

Conference Paper

Environmental Rehabilitation in Waste Management Disposable House-hold Medical Mask

Maria Novita Apriyani, Aldira Mara Ditta Caesar Purwanto*, Tio Naulita Aritonang

Faculty of Law, Universitas Pembangunan Nasional "Veteran" Jawa Timur, Surabaya 60294, Indonesia

*Corresponding author:

E-mail:

aldira.ih@upnjatim.ac.id

ABSTRACT

Environmental health has the aim of realizing a healthy environmental quality, both physical, chemical, biological, and social that allows everyone to achieve the highest degree of health. The problem of increasing waste has become a major issue in addition to the large number of Indonesian people who have been exposed to COVID-19. Masks are the biggest source of waste today, proper mask waste management will certainly have a good impact on the environment. Disposable medical mask waste in the community is generally thrown away without any effort to separate household waste and medical waste to the Final Disposal Site (TPA). Disposable medical mask waste management, especially in the community, requires environmental rehabilitation for a sustainable and environmentally friendly living environment. Based on these facts, it is necessary to conduct a study on how to regulate Covid-19 medical mask waste, especially those produced by households, and be studied from the perspective of the environmental health law. The research method used is included in the realm of non-doctrinal legal research because the object studied in addition to the law in a normative concept is also the law in an empirical concept. The approach chosen in this study is empirical juridical. The results of this study indicate that B3 waste management, especially disposable medical masks in providing environmental health protection can be carried out in the form of medical waste management, especially B3 types with gravity flow type Autoclave procedures, increasing public awareness to separate or destroy medical mask waste, Accelerate the availability of facilities Medical waste management throughout Indonesia and Issuing Regional Regulations related to Covid-19 medical waste disposal regulations.

Keywords: Rehabilitation, environment, management, waste, medical masks

Introduction

It shows that during the holiday season, the number of people infected by coronavirus increased gradually until the end of the holiday season becomes the peak of the highest number of active cases. Although it is not as scary compared to the beginning of the pandemic, a sudden spike is still as dangerous because of its arrival like a tsunami disaster which although predictable, is still difficult to avoid and will take many victims. For this reason, everyone is expected to be vigilant because even the slightest carelessness can cause an instant spike in active cases.

The discipline of wearing masks according to applicable rules is a kind of vigilance against the spread of the coronavirus. Although, the use of masks still confuses the community because the regulations change oftentimes depending on the pandemic conditions that occur from time to time. For example, at the beginning of the pandemic, WHO allowed the use of cloth masks without additional medical masks. Furthermore, because the facts presented by the news show that the spread of the coronavirus is getting more massive, the rule is replaced by using a medical mask and then covered with a cloth mask on the front. The regulation has changed again to become

How to cite:

Apriyani, M. N., Purwanto, A. M. D. C., & Aritonang, T. N. (2023). Environmental rehabilitation in waste management disposable house-hold medical mask. 7st International Seminar of Research Month 2022. NST Proceedings. pages 128-134. doi: 10.11594/nstp.2023.3322

looser where people are allowed not to use masks in open spaces but are still followed by applicable rules, such as for the elderly the use of masks in open spaces is still mandatory (Rokom, 2022).

Although currently there is a lot of leeway in the use of masks, it turns out that disposable medical masks are still a protective tool that is quite widely used by the public. Disposable medical masks are preferred by the community because it is easy to use, practical, and by the mask, standards set by WHO. The magnitude of the use of disposable medical masks in the community is evidenced by infectious waste data from the Ministry of Environment and Forestry which shows that infectious waste from March 2020 to February 2021 increased by 6,417.95 tons meanwhile according to the Asian Development Bank, the amount of infectious waste per day in Jakarta reaches 212 tons (Listiningrum et al., 2021). A large number of infectious wastes not only shows that the Indonesian people strictly adhere to health protocols. However, there is a fact that should not be forgotten, disposable medical masks that are used to protect themselves from COVID-19 can also be a big problem. This is because infectious waste is included in the type of hazardous and toxic waste that can have an impact on environmental health.

Meanwhile, environmental health is one of the efforts to realize a healthy environmental quality, both physically, chemically, biologically, and socially to achieve the highest degree of health. However, the waste of disposable medical masks that are not managed properly and appropriately will cause a bad impact on environmental health. Especially if you look at the waste of masks that come from households that come into direct contact with the community every day with very minimal and dangerous management, which is only limited to tearing and throwing them in the trash. Whereas a healthy environment is an implementation that needs to be realized from the mandate contained in the 4th paragraph of the Constitution of the Republic of Indonesia, namely "...to form an Indonesian state government that protects the entire Indonesian nation and the entire homeland of Indonesia and to promote general welfare...". In addition, it is also supported in Article 28 H paragraph (1) that everyone has the right to a good and healthy living environment.

This mandate is always pursued through the establishment of infectious waste management regulations as clearly stated in Government Regulation Number 101 the Year 2014 concerning Hazardous and Toxic Waste Management and The Circular of the Minister of Environment and Forestry Number SE.3/MENLHK/PSLB3/PLB.3/3 /2021 concerning Hazardous Waste Management Due to Covid-19 Handling (Menteri KLHK, 2021). The Government Regulation and The Circular are the implementing regulations of Law of The Republic Indonesia Number 32 the Year 2009 concerning Environmental Protection and Management. However, in its implementation, it is often inappropriate so the mandate to protect the entire Indonesian nation and the entire homeland of Indonesia and to promote public welfare is very difficult to realize. Moreover, regarding the rules for managing B3 waste due to the handling of Covid-19, until now, the implementation has only been regulated through circular letters. Considering that the power of the circular letters itself is not the same as the power of other regulations such as laws, government regulations, presidential regulations, and so on, the circulars themselves are not included in the hierarchy of laws and regulations. In addition, the circulars are only a means of communication between official institutions so that power is not binding on the wider community (Listiningrum et al., 2021).

Based on the description above, the author has concerns that need to be investigated further regarding several things. The first relates to the effectiveness of environmental rehabilitation in the management of disposable medical mask waste based on the Law of The Rof Public Indonesia Number 32 the Year 2009. The second relates to the implementation of the management of disposable medical mask waste in the community. Through this research, it is hoped that it can be input for the parties involved and can be an answer to the concerns that have existed so far.

Material and Methods

In this study, the authors observe and analyze the performance of legislation on the management of disposable household medical mask waste. Then this study also examines the facts of the management of disposable household medical mask waste in the community. Furthermore, the authors also look for the right way to handle the fact that disposable mask waste management can have an impact on environmental health. To bring good absolute observations and analyses, the author uses non-doctrinal normative legal research or commonly known as sociological-empirical research with a juridical-empirical approach. Through this type of research and approach, the author does not only examine the law as a written rule but also constantly raises social variables in society. For example, the social variables are community behavior or the performance of the legal itself. In other words, this research examines two objects, namely juridical and empirical. Juridical is related to law as a system of social institutions while empirical is related to observation in society.

Results and Discussion

Environmental rehabilitation effectiveness of disposable medical mask waste management based on the law of The Republic Indonesia Number 32 the Year 2009

Environmental degradation and phenomena underlie the establishment of laws and regulations for environmental protection and management. In 1982, the Law of The Republic Indonesia Number 4 the Year 1982 concerning Basic Provisions for Environmental Management was enacted. However, over time this law is not relevant to the changing times due because the changing environmental problems as well. For this reason, in 1997 a Law on Environmental Management, or Law of The Republic of Indonesia Number 23 the Year 1997 was enacted as a replacement for the aforementioned Law of The Republic of Indonesia Number 4 the Year 1982. Unfortunately, this new law also does not last long because it has quite a several shortcomings in terms of substantial, structural, and cultural aspects (Blora, 2009). The weakness in the substantial aspect of the law is the existence of multiple interpretations of norms. As for the structural aspect, investment policies are still supported and do not prioritize environmental considerations. Meanwhile, in terms of culture, the shortcomings can be seen from the weak level of structuring that still exists in business actors and the community in environmental management. Therefore, the Law of The Republic Indonesia Number 23 the Year 1997 is deemed necessary to be revoked and replaced. As a result, in 2009, the Law of The Republic Indonesia Number 32 the Year 2009 concerning the Protection and Management of the Environment was enacted. Philosophically, the law is formed based on the right to life which is owned by everyone and is a universal right that cannot be replaced and ignored by anyone. As we all know that with a healthy environment, all organisms and living things in it will be healthy. Meanwhile, the sociological factor that underlies the establishment of the Law of The Republic of Indonesia Number 32 the Year 2009 is the relationship between humans, society, and the environment. The creation of these relationships must always pay attention to harmony and balance. For example, the development of facilities and infrastructure aimed at the prosperity of the people cannot be carried out without considering the harmony and balance of environmental and social functions.

Based on the factors that underlie the formation of the Law of The Republic Indonesia Number 32 the Year 2009 it is clear that environmental problems are the main topics that need a lot of attention because their impact can affect the fundamental aspect of human life, the right to life itself. One of the environmental problems currently present as a result of a non-natural disaster, namely Covid-19, is the problem of disposable medical mask waste. This problem is the same as the saying "*Sudah jatuh ketiban tangga*", it means bad luck comes to you. It is like the phenomenon nowadays that the world has been hit by a disaster but still has to face the environmental problems that follow. The problem of disposable medical mask waste is not like the general waste problem. Although the type of waste is the same as other waste, which is made of non-organic materials and microplastics that are difficult to decompose, what distinguishes the

problem of disposable medical mask waste from other waste is the dangerous and infectious viruses that contain in disposable medical mask that can reduce the quality of environmental health in the community massively. Because the problems caused by disposable medical mask waste are very serious, this waste is categorized as hazardous and toxic waste.

Unfortunately, current concerns about the impact of inappropriate waste management of disposable medical masks have made a face. This fact can be seen from the impact on innocent animals. Free-flying birds are entangled in the waste of disposable medical masks on their bodies. The waste is wrapped around their bodies to the pecks they use to find food. This fact was discovered by a British researcher who collected photos of birds affected by the waste of disposable medical masks (Tay, 2022). Furthermore, a surprising phenomenon came from Indonesia itself, the accumulation of disposable medical mask waste in the Jakarta area, precisely in the Muara Marunde and Cilincing areas (Susanto, 2022). The disruption of the environment due to human acts will be impacted humans themselves. Although microplastics that enter the human body through food have not yet been determined as toxic compounds, their content in food can violate the purity of food as organic polluting compounds (Widianarko & Hantoro, 2018).

However, this polluted environmental condition does not necessarily become a barrier for us to restore the environment. The laws and regulations for the protection of environmental management have been regulated in such a way that there is still some movement that can be done to restore the environment that has already been polluted by waste. Law of The Republic Indonesia Number 32 the Year 2009 concerning Protection and Management of the Environment which is then regulated in Government Regulation Number 101 the Year 2014 states that the restoration of environmental functions that have been polluted by waste is carried out based on the steps that have been regulated. The stage is a cessation of pollution sources and cleaning of pollution elements, remediation, rehabilitation, restoration, and other means following technological and scientific developments.

In the first stage, namely cessation of sources of pollution and cleaning of pollutant elements, a pollution identification process is carried out before the process of cessation of activities begins, both production activities or other activities carried out to eliminate pollution and environmental damage. Termination of an environmental pollution activity is a form of liability for compensation from the polluter for the actions taken by themselves or the legal entity. As for the problem of disposable medical mask waste, which parties need to stop the pollution activity, it does not mean the producer of the masks but the community itself. To stop people from committing acts of pollution, binding and coercive rules are needed, namely the law itself. Currently, the management of single-use medical mask waste has not been included in the binding and coercive regulations. Its management is only in ministerial circulars, where its power is only limited to internal circles. So far, propaganda from environmentalists and observers regarding proper mask management is more reliable, although this method is not enough to force the public to consistently carry out the propaganda.

Next is the remediation stage. This stage is an effort to restore the environment to improve its quality of the environment, which is carried out at least by choosing the right technology for environmental restoration. After choosing the right technology for the problems that occur, the next action is to plan and implement remediation, as well as compile and report the remediation that has been carried out to the minister, governor, and regent or mayor. This remediation effort depends closely on the ability of the polluter in terms of finance. Choosing the right technology comes at a price. Even though technology has developed recently and it is easy for everyone to obtain, in the case of disposable medical mask waste, it is still rare for technology to be able to solve this problem. For now, the Autoclave Gravity Flow Type, which is the technology used to sterilize viruses in medical mask waste, has a pretty fantastic price, which is around 32 million rupiahs to 100 million rupiahs.

After remediation there is a stage of rehabilitation, rehabilitation itself is the restoration of the environment to restore the value, function, and benefits of the environment. The rehabilitation

can be carried out in various ways by considering options that have greater benefits and advantages with minimal losses that can be caused by the environment. The rehabilitation process is carried out by identifying pollution which is then followed by selecting a rehabilitation method, preparing plans, and carrying out rehabilitation, the last is compiling and submitting reports on the results of rehabilitation to the ministers, governors, and regents or mayors.

Next is the restoration stage. In this restoration process, the first action that can be taken is the identification of pollution which is then followed by choosing a restoration method, preparing a plan, and carrying out restoration, until the end by compiling and submitting a report on the results of the restoration to the minister, governor, and regent or mayor. The restoration itself is called ecological restoration, which is the process of helping the recovery of an ecosystem that has previously been degraded, damaged, or destroyed (Harahap, 2016). This restoration is carried out with natural restorations so that the expected values, functions, and environmental benefits can be restored to their original state.

Based on the description above, it can be concluded that the recovery of the management of disposable medical mask waste based on the Environmental Protection and Management Law of The Republic of Indonesia Number 32 the Year 2009, in general, has been regulated in such a way, starting from the first stage to the last stage. As for the effectiveness of recovery based on the Law of The Republic of Indonesia Number 32 the Year 2009, it can only be ensured through the results of the implementation of the law. Because the definition of legal effectiveness itself is a legal ability to create conditions or situations that are desired by law or expected by law (Wartiningsih, 2019). Thus, if we look at the fact that there is still a lot of mass media coverage showing that medical mask waste is a threat to the ecosystem, it can be concluded that environmental restoration in the management of disposable medical mask waste based on the Law of The Republic Indonesia Number 32 the Year 2009 could not be said effective. This sad fact can happen considering that the management of disposable medical mask waste involves many parties. Moreover, if it involves the community in the household sphere, its implementation will require more extra supervision and coercion because society departs from individuals who act according to their own will which is quite difficult to control. In addition, the absence of a lex specialist for environmental recovery due to the waste of disposable medical masks implements the recovery rules in Law of The Republic Indonesia Number 32 the Year 2009 increasingly difficult.

The implementation of disposable medical mask waste management in the community

As described in the discussion above, the management of disposable medical mask waste in the community does not yet have special rules or lex specialists. However, this is not a barrier for the community to be able to manage disposable medical mask waste in environmentally friendly ways while still producing tangible results for environmental recovery. Here are some of the management of disposable medical mask waste that can be done by the community.

1. Separating disposable medical mask waste from other waste

Separating disposable medical mask waste is carried out with the aim that other waste is not contaminated with viruses contained in medical mask waste. In addition, the process of managing medical mask waste is different from other waste management so this separation activity is tantamount to helping the work of workers at the TPA. The separation is done by separating medical mask waste from other waste which is then sprayed or even soaked using disinfectant or chlorine or clothes bleach. After soaking, the mask is torn off to prevent the reuse of medical masks, which according to the rules can only be used once. The next step is to collect the waste of the medical masks in single-use plastics to about three-quarters of plastic. Next, cover the plastic with a goose-neck model and make sure that there is no air remaining in the plastic. The plastic that already contains the mask waste is then lined with a second bag and tied back with a goose-neck model. In this waste collection process, waste does not need to be pressed to make free up space, just make sure that there is no excess air in it. Thus

the process of separating disposable medical mask waste can be carried out by the community in their home respectively.

2. Decontaminating disposable medical mask waste at home

The management of disposable medical masks is quite confusing for the public. The reason is that to manage this waste there is a danger that must be faced, namely the Covid-19 virus which is very likely to be in the waste. Especially for the general public who tries to manage the waste of disposable medical masks, may feel afraid because of the inadequate equipment and virus protection equipment. So, it needs an easy and inexpensive way to implement it. Thanks to researchers at Rice University, decontamination of disposable medical mask waste nowadays can be done using an oven, which is a tool that most people have. The oven temperature used is 70 °C and it only takes five minutes. This method has been supported by the *Lembaga Ilmu Pengetahuan Indonesia* or LIPI so that people no longer need to hesitate to use this decontamination method.

3. Recycling disposable medical mask waste into ecobrick

Ecobricks are the compaction of plastic in such a way into plastic bottles which will later form like bricks that can be used as materials for crafts, such as walls or staging stages. The medical masks used for eco-bricks must pass the sterilization stage first so that the medical masks that enter the plastic bottles are safe from the dangers of viruses and diseases. This idea has been implemented by Diponegoro University students by inviting residents in the Cirebon area to recycle disposable medical mask waste. These students started it through elementary school by utilizing medical mask waste produced by elementary school students.

4. Recycling disposable medical mask waste into plastic seeds

The recycling of disposable medical masks is offered by the *Lembaga Ilmu Pengetahuan Indonesia* or commonly known as LIPI. The idea offered by LIPI begins from LIPI's concern about the waste of existing masks, considering that the medical masks that are widely used by the public are masks made of plastic with a type of polypropylene. If these masks are not managed properly, they will only become waste which will be the same as other types of waste, which is a global problem. For this reason, LIPI contributed its idea in the form of recycling medical mask waste into plastic seeds using sterilization, extrusion, and molding into plastic seeds. The extrusion process itself is the process of making objects with a fixed cross-section where the material is melted by using friction heat from the outside with an extrusion temperature of 170°C. Although it sounds complicated because we have to use tools that are difficult to find in society, the role of the community can still be involved in this idea. This role can be realized simply, for example by sorting ordinary waste with disposable medical masks. Separating the waste makes it easier for workers at the TPA to work. In addition, if society wants to have an active role, LIPI itself is open to accepting parties who want to be involved in this recycling process.

Conclusion

Environmental rehabilitation for managing the disposable household medical mask waste has been regulated in such a way in the Law of The Republic Indonesia Number 32 the Year 2009 concerning Environmental Protection and Management. The recovery is organized into several stages, namely the stage of stopping the source of pollution and cleaning the elements of pollution, the stage of remediation, the stage of rehabilitation, the stage of restoration, and other methods that following the development of technology and science. However, in practice, this rule cannot be said "effective" because the effectiveness of statutory regulation is marked by the implementation of the expectations that are aspired from the formation of the regulation. This fact is marked by a large number of mass media reports on the environmental problems due to the waste of disposable medical masks in the community. This happens because the management of disposable medical mask waste requires the involvement of many parties who synergize with each other. Especially the community in the household sphere where these individuals often act

according to their own will. In addition, the absence of special regulations regarding the management of disposable medical mask waste in the household as an implementing regulation makes the recovery rules contained in Law Number 32 of 2009 increasingly difficult to implement effectively. However, this does not necessarily become a reason to surrender to the situation, the community itself can start managing this medical mask waste at home, for example by separating medical mask waste from other waste, decontaminating medical mask waste, and recycling the disposable medical mask waste.

Acknowledgment

This work was financially supported by the LPPM UPN "Veteran" Jawa Timur, through the Basic Research Scheme (RISDA 2022). Therefore, we are grateful for the funding and support of this research.

References

- Badan Keahlian DPR RI. (2009). *Kajian akademik pelaksanaan Undang-Undang Nomor 32 Tahun 2009*.
 Blora, K. (2009). *Naskah akademis rancangan Undang-Undang tentang Pengelolaan Lingkungan Hidup*.
 Harahap, F. (2016). Restorasi lahan pasca tambang timah di Pulau Bangka. *Jurnal Society*, VI, 61–69.
 Listiningrum, P., Firdaus, R. S., Annamalia, Q., & Mayarana, A. (2021). Optimasi regulasi, fasilitas, dan public awareness penanganan limbah infeksius di masa pandemi covid-19. *Jurnal Pengabdian Hukum Kepada Masyarakat*, 1, 202–219.
 Menteri KLHK. (2021). *Surat edaran tentang pengelolaan limbah B3 dan sampah dari penanganan corona virus disease 19*. pp. 1–5.
 Rokom. (2022). *Transisi pandemi ke endemi: Diperbolehkan tidak memakai masker di ruang publik*.
<https://sehatnegeriku.kemkes.go.id/baca/rilis-media/20220517/0739878/transisi-pandemi-ke-endemi-diperbolehkan-tidak-memakai-masker-di-ruang-terbuka/>
 Susanto, S. R. (2022). Sosialisasi peningkatan kesadaran generasi muda atas bahaya dampak lingkungan sampah masker medis bekas akibat pandemi covid-19. *Pusako: Jurnal Pengabdian Psikologi*, 01(1), 8–15.
 Tay, A. S. (2022). Burung terbelit sampah plastik dan masker medis yang banyak digunakan selama pandemi. *BBC News*.
<https://www.bbc.com/indonesia/articles/c4n9znl9jv>.
 Wartiningsih, M. N. H. &. (2019). Efektivitas penerapan Pasal 66 Undang-Undang Nomor 32 Tahun 2009 terhadap perlindungan aktivis lingkungan. *Simposium Hukum Indonesia*, 1(1), 574–586.
 Widianarko, B., & Hantoro, I. (2018). *Mikroplastik mikroplastik dalam seafood seafood dari Pantai Utara Jaw*. Semarang: Unika Soegijapranata.