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Plastic Waste and Pollution: An Evidence-Based review to Support WUP Policy Formation

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Abstract— *Plastic pollution is a real issue that damages the environment, animals, and humans. This research synthesizes literature from around the world to identify plastic waste issues and solutions that can help Wesleyan University Philippines (WUP) develop more effective plastic policies. The review examined over 30 studies and concluded that plastic waste increases due to inefficient waste management, the use of single-use plastics, and a lack of awareness. The Philippines is among the leading nations that contribute to plastic waste in the ocean. Effective solutions involve prohibiting single-use plastics, recycling, substituting with biodegradable products, and raising awareness to break people's habits. From the study, it is evident that plastic pollution requires collaboration between governments, businesses, communities, and schools. For WUP, this involves measures such as eliminating single-use plastics on campus, promoting reusable products, segregating waste, and educating students on plastic pollution. Through these actions, WUP can assist in safeguarding the environment and emerging as a model in combating plastic waste.*

Keywords— ***Evidence-based review, plastic waste, plastic pollution, policy formation, Wesleyan University-Philippines***

I. INTRODUCTION

Plastic waste is perhaps one of the largest issues today (Kibria et al.,2023). Plastic by the tons is disposed of every year in oceans, rivers, landfills, and streets. Plastic, since it takes hundreds of years to degrade, does damage to the environment over such a long period of time and harms both human beings and animals (Ormsby, Woodford & Quilliam, 2024).

This issue keeps increasing because of ignorance and poor waste management. Plastics are discarded irresponsibly in most areas, burnt openly, or used once and subsequently discarded. This results in pollution, flooding due to blocked drainage, and health issues for communities (South, 2014; Mohd Rosman et al., 2020).

To assist in addressing this problem, researchers at Wesleyan University Philippines conducted an extensive review of literature and data on plastic and waste pollution (Walker & Fequet, 2023; Kumar et al., 2021). They wished to know the severity of the issue and propose how it could be addressed better in schools, communities, and government.

The review established that plastic waste management is not simply a matter of cleaning up, but also requires clear regulations, improved systems, and the participation of all schools, such as Wesleyan University Philippines. Individuals, particularly students, must be informed, and policymakers must develop and implement policies to decrease plastic consumption and enhance waste management. Despite individuals' knowledge that plastic waste is bad for them, action is still none. This research was done to summarize previous studies and make specific recommendations to assist in policy-making and solutions to minimize plastic and waste issues in our society.

II. METHODOLOGY

This research used a Literature Review research design. A literature review is a qualitative research method that involves collecting, analyzing, summarizing, and synthesizing existing studies related to a specific topic. It

helps researchers identify patterns, trends, contradictions, and gaps in current knowledge, guiding future research directions and policy recommendations. According to Snyder (2019), literature reviews are crucial for building theoretical frameworks and supporting evidence-based decision-making in both academic and applied fields. In this research, the authors review over 30 existing studies from different countries to identify patterns and trends in plastic problems and solutions to guide WUP policy makers in crafting a better plastic pollution control policy. This study covers the Academic Year 2024-2025.

III. RESULTS AND DISCUSSION

The researchers behind these studies examined different aspects of the plastic pollution problem. Chen and his team (2021) focused on Malaysia, explaining how the country struggles with growing plastic waste, particularly due to its extensive imports of plastic from other regions. Heidbreder and colleagues (2019) studied people's behavior and found that even when people know plastic is harmful, they often still use it out of habit or convenience. Situmorang and team (2020) showed that students who study environmental science tend to have better habits when it comes to using less plastic, which shows how important education is.

Other researchers looked at the effects of plastic pollution on nature and health. Muñoz-Pérez and team (2023) studied the Galápagos Islands and found that many animals were getting hurt or dying from plastic waste. Kurtela and Antolović (2019) also warned about tiny plastic pieces, called microplastics, getting into fish and possibly into our food. On the science side, Millican & Agarwal (2021) and Narancic & O'Connor (2019) talked about better ways to make and break down plastics, like using biodegradable materials. Finally, Leal Filho and his team (2019) suggested that companies should take more responsibility for the plastic waste they create. All these researchers agree that solving plastic pollution will take action from governments, businesses, and everyday people.

Part 1: The Existence and Utilization of Plastics

Over the past 100 years, the development of plastics has changed modern life. Because they are strong, durable, flexible, and cheap, plastics are used in many industries like packaging, construction, farming, medicine, electronics, and transportation (Millican & Agarwal, 2021). For example, during the COVID-19 pandemic, plastics were essential in making protective gear and medical tools (de Sousa, 2021). However, the same features that make plastics useful, like being long-lasting and lightweight, also make them hard to break down in the environment.

As the world's population and consumption increase, the use of plastics, especially single-use plastics, has also grown. In Malaysia, plastic waste has risen alongside economic growth and changes in consumer habits. Since 2017, Malaysia has become the largest importer of plastic waste, putting more pressure on its waste management system (Chen et al., 2021). Even though the country uses landfills, recycling, and incineration, it still faces problems such as limited facilities, weak policies, and low public participation in recycling.

Cutting down the use of plastic isn't merely about new materials and technologies. Human behavior, social practices, and convenience are also very much part of the reasons why plastic continues to be used. Heidbreder et al. (2019) discovered that even if individuals are aware that plastic is bad, they will still use it out of convenience or habit. Therefore, cutting down on plastic use takes both government regulations and modifications in human behavior.

Education and awareness can help. Situmorang et al. (2020) found that students studying environmental science were more likely to reuse bags and avoid plastic packaging than others. This shows that better environmental education can change behavior, but it needs to be widespread and supported by proper systems and incentives. Also, while biodegradable plastics are promising, they need the right recycling or composting facilities to truly reduce pollution (Narancic & O'Connor, 2019). Overall, solving the plastic problem needs a complete approach involving smart product design, responsible consumer behavior, strong waste systems, and teamwork among different sectors.

Part 2: The Problems Due to Plastic Pollution

Even though plastics are useful, they also cause serious problems for nature, human health, and waste systems. One major issue is how plastic ends up in the oceans. Rivers carry about 1.25 to 2.41 million tons of plastic into the sea each year (Kurtela & Antolović, 2019). This harms marine animals through entanglement, eating plastic, and damaging their habitats. Small plastic pieces, called microplastics, are especially dangerous because tiny sea creatures eat them, and they move up the food chain, possibly affecting humans too.

Even remote and protected areas like the Galápagos Islands are now affected by plastic pollution. Researchers found plastic waste in all coastal areas and in 52 species, including rare reptiles, mammals, and sea animals (Muñoz-Pérez et al., 2023). Some species like sea turtles, iguanas, and whale sharks are most at risk from getting tangled in plastic, while others are harmed by eating it. This shows that plastic pollution is a global problem that reaches even the most untouched places.

Plastic pollution is also a danger to human health and society. Microplastics in seafood might expose people to harmful chemicals, although scientists are still studying the full effects (Kurtela & Antolović, 2019). In poorer countries, plastic waste clogs drainage systems, causes floods, and worsens living conditions. The problem is made worse by weak waste systems, low recycling rates, and poor planning. In Malaysia, for example, imported plastic waste and poor local systems make it even harder to manage (Chen et al., 2021).

One possible solution is a policy called Extended Producer Responsibility (EPR), which makes companies responsible for the waste from their products. Leal Filho et al. (2019) believe EPR can lead to better product design and more recycling. However, for EPR to work, it needs strong laws, support from industries, and public involvement. Without big changes, the environmental, health, and social problems caused by plastic will keep getting worse.

Part 3. Plastic Pollution in the Philippines

The Philippines has a serious plastic pollution problem, especially in its oceans. It is one of the top countries contributing to both large and small plastic waste in the sea, releasing about 0.75 million metric tons of unmanaged plastic each year (World Bank Group, 2021). Although the government has made some rules to control this, there isn't enough research to fully understand where the plastic comes from and how it affects the environment (Galarpe, Jaraula, & Paler, 2021; Abueg, 2019). This lack of data makes it hard to create strong and effective solutions.

The issue is made worse by poverty and poor waste systems. Many people use cheap plastic sachets because they are affordable, which adds to the waste problem (Ramos, 2023). About 70% of Filipinos don't have access to proper waste disposal, so a lot of plastic ends up in rivers and then the ocean. In fact, 7 of the world's 10 most plastic-polluted rivers are in the Philippines (Ramos, 2023). This shows the problem starts on land, with bad waste management.

Plastic pollution harms the country's marine life, including coral reefs that support fish and local livelihoods (Ramos, 2023). It also increases coral disease and puts microplastics into the food chain, affecting fish and possibly human health (Ramos, 2023; Omeyer et al., 2022). This is not just a problem in the Philippines. Many Southeast Asian countries face similar issues due to weak laws and poor coordination (Garcia, Fang, & Lin, 2019). While there are some local efforts, most are not enough to solve the problem at a national level.

Overall, plastic pollution in the Philippines is caused by a mix of poverty, poor waste systems, limited research, and weak enforcement of laws. To fix it, the country needs better cooperation among the government, scientists, communities, and industries, plus stronger policies based on good data (Garcia, Fang, & Lin, 2019; Omeyer et al., 2022). Without these changes, the Philippines will remain one of the top contributors to ocean plastic waste.

Part 4. Solutions to Plastic Problems: Policies and the Role of Wesleyan University Philippines

Many countries have made laws to fight plastic pollution. These include banning single-use plastics, adding taxes on plastic bags, and making companies responsible for their waste (Nikiema & Asiedu, 2022). The European Union encourages better recycling, while China has banned plastic waste imports to reduce pollution (Palm et al., 2022; Miao et al., 2021). These actions show that strong laws and major changes in plastic use are needed to solve the problem.

Technology also helps reduce plastic waste. Some new materials, like biodegradable plastics, can break down naturally, but they are not yet widely used (Filiciotto & Rothenberg, 2021). Recycling and turning plastic into fuel are also helpful solutions (Miao et al., 2021). However, these methods only work well if governments provide funding, create good policies, and build the needed facilities (Nikiema & Asiedu, 2022).

Communities are also instrumental. In Uganda, Indonesia, and the United States, residents collect plastic litter and trace it back to where it originates (Owens et al., 2023). In the Philippines, most of the plastic in mangroves originates from surrounding communities (Paler et al., 2022). This indicates that education at the community level and improved local waste management play an important role in preventing plastic pollution.

These beneficial practices could be implemented at Wesleyan University Philippines (WUP). WUP may install waste separation bins, promote the use of reusable items, forbid single-use plastics, and work with recyclers. These efforts can be led by departments and organizations. Additionally, WUP can run awareness campaigns and provide incentives for eco-friendly behavior (Borongan & Naranong, 2022). WUP can thus serve as a model for reducing plastic waste and protecting the environment for future generations (Paler et al., 2022).

IV. CONCLUSION

Plastics are helpful in many aspects of our existence, including packaging, health care, and technology. Yet, their longevity and strength also cause dire problems for the environment and people's health. In Malaysia and the Philippines, among others, plastic trash is growing exponentially because of poor waste facilities and poorly enforced laws. Plastics find their way into rivers and oceans, poisoning animals and humans. This issue is too large for

technology by itself to address. It requires assistance from the government, companies, schools, and communities.

Wesleyan University Philippines (WUP) can be a part of the solution. By prohibiting single-use plastics, encouraging recycling, and educating students about the issue, WUP can contribute to plastic waste reduction on campus and in the community. Other nations and cities have demonstrated that success is based on firm regulations, collaboration, and sound planning. If WUP takes action now, it can be an example for other schools in the Philippines and can save the planet for generations to come.

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