

Environmental Security and Plastic Waste Pollution

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This research aims to analyse the pollution of plastic waste that poses a threat to environmental security and alternative conflict resolution that can be carried out by various actors. Researchers also tried to address the response of international actors, both countries and international organisations to the pollution of plastic waste. The concept used in this research is environmental security as a non-traditional security concept that develops both as a concept and issue in International Relations and the concept of conflict resolution as a theoretical effort to provide alternatives for solving problems for pollution arising from plastic waste. Researchers interpret and analyse data using a qualitative research perspective. Plastic is the most widely used material in human life. However, along with its development, the use of plastic is considered too excessive. Plastics are much in demand by the public as well as manufacturers because the price is cheaper, easily formed and durable. However, increasing plastic production every year is considered a long-term threat to humans and can cause global conflicts. Responding to the issue of environmental security threats, international organisations such as the United Nations have declared war on plastic waste that damages the environment. Based on the results of data analysis, researchers found that the problem of plastic waste has entered the problem of environmental security threats globally so that solutions are needed involving a variety of actors, both state and organisational actors.

Windy Dermawan, Akim, Christian Vieri, Pangersaning Gusti Bayu Alam. Environmental Security and Plastic Waste Pollution. *Central European Journal of International and Security Studies* 13, no. 4: 191-207.

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Keywords: environmental security, conflict resolution, country, international organisation, plastic waste.

CEJISS
4/2019

In the past few decades, plastic is the most widely used material in human life. Plastics themselves are a synthetic polymer that has light-weight and long-lasting characteristics. This characteristic makes the demand for plastics very high from countries in the world. This has led to rapid growth in plastic production globally. Recorded since 1950 until now, annual global production of plastic has increased from 5 million tons to around 300 million tons. At first, there are few individual or industry that use plastic. But, nowadays almost all the industry use plastic as complement for their products. (Hammer, Kraak and Parsons 2012)

The application of plastic material itself is divided into two, namely: 1) long-term use; and 2) short-term usage. Long-term use of plastic applications is used for the manufacturing of electronic goods, transportation, and construction. Meanwhile, short-term use of plastic applications is used for packaging goods, and is usually only one-time use, or commonly referred to as single-use plastic. About 60 percent of plastic production globally is used for packaging that is only disposable. This of course makes a lot of plastic waste that is created every day. In fact, the time needed by plastic waste to decompose is not short-lived, both in the soil and in the ocean. In addition, the content of toxins contained in plastic can threaten environmental stability (Hammer, Kraak and Parsons 2012).

Regarding plastic waste pollution, a journal article entitled “*Plastic Waste Input from Land into the Ocean*”, published in 2015 (Jambeck, et al. 2015), has raised the urgency of the large amount of plastic waste that has reached the ocean. This article focuses more on the research on plastic waste that does not undergo management first, this is referred to as plastic-waste leakage in the journal article. The journal article also mentions the results of his research on 20 countries as the world’s largest producer of plastic with poor management of plastic waste. As many as 16 of the 20 countries are developing countries, where economic and industrial growth in the country is quite high, but infrastructure in waste management is still inadequate (Jambeck, et al. 2015).

Referring to these matters, the author realise s that the problem of plastic waste can cause potential conflicts both intranational and international. The most obvious conflict occurs between countries that

have good plastic waste management and countries that have poor management of plastic waste. This is because plastic waste produced by each country will merge with each other in the ocean, considering that the oceans are connected to each other.

The topics about plastic waste pollution have been discussed in various previous journals. In several international news and reports such as National Geographic (Parker 2018) and World Wide Fund (WWF 2018), many have been reported the dangers and threats regarding the problem of plastic waste that is currently happening. On the other hands, researchers begins to discuss this issue on their journal, such as 'The Challenges of Measuring Plastic Pollution' (Boucher and Billard 2019), 'Plastic pollution of world's seas and oceans as a contemporary challenge in ocean governance' (Haward 2018), and "Plastic Waste Input from Land into the Ocean", published in 2015 (Jambeck, et al. 2015), they categorised plastic waste pollution is a new challenge in future global security. Several previous journals discussed about plastic waste in several regions of the world, one of example is in the journal 'Marine Plastic Pollution in Asia' (Garcia and Fang 2019) which focuses on discussing the problem of plastic waste in Asia. Moreover, some several journals begin to find the most suitable solution according this issue, that are 'Solutions and Integrated Strategies for the Plastic Pollution' (Prata, et al. 2019), 'Governance Solutions to the Tragedy of Commons Plastic' (Vince and Hardesty 2018), and 'Solutions for Global Marine Litter Pollution' (Lohr, Savelli and Beunen 2017), which mainly focuses only on governance solutions according this problem.

It does not rule out the possibility that the impact of pollution of plastic waste produced by countries that have poor management of plastic waste will also be felt by other countries. The interconnection of the oceans within this planet makes threats from plastic waste a global threat. Through this article, the author intends to convey the importance of national policies from each country towards the management of plastic waste. Even so, the threat to plastic waste pollution cannot be overcome only through the national policies of each country, but also requires global cooperation between countries to mutually commit to reducing the production of plastic waste.

Research Method

In this research, the author uses qualitative methods, because researchers want to explore a phenomenon regarding the threat of environ-

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mental security from the emergence of plastic waste pollution. From this issue, researchers try to understand the potential for conflicts arising from environmental security and find alternative solutions to a possible conflict. Within this paper, the author discusses the potential threat of conflict that can be caused by plastic waste pollution. This is caused by an imbalance between the use of plastic and good plastic waste management in several parts of the world. Hence, the author tries to offer seven approaches on conflict resolution theory as a solution to the problem of plastic waste pollution. The author uses 'shift its priority' and 'compromises' among countries in the world as a solution for this problem.

Collection of data was done through documentation studies from various source of literature, both news, journals, books, magazines, and other sources relevant to the issues. Analysis of data is carried out after data collection, starts from data reduction to select data relevant to research, display data through narration and images, and draw conclusions. As a validity of this journal, researchers triangulate data from various sources to obtain valid data.

Theoretical Framework

The first concept used is the concept of environmental security that comes from the concept of global security. Around the 20th century, a new concept emerged in security, namely environmental security. Environmental security is still paying attention to human and state conditions such as the concept of national security, but focuses more on the discussion of human conflict with the environment (Thappa 2015). Environmental security sees that environment can be categorised as source of the problem for itself or can be solution (catalyst) for the problem. Environment is used as a barrier in human life. One of the international communities or organisations that are given the mandate to help maintain environmental security is Global Environment Facility (GEF) which serves to maintain the stability of the existing environment (Facility 2012).

Environment and humans are considered to be inter-connected. Environmental problems are generally caused by actions taken by humans, while on the other hand one of the threats felt by humans is caused by damage to the environment itself. Humans in this concept can be categorised as victims of environmental damage or causes of environmental damage (inter-actions) (Facility 2012). Environmental

security makes the ecosystem the main object to be protected. Where many experts consider that the ecosystem in the environment should not be disturbed so as not to cause environmental damage. Environmental security seeks to maintain the environment in order to continue. Ecosystems must avoid human actions that damage the existence of the ecosystem. Environmental security also pays attention to both human anthropology and natural natural conditions (Brauch 2005). A prosperous life is considered a necessity for countries to have.

Environmental security experts try to categorize the causes of environmental problems into six things called environmental stress, namely: (1) Air - Climate change, (2) Land, (3) Water, (4) Human Population, (5) Population System, and (6) Regional Systems. Each point has a different impact on each other. However, environmental security focuses on the social and economic impacts felt by humans or the state of the problem. Where socially, these problems can cause illness or death caused by a damaged environment, there are economically able to hinder the economic growth of the region due to the damage to the environment. At a certain point, the state has an obligation to overcome these environmental threats. The state is considered to have to issue decisions based on the country's national political process (interaction between state, society and economy). The response issued by the government itself must be in line with the main goal of the concept of environmental security, namely to create a prosperous condition for its people (Brauch 2005).

The second concept used is the concept of conflict and conflict resolution which is used as an analysis material for this article. The conflict caused by the problem of pollution of plastic waste itself is only in the form of a potential threat of conflict that is of a long-term nature and the impact it has caused cannot be felt significantly. This makes the lack of attention given by countries in the world. In theory of conflict resolution, there are seven ways of resolution offered by the theory. Looking at the seven conflict resolution paths in the theory, the path or step that is felt most appropriate to overcome the threat of plastic garbage pollution conflict is that each country begins to shift its priorities. Countries must begin to care about the environment and make the environment one of the priorities to be discussed and applied in their national interests. The priority of the country which is basically in the economic aspect, should be done while taking into account

the impact on environmental stability. In addition, one other step offered in overcoming the threat of conflict is plastic waste pollution, a compromise or middle ground. Where the state continues to produce plastic in bulk which is accompanied by a better plastic waste treatment system. (Jambeck, et al. 2015)

Discussion

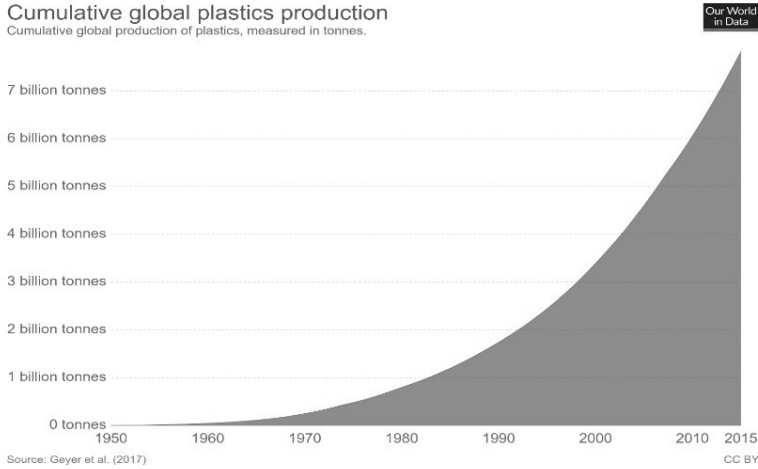
Plastic Usage Today

Plastics are now a material that is widely used by the global community and is considered valuable because it has many uses and is easy to produce. Plastics have flexible properties that are easily formed into many items and can last a long time making plastic very useful for human life every day. However, humans become addicted to the use of plastic which has a negative impact on the environment. Plastic production is very excessive because of the high demand of the community. Based on the data, one million plastic drinking bottles are traded every minute, while 500 trillion disposable plastic bags are used by the public every year. Nearly 50% of the total production of plastic is designed for use only once and this is what damages the environment (Roland Geyer 2015).

Plastics have actually developed since the days of the ancient kingdom, but their use is still limited. During World War II, the demand for plastic was increasing because copper, aluminum and iron were very expensive for military needs. Plastic is considered a substitute material for some equipment because the price is more affordable. The use of plastic then increases rapidly at that time until the plastic is then used as manufacturing material.

Even after World War II, plastics were still needed by entrepreneurs to maintain their business. The price of cheap plastic and its disposable nature make the demand of the community increases every year. The peak was in 1979 plastic production in the United States exceeded the production of steel and other mining materials. We can conclude indirectly that the era of the plastic industry began during World War II (Roland Geyer 2015).

Figure 1. Cumulative global plastic production, 1950 – 2015



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Plastics are produced from the conversion of natural materials or synthetic materials from oil, natural gas and coal. Once converted, plastic can then be easily formed according to the needs of the consumer. The plastic itself was only marketed globally in the 1950s. It can be seen from the table above about global plastic production that there is an annual increase in the global cumulative amount of plastic production. The increase in global production of plastic between 1950 and 2015 alone shows that every year there is an increase of 9% every year. From 1950 to 1970 the production of plastic was still produced in small quantities so that the waste can still be processed properly (Roland Geyer 2015).

From 1970 to 1980, the use of plastic was still below the figure of 1 billion tons. This amount can still be controlled. Over time there has been an increase due to the discovery of new types of plastic that are cheaper and stronger. In 1990, the amount of plastic production increased 3x over the past 20 years. This started to become a problem because plastic material is difficult to decompose (Jambeck, et al. 2015).

Then, in the period 2000 to 2010 there was a drastic increase where initially plastic production in 2000 was only 3 billion tons to 7 billion tons in 10 years. Plastics are being used more frequently by the community so that producers make large-scale production. Although plastic production has declined by 15 million tons in 2008 due to the global economic crisis, plastic production has increased again in 2009 after the economic recovery. In 2015 alone, cumulative plastic production

touched 7.8 billion tons (Roland Geyer 2015). This is tantamount to that one person in the world produces more than one ton of plastic.

Currently, the consumption of plastic per capita itself continues to increase to 150 to 250 kg/year. The biggest increase itself occurred in Western Europe and North America. If growth continues, plastic consumption is predicted to increase to 300 kg per capita by 2020. There is a rapid growth potential of developing countries in Asia, such as in Southeast Asia (Nations 2015). Asian countries whose population continues to grow each year are alleged to be the reason for the use of plastic in Asian countries will also increase. In addition, the emergence of new European countries whose economies are increasing is also predicted to increase the plastic consumption of these countries (Roland Geyer 2015).

The results of the study noted that more than 8.3 billion tons of plastic was produced and a total of 60% of the plastic waste ended up in land or the natural environment. In addition, 99% of plastic production has a mixture of chemicals that cannot be renewed so it is dangerous if used too often (Kiener 2010). If the trend of plastic consumption continues, then in 2050 it is estimated that the plastic industry will spend more than 20% of the world's oil reserves. The main problem in increasing plastic production is processing that is not commensurate with the plastic produced. In addition, another problem is the use of single-use plastics that are increasingly global. Disposable plastic tends to be more difficult to process and if it has been used it has almost no function. Plastics themselves are closely related to human life after the emergence of the plastic industry which produced various types of plastic.

Connection between Using Plastics and Environmental Safety

Plastic waste pollution originating from every country in the world causes various impacts that have threatened global environmental stability. The long-term impact of plastic waste pollution can be water, air, or soil pollution. This is due to the toxic content contained in the plastic structure, so that it can reduce or even kill the environmental fertility it contaminates. Meanwhile, the short-term impact of plastic waste pollution is in the form of clogged rivers, due to improper disposal of plastic waste.

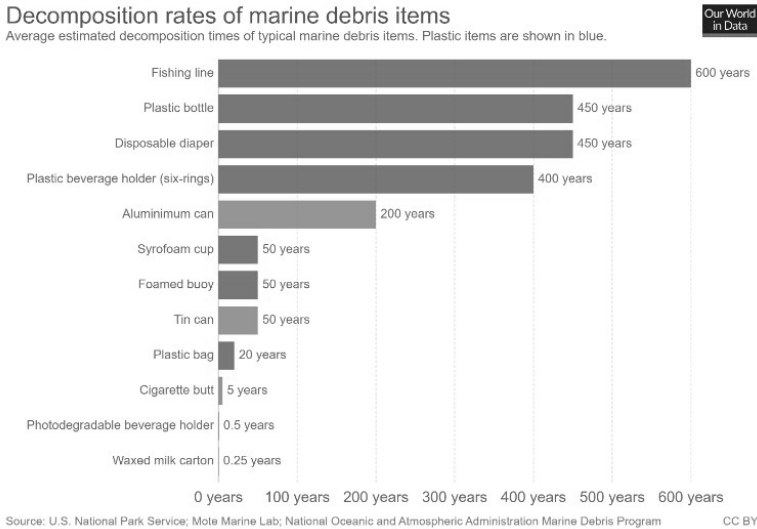
The biggest production of plastic waste comes from the use of plastic used by individuals, where plastic is usually used for packaging

items that are only disposable. Most of the waste production from the use of disposable plastics does not experience waste management first. Recorded there are about 12 million metric tons of plastic added to the oceans every year (Ritchie and Roser 2018). It is estimated that by 2050, there will be more plastic waste than fish that occupy the ocean

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The use of disposable plastic creates an imbalance between the time the process of using plastic and the processing time required by the plastic to do the decomposition. It takes at least 20 to 600 years for a plastic to completely decompose, depending on the type of plastic (Table 2). Pollution of plastic waste scattered on the beach and the ocean will then disrupt the stability of the environment, especially the oceans (Ritchie and Roser 2018).

Figure 2. The rate of decomposition of various types of plastic



A study conducted in an opinion journal shows that plastic waste pollution can have an impact on biodiversity, ecosystems, food security, and even human health. Small particles of the plastic polymer structure, which are often referred to as microplastic, will seep into the aquatic ecosystem and be carried into the ocean. This will cause microplastic content in various seafoods and kitchen salt consumed by humans. Not only that, plastic waste scattered in the ocean can also trap various marine animals, such as sea turtles and seahorses, and pose a fatal threat to the survival of these animals (Borelle, et al. 2017).

It is noted that in India, an estimated 20 cows die per day due to swallowing plastic, so that the digestive system is blocked. This is similar to what happens to whales, dolphins, and turtles in the ocean, where they cannot distinguish between plastic and food. As for Africa, plastic waste pollution clogs the flow of water and increases the population of malaria mosquitoes, so that malaria outbreaks in Africa experience a significant increase (Kiener, 2010).

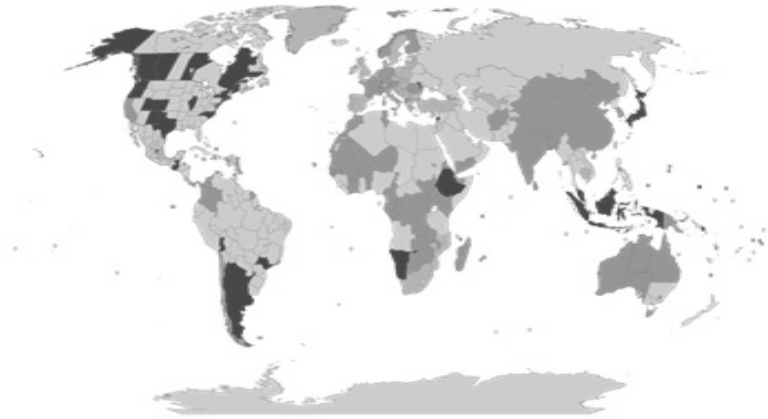
As for the challenges, namely that plastic waste pollution is not limited by national boundaries. This is because pollution of plastic waste can move through the flow of water, namely the oceans that are connected to each other, air, and sedimentation of the soil. Therefore, the threat of plastic waste pollution must be eradicated through global actions, which can be started from the national policy of each country in advance on the use of plastic and plastic waste management.

Country Actor Response

The global threat regarding plastic waste pollution has caused different responses from each country in the world. Even so, it was noted that in 2019, many countries had begun to include environmental issues in their national interests. One of them is about the steps to reduce the use of plastic. There are some of the most popular methods for reducing plastic waste pollution, namely by prohibiting its use or providing additional costs for every use of plastic. This method is more commonly known as ban and charges (Table 3). According to research conducted in economic journals, the additional costs incurred for each use of plastic bags can reduce the use of plastic bags by 40% from normal usage. This shows that the method of charges or additional costs is an effective method to reduce the use of plastic waste, especially the use of plastic waste that is only disposable (Homonoff, 2018).

As for the reality, there were still many countries that are the largest producers of plastic in the world with poor management of plastic waste. The five countries that occupy that order, namely: 1) China; 2) Indonesia; 3) Philippines; 4) Vietnam; and 5) Sri Lanka (Kibria 2017). This is due to the large number of people in the country, lack of plastic waste management technology, lack of policies regarding the use of plastic. The tire and charges method itself is usually only applied to certain parts of the country. This makes the two methods considered still not able to reduce the use of plastic in total. Even so, there

Figure 3. Reducing the use of plastic through the ban and charges method by countries in the world



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■ Countries that use the ban method

■ Countries that use the charges method

■ Countries that use the voluntary cost agreement method

■ Countries that use part of the ban method & part of charges methods

are several countries that have placed environmental issues as one of the main priorities in their national interests. These national interests then turn into policies that can also be applied to other countries. One example of a country that prioritises environmental issues, especially the problem of plastic waste pollution, in its national policy, is namely Canada. Canada realise s that plastic waste pollution which mostly pollutes the ocean is a global threat. The plastic waste pollution cannot be limited by the national boundaries of a country, because the oceans are interconnected with one another. Seeing this, Canada, Kenya and Japan form a policy called 'Blue Economy'. This policy is made to preserve the waters. Where economic activities carried out by a country must continue to pay attention to the environment, namely the waters and the ocean. The 'Blue Economy' policy which is then promoted by Canada to other countries, invites countries in the world to manage plastic waste pollution. This can be done through ways to improve the technology of plastic pollution waste management and reduce the use of plastic (United Nations Development Programs 2018).

Different national interests from each country on environmental issues, especially plastic waste pollution, can pose a potential threat of conflict. For some countries, environmental issues have not become a top priority that must be in their national interests. This is of course because many of the countries prioritise the economic sector compared to the environmental sector. The economic sector is considered to be more profitable to then increase national development of a country. This often happens in developing countries. Meanwhile, for developed countries whose economies are already stable, environmental issues are a top priority for them. This is because they are aware of the global threat to plastic waste pollution. To overcome the potential threat of conflict between countries that have not prioritised environmental issues with countries that have prioritised environmental issues into their national interests, the authors offer several conflict resolution that can be used.

First, the conflict resolution that the authors offer is to 'shift the priorities' of each party. Where, each party must understand each other what is the national need of their country. Proposed recommendations to reduce the loss of microplastics to the environment during production, consumption, and disposal (i.e., mismanagement), organised by their priority, include: 1) short-term measures; 2) mid-term measures; and 3) long-term measures. Short-term measure is through regulation of production and consumption of plastic usage, which is bans or taxes. On middle-term measure, countries should prioritizing recycling followed by feedstock and waste-to-energy that allows recovery of valuable chemical and energy; landfills should only be used in waste produced in the previous processes. Furthermore, countries should using renewable energy during collection of waste and recycling to reduce the environmental impacts of recycled plastics for long-term measures.

Secondly, the conflict resolution that the authors offer is to find a middle ground or compromise with the threat of plastic waste pollution. This can be done through cooperation in the field of plastic waste management technology. With the actions taken through a joint alliance, it is expected to reduce the potential threat of conflict against plastic waste pollution. The countries that have a good waste management technology, like Germany and Austria, should cooperate with those countries that do not have a good waste management technology. Each country must be aware that the threat of plastic waste pollu-

tion has become a global threat that requires a collective cooperation of all countries.

International Organisational Response

The threat of plastic pollution which is getting worse every year also gets responses from several international organisations. Plastic waste pollution not only damages the environment but plastic can also injure and kill living things. Action is needed globally to combat this plastic problem. Some countries have implemented policies to regulate the amount of plastic production. However, plastic not only affects the country but the world is globally affected. Action is needed from international organisations such as the United Nations (UN) to reduce the danger of plastic.

One of the efforts made by the United Nations is to create an international organisation that coordinates activities related to nature. In addition, the organisation is used as a forum for state aspirations and regulations that regulate the environment. The organisation is the United Nations Environment Program (UNEP) which was founded in 1972. The main objective of the establishment of UNEP was to promote collective cooperative relations between countries regarding environmental concerns through programs prepared by UNEP. Every country, especially UN member states must take part in resolving the environmental crisis caused by plastic production. With the existence of global cooperation, plastic problems can be handled well.

UNEP annually conducts global monitoring and research on the environment both globally and regionally. The results of the research were then made into regulations and recommended to governments. UNEP is a facilitator to increase environmental awareness and enhance sustainable development that is safe for the global environment. The applied environmental security must be sustainable, so that it is not only safeguarding the security of the community, but still paying attention to the continuity of the successor's future.

One of the global solutions made by the United Nations is to create a sustainable program called the Sustainable Development Goals (SDG). The program was run for 15 years with the aim of encouraging developing countries to have the same capabilities as developed countries. The program collaborates with other international organisations, one of which is UNEP. Where at point 13 on SDG's is about the climate action. Many countries have begun to fight plastic problems after the

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involvement of countries in international organisations. Indonesia is a good example of these countries at the marine convention where 70% of the plastic waste produced by the state was reduced. The State itself currently does not have anything sort of a strong law, which regulates the problem of own plastic production.

In addition to the United Nations and UNEP, there are also non-governmental international organisations, namely World Wide Fund for Nature (WWF), which also has an interest in overcoming plastic environmental problems. The organisation moves to address environmental and animal problems. The environmental crisis caused by plastic is considered to be damaging to the environment because of the material from plastic that is difficult to decompose. Also based on the data, more than 60% of plastic waste ends on land and sea (Nature, 2015). In general, plastic waste is disposed of in rivers and oceans without being processed first. The garbage tends to contain chemicals from the factory. This can endanger the survival of living creatures that accidentally consume the plastic waste.

Based on data from WWF, 8 million plastic wastes are discharged into the sea by European countries and 7 million plastic wastes are in the form of plastic bottles. Another fact, one in two sea turtles has eaten plastic and more than 90% of marine fish have plastic in their bodies (Nature, 2015). WWF then created a campaign on the dangers of plastic waste for animals, especially marine animals. In addition to WWF, there are also Greenpeace international organisations engaged in the environment. This organisation often protests about regulations carried out by plastic producers that damage the environment. International organisations such as WWF and Greenpeace are trying to encourage each country to fight the plastic crisis that is damaging the environment. Every country must participate in order to resolve this environmental problem.

Conclusion

The phenomenon of the use of plastic has now occurred globally in almost all parts of the world. Plastics that are cheaper make the material the main choice of the community. However, plastic production which is increasing every year indirectly affects the amount of waste produced. Plastics that have difficult properties to decompose and contain chemicals make the waste produced is considered a long-term threat to the environment or other living things. This is considered to

disturb the economy of the community. While plastic waste that ends up in the sea is more difficult to decipher and usually can injure living things in the sea. The environmental threat generated by the problem of plastic waste pollution itself cannot be felt at this time. Plastic waste pollution is still in the potential threat stage, because both the community and the state consider that the environment can still improve itself without human intervention. Though plastic waste pollution is a long-term threat that works like a time bomb, the effects of this problem can only be felt after several years. The problem of plastic itself was that it has the potential to disrupt the stability of the environment of a region. The large amount of plastic waste can damage the ecosystem in the environment.

However, the problem of plastic waste pollution is considered not a problem of individual countries but a global threat that requires collective cooperation of all countries. This paper offers resolution conflict for plastic waste pollution through 'shifts its priority' and 'compromises' countries in the world as a solution for this problem. The state must begin to shift their priorities to be more concerned about the environment as one of the important points to maintain. The country is currently considered to be less concerned about plastic production so that it tends to be a lot of countries, especially developing countries that produce excessive plastics but plastic waste cannot be processed properly.

Furthermore, the author sees the need for global governance that can regulate these sovereign countries. International organisations such as the United Nations (UN) are considered as enforcers who can bridge countries to cooperate and collaborate to overcome these environmental problems. The UN in 1972 established the United Nations Environmental Program (UNEP) as a forum for aspirations to increase environmental awareness of member countries. In addition to UNEP, there is also the United Nations Development Program (UNDP) which has developed a long-term plan for the Sustainable Development Program (SDG) to address existing problems in the world. One of the points of the plan is to address environmental issues, where the program encourages developing countries to be more concerned about environmental issues. Not only does the UN care about the environment, some non-governmental organisations such as the World Wide Fund for Nature continue to campaign on the problem of plastic waste pollution which damages the environment and kills living things, es-

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pecially in the waters. Many fish and sea turtles die from plastic waste that disrupts the ecosystem in these living areas. In addition, there are Greenpeace organisations that are engaged in the environment. This organisation often holds protests to fight for the environment. Many private companies and factories are considered to be producing too much plastic, which is damaging the environment.

In order to provide a change, collective cooperation is needed as a solution to solve this problem of plastic waste pollution. The first solution is to increase environmental awareness, especially regarding the amount of plastic production. Neither countries nor international organisations, and even individuals can also give contribution according this problem. Individuals can also overcome this problem by doing simple things on their daily lifes, like brings own tumblr instead buy a plastic-bottled water or use a paper bag instead of a plastic bag in the supermarket. Since individual is the actor that directly related on plastic usage and production, individual should be more aware of the danger of plastic waste. As the concentration of plastic in the oceans stabilize, clean-up activities can remove plastic in the environment, send them to waste management, and help ecosystems to recover from plastic pollution. Therefore, all of the actors must be able to work together overcome this problem, because global problems require global action as well.



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