area principles, the state, government, and all policymakers must protect and oversee the environmental aspects of medical waste management. The goal is to ensure that the environment continues to provide a source of food and support for the Indonesian people and other living organisms. To avoid environmental pollution caused by medical waste, the optimisation and development of medical waste management facilities must be subject to prompt and periodic evaluation, with proper consideration given to environmental considerations. In this way, the purpose of the legislation is met, particularly in terms of cultivating a sense of justice (*gerechtigheit*), providing legal certainty (*rechtssicherheit*), and offering advantages (*zweckmabigkeit*) to the public.¹⁸

D. CONCLUSION

Due to the shortage of land for managing hazardous and toxic medical waste, healthcare facilities are often compelled to partner with external companies that specialize in this field. Many of these facilities still rely on third-party services, indicating that achieving effective local management of medical waste remains a challenge. To address this issue, it is essential for the government to develop a policy specifically for medical waste management facilities. This policy would help ensure that the waste generated by healthcare facilities in each region is managed efficiently. By implementing such a policy, the government can improve the management of hazardous and toxic medical waste, ensuring that it is properly handled within each area where it is produced.

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¹⁸ Muhamad Erwin, *Filsafat Hukum: Refleksi Kritis terhadap Hukum* (Jakarta: PT Raja Grafindo Persada, 2013), <https://opac.perpusnas.go.id/DetailOpac.aspx?id=968458>.

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