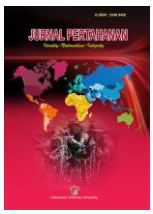
Jurnal Pertahanan

Media Informasi tentang Kajian dan Strategi Pertahanan
yang Mengedepankan *Identity*, *Nationalism* dan *Integrity*
e-ISSN: 2549-9459
http://jurnal.idu.ac.id/index.php/DefenseJournal



PROTECTING LIFE BELOW WATER: LESSONS LEARNED FROM JAKARTA AND BALI

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Article Info

Article history:
Received 27 June 2020
Revised 20 July 2020
Accepted 9 August 2020

Keywords:
Environmental Protection,
Life Below Water,
Marine Pollution,
Maritime Security

Abstract

As the Millennium Development Goals (MDGs) ended, the United Nations followed them up with 17 Sustainable Development Goals (SDGs). One of the goals, Life Below Water, is very strategic to Indonesia given its position as the biggest maritime archipelagic nation in the world. However, Indonesia's life below water faces threats as pollutants from human activities end up in the sea. Using Structural Human Ecology (SHE) theory, this article discusses the issue using cases in Jakarta and Bali and how the two provinces have dealt with the problem. Employing the qualitative method through document analyses, this study found that the two provinces have used different approaches in solving the problem. While Jakarta has its law regarding the issue, Bali has more progressive law in curbing the disposal of waste, especially plastic, to the river leading to the sea. Law enforcement and education have become the keys to ensuring that industrial and domestic actors to stop irresponsible disposal of waste.

DOI:
http://dx.doi.org/10.33172/jp.v6i2.856

INTRODUCTION

Upon the conclusion of the Millennium Development Goals (MDGs) in 2015, the members of the United Nations approved a

Figure 1: Sustainable Development Goals
Source: United Nations, 2016a

newer blueprint called Sustainable Development Goals (SDGs) that set the target and indicators to be included in the members' development policies in the next 15 years (Ford, 2015). The new blueprint was designed after MDG implementation was evaluated. The evaluation showed that people demanded that the UN create a succeeding agenda, which was later called SDGs (United Nations Development Programme, 2016)

Based on the "Transforming Our World: The 2030 Agenda for Sustainable Development (A/Res/70/1)" document, the United Nations (United Nations, 2016b) described the 17 goals in detail and provided directions for the UN members to achieve them. The document further emphasized how serious the goals were set as the efforts are not merely achieving the goals, but also determining the measures of successes by referring to the provided time frame, which is 15 years, starting 2015.

The 17 goals in SDGs address a range of social, economic, and environmental issues such as poverty, gender quality, economic growth, education, and concerns about life inland and below water (see Fig. 1). These goals are essential because the world population has grown to be near eight billion living in 196 countries. Goujon stated that the concern for the future is not on the number of people, but on how the people will respond to challenges in the future as natural resources are decreasing and the human population grows (Goujon, 2019). As this being the case, SDGs were set to preserve human well-being and entire environmental and natural resources.

Of the 17 SDGs, Goal No. 14, Life below Water, has become one of the most important issues to address. The goal is defined as the efforts to conserve, and sustainably use of oceans, seas, and marine resources for sustainable development (Galatsidas, 2015; UN, 2020), which means that oceans, seas, and marine resources are utilized and developed sustainably (Ford, 2015).

The Goal No. 14 has several targets keywords and key phrases, namely minimizing impacts of ocean acidification, enhancing sustainability and conservation of oceans, called *The Future We Want* (United Nations, 2012), protecting coastal ecosystems, reducing marine pollution, regulated fishery, maintaining cooperation under the United Nations Convention on the Law of the Sea (UNCLOS), and increasing the economic benefits for

developed countries (Galatsidas, 2015). Those keywords and key phrases can be summarized in Figure 2, as follows:

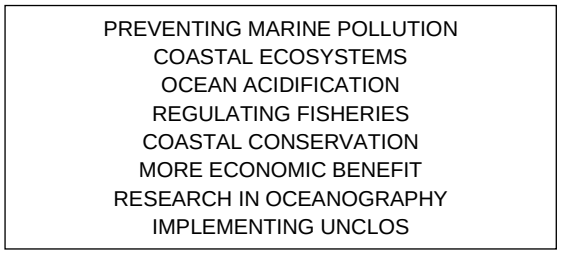

Figure 2. Target focus on SDGs No.14 Life Below Water
Source: United Nations, 2012

SDG No. 14 is extremely relevant to Indonesia as the country is an archipelago and has more water territory than land. The decreasing quality of the marine environment has resulted in potential security problems in Indonesia, especially due to pollution to marine life in several regions in Indonesia. The security problems include, among others, threats to food security, the livelihood of coastal people, environmental resilience, and current and future marine life.

The government of Indonesia has paid attention to the dangers caused by pollutants to the maritime environment. This is explicitly mentioned in the National Medium Term Development Plan 2015-2019, in which the government has focused on, among others, strengthening the efforts to monitor and control pollutants, mitigating river pollution through structural and non-structural measures, managing household liquid pollution, and reducing the pollution in coastal and maritime regions (Badan Pengawas Nasional, 2015). This is further highlighted in the narrative of the Medium Term Development Plan 2020-2023, in which, based on the evaluation, the performance to control plastic and industrial waste need to be improved, especially the sea pollution due to plastic waste which reaches about 1,29 million per year (Kementerian PPN/ Bappenas, 2019). The narrative also emphasizes the need to control the pollution and destruction of coastal and marine areas.

As the marine pollution has become an issue that continues to attract attention from the government and people, this article aims to analyze the management of water and sea pollution in Indonesian urban and rural areas, especially Jakarta and Bali and its affects to maritime security as the issue has already been incorporated in the central government's plan. This article also aims to provide insights on how those two provinces regulate the pollutants that threaten sustainable marine life and marine resources.

LITERATURE REVIEW

As marine pollution can directly affect maritime security, this article starts by discussing the concept of maritime security. According to Bueger, no definite meaning is assigned to the concept of maritime security as it depends on the view of the actors who often tend to describe the threats on maritime more than to give a fixed definition. Bueger further explained that maritime security relates to the marine environment, economic development, national security, and human security (Bueger, 2015).

According to the United Nations, failure to provide one or all the threat resolution would result in maritime insecurity. These threats are described in the 2008 United Nations Secretary General's Report on Ocean and Law of the Sea (United Nations, 2009). Those threats and resolutions include piracy and armed robbery, smuggling and terrorist acts against ships at the sea, illicit trafficking of narcotics and weapon, illegal, unreported, unregulated (IUU) fishing, intentional and unlawful damage to the marine environment, and organized crime at sea. Furthermore, one of the highlighted threats to maritime security is the threat to marine resources (Poerwowidagdo, 2015)

The threats to maritime security do not only affect the economic sector, but also

humanity in general, especially the intentional and unlawful damage to the marine environment. If it is not solved, the threats to maritime security might affect the efforts to achieve SDGs. The evaluation of the implementation of SDGs in the first period of its implementation shows that pollutants coming from land and marine debris have threatened the coastal habitats (United Nations, 2019). Further several studies have reported the impact of pollution on the marine environment (Derraik, 2002; Todd, Ong, & Chou, 2010). Nevertheless, the UN is still optimistic that we can improve water quality (United Nations, 2019).

The marine environment quality highly depends on land environment quality because the pollutants flow from rivers are the products of social and economic activities such as industrial discharging wastewater (inland and coastal Industry), small to medium industry discharge, and domestic activity using detergents. This, too, aligns with the relationship between ocean and ocean economy concept. Park and Kildow (Park & Kildow, 2015) defined ocean economy as the economic activity which has input and output to the oceans. The following Figure 3 can help see the relationship between land and ocean from the economic activity perspective.

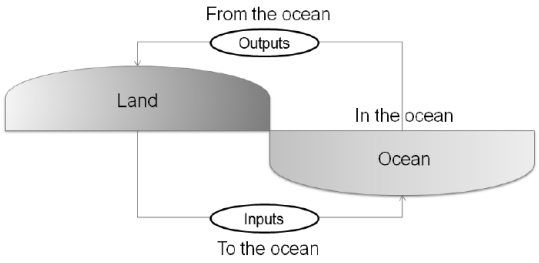

Figure 3. Relationship between ocean and ocean economy (Park & Kildow, 2015).

Source: Rebuilding the classification system of the ocean economy, 2014

As we can see that land is giving direct input to the ocean, including several aspect-like human resources, or natural inputs like rivers flow with parameters embedded on it, like its rate, chemical compositions, and pollutant amount. Therefore, if the marine pollution increases in one marine area, one of the causing aspects we can see is the rivers water quality that flows into this marine area.

This issue was already discussed and anticipated three decades ago. After the incident of Torrey Canyon in which 117,000 tons of oil leaked, an international convention has set to fight against marine pollution through the 1974 Paris Convention for the Prevention of Marine Pollution from Land-based Sources. This convention provides preventive steps to avoid marine pollutions that include maritime area, freshwater limit, and pollution from land-based sources (Afriansyah, 2004).

Given its worsening situation now, it is of no wonder that the UN specified this issue in its SDG document. The UN, especially in point 14.1, stated that by 2025 we need to ”prevent and significantly reduce marine pollution of all kinds, in particular from land-based activities, including marine debris and nutrient pollution” (United Nations, 2016b). Four years after SDGs’ inception, the evaluation of the *Life below Water* goal implementation showed that coastal habitat is threatened by land-based pollutants and marine debris (United Nations, 2019). Therefore, the issue continues to cause further damage to the marine environment if not progressively handled.

Theoretical Framework

This study utilizes the framework and concepts introduced in the theory of structural human ecology (SHE). SHE examines "the interplay between structure and agency in human-environment interactions” (T. Dietz & Jorgenson, 2015). Further, SHE highlights the impact of human activity on environmental

change and the risk and certainty it entails. According to Dietz (Thomas Dietz, 2015), SHE also highlights how all types of resources (manufactured, natural, and human) are used to produce well-being and how social structures affect such production. The theory also examines structural influences, such as "the role of institutions and the distribution of power, culture, and other factors" (p. 132) to the local level. This is believed to provide more understanding of "the production of well-being, human stress on the environment, and the trade-offs between the two" (p. 132). By utilizing these macro and micro approaches, the impacts of human activity toward the decreasing quality of the environment in their efforts to improve their livelihood can be explained.

METHODS

The research employed qualitative research. The primary data were published documents, reports, and media articles as well as other types of documents. The data were analyzed using the interactive model of Miles and Huberman's (Miles & Huberman, 1994) data analysis procedure, which consists of data reduction, data display, and conclusion drawing and verification. In triangulating the points of analysis, of Patton's (Patton, 2002) four types of triangulation—method, investigator, theory, and data source, this study utilized the data source triangulation.

RESULTS

Based on the discussion above, intentional and unlawful damage to the marine environment should be resolved to achieve a target of preventing marine pollution. Consequently, this section describes how intentional and unlawful damage acts causing marine pollution in Jakarta and Bali.

Jakarta's Case

Almost two decades ago, the research conducted by Japan International Cooperation Agency/JICA (JICA, 1991) already claimed that industry, whether inland or coastal, became the cause of the deterioration in groundwater and surface water quality in Jakarta. The leading cause of the degradation quality of groundwater and rivers are disposing of waste into river bodies in the Jakarta area. The data showed that domestic wastewater is a significant cause of the deterioration in the quality of river water in Jakarta. The research also claimed that the contribution of domestic wastewater was 78.9%, while industrial wastewater was only 8%; it also predicted that in 2010 the estimated contribution of domestic wastewater would be decreased by around 72.7% while industrial wastewater would be increased to 9.9% (JICA, 1991). The project-based on this study, however, did not lead to successful results because of unsynchronized wastewater management and the city's urban planning (Kusumaningrum & Cahyadi, 2018)

The condition has not improved but tends to get worse decades after the report was released. Pollutants from household and office activities are still the biggest contributor to water pollution in Jakarta (Said, 2008). This is also supported by current data that 96% of the water in Jakarta is heavily polluted and dangerous to be consumed (Purba, 2018).

The rise of several rivers that cross the Jakarta area to Jakarta Bay waters has brought various pollutants. So, it is not surprising that the waters of Jakarta Bay have now experienced excessive enrichment, which has the potential to cause plankton blooming or even worse to cause Red Tide, which is followed by a sudden drop in oxygen. This condition is very unfavorable both ecologically, economically, and aesthetically, so it is necessary to minimize the possibility of occurrence or even prevent it all together (JICA, 1991).

Domestic wastewater discharged into rivers in Jakarta also contains many detergents, which can cause a high burden

of pollution in these rivers. As a result, detergent and biochemical oxygen demand (BOD) content becomes high, so the oxygen content (DO) in the water becomes thinner than before (JICA, 1991). Pollution in Jakarta Bay and the environment of Jakarta's rivers has been worsened due to the increase of the domestics and industrial waste and activities within the city for the decades and the carrying capacity of the water ecosystem was degraded, including Jakarta Bay, as the estuary of the passing rivers of Jakarta City (JICA, 1991; Kunzmann, Arifin, & Baum, 2018; Yudo, 2007).

Further, the reefs in Jakarta's Kepulauan Seribu area have degraded dramatically over the last 40 years while large-scale gradients have extensively studied and shown shifts and declines in composition. The primary anthropogenic stressor is pollution and sedimentation rate, NO2, PO4, and chlorophyll explain that over 80% of the variations. Surfactants from sewage and bilge water discharges are common pollutants. According to Yudo's (2007) research about chemical quality in the rivers flow to Jakarta bay, toxic chemical drastically increased from 1999 to 2004. The continuous research in this period showed that nitric as one of fertilizer excess increasingly found in the river water, causing unbalance chemical property of water in Jakarta Bay.

Measures have been taken to reduce the pollutants being dumped to the rivers which end up in the coastal area of Jakarta. The government of Jakarta has implemented several programs to reduce this problem, such as through Muhammad Husni Thamrin Project, Environmental protection and Management Plan (*Rencana Perlindungan dan Pengelolaan Lingkungan Hidup*/RPPLH), Sanitation White Book (*Buku Putih Sanitasi*/BPS), Society-based Sanitation (*Sanitasi Berbasis Masyarakat*) supported by Islamic Development Bank, and City Without Slums Program (*Program Kota Tanpa Kumuh*/Kotaku). However, those programs were deemed unsuccessful because they were ineffective and overlapping (Kusumaningrum & Cahyadi, 2018).

From the legal perspective, besides the regulations issued by the central government, the government of Jakarta has also produced its regulations related to the management of dangerous waste, water pollution control, and solid waste management. The most current regulation is the Gubernatorial Decree No. 142/2019 on the banning of single-use plastic which has taken effects since July 1, 2020. Albeit being considered late, this regulation was welcomed by many. While established businesses and stores have started to strictly implement the policy, the road stall vendors still ignore the policy and do business as usual. Building awareness and educating Jakarta's residents about the policy and its implementation are still the biggest challenges to face. Therefore, the law enforcement of the policy is also being questioned, especially in dealing with the informal street vendors.

Bali's Case

Meanwhile, Bali Island, contrary to its image as heaven on earth, is being surrounded by plastic garbage. At this juncture, if we see the shores, beaches, mountains, and villages in Bali, we often see mineral water bottles, plastic bags, straws, and any plastic wraps (Sutrisnawati & M. Purwahita, 2019). Sutrisnawati further reported that Bali is suffering from marine litters or debris disasters, especially Kuta Beach Bali almost every year. The research also helps us to understand the physical processes of marine debris characteristics in Kuta, such as its propagation and distribution along the coastline and the water columns during the two different seasons the West Monsoon and Transitional seasons.

Sutrisnawati (Sutrisnawati & M. Purwahita, 2019) utilized the hydrodynamic model to investigate the

transport of marine litters from their sources by tide-driven surface currents and wind. Field surveys were also conducted to assess the marine litter's characteristics on the surface and the sea beds for plastic and wood types of litters.

The waste discharging to the environment and rivers is already ruled in Regulation No.32 of 2009 concerning Environmental Protection and Management. The regulation states that anyone discharging pollutants to the environment without any permit will be charged three years in prison and fined as much as three billion rupiahs. Regulation No.32 of 2014 about Marine mentioned also dictates that anyone causing the quality of air, groundwater, and seawater to be decreased will be charged a maximum of 10 years in prison and fined maximum to 10 billion rupiahs. However, these regulations have yet been able to deter people from doing the practices in discharging pollutants into the river and the seawater despite being labeled as intentional and unlawful acts.

However, once in a while the law was enforced in Bali. For example, a case occurred in Denpasar City when the Civil Service Police Unit (Satpol PP) closed a screen-printing business on Jalan Pulau Misol I Number 23, Banjar Sumuh, Dauh Puri Kauh Village West Denpasar, which had dumped waste into Tukad River (Yuda, 2019). Tukad River, flowing to Benoa Bay, is one of the most favorite rivers chosen for tourism activities. Consequently, polluting Tukad River threatens tourism, life in the river, and marine environment as Benoa Bay is also rich in sea life and become one of the busiest bays in Bali. This screen-printing business discharging pollutants to the river violated Law Number 32 of 2009 concerning Environmental Protection and Management. This case is still under investigation and trial.

Another case in Bali follows Bali's Government announced the Regulation of Mayor of Denpasar No.36/2018 about the reduction of plastic waste and the Regulation of Governor of Bali No.97/2018 about Restrictions on the emergence of disposable waste. These regulations aimed to limit the use of plastic waste and prevent people from throwing waste into the sea, and also to prevent damage to marine habitat environment. The local government followed up the regulations by issuing instructions and circulars to urge people to restrict disposable plastics on the market and at all points (Suriyani, 2018). If this regulation is obediently followed, by 2019 plastic waste should have been dramatically reduced because in this regulation stated that every producer, distributor, supplier, the business actor must provide the plastic replacement product.

The efforts to combat plastic waste are also seriously considered by the District of Badung Bali by issued the regulation of Regent of Badung (Perbup) No.48/2018 and Perbup No.47/2018 about guidelines for use plastic bags of reducing, reuse, and recycle through garbage and reduction banks. Even those who violate the regulation will be fined IDR five million (Aryanta, 2019).

DISCUSSION

The data displayed above clearly shows the interactions between humans and the environment from the structure and agency as explained in SHE. While the structure in the form of regulations has already been set to reduce or limit the irresponsible acts by the residents of those two provinces to pollute the rivers, the agency which underlines the residents' decision to act against the regulations continues to produce unwanted consequences that affect life below water. This also includes, for example, how the bans of a single-use of plastic are followed by established business, but not informal street vendors due to the limit of and discriminating practices by the authorities' acts to enforce the law.

The structural influences, especially the

role of institutions—government bodies, law enforcers, and local social institutions, were greatly hindered by the resistance from the residents to follow the regulations. Unless strictly enforced as seen in Bali, the regulations would not be effective in curbing the practices that damage the environment. This is further worsened by the fact that such resistance by the residents implicitly challenges the power held by the formal institutions; thus, questioning the distribution of power among the stakeholders involved in the issue of pollution that threatens life below water.

Besides, another factor that also comes into play, as pointed put by SHE, is culture. There is a big discrepancy between the ideals and practices of culture regarding the environment. Despite claiming to protect nature as prescribed in their religious and cultural values, residents from those provinces have done just the opposite of that.

As human activity impacts the environmental change as outlined in SHE, from the cases in Jakarta and Bali above, we can see that any pollutants coming from inland, like industrial discharges (inland or coastal), coastal development, growing urbanization, domestic chemical discharge, and the use of pesticides or fertilizer are the contributors to the quality of the river's water in that flows into the sea. Therefore, seeing marine pollution only as a marine problem and caused by only marine situations are not relevant anymore. To solve marine pollution is to also include managing, regulating, and punishing whoever intentionally and unlawfully disposes pollutants to the rivers and any possible objects damage the quality of the sea.

The condition above increases the risk of damage toward our marine interconnected ecosystem at the local and national levels. This will affect our maritime security as the uncertainty rises due to the diminishing quantity of food sources from the sea and reducing the quality of livelihood. Eventually, as stated by SHE, our efforts to maintain and increase our well-being put too much stress on the environment resulting in the unsustainable use of manufactured, natural, and human resources. This is also affected by less social involvement and participation by society due to a lack of awareness and disregard for social and legal consequences of deliberate acts to produce materials that pollute the rivers and seas. Here, the elements of education and law enforcement become crucial to ensure support from the stakeholders in protecting life below water.

CONCLUSION AND RECOMMENDATIONS

This article highlighted that marine environment quality is not only linked with marine pollution caused by marine/sea pollution produced in the sea but also mostly related and caused by inland social and economic activity. Therefore, solving the problem focus must include and consider inland activities and actors.

Using SHE, this article shows the impact of human activity toward the change of marine ecology and the risk and certainty due to the damage afflicted to the environment. The structure and agency as represented by regulations and acts by the stakeholder respectively are not compatible with enduring marine life protection.

As one of the critical qualities of the sea depends on the quality of the rivers, this article recommends the government put green projects on significant rivers flow in the major cities as a continuous project.

Further, of the UN’s agenda on 17 SDGs, Indonesia should focus more on Goal No. 14 (Life below water focus), especially protecting the life below water from the acts of polluting. Cases in Jakarta and Bali provide how fragile and easily affected marine life is by the acts of humans. Therefore, Indonesia should pay attention to the measures to prevent marine

pollution as exemplified by pollution cases in Jakarta and Bali.

As marine pollution becomes the threat to achieving the SDGs targets, this article suggests the government focuses both on law enforcement and education. This research also suggests that the government provides mitigation efforts and start educating people to continue the cleaning campaign for the stranded litters on the beach. Besides, industrial and domestic actors who commit intentional and unlawful damage to the marine environment need to be responded through serious law enforcement. By the combined measures, it is expected that life below water can be protected in Indonesia.

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