

The impact of environmental management on the growth of the bottled water industry in Indonesia (Case study: sales of disposable gallons)

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Abstract:

Purpose: This study aims to analyze the impact of environmental management on the growth of the bottled drinking water industry (AMDK) in Indonesia, focusing on the consequences of single-use gallon sales. The bottled water industry in Indonesia has grown significantly due to the high demand for safe and practical drinking water, especially in areas with limited access to clean piped water. However, the use of plastic gallons, whether refillable or disposable, poses serious environmental and health concerns.

Method: This research uses a qualitative method with normative juridical, sociological juridical, and analytical juridical approaches. Secondary data were obtained from various literature, while primary data were collected through interviews with communities around Bantargebang landfill, Bekasi.

Results: The findings indicate that refillable plastic gallons have a higher risk of releasing microplastics into drinking water due to repeated use, while disposable gallons contribute significantly to plastic waste accumulation, often not being recycled properly. The study also reveals that strict regulations and public education on recycling, as practiced in countries like Japan and Germany, are essential for effective plastic waste management.

Implementation: The implementation of BPOM's safety standards, including limits on Bisphenol-A (BPA) migration, is crucial to mitigating health risks. To balance industry growth and environmental sustainability, recommendations include improving environmental management practices, promoting consumer awareness, and enhancing recycling initiatives. The study provides a comprehensive view of the environmental and health impacts of using plastic gallons in the AMDK industry and suggests policy and practical measures to address these challenges.

Keywords: Bottled Water Industry, Environmental Management, Health, Plastic Waste, Recycling, Impacts

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1. Introduction

The phenomenon of using plastic gallons in drinking water distribution in Indonesia has grown rapidly along with the increasing need for safe and practical drinking water. Bottled water has become an important part of daily life, especially in areas with limited access to clean piped water. According to data from the Food and Drug Administration (BPOM), bottled water production reached 21 billion litres per year in 2021, with only about 20-60% of the population having access to safe piped water

(Environmental Impact Journal, 2021). The high consumption of bottled water is due to the inability of the piped system to meet the clean water needs of the entire population.

The majority of bottled water is packaged in refillable or disposable plastic gallons. Polycarbonate plastic gallons, which are widely used, have raised concerns due to the potential release of harmful substances such as Bisphenol-A (BPA) into drinking water. This has fuelled concerns among consumers and governments about long-term health impacts (Zulys, 2021). The use of disposable gallons, although considered more hygienic as they are not reused, also poses serious environmental concerns. The Indonesian Waste Management Association (APSI) notes that disposable gallons are often not recycled properly, adding to the burden of plastic waste in landfills such as Bantar Gebang in Bekasi (Indonesia, 2021).

This research aims to find out, what is the impact of using refillable plastic gallons on consumer health, focusing on the potential release of Bisphenol-A (BPA) and microplastics into consumed drinking water. What is the environmental impact of using single-use plastic gallons compared to refillable plastic gallons? Evaluate the amount of plastic waste generated and the difficulty in recycling. What is the consumer perception towards the use of single-use plastic gallons versus refillable plastic gallons? Analysis of changes in consumer behaviour and preferences towards bottled water products. How effective are existing regulations in reducing the negative impacts of using plastic gallons on health and the environment? Study of the implementation and enforcement of BPOM regulations as well as international standards such as those implemented by the FDA. What efforts can be made by government and industry to increase consumer awareness and recycling practices of plastic gallons? Policy recommendations and public education strategies on plastic waste management. How can best practices from other countries in managing plastic waste be applied in Indonesia?

With these questions, the research aims to provide a comprehensive picture of the impact of using plastic gallons in the bottled water industry in Indonesia, both in terms of health, environment, as well as regulation and consumer awareness.

2. Literature Review

2.1 Definition of Waste

Waste is defined as the residue of a business and/or activity that can become an environmental pollutant, as per Law No. 23 Year 1997. This definition emphasizes that waste results from human activities and has the potential to pollute the environment if not managed properly. (karmana, 2007; Susilowarno, 2021) describe waste as the residue or by-product of processes that can become pollutants in the environment, including industrial, transportation, and household activities. Improper waste management can lead to pollution, disrupting environmental comfort and health (Khong & Huynh, 2022).

2.2 Environmental Impact of Plastics

The use of single-use plastics, such as disposable drinking water gallons, poses significant environmental challenges. Plastic is a material that is highly resistant to decomposition, leading to waste accumulation that damages ecosystems. Microplastics, tiny plastic particles resulting from the degradation of larger plastic items, can enter the food chain and impact animal and human health. According to a report by the (Forums, 2021), only 9% of the 9 billion tonnes of plastic produced globally has been recycled, with the remainder taking hundreds of years to decompose fully. The large presence of degraded microplastics in the environment poses severe risks to both ecosystems and human health.

Microplastics have been found in various environmental compartments, including oceans, rivers, and soil, and have been detected in a wide range of organisms, from plankton to large marine animals. Their persistence and ubiquity make them a significant environmental hazard. Studies have shown that microplastics can absorb toxic substances, which may then be released into the organisms that ingest them, potentially causing harm (Forum, 2021).

2.3 Regulations and Standards

Strict regulations and standards are crucial to ensure the safe use of plastics, especially in products that come into direct contact with food and beverages. In the United States, the Food and Drug Administration (FDA) enforces stringent safety standards for plastic materials used in food packaging, including drinking water gallons. These standards cover various aspects such as Identity Standards, Quality Standards, and Current Good Manufacturing Practices (CGMP). Compliance with these regulations ensures that the materials used do not pose health risks to consumers (FDA, 2021). In Indonesia, the Food and Drug Administration (BPOM) sets a maximum limit for the migration of Bisphenol-A (BPA) from plastic packaging into food. BPA is a chemical commonly used in producing polycarbonate plastics and epoxy resins, and its migration into food products has raised health concerns. According to Boubacar and Bans-Akutey (2023), the maximum permitted migration limit for BPA is 0.6 bpj (600 micrograms/kg). This regulation aims to mitigate the health risks associated with BPA consumption, including its potential endocrine-disrupting effects (Boubacar & Bans-Akutey, 2023).

2.4 Best Practices and International Comparisons

Countries like Japan and Germany provide exemplary models of effective waste management practices that could be adapted in Indonesia. Japan has implemented comprehensive waste segregation systems and rigorous recycling programs. Japanese regulations mandate the separation of waste into categories such as burnable, non-burnable, and recyclable materials. This system has significantly reduced the volume of waste sent to landfills and promoted higher recycling rates (Mappau & Islam, 2022).

Germany employs a circular economy approach, where products and materials are kept in use for as long as possible through reuse, repair, and recycling. The German Packaging Act requires producers to take responsibility for the entire lifecycle of their packaging, from production to disposal. This law has led to the development of efficient recycling systems and reduced the environmental impact of plastic waste (Simoens & Leipold, 2021).

2.5 Health Impacts of Plastic Waste

The health impacts of plastic waste, particularly from substances like BPA, are well-documented. BPA exposure has been linked to various health issues, including hormonal disruptions, reproductive problems, and increased risk of certain cancers. Studies have shown that BPA can leach into food and beverages from plastic containers, particularly when they are heated or damaged (Yang, Man, Wong, Owen, & Chow, 2022).

Microplastics also pose a significant health risk as they can carry toxic chemicals and pathogens. Ingesting microplastics has been associated with inflammatory responses, cellular damage, and potential disruptions to the gut microbiome. The pervasive nature of microplastics in the environment means that they can enter the human body through various pathways, including food, water, and air (Tiwari, Lecka, Pulicharla, & Brar, 2023).

Effective waste management and strict regulatory standards are essential to mitigate the environmental and health impacts of plastic waste. Countries with robust recycling systems and comprehensive waste management policies, such as Japan and Germany, offer valuable lessons for Indonesia. By adopting similar practices and enhancing public awareness, Indonesia can improve its waste management outcomes and reduce the negative impacts of plastic waste on the environment and public health.

3. Research Methodology

This research uses a qualitative method with normative juridical, sociological juridical, and analytical juridical approaches. Secondary data was obtained from various literatures and literature studies, while primary data was collected through interviews with communities around Bantargebang landfill, Bekasi. The research also involved analyses of government regulations and plastic waste management initiatives by the AMDK industry.

4. Results and Discussion

This study found that the use of plastic gallons, both refillable and disposable, has significant impacts on the environment and health. Pros and Cons of Disposable Gallons. The use of disposable gallons made from PET is considered easier to recycle and can produce economically valuable products such as raw materials for pillows. However, these recycling claims often go unrealised, adding to the waste burden in landfills such as Bantar Gebang (Greenpeace Indonesia, 2021). Many people do not realise that while disposable gallons have recycling potential, the reality is that only a small percentage are actually recycled.

Environmental Impact, disposable gallons add to the waste load in landfills. The non-biodegradable plastic creates odour and pollution for the surrounding community. Refillable plastic gallons have a higher risk of microplastic decay than single-use gallons (Zulys, 2021). According to research, the microplastic content of refillable gallons is higher than that of single-use gallons, which is due to repeated use that causes the decay of plastic particles into drinking water (Khan & Hossain, 2021).

International Regulations and Best Practices, Japan and Germany demonstrate that good waste management can be achieved through strict regulations and public education on recycling. Japan manages waste well through classification and recycling systems, while Germany uses closed-cycle management laws to reduce plastic waste (Mappau & Islam, 2022). In Japan, the government managed to reduce plastic waste by educating schools and providing separate bins for organic and non-organic waste.

Social and Economic Impacts, the use of single-use plastic gallons can lead to a change in consumer behaviour that has become accustomed to refillable gallons. This results in a drastic increase in the national plastic waste volume. Consumers who have become accustomed to refillable gallons may feel disrupted by this change, resulting in resistance to the new product (Indonesia, 2021).

Product Safety Standards, BPOM has set a safety standard for plastic gallon products with a maximum limit of BPA migration. However, there are still many products in the market that do not meet this standard, causing health risks to consumers. BPOM's findings show that 34% of plastic gallon samples tested contained BPA in excess of the set safety limit (Pathiraja, Karunaratne, Hewage, & Jayawardena, 2021). This step is important to protect consumers from the long-term health hazards associated with BPA.

5. Conclusion

This study shows that the use of plastic gallons, both refillable and disposable, has a significant impact on the environment and public health. The use of single-use gallons, while more hygienic, adds to the burden of plastic waste that is difficult to degrade. Strict regulations and good waste management practices are needed to reduce these negative impacts. Government and industry must work together to raise consumer awareness and promote effective recycling practices.

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