UI Zero Plastic as an action towards sustainable campus

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Abstract. Plastic waste has become a globalized environmental issue. Indonesia became the second-largest producer of plastic waste after China based on a report from the World Economy Forum. Waste management and individual awareness of environmental issues are challenges for Indonesia. The more individuals who move, the more waste generation will result from these activities. University of Indonesia (UI) as an educational institution has more than 50,000 academic people/year and has diverse activities. UI produced 663,984 kg of plastic waste in 2018. UI was responsible for the production of plastic waste generated as a form of effort towards sustainable universities. Efforts to increase awareness of environmental issues by conducting socialization related to the UI Zero Plastic Program in the campus environment to leaders at UI, students, employees, canteen tenants, and during major events at UI such as UI graduation and the beginning of new student activities. Based on the socialization of the UI Zero Plastic Program that has been implemented, there has been a decrease in the generation of plastic waste from 2018 to 2019. UI Rector's Decree regarding the UI Zero Plastic Program as a reference in the socialization and implementation of the UI Zero Plastic in the campus environment.

1. Introduction

Increasing population, rapid economic growth, rapid urbanization, and increasing living standards of the community have increased waste production especially in developing countries that do not yet have good waste management [1]. Globally, natural resources consumed reach 120-130 billion tons annually and produce solid waste of around 3.4 to 4 billion tons [2]. A total of 2.5 billion of waste was generated by 6.4 billion people living in 192 coastal countries (93% of the global population) in 2010 including Indonesia [3].

The problem of waste is a global issue including plastic waste. In 2016, globally, plastic production was 335 million tons and most (39.9% in Europe) was used for packaging [4]. Plastic waste that is not well managed and entered the sea is estimated at 4.8 to 12.7 million MT in 2010. Indonesia became the
second largest producer of plastic waste after China, followed by the Philippines, Vietnam and Sri Lanka [3]. Plastic waste has the potential to cause damage to natural ecosystems and pose a threat to human health, while contributing directly to climate change. This happens because of the irreversible nature of plastic and low degradation [5]. Though majority of consumers are aware of the harmful of plastic to environment but a considerably large portion of consumers are still not giving up the practice or habitual of using plastic bags. This habitual is highly related to the consumer mindset and behavior [6]. Many efforts have been made to reduce the production of plastic waste in various countries, one of which is Canada, which has committed to recycle at least 50% of recycled products in its products in 2030 and the ban on the use of disposable plastics in 2021 [7]. Plastic waste in Indonesia is also a serious threat and challenge given the waste management system that still needs to be improved. Some regions in Indonesia, especially the capital city of Jakarta, have also tried to deal with the problem of plastic waste by banning the use of disposable plastic and issuing regulations made by the Governor of the Jakarta Special Capital Region Province regarding the obligation to use environmentally friendly shopping bags at department stores, supermarkets and people's markets. The problem of plastic waste requires support from various sectors in order to provide solutions to problems.

Universitas Indonesia (UI) as the education sector, has the responsibility to provide solutions to every problem through various academic disciplines. The number of UI academicians who are not small and the various activities carried out will result in not too little waste. In 2018, UI produced 663,984 kg of plastic waste. The university and the academic community must be responsible for the waste generated from each activity towards sustainable universities. Therefore, it is necessary to make an effort to increase the awareness of academicians towards reducing the use of disposable plastic to support the creation of a sustainable campus.

2. Theory

Based on Presidential Regulation of the Republic of Indonesia Number 83 Year 2018 regarding Handling of Sea Waste, what is meant by plastic waste is waste that contains polymers [8]. Plastic waste can also be interpreted as the rest of human daily activities in the form of solid and is a macromolecule formed by polymerization of organic compounds that are not easily rot, containing various elements such as carbon, hydrogen, oxygen, nitrogen, chlorine, and sulfur which can pollute the environment [9]. Plastic is widely used for packaging purposes (39.9% in Europe) [4], and is estimated to produce packaging waste volumes of 420 million tons [2]. According to study, food waste often contains 27% plastic packaging and this is a challenge during composting [10]. Plastic waste that is not managed properly will cause a significant increase in plastic waste have an impact on public health and environmental problems [11]. Examples are increased loads at landfills, increased emissions of toxic emissions to the environment, and polluting marine ecosystems [2]. Unmanaged waste enters the ocean through the flow of wastewater, wind or tides [3].

The problem of plastic waste has become a global issue, including Indonesia. In Indonesia, some efforts have been made to reduce the use of disposable plastic packaging. For example, in December 2019, DKI Jakarta had ratified Governor Regulation number 142 of 2019 concerning the obligation to use environmentally friendly shopping bags. Some areas in Jakarta, especially in shopping centers or convenience stores, have implemented the regulation. This is in line with the University of Indonesia, which has ratified Rector's Regulation No. 4 of 2019 concerning the Zero Plastic Program in the UI Environment.

To change people's behavior is not easy. However, there are several ways you can do to reduce the use of disposable plastic.

- Make regulations regarding reducing the use of plastic in daily activities together with a team of experts who have been appointed.
- Implement the concept of Zero Waste with 3 R (Reduce, Reuse, Recycle) [2].
- Improve the waste management system.
- Replacing disposable plastic packaging with alternative materials [5].
- Socialization and education to the academics related to raising awareness to reduce the use of disposable plastic in daily activities [5,12].
- Provides facilities to support programs to reduce the use of disposable plastic packaging.

3. Methods
Waste generation data is obtained from the Directorate of Maintenance and Management of Facilities and Waste Management Units in the period 2018 to 2019. The data is seen to compare between before and after the implementation of the UI Zero Plastic Program. The UI Zero Plastic program aims to increase UI academics awareness related to environmental issues particularly in plastic waste and also support efforts towards sustainable campus.

The activities of this program are to socialize the UI Zero Plastic Program to the leaders of the Faculty, UI academics, and canteen tenants as well as at several major events at UI such as at graduation events and new student activities. This aims to increase the academic community's awareness on environmental issues such as reducing the use of disposable plastic packaging in daily activities [5].

4. Results
Data on plastic waste obtained from July 2018 to July 2019, can be seen in figure 1.

![Graph showing plastic waste generation from July 2018 to July 2019](image)

**Figure 1.** Data on plastic waste from July 2018 to July 2019.

Figure 1 shows the data on the volume of plastic waste generation from July 2018 to July 2019. The largest volume of plastic waste generation reached 86,000 kg in August 2018. Meanwhile, the smallest volume of garbage generated reached 27,000 kg in November 2018.

5. Discussion
Environmental issues and their management efforts are increasingly complex and cover a broad range of aspects, coupled with an extremely low level of individual awareness regarding environmental issues. Environmental issues, especially regarding plastic waste has become a global problem so it must be addressed in a global context as well. Universities as educational institutions must be environmentally responsible and play an effective role in education [13]. University of Indonesia, with a total number of students and educators of almost 50,000 people with many activities carried out, will produce a lot of waste. In 2018 the average plastic waste at UI reaches around 663,000 kg of course this is a challenge and must make efforts to reduce plastic waste.
Reducing the use of plastic in daily activities has many benefits for the environment. Many countries have also taken actions to reduce or even prohibit the use of disposable plastic, such as Canada, New Zealand, United States, and United Kingdom. However, the ban on the use of plastic must also consider its impact on public health. In several studies show that, the prohibition of the use of plastic will also have an impact on public health because some plastic is used for medical equipment and packaging for food. It is not necessary to prohibit the use of disposable plastics because some also require food packaging, but they must consider other alternatives to substituting plastic packaging that are eco-friendly [5].

At the production level, the use of plastic can be reduced by using alternatives such as using glass, recycling, or using biodegradable materials [5]. The application of waste management is based on the concept of zero waste by making 3R efforts (Reduce, Reuse, Recycle). The concept of zero waste has been applied in several countries such as South Africa, New Zealand, and California [2]. Increasing 5% recycling plastic packaging will reduce by 7% the potential for global warming [5].

Most of the piles of garbage that enter the environment are caused by waste that is not managed properly. In 2015, approximately 6300 metric tons (Mt) of plastic waste were produced, around 9% had been recycled, 12% was incinerated, and 79% was accumulated in landfills or in the natural environment [14]. Sixteen out of 20 producers are developing countries, where economic growth may be good but the waste management infrastructure is bad. It is estimated that a country without improvement in waste management infrastructure will cause an increase in the total amount of plastic waste entering the ocean by 2025. An integrated waste management system and infrastructure improvements are needed to support the community implementing a reduction in the use of plastic in daily activities [3].

The existence of government regulations to reduce or prohibit the use of disposable plastic will be the basis for determining a program. Strategies that can be implemented to reduce plastic waste include market-based instruments (e.g., levies on single-use plastic bags) for reducing waste and regulations that impose a ban on single-use plastic bags [12,15,16]. Many countries in the world, especially in Europe, have successfully implemented a ban on the use of disposable plastics [16]. Other regulations to reduce single-use plastic include a ban on the use of plastic straws and plastic bottles [15]. Introduction of the ‘Zero Waste’ program in South Australia led to a plastic bag ban in October 2008, reducing an estimated 400 million bags per year [16].

The University of Indonesia has issued a regulation regarding the Zero Plastic Program in the campus environment. This program is an effort to reduce the use of disposable plastics in daily activities on campus. This program is implemented through an approach or outreach to the UI academic community to reduce the use of disposable plastic. Increasing the awareness of the UI academic community on environmental impacts is a long-term strategy to reduce the use of plastic [5]. Awareness raising and behavior change through environmental education in educational institutions will be an effective way to mitigate plastic waste [12].

Sustainable campus must meet three basic requirements, namely facilities, operations, and education [13]. Education is a powerful way to reduce plastic waste [5]. Various activities have been carried out by UI to reduce plastic waste including education at various major events at UI such as graduations and new student activities. Of course this must be done by every element of the campus and continuously. Educate students about plastic waste issue is very important as it will help in increasing their awareness to take steps in waste management at universities.

Effort to increase student awareness can be done through awareness campaign that can change their attitudes and perceptions of environmental issues [17,18]. On the other hand, using social media is also important to educate people and make it easier to deliver messages [19]. Even more, generation Y and Z having more pro-environmental mind set due to factors such as exposure to technology and higher literacy, hence they are more supportive to pro-environmental programs [6].

By making efforts to make UI regulation regarding the Zero Plastic Program in the campus environment and forming a team of experts from various Faculties, conducting socialization and education on environmental issues especially plastic waste at the Faculty and at various events can reduce the volume of plastic waste from 2018 to 2019. Certainly this is an achievement but also a new
challenge for the University to continue to educate the academic community and provide various facilities to support this program.

6. Conclusion
The Zero Plastic program has been implemented at the University of Indonesia and has succeeded in reducing plastic waste in 2018-2019. This shows that the awareness of the civitas UI on environmental issues, especially plastic waste, has increased. This is evidenced by the many activities at UI that have reduced the use of disposable plastic and replaced with other alternatives such as using glasses and plates when serving drinks and food at meetings, and using other alternative materials to wrap foods such as banana leaves and paper. In addition, many UI members have brought their own tumblers or food containers when there are activities.

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