The Effectiveness of Plastic Bag Reduction Rules in Banyumas in Supporting *Net Zero Emissions* from an Environmental Fiqh Perspective

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Abstract

Banyumas Regency has successfully managed 82% of the 600 tons of waste produced per day, including 30% plastic waste. Plastic waste is one of the largest sources of carbon emissions that must be addressed immediately. This study examines the effectiveness of implementing plastic bag reduction regulations in Banyumas Regency from an environmental jurisprudence perspective to support the achievement of Net Zero Emissions (NZE) targets. Using a normative-empirical approach, this study examines regulatory documents, interviews with stakeholders, field observations, and thematic analysis. The research focuses on social, legal, and environmental aspects as determinants of regulatory success. The results show that the implementation of the Banyumas Regent Regulation is still hampered by cultural factors, low environmental awareness, and limited supervision. The study also highlights the role of environmental fiqh in providing a moral and ethical foundation that supports the principles of social justice and ecological responsibility. Efforts to strengthen education, provide environmentally friendly alternatives, and consistent supervision and law enforcement are key to the success of supporting NZE in a sustainable manner. This study contributes to the development of environmental policies based on fiqh values and supports sustainable social transformation in the context of climate change. The results of this study are expected to be an important reference for the development of environmental regulations at the regional and national levels.

Keywords: Environmental fiqh, Legal effectiveness, Net zero emissions, Plastic waste

Introduction

Banyumas Regent Regulation Number 14 of 2019 concerning the Reduction of the Use of Plastic and Styrofoam Bags is one of the legal umbrellas for plastic waste management in Banyumas. This regulation is interesting to study, considering that this area is a national pilot related to waste management.(Darmawan, 2025) Banyumas manages waste with an integrated system ranging from household collection to final treatment at Integrated Waste Management Sites (TPST) and landfills that apply environmentally friendly technologies such as non-incinerator pyrolysis to reduce greenhouse gas emissions, especially methane from inorganic waste which is usually more dangerous than carbon dioxide.(Purba, 2022; Sudarman, 2010)

Research in 2023 shows that plastic waste is produced on average around 137 million tons each year, and more than 70 percent ends up as waste.(McGlade et al., 2023) Meanwhile, data from Making Oceans Plastic Free (2017) as quoted by Naurah shows that the average Indonesian uses 182.7 billion plastic bags every year.(Naurah et al., 2024) Even though

Indonesia is seriously committed to achieving the target *Net Zero Emissions* (NZE) in 2060 or sooner, as affirmed in the national roadmap published by the Ministry of Energy and Mineral Resources (EMR). This commitment is part of a low-carbon development and climate change mitigation strategy that integrates a range of innovative technologies and policies.(ESDM, 2021; Rasyada, 2024)

Banyumas was chosen because of the existence of specific plastic bag reduction rules, and its implementation needs to be studied, the potential of existing waste management in supporting nature conservation. In addition, this area has potential and innovations in waste management that are quite advanced, including the processing of plastic waste into valuable products such as plastic seeds and RDF (*Refuse Derived Fuel*). Although the implementation of Banyumas Regent Regulation Number 14 of 2019 is considered less effective, Banyumas Regency has managed to manage more than 82% of waste generation from households and industries. However, the implementation of these policies in the community still faces various obstacles so that its effectiveness is not optimal.(Agrippina & Santoso, 2024; Permana et al., 2023)

Research on plastic bag regulation has been carried out by several authors, one of which was conducted by Yuliyawati who focused her research on consumer perception of paid plastic bag policies. The results of the study show that government policies have not had an impact on reducing plastic waste and recommend the government to replace plastic bags with more environmentally friendly materials.(Yuliyawati & Kamaluddin, 2021) Another study came from Yulyanti which highlighted the restriction of plastic bags in terms of legitimacy *green accounting.* The results of this research show that retail owners comply with government regulations and implement *Green Accounting* However, from the consumer side, it is considered burdensome and ineffective in reducing plastic waste.(Yulyanti & Shauki, 2020) Rahmayani highlighted the control of plastic waste in the city of Semarang which has been complied with by modern store and supermarket managers, but has not been implemented properly by restaurant business actors, restaurants, or food sellers.(Rahmayani & Aminah, 2021) A study on the effectiveness of reducing the use of plastic bags was carried out by Agripina. This research focuses more on the campaign to reduce plastic in Alfamart retail by increasing the price of plastic bags,(Agrippina & Santoso, 2024) However, it does not allude to the problem *Net Zero Emissions* (NZE).

The study of the implementation of environmental fiqh was carried out by Isaac with the results of his research stating that the role of scholars is very necessary to foster public awareness by educating that protecting the environment is part of worship.(Isaac et al., 2024)

The study of plastic waste from the perspective of Islamic law was carried out by Herlina, by relying on the MUI Fatwa Number 41 of 2014 that the handling of plastic waste needs to have legal products that regulate further.(Herlina, 2024) Meanwhile, the study of legal rules related to environmental jurisprudence was carried out by Ramadlan which specifically highlighted plastic waste from mineral water bottles. He concluded that plastic waste management is quite good in the FIAI UII environment, but the reduction of plastic waste has not been implemented.(Ramadlan, 2024)

Meanwhile, a study on NZE opportunities and challenges was written by Aprilianto which emphasized the use of *Variable renewable energy* on the electricity system in Indonesia. This research focuses on the feasibility of the electricity system to achieve the NZE program in Indonesia. According to him, the abundance of new and renewable energy (NRE) materials allows Indonesia to become an NZE country.(Aprilianto & Ariefianto, 2021) Another research titled Eco-Enzyme Innovation in Supporting the Government Towards Net Zero Emission in Indonesia by Yulistiar revealed that one of the ways to achieve NZE is to apply waste processing with Eco-Enzyme innovation, so that organic waste can be broken down into simpler elements that can then be processed effectively and efficiently.(Yulistiar & Manggalou, 2023)

From several studies that have been conducted, the conclusions show that there has been no significant change in reducing the use of single-use plastic bags which results in high plastic waste and can threaten the sustainability of the environment, including threatening human health. Therefore, a review of rules or regulations on plastic reduction from the perspective of environmental jurisprudence is very relevant to support the net zero emission program launched by the Indonesian government.

Methods

The researcher uses normative-empirical legal research methods (*Mix Method*) with a qualitative approach. This approach generates descriptive data in the form of written or spoken words from people and observable behaviors,(Basrowi, 2008) aims to understand the effectiveness of plastic reduction regulations from the perspective of environmental fiqh and its impact in reducing plastic waste towards *Net Zero Emissions*. This behavior can be observed in a tangible and measurable manner as evidence that the community has behaved in accordance with or not in accordance with the provisions of normative law (laws and regulations and other written documents).

The subject of the study includes policymakers of the Banyumas Regent Regulation Number 14 of 2019, in this case the Regional Government, especially the legal department and the Banyumas Regency Environmental Service (DLH). Furthermore, the research conducted in-depth interviews with retail business actors and traditional markets, as well as the plastic bag user community affected by this regulation. The researcher also explored information from scholars or academics in Banyumas who have a deep understanding related to the implementation of Islamic law, especially about environmental fiqh.

The data collection technique in this study uses three main steps to obtain comprehensive information on the implementation and effectiveness of plastic waste management policies. First, interviews to explore the views of various parties related to plastic reduction policies so as to gain in-depth and diverse perspectives. Second, observation to directly observe people's behavior in using plastic bags after the policy is implemented, so that the data obtained is empirical data related to community response. Third, documentation is carried out by collecting data from existing regulations, previous research reports, and other written sources as valid supporting materials in terms of policies and previous studies. The source triangulation approach is applied to ensure the validity and reliability of the data, namely by comparing the results of interviews, observations, and documentation and confirming to the sources the results of the interviews and observations.

Data analysis uses a thematic analysis method with structured steps including data reduction, which is selecting relevant data according to the focus of the research; then categorization, which is grouping data into main themes such as policy effectiveness, community response, and environmental fiqh review; and finally interpretation that connects the findings with the concept of environmental fiqh and *net zero emissions* policy (NZE). This thematic analysis is very suitable for use in qualitative research that examines social phenomena and the interpretation of religious values in the context of the environment. This approach allows the study to systematically interpret the meanings contained in empirical data and literature related to Islamic ecotheology, thus producing relevant and contextual conclusions.

Results

According to data from the Banyumas Environment Agency, this region has around 29 Recycling Centers (PDUs) spread across various regions, with 15 of them located in Purwokerto. Banyumas has a pyrolysis machine with a capacity of 15 cubic meters per hour to process waste into RDF (*solid recovered fuel*), which operates in multiple locations. Waste

treatment is carried out with the support of local technology *Waste to Wealth* which is able to sort waste automatically and produce compost, paving blocks, bricks, plastic seeds, and organic waste pulp as biomass raw materials *Co-firing* which is now collaborating with PLN. This management innovation not only reduces the generation and volume of final waste, but also has a direct impact on reducing pollution in watersheds, coasts, and other public areas, as well as reducing carbon emissions from burning open waste. Through this program, Banyumas was named the district with the best waste management in Southeast Asia in 2023, showcasing a successful model of modern and sustainable waste management that prioritizes community empowerment.(Fadilah, 2025; Ika, 2025)

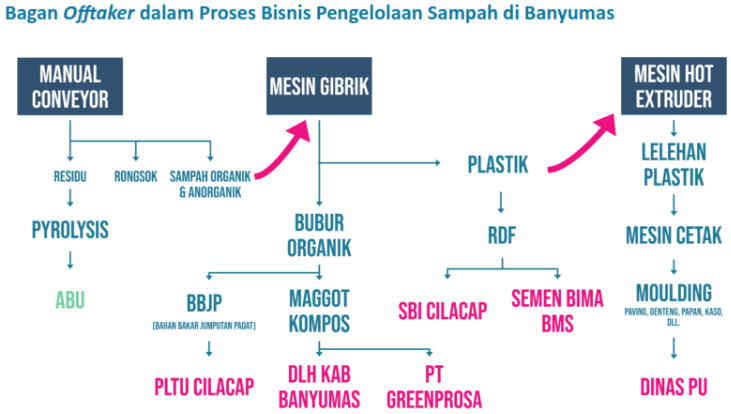

Figure 1. Waste Management Process in Banyumas

Banyumas Regency has effectively implemented Regent Regulation Number 14 of 2019 concerning the Reduction of the Use of Plastic and Styrofoam Bags since March 2, 2022. This regulation regulates the obligation of local governments to conduct inventory, socialization, encourage business actors and the community to use environmentally friendly pockets, as well as supervise and impose sanctions for violators. The locations for the implementation of plastic reduction include shopping centers, hotels, government offices, public facilities, traditional markets, and other business activities that are the main points of plastic bag consumption. Implementation is the implementation of policies to achieve the desired goals,(Ramadhan et al., 2021) In this case, all locations that are the location of policy implementation are expected to no longer use plastic.

Since the enactment of this regulation in Banyumas Regency, there have been positive changes and significant impacts on the environment and society. According to data in 2024, the volume of plastic waste transported to landfills has decreased by around 30-40% compared to before the enactment of the regulation.(Banyumas Communication and Information Agency, 2024; Fitriani & Hadijaya, 2025) Although the volume of waste is not much different from 2023, Banyumas Regency can process around 82 percent of the total waste generation into

substitutions for coal, fuel for making cement, mixing plastic with asphalt for road construction to making plastic block paving.(Abdulrahman, 2024; Duncan, 2025)

Based on an interview with Riza Bachtiar, as a Non-Governmental Group (KSM) Facilitator from the Banyumas Regency Environment Agency (DLH), that waste in Banyumas is processed independently by KSM in 29 Integrated Waste Management Sites (TPST) which acts as the main liaison in the process of segregation and waste processing before being taken to the BLE Landfill (Environment-Based and Education-Based Final Waste Disposal Site). This landfill can process around 60 tons of waste per day and applies the concept of *zero waste to landfill*. The optimal capacity of the BLE landfill is around 75 tons per day.(R. Bachtiar, personal communication, October 24, 2025)

The use of raw materials derived from recycled plastic is able to significantly reduce the volume of waste in Banyumas. Plastic collected from the community and waste management has been successfully recycled into various new products that are useful for daily life while having high economic value. This program is integrated with the circular economy concept that makes waste not just waste, but a valuable resource and opens up new business opportunities for the community through non-governmental groups that manage waste and earn income from the sale of recycled products. This recycling system is also supported by advanced technology such as sorting machines and plastic washing machines at PDU and TPST spread across Banyumas, so that waste processing runs effectively and efficiently and creates jobs while increasing community environmental awareness.

Discussion

Although there are regulations regulating the use of plastic bags, practices in the community, especially in shopping centers and traditional markets, show that these regulations have not been effectively implemented in the community. The existence of plastic bags is still very commonly used, even in places that should be an example of the implementation of environmentally friendly policies such as large retail stores in Purwokerto or traditional main markets as shopping centers. Cultural factors from traders and consumers in buying and selling transactions play a role in the amount of plastic waste produced. In addition to cultural factors, economic and convenience factors also play a role in the effectiveness of the implementation of plastic bag reduction regulations. Merchants and consumers tend to still prioritize convenience and cost efficiency, who often prefer to use plastic bags because they are cheap and practical.

In addition to the convenience factor, the socialization of plastic bag reduction rules is also one of the factors for the ineffective implementation of this regulation. There are still

people who do not know about the rules to reduce the use of plastic shopping bags. For example, one of the restaurant employees around East Purwokerto did not know about the rule.(Yuliyanti, personal communication, October 7, 2025) So did Akbar, one of the street vendors at the event *Car Free Day* (CFD) Jl. Prof. Dr. Suharso, does not know the regulation, he only knows that the restriction of plastic shopping bags is only at Alfamart and Indomaret.(A. Hilmi, personal communication, October 26, 2025) Although in some shopping centers there are still many plastic shopping bags, we also find that retail stores such as Alfamart and Indomaret in the Banyumas area no longer provide plastic shopping bags.

According to Lawrence, the law can run effectively if the legal system can interact well, namely the elements of the legal structure, the substance of the law, and the legal culture run synergistically and are integrated with each other.(Friedman, 2019) Although this regulation has had a positive impact on the community and the environment around Banyumas, if it has not been able to change human behavior into legal behavior, a regulation cannot be said to be effective in its implementation.(Soekanto, 1988) In the framework of legal effectiveness, this situation indicates the weak function of social law as a means of forming collective consciousness.(Nonet & Selznick, 2019; Yudhayana & Aziz, 2024) Various studies confirm that the success of reducing plastic use must be based on the strengthening of clear regulations, continuous monitoring, intensive education, and alternative support such as the provision of affordable eco-friendly bags for all groups.(Fatimah & ST MT PHD, 2023; Hendra et al., 2024; Loemoindong et al., 2024) A combination of clear legal substance, effective oversight systems, and sustainable changes in the legal culture is key to achieving sustainable waste management.

Viewed from the perspective of environmental jurisprudence, the implementation of the Banyumas Regent regulation related to the reduction of the use of plastic and styrofoam provides a strong legal basis for nature conservation and environmental protection, which is in line with the principles of sharia maqasid. Maqasid sharia emphasizes the main purpose of the formation of Islamic law, which not only covers aspects of worship but also the benefit of the ummah in various fields, including the environment.(Mutakin, 2023; Nasution & Bahar, 2024) The principles of maqasid such as *HUFZ al-NAFS* (preserving the soul), *Hifz al-Biah* (maintain the environment), and *Hifz al-Mal* (Maintaining Property) that emphasizes benefits and sustainability, relevant in the context of reducing plastic and Styrofoam waste that can cause pollution or environmental damage. Therefore, environmentally friendly plastic waste management can be seen as part of the implementation of Islamic law in safeguarding the welfare of humans and nature.(Hirsch, 2022; Safrilsyah & Fitriani, 2014) Thus, this policy is a tangible manifestation of the implementation of environmental jurisprudence based on sharia

maqasid, namely maintaining a just, harmonious, and sustainable life through concrete environmental protection.

Although there are already technical rules in the implementation of Perbup Number 14 of 2019, this regulation is not effectively implemented by various sectors affected by these regulations. However, when viewed through the study of environmental fiqh, the Banyumas Regent regulation is part of carrying out the mandate as *Caliph fi al-Ard*, namely the responsibility of humans to protect nature as a mandate from Allah SWT and also carry out the mandate as a caliph in the sense of leadership. From an Islamic perspective, human beings as caliphs on earth have a moral and spiritual obligation to care for and preserve the environment so that it remains healthy and sustainable. As emphasized in the Qur'an Surah al-Baqarah verse 30, the main function of the caliph is to carry out the commands of Allah, manage the earth, and utilize its contents for the benefit of others. Humans were created not only to enjoy but also to be responsible for maintaining harmony between humans and the surrounding nature, so as not to cause damage (*Facade*) on earth. Meanwhile, the mandate of the Regent as a caliph in the sense of a leader requires leadership with integrity, which is able to balance environmental sustainability and the interests of the community in a fair and responsible manner.(Kholil, 2024)

Specifically, the regulation also encourages new economic growth in the Banyumas community through innovative and sustainable waste management. Banyumas Regency has successfully developed a waste management model based on the circular economy and *waste to energy*, such as at the BLE Purwokerto Landfill. Organic waste is processed into compost and animal feed, while inorganic waste is recycled into paving blocks, plastic tiles, and alternative fuels (RDF). This model creates jobs for around 70 non-governmental groups, increases regional revenue from IDR 1 billion in 2021 to a target of IDR 12 billion in 2025, and reduces the burden of waste management budgets from IDR 30 billion to IDR 5 billion per year.(Apriyani, 2025) Thus, this policy not only preserves the environment but also empowers the community's economy in a real and sustainable manner.

So, the success of the Banyumas Regent regulation shows how the mandate as a caliph with integrity can be realized through wise environmental governance while creating new economic opportunities that have a positive impact on the welfare of the community. This is a concrete example of the implementation of Islamic values in governance that is responsive to contemporary environmental and economic issues.

Some of the obstacles in the implementation of plastic bag reduction rules in Banyumas Regency that have been described above, turned out to have a less-than-optimal impact on the

region's contribution to reducing carbon emissions as part of the target *Net Zero Emissions* (NZE). Uncontrolled organic decomposition process in *Landfills* produces greenhouse gas emissions in the form of methane (CH_4) which has 21 times greater global warming potential than carbon dioxide (CO_2).(Purba, 2022; Sudarman, 2010)

The Government of Indonesia is seriously committed to achieving the target *Net Zero Emissions* (NZE) in 2060 or sooner, as affirmed in the national roadmap released by the Ministry of Energy and Mineral Resources (EMR). This commitment is also linked to low-carbon development strategies and climate change mitigation through a variety of innovative technologies and policies.(ESDM, 2021; Rasyada, 2024) Efforts to achieve a balance of carbon emissions between produced and absorbed are not just technical issues, but also involve social, moral, and institutional roles. This means that plastic reduction will not succeed only with strict regulations but also requires a support system and community participation that has high environmental awareness.

The application of technological innovations, data science, and an integrated monitoring system is crucial to effectively monitor waste management and carbon emissions.(Indrayani et al., 2025; Kusumastuti et al., 2025) This allows for the evaluation of the real impact of plastic reduction policies and encourages the accountability of all stakeholders in achieving the NZE targets. Thus, the integration of regulatory, social, moral, technological, and institutional aspects is the key to the success of plastic reduction while supporting the achievement of *Net Zero Emissions* in Banyumas and Indonesia at large.

The Banyumas government has taken several initiatives to reduce the use of plastic bags by issuing a Regent Regulation, but the impact is still limited because it does not cover all levels of society and the informal sector. The limited scope of regulations in reaching all levels of society, especially the informal sector, shows the need to strengthen support systems and increase the participation of people who have high environmental awareness so that the success of this regulation can be optimal.

Conclusion

The implementation of Regent Regulation Number 14 of 2019 has provided a legal basis and a normative basis in reducing the use of plastic and styrofoam bags in Banyumas, in line with the principles of environmental jurisprudence that emphasizes nature conservation and the benefit of the people. However, the effectiveness of the implementation of this regulation is still limited, especially in reaching all levels of society, including traditional markets and the informal sector which still dominantly use single-use plastics.

In terms of environmental jurisprudence, this regulation is a form of implementation of sharia maqasid, especially the principle *of hifz al-bi'ah* (environmental maintenance) which must be maintained for the common good. However, without social and moral support from all elements of society and the strengthening of implementing institutions, the implementation of regulations is difficult to achieve maximum results.

The government needs to increase the intensity of education and socialization comprehensively to all levels of society, especially in traditional markets and the informal sector. Educational programs should be designed to be relevant to the needs of the community and educate about the impact of plastic use on the environment and carbon emissions as well as the benefits of using environmentally friendly products. This can be done through small units at the village level or through a cultural approach that involves religious leaders and community leaders participating in campaigning to reduce the use of plastic packaging, to reduce the burden on the government and the Environment Agency which has limited employees.

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