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# Policy response For marine plastic debris In Timor Leste

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# POLICY RESPONSE FOR MARINE PLASTIC DEBRIS IN TIMOR LESTE

By

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**TIMOR LESTE**

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# Declaration

I certify that all the material in this dissertation that is not my own work has been identified, and that no material is included for which a degree has previously been conferred on me.

The contents of this dissertation reflect my own personal views, and are not necessarily endorsed by the University.

(Signature): 

(Date): **21st September 2021**

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# Abstract

Title of Dissertation: Policy response for marine plastic debris in Timor Leste

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This study aims to examine the current status of marine plastic debris at Timor Leste and understand the roles and responsibilities of the relevant agencies and institutions. It also aims to identify the policies and action plans to control marine plastic debris, the challenges and barriers in implementing it, and how to overcome it.

In this study, four research questions were developed and used structured interviews as the primary data source to achieve the study's objective. The interviewees were representatives from various high-level ministries, local non-governmental organizations, the youth movement, and the private sector. The data was analyzed using the method of coding and categorization according to the research objectives.

The studies show that lack of waste management on land, inadequate waste disposal infrastructure, and lack of people awareness lead to marine plastic debris at the crisis point. In addition, the studies also suggest that marine plastic problems and environmental problems are everyone's responsibilities. Furthermore, the studies identified several initiatives, policies, action plans, and programs that aim to tackle marine plastic debris, including the challenges and barriers to addressing the issue and ways to overcome them.

The studies recommended the engagement of all relevant stakeholders (government, private and civil society) and establishing an adequate infrastructure and waste management system. In addition, public awareness and education; training and education to politicians and legal advisors to develop appropriate policies and conduct research analysis and monitoring related MPD for policymaking are recommended to tackle MPD. Further, providing incentives, establishing litter warden to enforce anti-litter regulation; reduce, reuse, and recycling programs could address MPD in Timor Leste and other small development ocean states besides enforcing national and international instruments and fines.

**KEYWORDS**: marine plastic debris, policies, action plans, programs, initiatives, Timor Leste

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# List of Abbreviations

| | |
|---|---|
| **ASEAN** | Association of Southeast Asian Nations |
| **EU** | European Union |
| **FAO** | Food and Agriculture Organization |
| **GMPL** | Global Partnership of Marine Litter |
| **GES** | Good Environmental Status |
| **GPA** | Global Programme of Action |
| **GDP** | Gross Domestic Product |
| **HASATIL** | Hametin Agrikultura Sustentavel Timor Lorosa'e |
| **IMO** | International Maritime Organization |
| **IGT** | Interactive Governance Theory |
| **IOC** | Intergovernmental Oceanographic Commission |
| **LCD** | London Dumping Convention |
| **MT** | Metric Ton |
| **MSFD** | Marine Strategy Framework Directive |
| **MSA** | Ministry State Administration |
| **MTM** | Movimentu Tasi Mos (Clean Ocean Movement) |
| **MPD** | Marine Plastic Debris |
| **MARPOL** | The International Convention for the Prevention of Pollution from Ships |
| **NGO** | Non-Governmental Organization |
| **NOAA** | National Oceanic and Atmospheric Administration |
| **NYD** | National Youth Development |
| **OSPAR** | The Convention for the Protection on the Marine Environment of the North-East Atlantic |
| **PRF** | Port Reception Facilities |
| **RDTL** | The Democratic Republic of Timor Leste |
| **SSE** | Secretary State of Environment |
| **SCT** | State Coral Triangle |
| **SDG** | Sustainable Development Goal |
| **TL** | Timor Leste |
| **UNCLOS** | United Nations Convention Law of the Sea |
| **UN** | United Nations |

# Chapter 1: Introduction

## 1.1. Introduction

The first chapter intentions to present an overall picture of the studies by providing relevant information on the background to the topic that the study wishes to explore. The problem statement identified followed the research objective and questions, the rationale for the study, and contribution to the field. Finally, this study describes the methodology, ethical issues, key assumptions, potential limitations, and thesis structure.

## 1.2. Background of the studies

The Democratic Republic of Timor Leste (RDTL) is situated in Southeast Asia, officially called Timor-Leste (TL). It has had three islands, namely Atauro, Jaco, and the enclave of Oecusse on the North Coast, which surrounds Indonesia West-Timor. The country's area is approximately 14,874 km2 (ADB, 2014), and the population is 1.3 million (WBG, 2020).

Timor-Leste, a small peninsular state, is surrounded by the sea with approximately 706 kilometers of coastline and 81,737 km2 of maritime jurisdiction and is heavily dependent on the sea for transportation and tourism, fishing, and ecotourism (Edyvane et al., 2009). In addition, the Timor Leste Sea is home to many marine species and provides food security for smaller-scale artisanal fisherman to sustain their lives, income, and nutrition (ADB, 2014).

Timor Leste also includes one of the state's coral triangles (SCT) and is recognized by environmentalists as being too rich in marine biodiversity. It is represented as the largest mangrove forest globally, which is a spawning and breeding ground for species of global importance (e.g., tuna and other commercial fish). It also hosts 76 percent of all known coral species, 53 percent of coral reefs of the world, and all known reef fish

species, 37 percent (ADB, 2014). In addition, Allen and Erdmann (2012) reported that the total reef fish fauna comprises 968 species belonging to 88 families, and 316 species exist in Timor Leste and West Timor Regions.

Marine terrestrial environments include coastal regions, agriculture, protected wetlands, tropical rainforests, and mangroves (NBWG, 2011). Timor Leste offers significant ecotourism with its coastal and marine diversity, including turtle and whale tourism and coral reef diving (Edyvane et al., 2009). Therefore, without monitoring and controlling human activity on land, it will damage the sustainability of the ocean for small countries like Timor Leste.

However, as a new country, Timor Leste still relies heavily on importers of essential goods, building materials, clothing, electronics, second-hand products, and low-quality products that end up in the trash, mainly in the form of plastic. There is no government policy banning any imported products, especially plastic. Moreover, plastic products are easy to find, cheaper, and flexible, tempting people to choose plastic for ready-to-go options. However, poor waste management on land, lack of disposal facilities, and people's awareness about plastic waste impact the environment, ecosystem, and human health.

Plastic dispersed in the ocean is called marine plastic debris (MPD). Marine plastic debris can be generated from land or land-based sources and aquatic activities or marine sources. However, land-based sources contribute 80 percent (Jambeck et al., 2015). Marine plastic debris is the predominant type of pollution in the oceans, with 60-80 percent of the ocean debris consisting of various plastics (Avio et al., 2017). The causes of many plastics in the oceans are the photodegradation process which is very slow due to the cold and the lack of sunlight (Andrady, 2015).

According to scientific research conducted in 2015, people produced about 6300 tonnes of plastic waste worldwide. Around 79 percent of unused plastic items were

dumped in landfills or the natural environment, while almost 21 percent were recycled or incinerated (Geyer et al., 2017; Wu, 2020). In addition, plastic was found washed up in the oceans through various pathways. It is estimated to be 8-10 million tonnes, of which 80-90 percent likely came from land-based sources. It is also expected to double by 2030 and twofold by 2050 (Gallo et al., 2018; Wu, 2020).

There is insufficient data evidence on the amount of plastic waste in Timor Leste, but some studies show that about 13 percent of the waste stream from Timor Leste is from plastics. Poor waste management of non-flexible plastics and lightweight plastic products consumed daily enter the sea by inland rivers or wastewater outfalls or are blown by wind and tides and become marine debris (PRIF, 2018).

In addition, people in Timor generate plastic waste daily, estimated at 68.4 tonnes (t). About 56.6 t are mishandled daily and are believed to enter the marine environment through overloading from uncontrolled landfills or direct littering. In 2010, about 20,690 t of plastic waste was discharged into the waters around Timor-Leste. This is expected to increase to 64,205 t by 2025 if not adequately addressed (PRIF, 2018).

Marine Plastic Debris is harmful to marine ecosystems in the ocean. Waste that flows from the river into the ocean remains permanently in the ocean, polluting it. This plastic waste continues to destroy living things in the waters. It is projected that 557 species are unintentionally affected by plastic waste in the ocean worldwide (Khün et al., 2015). At least marine species, 23 percent, seabird species 36 percent, and about 86 percent of other species have been identified as affected by marine plastic debris (Stamper et al., 2009; Pawar et al., 2016).

The ocean is recognized globally for its benefits and plays an important role in human life. Therefore, through Sustainable Development Agenda (SDG) 2030 targets, Goal 14.1 requires minimizing marine debris activities by 2025 from land-based and SDG 14.2 Avoiding potentially detrimental impacts on marine and coastal ecosystems'

sustainability. By changing people's behavior and attitudes on land to manage their waste correctly as well as industrial production to produce less plastic which can prevent plastic waste globally. Furthermore, SDG 14c focuses on implementing international law that provides a legal framework to protect oceans and their resources as reflected in UNCLOS, and as mentioned again in " The Future, We Want" paragraph 158 (Sturesson et al., 2018)

### 1.3. Problem Statement

Marine plastic debris has become a global problem and has been included in the international agenda list of concerns. UNCLOS (United Nations Convention on the Law of Sea), MARPOL (International Convention for the Prevention of Pollution from Ship), and the London Convention 1972 are the leading international agreements and legal frameworks that can address the protection of the oceans against the problem of MPD (Wu, 2020).

In addition, the national environmental regulation of Timor Leste also clearly describes the protection and conservation of the environment both on land and in the ocean. However, the Government of Timor Leste has not yet ratified some of those conventions, and the lack of a national framework specifically for dealing with marine plastic litter becomes a challenge.

Therefore, the study intends to examine the present status of marine plastic debris in Timor Leste and understand the roles and responsibilities of relevant authorities and institutions. Moreover, to identify the policy and actions undertaken to control marine plastic debris and the challenges and barriers in implementing marine plastic debris policy.

### 1.4. Research objectives

Grounded from the background illustrated above, this study aims to:

a. Examine the current status of marine plastic debris in Timor Leste;

b. Understand the roles and responsibilities of the government and other institutions in addressing marine plastic debris;
c. Identify the policy and actions undertaken by the government and other institutions to control marine plastic debris;
d. Explore the challenges and barriers in implementing the marine plastic debris policy and the best way to overcome them.

### 1.5. Research Questions

a. How has waste been managed in Timor Leste?
b. What are the roles and responsibilities of the government and other institutions in addressing the issue of marine plastic debris?
c. What policies and actions are the government and other institutions undertaking to control and reduce marine plastic debris?
d. What are the challenges and barriers in implementing these policies and action plans to address marine plastic debris, and how to overcome them?

### 1.6. The rationale for the studies and contribution to the field

Marine plastic debris is recognized as dangerous and harmful. The destruction of the marine ecosystem is already at a crisis point. Human actions can reduce environmental quality because it concerns the ecological value for human health and well-being. Besides, environmental value benefits are too manifold for humankind.

As a result, an international legal framework and national policy frameworks need to be established to respond to the problem of marine plastic debris. In addition, several studies have been conducted in different countries to identify the policy and regulatory tools for effectiveness in the regulated plastic problem. However, there are very few studies on the policy to address the plastic marine litter issue in Timor Leste. Therefore, this study has been conducted to identify the policy response to marine plastic debris in Timor Leste.

It is expected that the study will help to increase the knowledge of what is already known about marine plastic debris and bring awareness to the impacts on the environment. In addition, it is expected that the study will make recommendations and contribute to policy making and the implementation of measures to best control and reduce the amount of marine plastic debris inflowing to the ocean environment.

### 1.7. Methodology

This study will utilize qualitative research. Qualitative research aims to discover more detailed information from the participants regarding the selected topic. In this study, the primary data will be obtained using a structured interview method to obtain opinions from the participants.

In addition, in the structured interviews, all study participants will be asked the same set of predetermined questions and given a limited time period in which to respond. There is usually little room for variation in responses, except for open-ended questions (which is rare) that can be used (Fontana & Frey, 2005). Participants are selected purposely or as a non-probability sample (Hennink & Bailey, 2020). They will be selected from policy makers and various stakeholders. Furthermore, the data will be transcribed into the text, then analyzed and coded, with classification based on the theme stated in the research question (Liu et al., 2015).

### 1.8. Ethical issue, key assumption, and potential limitation.

Before conducting the study or research, full agreement and consent will be obtained from the participant to comply with ethical considerations outlined in the WMU Ethical Research Guidelines. These include respecting the participant's dignity, protecting confidentiality, and ensuring an appropriate level of privacy for research participants and the data and privacy of the institutions and organizations involved in the research.

It is assumed that policymakers, government officials, and stakeholders would provide their willingness to provide information within a limited time frame. It is understood that time constraints and the researcher located in Malmö during the research could affect the researcher's ability to conduct a thorough study of the proposed topic. However, the researcher is willing to complete the study to meet the requirements and research standards of the World Maritime University.

### 1.9. Dissertation structure

The thesis is composed of five chapters as described below:

Chapter one describes the background of the study, the problem statement, the research aim, the research question, the rationale for the study and the contribution to the field, the methodology, the ethical issue, the main assumption and limitation of the research, and finally the structure of the thesis.

Chapter two provides a literature review on the conceptualization of marine debris and marine plastic debris followed by the policy response framework on marine plastic debris and provides an overview of international, regional, and national instruments.

Chapter three contains the research methodology used in the study. The study is based on a qualitative research method using primary data to collect data through structured interviews. The data is then analyzed and organized by themes in order to develop a more comprehensive approach.

Chapter four examines the study results obtained from the interview and discusses them based on the research objectives.

Finally, chapter five provides a summary of the dissertation, a recommendation, and a conclusion. It also outlines the contribution of the study, limitations, and future research and development.

# Chapter 2: Literature Review

## 2.1. Introduction

This literature review emphasizes the conceptualization of marine debris, marine plastic debris, and its impacts. They were followed by the policy response to marine plastic debris and the overview of the instruments divided into three: international, regional and national. Finally, the theoretical framework underlying this study is described.

## 2.2. Conceptualization of Marine Debris

This section will conceptualize marine debris and how marine plastic debris is present in the marine environment, and the impact of marine plastic debris on the marine environment and socio-economic.

One of the main dangers to the ocean environment and the most extensive reaching pollution developing worldwide in recent years is marine debris (Chiu et al., 2020; Korshenko et al., 2020). Human activity and behavior on massive production and consumerism coupled with "throw-away" culture (Woodall et al., 2014; Rhinane, 2019; Fitria, 2020) led all the waste to end up at sea and eventually become marine debris.

Before moving so far, marine debris needs to identify why marine debris has become a global problem. UNEP, 2009 defined marine debris as any processed solid item or manufactured disposed of and abandoned in the coastal and sea environment. The marine debris issue is central to the United Nations agenda and scientifically examined in the First United Nations World Ocean Assessment. Moreover, it was covered in the UN Informal Consultation Process five days under the UN Division of Maritime Affairs and Law of the Sea and featured in SDG 14 of the 2030 Agenda for Sustainable Development (Oral, 2021).

Additionally, NOAA (2021) added marine debris as any abandoned object or item found in the ocean environment or Great Lakes discarded directly or indirectly, intentionally or unintentionally. The further international definition of marine debris also established in Annex V of the MARPOL 73/78 Convention in terms of 'garbage' is any waste food (e.g., domestic and operational waste) generated during the regular vessel operation to be disposed of continuously and occasionally. Therefore, marine debris is an unwanted item abandoned at sea, discharged accidentally or intentionally, and resulting from human activity.

Marine debris comprises substances made and used by people and discharged accidentally or intentionally to the marine environment. It reaches the ocean through the river, drains, canals, sewage outlets, stormwater outflows, tides, and winds (Gjyli et al., 2020). Marine debris consists of paper, plastic, wood, metal, glass, rubber, and textiles (Gall, S. C., & Thompson, R. C. 2015; Galgani et al., 2015). Although plastics are most found and abundant in the ocean environment, studies from Jambeck et al. (2015) estimated that nearly 275 million tons of plastic waste are generated, with approximately 4.8 to 12.7 MT inflowing the ocean from 192 coastal countries.

Improper urban and industrial solid waste management are the primary sources of marine debris that find their way entering the sea through various points and significant sources, from land-based and ocean-based sources. Marine debris can also be carried long distances before lying down on the seafloor or the shorelines (Veiga et al., 2016, Gjyli et al., 2020). Therefore, marine debris can be categorized as hazardous items that come from different sources and can jeopardize human life and the environment if it is not managed well. All the plastic debris found in the ocean environment will be called marine plastic debris.

### 2.2.1. Marine Plastic Debris

The plastic origin came in the late 19$^{th}$-century from various synthetic polymers, but well known and existence in the mid-twenty century (Ryan, 2015). The word Plastic

origin came from a Greek named "plastikos" which means that the plastic will not change and remain shaped in various systems. Nowadays, plastic pollution has become a ubiquitous and worldwide problem discovered everywhere: food, air, sand beaches, ocean environment, surface waters, sludge, soils, sediment, biota, and wastewaters (Barcelo & Pico, 2020).

Moreover, the plastics' advantages include versatility, durability and resistance, low-cost product, density, and ease to go leading to high production every year (Ryan, 2015). Plasticseurope (2019) states that plastic production increases every year, almost reaching 360 (MT) in 2018. The giant plastic producer is from China, contributing 30 percent of plastic pollution. Menndenhal (2018) argues that marine plastic debris has to become a common feature of modern civilization and is an externality of the ongoing "plastic feast."

Furthermore, virgin plastics estimated more than 8300 (MT) had been produced to date. Nowadays, plastic plays an essential role in our everyday life, and people worldwide consume one million drinking bottles of plastic every minute and four trillion plastic bags annually. An estimated four and twelve million tons of plastic annually end up at sea, and by 2050, the plastics will exceed the amount of fish (Barcelo, 2020; Barcelo & Pico, 2020).

Plastic production has outpaced any other manufactured material in the past 65 years. The versatility of use, lightweight, and cheap make them suitable for manufacturing and an extensive range of products. Plastic is durable and solid makes the materials challenging to integrate with nature (Jambeck et al., 2015). Therefore, it will stay or remain in the environment if it is unmanaged properly, affecting wildlife and severe damage to the environment.

Approximately 80 to 90 percent of ocean plastic is generated from the land, and the rest is from ocean activity (Gallo et al., 2018). Through rivers, canals, drains, sewage

outlets, winds, tides, and stormwater outflows, marine debris find their pathways to the coastal environment (Gjyli et al., 2020). RAPMaLI (2016) argues that the litter or debris that occurs on land-based is associated with people's activities being improperly discarded along streets, waterways and blown by the wind or washed by rain.

Land-based sources include illegal dumping, sewage treatment plants; waste processing facilities; trash from street vendors in coastal cities or urban areas; public littering on the beach; and factories or industries. Moreover, activities are done in the ocean, and the waterways are deposited straight in the water. The ocean-based sources come from different fishing vessels, cruise and cargo ships, water sport, offshore fuel platforms, and transportation due to illegal treatment and dumping (Pawar, 2016). Therefore, plastic debris in the sea environment will have significant adverse effects on the environment and socioeconomic.

### 2.2.2. Impact of marine plastic debris

The occurrence of marine plastic debris in the ocean environment is causing concern and harms the variety of marine mammals, fish, reptiles, and birds and has been identified as a global problem (UNEP 2016). Pham et al. (2014) reveal that marine biota (e.g., marine mammals, seabirds, and sea turtles) are ingested by mistaken marine debris like food, resulting in infection, pain, and damage to their bowels, and death due to marine debris.

It was estimated that pinnipeds and baleen whales, about 57000 and 135000 globally each year, are entangled in the ingestion of marine debris beside the uncountable fish, seals, birds, and turtles (Annex VI; Butterworth et al. 2012; as cited by UNEP 2016). Studies from Parton et al. (2019) show that animals are entangled by ghost fishing gear around (74%), followed by (11%) of animals trapped by polypropylene strapping bands, and (1%) of animals entangling other materials, including circular plastic debris, polythene bags, and rubber tires.

Besides marine plastic debris entanglement and ingestion of the animals, it also impacts socioeconomic effects that are hard to quantify due to various social, economic, and environmental impacts that take a long period to identify and calculate (Newman et al., 2015). Nevertheless, economic sectors including shipping, tourism, fisheries, aquaculture, and agriculture are affected much by marine debris.

According to UNTWO (2017), the tourism beach industries contribute up to 50% to GDP in the well-developed tourism country and employ every six in one hundredth person globally. For instance, Chile's experience in 2017 had received 6.5 million visitors and contributed revenues of 3.6 billion USD from foreign tourists (UNTWO, 2018; Rangel-Buitrago et al., 2019). However, human activities in the coastal environment reduce environmental quality, critical to the coastal areas and their national economies.

Studies performed by Krelling (2017) in the municipality of Pontal Paraná's local income may be reduced by 39.1 percent representing losses per year up to 8.5 million USD due to stranded waste. On the other hand, the range of stakeholders and the communities living on the remote island feel uncomfortable and burdened by the clean-up cost due to marine litter or debris (Rodriguez et al., 2020).

Moreover, the commercial shipping sector also experiences the same impact. Marine debris increases in shipping and cruising industries cost due to removing debris from their facilities and keeping the vessels nice-looking and away from interfering with propellers, anchors, rudders, and blocked intake pipes and valves. Approximately €2.4 million was spent per year due to removing marine debris in UK ports and harbors (Mouat et al., 2010; Newman et al., 2015).

Furthermore, the fisheries sectors experience repairing and replacing damaged and lost fishing gear damage or lost fishing time and income due to encounters with marine debris (Newman et al., 2015). Posadas et al. (2021) indicate that due to marine debris,

80 percent of most shrimpers reduce in the catch, 82 percent lost in fishing time, and 75 percent in vessel repairs. These indicate that the commercial shrimping industry is affected significantly by marine debris.

Marine plastic debris also treats the aquaculture industries. For example, FAO (2020) reported in 2018 represent 53.3% of the aquaculture production, shelled mollusks (17.3 MT), finfish about (7.3 MT), crustaceans (5.7 MT), and altogether responsible for 42.5%, and aquatic plants represent the rest. However, marine plastic debris can threaten aquaculture production and cost time and price to remove debris from entangling propellers and block intake pipes (Mouat et al., 2010). Studies undertaken in Scotland on aquaculture producers (e.g., finfish, shellfish) estimated that per year the sector cost approximately €156,000 due to marine litter or debris, which around €580 per producer per year and the price mostly 90% consequence of time spent to straighten out fouled propellers on workboats and repairs (Newman, 2015).

Nevertheless, the recent studies from Galgani et al. (2021) concluded that activities reliant on the marine and coastal environment, the socio-economic adverse of marine debris, and the potential cost for key sectors had not been well estimated, leading to mispricing of ecosystem values and the externalizing pollution costs. Methods for giving value to marine debris are also not well known. Efforts need to focus on assessing marine debris damage's environmental and socio-economic costs and the cost-benefit analysis of marine debris prevention and reduction measures.

Apart from all the impacts posed by marine plastic debris on marine life, aquaculture industries, and the aesthetic and value of the beach, there is a lot of effort undertaken at the international to the national level to mitigate and reduce plastic flow into the ocean environment. One of which is introducing a global framework by the International Maritime Organization and various regional and national policies to manage, prevent and reduce marine plastic debris.

## 2.3. Policy Response for Marine Plastic Debris

This section will define policy and policy responses for marine plastic debris and describe the international framework's overview that appears to respond to marine plastic debris.

Cambridge Dictionary defines policy as a concept of ideas or plans about what to do in a particular situation that has been officially endorsed by a group of people, political parties, governments, or economic organizations (Cambridge English Dictionary, n.d). Colebatch, 1998:x (cited in Cairne. P, 2012, p. 18) defines policy as the multiple activities of different agencies that are combined into stable and predictable patterns of action that are (often not) referred to as 'policy. In addition, the term policy is also defined by Richard & Smith (2002) as a general term used by an actor to define a formal decision or plan of action to accomplish a particular objective. Furthermore, a policy is a commitment authoritatively made on behalf of a particular entity or collective for a specific goal or action, accompanied by guidelines for its achievement (Orren & Skowronek, 2017).

Based on the argument mentioned above, it can be concluded that policies are activities or actions and commitments made intentionally or purposely by a person, a group, or government to achieve the goal and specific purposes set before.

The policy is set by the government and other institutions composed of rules, regulations and procedures, administrative action, incentive, or voluntary practice. The policy is a series of principles and concepts to become a line of implementation in leadership, job, or way of acting (Itika, 2011; Yuwantari et al., 2020). This policy is very influential in citizens' lives, and the government's existing regulations cannot run regularly if the country does not have a policy (Pontonuwu et al., 2021). The policy also refers to important decision-making processes in an organization and must always be considered carefully, and the decision can be in the form of political, financial, or in any form (Yuwantari et al., 2020). Therefore, a policy is an important matter, and

this is because policies can have a tremendous impact on addressing every problem, primarily in terms of marine plastic debris.

There have been growing studies related to a policy framework taken by several countries to respond to marine plastic debris. Lack of legal and institutional framework and enforcement and monitoring from authorities to regulate people's behavior resulted in marine pollution and affected marine life and ecosystem. In their paper, Clayton et al. (2020) reviewed current policies by exploring the tools used and implementing them in the thirteen English-speaking Caribbean countries. The studies identify that they successfully implemented multiple policy tools to address marine plastic debris by engaging key stakeholders, the adequate waiting period between policy declaration and implementation, and broad public education campaigns. Resulting in eleven has introduced legislative policies, with seven comprising levies and penalties for disobedience.

Moreover, Garcia et al. (2019), in their findings from analyzing two case studies jurisdictions, China and Indonesia, recognized that authorities from municipal and the private sector were most active and innovative in response to marine plastic debris compared with the government at the national level. Further, the multi-level actors, inter-state cooperation involvement, and targeted regulatory and non-regulatory tools are essential in dealing with marine plastic debris.

These findings are in line with Wu (2020), who reported that the successful key to mitigate and control MPD is in the matter of those countries that have effectively established regulatory governance schemes to minimize and reduce unneeded plastic use and to improve reuse and recyclability of plastic with enforcement measures and steadfast commitment.

Different studies reveal that to impose marine plastic debris in place, the policymakers need sufficient data from research and scientific findings (Rochman et al., 2016).

Moreover, these studies align with Arabi & Nahman (2019), stating that evidence-based support must be provided to decide appropriate policy responses. Further, in his paper, Mendenhall (2018) argues that mitigation of plastic amount entering the ocean, minimizing harm resulting from plastic, and beach cleaning activity are the three distinct categories of policy response.

The impact of marine debris on the environment was identified in the 1970s and 1980; due to the decrease in plastic waste entering the environment, various policy discussions and recommendations emerged (Chen, 2015). The legal framework appears to manage and prevent marine debris in multiple layers of governance, starting from international, regional to national and local rules through different legal effects (Lachman, 2017). Chen (2015) added that the instruments are conventions, regulations, agreements, programs, strategies, guidelines, and action plans.

### 2.3.1. The overview of the international, regional and national framework of marine plastic debris

This section will outline the international and regional instruments or agreements in responding to marine plastic debris. The leading global, regional, and national agreements that capable of reducing and managing marine plastic waste are listed below:

#### 2.3.1.1. International instrument

**UNCLOS (United Nations Convention Law of the Sea).** The fundamental international legal framework that addresses marine pollution is The United Nations Convention on the Law of Sea (UNCLOS) (Wu, 2020), and all the aspects of marine resources and uses of the oceans are set up by UNCLOS legal regime (IMO, 2017a; Lachman, 2017). The UNCLOS requires to adopt regulations to prevent pollution came from land sources and ships by parties, and UNCLOS also establish jurisdictional ocean limits area that countries may claim (IMO 2017b; Lachman, 2017)

**Annex V of MARPOL 73/78.** To prevent pollution from ships at sea, The International Maritime Organization has designed an international convention called MARPOL 73/78. This convention also creates an international guideline to prevent ship pollution as a comprehensive approach to dealing with ocean dumping. MARPOL includes six annexes which is annexes I (oil discharge), II (hazardous liquid control), III (Hazardous material transport), IV (sewage discharge), V (plastic and garbage disposal (V), and annexes VI (air pollution) (Djadjev, 2015). Annex V came into force in 2013 (Lachman, 2017), prohibited any discharge of plastic materials, and regulated other garbage at sea. MARPOL Annex V also recommended ports to provide port reception facilities for vessels to discharge the waste and ban discharges of all garbage to sea by ship unless clearly defined circumstances.

**1972 London Dumping Convention (LDC).** LDC was adopted in 1972 administered by The International Maritime Organization (IMO) as a sign marking a step towards regulating the specified dumping waste at sea and regulated human activity to safeguard the marine environment. The regulation applies to the purposely or accident disposal at sea of garbage or other matter from aircraft, platform vessels, and other manufactured structures (Birchenough & Haag 2020). Wu (2020) argues that the London Convention since 1975 became essential international norms that aim at defending the marine environment from ocean dumping. In 1996, the 1972 London Convention was improved and replaced, and by 2006 the protocol entered into force. The protocol aims to restrict dump waste at sea unless special permission is granted for materials suitable for disposal at sea under strict control standards (Wu, 2020).

**Action Plan of IMO's on tackling the inadequacy of PRFs.** The IMO committee, which is Marine Environment Protection Committee in 2006, approved an Action Plan to address PRF insufficiency. This action plan aims to promote the effectiveness of MARPOL 73/78 and quality and environmental awareness among the shipping administration and industry. The action plan comprises PRFs standardized reporting,

types and amount of garbage, equipment and technology, technical cooperation, regulatory matters, and support (Chen, 2015).

**UNEP Regional Sea Programme.** In 2003 the UNEP Regional Sea Programme and GPA (Global Programme of Action) initiated the development of a global initiative program on marine debris. The main activity focuses on a) assessment and examination of marine debris status in the region. b) organization of regional meetings between marine debris experts and national authorities. c) regional action plans preparation for marine debris management. d) in the framework of the International Coast Cleaning Campaign participating in regional clean-up days. The activities were organized in twelve regions through individual arrangements (UNEP 2009; Chen 2015).

**UNEP/IOC Guidelines on monitoring and surveying marine debris.** In collaboration with the IOC (Intergovernmental Oceanographic Commission), the UNEP developed procedures on monitoring and surveying marine litter to give a scientific long-term platform monitoring. The guidelines are composed of four sets: broad beach assessments, benthic, floating debris, and rapid evaluation of beach debris (Cheshire et al., 2009; Chen 2015).

**UNEP Guidelines on economic instruments and market-based.** The UNEP develops procedures on economic instruments and is market-based to provide information to decision-makers that work as a practical reference on choosing, applying, and implementing economic-related tools. The tools include a tax on plastic bags, subsidies, taxes for tourists, program on deposit-refund plastic and glass bottles, fees for car parks, charges for waterfront business, incentives for reporting and removing debris for fishers (Ten Brink et al. 2009; Newman et al. 2015; Chen, 2015).

**Honolulu Strategy**. Established in 2011 on the fifth Conference of International Marine Debris co-organized by the NOAA and the UNEP. The Honolulu Strategy is a

global comprehensive framework action to reduce marine debris. It comprises of three goals on reducing threats of marine debris, 19 strategies, and numbers of activities that concerned parties can adopt at national levels (UNEP/NOAA 2011; Chen 2015)

**UNEP Global Partnership of Marine Litter.** In June 2012, the UNEP established a Global Partnership of Marine Litter (GMPL) that constructs the Honolulu Strategy. The GMPL stands as a "coordinating forum" among stakeholders such as an international, regional, national, and local organization involved in managing and preventing marine litter areas (Chen, 2015).

**UNEP/FAO ALODFG (Abandoned, lost, or otherwise discarded fishing gear)**. The UNEP and FAO Commission (Food Agriculture Organisation) report identified the causes of abandoned, lost, or otherwise discarded fishing gear and revised existing measures to reduce it. Further, suggested solutions for future action to address ALODFG. (Macfadyen et al. 2009).

#### 2.3.1.2. The regional instruments

**Marine Strategy Framework Directive (MSFD**). The European Union has introduced several policies, laws, and initiatives, including the Marine Strategy Framework Directive (MSFD), to reduce marine litter and its impacts. The Directive is the first EU-wide legislation to protect marine biodiversity and was adopted on 17 June 2008. The MSFD goal is to more effectively protect the ocean environment across Europe and accomplish good environmental status (GES) of EU marine waters by 2020 (Chen, 2015)

**OSPAR Convention**. OSPAR aims to provide a single instrument for monitoring and protecting the marine environment among OSPAR countries. It was adopted in Paris on 22 September 1992, replacing the Oslo Convention for the Protection of the Marine Pollution by Dumping from Ships and Aircraft, 1972 and the Parish Convention for the Prevention of Marine Pollution by Land-Based Sources, 1974 (Wong, 2017).

**Bangkok Declaration on Marine Debris**. In this declaration, representatives of participating countries conveyed a joint call to address the global pollution threat to the ASEAN regional marine environment, including plastic waste. They emphasized several priority issues, including; a) they were strengthening action to reduce marine plastic waste at the national level, among members of ASEAN countries and related parties. b) Enhancing inter-sectoral coordination. c) Improving multi-stakeholder cooperation and coordination. d) Promoting engagement and investment by the private sector. e) Strengthening research capacity and scientific knowledge application. f) Increase public awareness, participation, and education on the marine environment by accelerating advocacy and action. ASEAN ratified the Bangkok Declaration to eradicate Marine Debris, adopted at the 34th ASEAN Summit in Bangkok on 22 June 2019 (Sabatira, 2020).

**ASEAN Framework for Action Marine Debris**. ASEAN Special Ministerial Meeting on marine litter was held on 5 March 2019 in Bangkok, Thailand. The meeting consisted of representatives from natural resources, environment, and marine affairs from all ASEAN members. The meeting outcome is a framework to strengthen cooperation to prevent and address marine plastic litter among ASEAN member countries and related parties. This framework consists of four priority areas: a) Support and planning policy. b) Capacity building, research, and innovation. c) Public awareness, education, and outreach. d) Private sector involvement (Sabatira, 2020).

#### 2.3.1.3. National Instrument for protection marine environment in Timor Leste

**Constitution RDTL.** Through article six, as the state's main goals, the constitution recognizes protecting the environment and preserving natural resources. Moreover, Article 61 emphasizes the right of the citizens of Timor-Leste to a healthy, humane, and environmentally balanced and is obliged to protect and enhance it for future generations' benefit.

**Decree-Law 26/2012** based on environmental law. Article 25 emphasizes the basis for conservation, including protecting and sustainable use of marine resources, species, and ecosystems; the state must ensure the integrated management of coastal areas. It must pay attention to the limits of natural processes and the long-term balance of economic, social, cultural, environmental, and tourism activities, including management of pollution discarded from land and sea sources.

**Decree-Law 2/2017** regarding Approves the Urban Solid Waste Management System. This decree-law defines the rules to which the system complies with solid urban waste management in Timor-Leste. Among the various measures to achieve this goal is introducing urban waste management procedures based on rules and regulations to establish criteria for waste handling in capital Dili and another urban area in Timor-Leste. In addition, educational campaigns that can influence citizens' habits and consumption patterns should be conducted to reduce the use of materials that negatively affect the environment in the long run.

**Decree-law 37/2020** regarding Disposal, Import, and Production of Bags, Packaging, and other Plastic Objects entered Timor Leste. Considering that the current pattern of consumption of plastic bags and packaging results in high levels of pollution and inefficient use of natural resources, it demands a robust legislative response to the problem; otherwise, the accumulation of residues in water bodies results in more frequent flooding and threatens aquatic ecosystem

## 2.4. Theoretical Framework

This section will describe the theoretical framework that will be used in this study.

Numerous studies draw on a body of natural resources governance theories and their implementation to specific contexts of coastal area nations and regions (Gelcich et al. 2010; Vince 2014; Freire-Gibb et al. 2014; Fletcher et al. 2014), or particular fields sectors like fisheries (Koiman et al., 2005; Jentoft & Chuenpagdee 2009; Bavinck et

al. 2013), shipping (Seebens et al. 2013), watersheds (Kroon & Brodie 2009; Álvarez-Romero et al. 2015), small islands (Glaser et al. 2018), mining (Wedding et al. 2015), offshore energy (Wright, 2015), or marine protection and conservation (Jentoft et al. 2007; Gruby & Basurto 2014).

Few, however, have explored the application of governance theories to the problem of marine plastic litter. Such studies have been conducted by Vince & Hardesty (2018). They address governance and policy to reduce marine plastic pollution by managing and changing the global society's relationship with plastic. In addition, reducing the global plastic pollution problem requires a complete, integrated approach that employs community participation, scientific knowledge, and market-based schemes (Vince & Hardesty, 2016).

Marine plastic debris or MPD has been defined as anthropogenic litter or debris found abandoned in the marine environment mainly by plastic. Moreover, studies show that 8o percent of MPD is generated from land-based sources. Therefore, the alternative and effective way to mitigate MPD is to formulate and apply a specific policy or action by the government or other institutions.

The policy is a set system of principles deliberate in guiding decisions and achieving rational outcomes. A policy is a statement of intent and is executed as a procedure or rule (Rahimi & Noruzi, 2011). The governance body generally adopts policies within an organization. Governance consists of the government, policy sector, organizations, groups, and individuals, and they are undertaking governing processes.

Two theories support this study as a theoretical framework. These theories are Interactive Governance Theory (IGT) by Kooiman to explain the approach to the problem and formulate the principles and guidance to implement it and Role Theory to explain the role and responsibility of the actor involved by Ralph Linton (1936)

The first theory that used is Interactive Governance Theory (IGT), defined by Kooiman as;

*"The whole of interactions taken to solve societal problems and to create societal opportunities; including the formulation and application of principles guiding those interactions and care for institutions that enable and control them" (Kooiman et al. 2005, p. 17).*

Interactive governance involves interactions of multiple actors such as civil, public, and private to solve the problem, not only through single efforts or doing it alone (Kooiman et al., 2008). In other words, environmental governance is a multi-level interaction between local, national and international, or global, but not limited to the interaction between the three main actors: government, private, and civil society, no single actor has all the understanding, capacity, and data and evidence required to solve the diverse, complex and dynamic problem together they may well have the resources and capability to fulfill a governing task (Kooiman et al., 2008). These interaction activities are carried out formally and informally in formulating and implementing policies to respond to demands and input from the community related to the environment, aiming to achieve a sustainability-friendly environment (Partelow et al., 2020).

A theoretical base for judging and improving the interactive natural resource governance system has been provided by governability (Kooiman et al. 2008:2) and composition of governance capacity and governance quality (Chuenpagdee and Jentoft 2015). The former system plays a role in focus, while the latter system adds a normative dimension, testing whether the government meets specific standards or principles (Partelow et al., 2020).

Governability shows a balance between the social system (SG), capacity government system (GS), and the totality of government interactions (GI) to meet specific needs

(Partelow et al., 2020). Governability is defined as: "*The overall capacity for governance of any societal entity or system"* (Kooiman et al., 2008, p. 3). The interactive governance perspective captures in a conceptual framework how governance bodies engage with the operational parts of a marine plastic litter problem to ensure that marine plastic litter concerns become part of governance efforts. To examine the dynamic in terms of an element, modes, orders, and interactions, IGT proposes a model that assumes that any system of society features, namely its diversity, complexity, and dynamic, will generally increase (Partelow et al., 2020).

The elements of governance consist of images, instruments, and action. "Images" are guides to the how and why of governing. There are many different kinds of images: visions, knowledge, facts, judgments, presuppositions, hypotheses, beliefs, goals, and objectives. The "instrument" links the ideas to the action. The series of instruments existing to influence social interactions is wide. They may be ‘soft’ instruments such as information, bribes, or peer pressure. They may involve taxes, permits, or fines in legal proceedings and have their roots in law or finance. There are also 'hard' instruments of physical strength. The final element of interactive governance is 'action,' which is the implementation of instruments, including the implementation of policies according to established guidelines, which are routine matters (Kooiman et al., 2008)

There are three ideal-typical forms of governance: hierarchical governance or a classic model, self-governance, and co-governance. All public and societies exhibit and oblige a mixture of these three types. However, the most typical governance used is hierarchical governance, where its characteristic is the interaction among the state and the citizen. It is a top-down style where command and control are the key concepts. At the same time, self-governance refers to a situation where actors look after themselves without the state's sphere of influence. Co-governance means that community parties join together with a mutual goal in mind, risking their identity and independence to

achieve it. Co-governance has captured plenty of attention from the public and with all its possibilities (Kooiman et al., 2008).

The order of governance is divided into first-order governance, which occurs where society and their groups co-operate to solve social problems and create new chances or possibilities. In addition, second-order governing emphasizes the institutional settlement in which first-order governing occurs. Further, the third-order governance, or meta-governance, follows the core principle of rationality. The idea is that the government should be based on reliable data or facts and choose rational and defensible mechanisms. Another core principle of meta-governance is responsiveness and performance that binds and evaluates the implementation of government as a whole. (Kooiman et al., 2008).

The governance of interactions can be viewed from the actor's perspective and the structural level. Actors come from a variety of societies whose actions are constrained or allowed by structures. They come from any social unit within the agency, including individuals and households, associations, managers, corporations, government agencies, and international organizations. Structure refers to the outlines in which actors operate and consider these, including culture, laws, agreements, technical capabilities and materials, and many other measurements of what we have inherited from birth and what makes up the world we live in. In sociological terms, actors are always changing the structure while being the target of their influence (Kooiman et al., 2005)

IGT is known to be problem-oriented and provides the analytical outline with fewer references to the underlying theory described. For instance, Chuenpagdee (2011) provides an example of Interactive Governance Theory analysis in coastal protection. He argues that interactive governance and governance analysis are used to look at governance with a holistic lens which can help solve sustainability problems when there is a balance between environmental integrity and socio-economic viability.

The interactive governance theory recognizes the involvement of different actors as they are the most significant actors. This study will explain the roles and responsibilities of actors (government and other institutions) more comprehensively by using the role theory from Ralph Linton (1893-1953), an anthropologist from American culture. He is one of the significant contributors to anthropological reconstruction throughout the second quarter of the twentieth century (Linton, retrieved June 2021). Linton defines status social as "*a position in a particular pattern which is a collection of rights and duties*" and social role as the "*dynamic aspect of a status that puts the rights and duties which constitute the status into effect*" (Lopata, 1991, p. 1).

Robert Linton has succeeded in developing a role theory that describes the social interactions of actors who play according to what has been determined by culture. Role expectations will guide a person to behave in everyday life. Moreover, role theory is a blend of the disciplines of psychology, sociology, and anthropology, and the three fields of science take the term role from the world of theatre. In a theatrical performance, an actor must act as a particular character. Further, it is explained that the character is expected to behave in a certain way when carrying out their role. Each given role has an identity that distinguishes individuals about who and how the individual acts in certain situations. According to role theory, a person has a particular role, such as a doctor, student, or parent (Lopata, 1991). Role theory suggests that when a person is aware of the role they are expected to play by others, they will know how to behave (Biddle, 1986). Therefore, the person is likely to behave according to their role.

Role theory conceptualizes daily activities as actions of socially defined categories (e.g., mother, worker, and housewife). A set of rights, responsibilities, expectations, norms, and behaviors that a person must face and fulfill is a form of each social role. The root observation of this theory is that individual behavior is context-specific, and

they behave in predictable ways based on social position and other factors (Barnett, 2014). Moreover, responsibility is one of the character values that must be instilled in every human being to become a person with a good personality. Responsibility is the personal behavior and attitude to carry out the obligations and duties he should do to himself, society, and the environment (nature, community, and culture) (Hidayat, 2020)

The theoretical framework described above is chosen to support this study to assess policies responses for marine plastic debris. Policies are regulations made by the government and other institutions to optimize environmental maintenance, especially in the marine environment. Policy implementation is a follow-up to the existence of a particular policy. At this stage, it is necessary to make efforts made by the government and other institutions to be in harmony with the policy's objectives in implementing the policy. The results of good policy implementation will produce a marine environment maintenance system in line with expectations. So far, marine plastic debris has been managed appropriately (i.e. regulations, policies and programs), and the government and other institutions have defined roles and responsibilities in maintaining the marine environment. In addition, whether in implementing the policy, there are many challenges and barriers. Therefore, it becomes more of a challenge in preserving the marine environment.

## 2.5. Conclusion

Marine debris refers to unwanted items consisting of substances produced and used by humans that are accidentally or intentionally released into the marine environment. It enters the marine environment through rivers, drains, sewers, sewage outfalls, stormwater runoff, tides, and seeps. Marine debris consists of plastic, wood, metal, glass, rubber, textiles, and paper. However, plastics are most commonly found in the ocean environment. Improper waste disposal in cities and industries is the primary source of marine debris entering the oceans. Therefore, marine debris can be classified as hazardous items that come from various sources and endanger the environment and

human life if not well managed. All plastic waste found in the ocean environment is referred to as marine plastic debris.

In the 1970s and 1980s, the impact of marine plastic debris on the environment was recognized. Due to the decrease in plastic waste entering the environment, various policy discussions and recommendations were developed. The legal framework for managing and preventing marine litter covers several levels, ranging from international, regional, and national and local regulations. The instruments consist of conventions, agreements, regulations, strategies, action plans, programs, and guidelines. It also describes two theories that support this study as a theoretical framework. These theories are Interactive Governance Theory (IGT) by Kooiman to explain the approach to the problem and formulate the principles and guidelines for its implementation. Role Theory, to explain the roles and responsibilities of the actors involved, Ralph Linton (1936).

# Chapter 3: Methodology

## 3.1. Introduction

This chapter will provide the methodology of this research. The chosen research design, sources of data, data collection, data validity, and data analysis will be discussed in detail.

## 3.2. Research Design

This research is based on qualitative methods, where the data collected is words, not numbers (Drury & Randall, 2011). According to Sofaer (1999), Qualitative research techniques describe complex phenomena very well and track unexpected or unique incidents. It illuminates the experience and interprets events by actors who are with wide differing roles and stakes while paying attention to views that are rarely heard. Further, it conducts preliminary explorations to build up theories and test hypotheses with rich explanations.

This qualitative method research is rigorous and systematic, trying to reduce error and bias and find evidence that initially disconfirms or develops hypotheses. Moreover, qualitative methods build comprehension of the context of events and the events themselves (Sofaer, 1999). Therefore, this qualitative method used in this research is intended to find out what policy was formulated by the government and other institutions to control and reduce marine plastic debris in Timor Leste.

From various reference books on research methodology, Creswell (2013) five main qualitative research classifications were noted: narrative research, phenomenology, grounded theory, ethnography, and case studies. Case study research seeks to explore a problem or several problems within a system boundary through in-depth studies and detailed data collection from various sources of information (observations, interviews, audio-visual materials, documents, and reports). This study explores to find answers to research questions to examine the current status of marine plastic debris in Timor

Leste. The type of qualitative research chosen in this study is case study research to seek answers to these questions.

### 3.3. Method of Selecting Participants

Email invitations were sent to 13 participants during June 2021 via the WMU Gmail account (Appendix E), and 11 participants were replied. Participants were selected purposely or as a non-probability sample (Hennink & Bailey, 2020). Therefore, the study selected high-level policymakers and decision-makers in their institutions since they have the knowledge and are key experts of marine plastic debris. This research was conducted from June 2021 to August 2021 after getting approval from the WMU ethics committee (Appendix A).

In addition, Moon (2000) argues that relationships between participants and researchers can be based on openness and mutual respect even without face-to-face contact. Moon also suggested that researchers should be open and keen to provide participants with detailed information about themselves and their research. Therefore, a brief introduction to the research topic and an overview of the purpose of the study were provided prior to the interview (Appendix B). Furthermore, in the process of recruitment, some participants have promptly replayed the invitation. However, some participants received reminder invitations after three weeks, as the use of reminders can be helpful as it increases the response rate by five times on average from the participants (Meho, 2006).

### 3.4. Data Sources

Data collection plays an essential role in statistical analysis. There are different methods in research used to collect information. Data can be collected in two categories: the primary source, primary data obtained by the researcher themselves for the first time. Primary data sources include questionnaires, surveys, observations, personal interviews, and experiments. Secondary sources are the data obtained from

other sources collected by other sources such as journals, websites, or other publications (Mesly, 2015, Ajayi, 2017).

This study used primary data to collect information from the field. In this study, the primary data sources are governments from different ministries (Ministry of Fisheries, Ministry of Environment, Municipal Authority, National Directorate of Maritime Transport, Ministry of Tourism, and the Ministry State of Administration) and other institutions (NGOs, youth movements, private business).

### 3.5. Data Collection Method

Data has become an essential part of the research because, from the data, researchers can find out the results of their study. In this study, data was collected from primary sources that refer to the first-hand data gathered by the researcher through interviews (Ajayi, 2017). A valuable opportunity for researchers to explore topics based on respondents' experiences is through interviews (Weiss, 1994). The interview is commonly used in the qualitative data collection method composed of structured, semi-structured, and unstructured interviews (DiCicco- Bloom, 2006).

This study used the structured interview method to identify the policies to control and reduce marine plastic debris at Timor Leste. In a structured interview, all participants will be asked the same set of predetermined questions with a limited response category by the interviewer. There is usually little room for variation in responses, with the exception of open-ended questions (which is rare) that can be used (Fontana & Frey, 2005). These interviews can be conducted face-to-face, in written form, or by telephone. In this study, the interview was conducted by Zoom.

There were nine main questions (Appendix C) prepared to guide the research and obtained approval from the WMU ethics research committee. The questions focused on their current knowledge about marine plastic debris in Timor Leste, their organization's role and responsibilities, and what policy to use to control and reduce

marine plastic debris in Timor Leste. To make it easier for the respondents to express their opinion, the interview was conducted in both languages, Tetum (mother tongue) and English. Moreover, it will allow them to speak easily about the essential subject. The interview was generally 30 minutes to one hour.

### 3.6. Data Validity

Credibility criteria are used to determine the validity of the data in this study. In order to obtain relevant data, a pilot study was used in this study to check the validity of the research data before going to the research study (Jack, 1998). The pilot tests were conducted with study colleagues who have background and knowledge related to the research studies to make final adjustments to the questionnaire before it is included in the research study.

### 3.7. Data Analysis Method

Recordings and notes were taken during the interview. After the interviewing researcher transcribed all the data and created a separate folder to store the video footage, recordings, and transcribed data interviews.

This study utilizes Miles and Huberman's three steps to analyze the data. The steps are composed of data reduction, display data followed by conclusion: drawing or verification.

1. Data reduction is defined as the process of selecting, shortening, abstracting, and transforming raw data obtained from field records. Data reduction cannot be separated from data analysis. In data reduction, the researcher codes the data collected in the field. Coding aims to select what data will be discarded, what patterns can be used as research findings, summarize the developing stories, and what information does not relate to the research objectives.

   For this analysis, after transcribing the data, many codes were created for each interview, which was then merged and combined into one overarching theme

created according to the research question and coded under a specific theme. The four themes were identified in the research question, which includes examining the current status of marine plastic debris in Timor Leste and understanding the role of government and other institutions in addressing marine plastic debris. It also identifies the policies and action plans taken to control and reduce marine plastic debris, identifying the challenges and barriers in implementing the policies and ways to overcome the challenges.

2. Data display explains a group of structured information that provides the ability to draw conclusions and take action. The display of qualitative data takes the form of a narrative text designed to arrange the information in a coherent structure that is easy to understand. This means that when results are collected in the field, the data obtained are scattered and poorly structured, and the results do not meet the research objectives. Therefore, by using this second method, the data will be good and arranged and meet the expectations of the researcher. The data can be presented with the help of tables, charts, pie charts, pictograms, and others. Thus, the method used by the researcher is to facilitate obtaining accurate data that will meet the research objectives.

3. Drawing conclusions or verification is the final part of qualitative research. The researchers have to come to conclusions and verify them, both in terms of the meaning and the truth of the conclusions, which are consistent with the study's location. The meaning of the data formulated by the researchers must be tested for accuracy, suitability, and robustness. Therefore, while conducting the research, the authors continuously conduct the conclusion phase. Then the data in each conclusion becomes valid and sound. Verification is continuously conducted by the author briefly checking and reopening the results of the notes from the field. Moreover, in this third phase, the researcher looks for the relationship between the categories formed in the previous step. Thus, the category process finds patterns or themes by looking for relationships between

the categories found, hoping that the researcher will obtain information to help achieve the research objectives.

The above three steps form the interactions in data collection as a cyclical process in the field. In this process, the study moves from the direction of data collection during data collection and follows the lines of the Miles & Huberman models. Thus, the data were analyzed, including data reduction, display, and conclusion (drawing or review). It aims to find and build an understanding of the workflow and obtain data accurately, precisely, and empirically. The processing activity is shown in Figure 3.1.

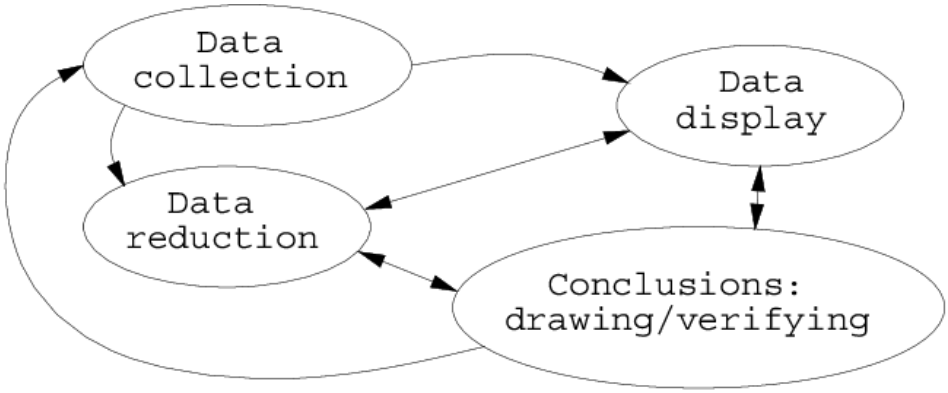


Figure 3.1: The interactive model of data analysis

Sources: Miles and Huberman 1994

### 3.8. Ethic and Clearance

The participant information sheet (Appendix B), list of interview questions (Appendix C), and consent form (Appendix D) are attached. All documents were approved by WMU Research and Ethics Committee (REC) in June 2019 (Appendix A). As part of the guidelines, respondents will be required to sign the consent and confidentiality form prior to the interview. Participants' identities will not be revealed throughout the study for confidentiality and data integrity reasons, and they will be classified as R1,

R2, and R3. All materials collected in the field will be kept for the research period and will be permanently deleted after completing the study.

# Chapter 4: Result and Discussion

## 4.1. Introduction

This chapter will provide detailed information on the participants in this study and display data analysis obtained through structured interviews and discussion.

## 4.2. Participant Overview

This section provides detailed information about the participants. They are 11 interviewers composed of the government officers, NGOs, youth movement organization, and private sector participated in this study. The breakdown information is shown in the table (see table 1).

**Table 1: Demographic profile of the respondents**

| Date | Respondent | Gender | Age | Education | Occupation | Position | Work experience |
|---|---|---|---|---|---|---|---|
| 24-06-21 | R1 | M | 43y | Bachelor degree | Non-Government | General Coordinator HASATIL | 20y |
| 25-06-21 | R2 | M | 25y | Bachelor degree | Youth Movement | Coordinator 3R | 6y |
| 26-06-21 | R3 | M | 29y | Bachelor degree | Non-Government | Founder of NYD | 7y |
| 02-07-21 | R4 | M | 48y | MSc | Government | Director General of Environment | 21y |
| 07-07-21 | R5 | M | 34y | Bachelor degree | Youth Movement | Coordinator of Movements Tasi Mos | 7y |
| 04-07-21 | R6 | M | 57y | Master degree | Government | Director-General of Fisheries and Marine Resources | 25y |
| 02-08-21 | R7 | M | 60y | Bachelor degree | Government | National Director of | 20y |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| | | | | | | Maritime Transport | |
| 30-07-21 | R8 | F | 36y | Master degree | Government | Director of Planning Dili Municipality | 2y |
| 30-06-21 | R9 | M | 62y | Master degree | Government | Director-General State of Administration | 20y |
| 09-08-21 | R10 | M | 40y | Master degree | Government | Director General of Tourism | 10y |
| 11-08-21 | R11 | F | 27y | Bachelor degree | Private sector | Chief of Staff | 5y |

## 4.3. Data Analysis

This section provides the results of the study and will examine the current status of marine plastic debris in Timor Leste. The findings will describe the roles and responsibilities of the government and other institutions in addressing the MPD. It also will identify the policies and action plans undertaken to control MPD. Besides, it will explore the challenges and barriers in implementing it and how to overcome them.

### 4.3.1. Examining the current status of marine plastic debris in Timor Leste

The study conducts a structured interview to explore the participant's knowledge of marine plastic debris in Timor Leste. In chapter one, the study mentioned that Timor Leste heavily depends on importers of essential products that, if unmanaged well, will all end up in the trash and find their way to the ocean. This issue was also raised by respondents when doing the interview. Some respondents (R2, R3, and R5) mentioned that marine plastic debris occurs when Timor Leste enters a new era open to free trade, importing, industrialization, increasing population, and consumption demands mainly in the form of plastic, including plastic packaging, plastic bottles, and styrofoam. According to R4, the three-element of plastic (plastic packaging, bottle plastic, and styrofoam) become a risk to the environment; people will eat and drink, litter the

environment, and cause degradation, especially when having a picnic at the beach. Nevertheless, R5 stated, based on his experience and knowledge of the maritime area, that Timor Leste has not yet reached the threshold or tipping point where problems are difficult to control. Moreover, there is insufficient data to explain that Timor Leste marine debris has contributed to several points.

In addition, this study also found that poor waste management from the authority responsible for plastic spread in the ocean environment. For instance, there is no segregation of waste (wet and dry or bottle and can) from the household, and all are mixed and dumped in the temporary garbage station. The company responsible for garbage collection will be collected and transferred to the final dumping site using an ordinary truck that does not deserve to load the garbage allowed to blow by the wind to the street. Furthermore, the study also found that there is inadequate waste disposal infrastructure. For instance, some respondents mentioned that the garbage station in the street is freely open and allows animals and people to access and lead the waste to spread everywhere in the environment. Further, it is difficult for sanitation collectors to collect the garbage. The observation came from respondents who identified that people living on the riverside are freely dumping waste into the river due to the limitation of proper facilities and the lack of awareness among the people.

The plastic waste that washes away into the sea will stay and remain, threaten marine biodiversity, damage the ocean environment, and impact tourism. In addition, to cope with the growing plastic debris in the Timor Leste Ocean, R4, R5, and R11 stated that Timor Leste currently does not have proper standards or guidelines to manage marine debris especially marine plastic debris. Even Timor Leste takes part in the coral triangle and is an Asian and Regional group member. Still, Timor Leste's marine debris management is not well managed. However, they all agree that marine plastic debris in Timor Leste is partly addressed through beach clean-up by government and organizations working on conservation, raising public awareness, education, recycling, and creating and implementing policy.

**Table 2: Excerpts on examining the current status of marine plastic debris in Timor Leste.**

| Respondent | Quotation |
|---|---|
| R1 | "I think this is our concern; waste management in Timor Leste is not well organized. The process starts with the municipality responsible (called; blue brigade) collecting directly from each area and transporting to the final destination area without segregation or separation all mixed and transported to the dumpsite". |
| | "Government through the Ministry of Environment has already facilitated the participation of the youth in this issue, for instance, created a Facebook group to mobilize youth activity for beach clean-up. We are starting to mobilize our volunteer youth from each village or area to process plastic waste into a product". |
| | "From our side observation during the long period, we identified that in the riverside people that live in the riverside or near to riverside utilize the river as their dumpsite and when the rain is coming, it will wash away all the waste to the ocean. From the identification, we find out that all the waste, much of it contains bottle plastic (bottled water, bottled soda, can, etc.)." |
| R2 | "If you want to compare marine debris in Dili Timor Leste and the other countries, for example, Indonesia and Philippines, I don't have any data about the marine plastic debris in our ocean. But, you can see visually that our marine plastic debris is not too worse than Indonesia or the Philippines. Indonesia and the Philippines are worse because their population is higher their consumption of plastic is higher than TL. Timor Leste is very small. But, if we compare marine debris pollution with our population, which is 1.3 million, I think our marine debris is also in the phase of too worse." |
| | "The waste management system in Timor Leste is still in the very old style, all of the waste going to the dumpsite. For example, in Dili, the waste will go to Tibar, and digging the holes and burned, so the pollution causing other pollution which is air pollution so it is affected to the others area as well or other sectors as well, not just the air pollution but, because of the stinky smell from the waste, sometimes communities that living surrounded or living the near dumpsite affected there is a lot of data about it, this issue affected to the community which is diarrheas the respiration problem and many more issues." |
| | "Let me try to mention some of these problems that are causing marine debris in the country, which are infrastructure, waste management system, and the consciousness of the people itself." |
| | "We are facing many challenges regarding plastic waste in the ocean because many people don't have the consciousness to dump plastic waste in the proper place." |
| | "For plastic in general, there is no system to do the recycling to do the re-use again, but there are some we can say that very-very small or little activity of recycling or processing the plastic or the plastic waste which is from the volunteer organization." |
| R3 | "When we started our independence in 2000, it's been…. 18 years now. We don't see any plastic before our independence. It is our government's decision of free trade that allows all company to import their grocery (drinking bottles) start; from that, Timor Leste has established their industrialize. Plastic pollution in Timor Leste right now is frustrated among other urban plans." |
| | "We don't have the technology of the waste management, and we have only one place to disposal waste, we don't have separation waste in our household, organic and non-organic they mixed together." |
| | We have a lot of rivers and drainage, especially in rainy seasons as we say before about collecting rubbish people usually throw in the drainage and the river and wash away into the main river. Some people who live in the river bank or near the river, they don't have any rubbish collector, seriously." |
| | "I am a diver. I feel shame or embarrassment when we take other to diving we have lot healthy corals, but some are full of rubbish, but people love our corals, our ocean, healthy coral and marine creature, but our coastal or shore management is too poor." |
| | "Waste and marine debris are connected to our character and our behavior uneducated and disoriented." |
| | "Government every Friday is doing a beach cleanup." We dive to clean or remove the plastic in the ocean." |

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| R4 | "We will not import the three elements of plastic in the future, because we can say that the three principal elements of that plastic are becoming a risk to our environment, people will eat and drink and throw everything to the environment and cause degradation." |
| | “Our waste collection uses ordinary truck that it does not deserve to load garbage. The garbage is collected and loaded to the final destination (Tibar) took 8km. So, as you can see, it is a far distance, the condition of the truck that only covers with a tarp, when the wind is coming it will blow away to the street and everywhere before reaching the final destination.” |
| | The community that leaves, for example, 100 meters far from the waste station, they will burn it or throw it into the river, and when rain coming, it will wash away to the sea.” |
| | "Our garbage facilities in Dili it is not a good proper, we can say that the garbage bins or the garbage station are freely opened can allow an animal to grab the food inside and people can burn all the garbage inside the garbage bins, when rain is coming it will wash away all the garbage in the garbage bins/station to the drainage, then it will cause the drainage blocked. In reality, our community lives in an unmanaged area (infrastructure); the house is in an irregular position difficult for the sanitation worker to collect the waste in each house or area.” |
| | “Still, it is in the leader community to educate and increase their community awareness to treat their garbage correctly and dump it appropriately.” |
| | “Even we take part in the Coral triangle, partner with the coordinating body on the seas of East Asia, Indonesia marine ecosystem, we take part in the Asia group and regional group, but our marine debris management is not well managed.” |
| | “Provide training and prepare our youth and community to enable them to transform the plastic waste to something that has economic value.” |
| | “We have some groups name MTM, HOPSELER, TAFON Green, KFF (Konservasaun Flora Fauna), then right now, we also have an environment protection brigade. These groups that during this time have an initiative every weekend they clean the sea because they see the huge potential of the sea came from tourism.” |
| | “We hope that ocean policy, fisheries law, protected area, so, from those laws, will facilitate us to do…..besides raising awareness.” |
| R5 | “We have an increase in imports from outside then the waste generated also increase too, and it is due to a weak management system." |
| | "But in the context of Timor Leste, in my opinion, it has not yet reached the threshold or tipping point where the problem is very difficult to control. Apart from that, there has also been no extensive research on marine debris. There is no strong data yet to say that the production of marine debris in Timor Leste has contributed several percent. There is no strong data yet to say that the production of marine debris in Timor Leste has contributed several percent.” |
| | “Regarding waste management, in my opinion, we have not achieved standardized treatment measures.” |
| | “Our experience (diving) has found a lot of plastic in the sea, some are wrapped around coral reef, animals, seabirds, and there are also some animals that eat garbage.” |
| | "Regarding waste management, we do not yet have standard guidelines, especially for marine debris, to tell us that this is required.” |
| R6 | “In my opinion, plastic waste is generated by humans and discards to the ocean environment intentionally or by accident. This plastic waste cannot be recycling or can't be decomposed naturally.” |
| | “Timor Leste has regulations in terms of plastic management, the law is there, and we can use it as a guideline to implement it.” |
| | “In my observation, waste generated from the community will collect from the waste station and transferred to the final destination. In the final destination, people are living near the waste station collected the necessary waste that can be used for the recycling process.” |
| R7 | “Plastic waste such as plastic bags, mostly collected from beaches and other areas of the city, can be destroyed by burning in open places. Fortunately, at the end of June 2021, SSE launches a waste manufactures recycling”. |
| R8 | "The work that we have been doing right now is we still collected manually. We have 50 dump trucks to collect every waste in every zone point, starting from east to west. That's why we have only collected all the waste from the bins that we placed all over the street. We will collect and bring directly to the Tibar. In Tibar, the process will be digging the hole and buried no more treatment because we adopt a manual system to treat all the waste. The burned |

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| | garbage is caused by the waste picker. Our environmental law doesn't allow to burn the garbage." |
| | "There is a youth movement and NGOs concerned about collecting marine plastic debris, especially on the shoreline." |
| R9 | "We are facing many challenges regarding plastic waste in the ocean because many people don't have the consciousness to dump plastic waste in the proper place." |
| | "The government of Timor Leste right now adopts zero plastic policy to implement decree-law no 37/2020". |
| R10 | "As I know, plastic waste in the ocean contributes to the contamination of Timor salt. Currently, Timor Leste's situation regarding plastic waste and can that spread in the shoreline destroy our beautiful ocean. When people are walking on the beach, they don't smell the fresh ocean, but they smell the stench of the garbage at sea." |
| | "This effort has been made as a method that the government prepares to manage the waste. The problem is lack of people's awareness to manage their own waste". |
| R11 | "Regarding the plastic waste in Timor Leste, we can say a lot because people still use plastic in the market, in the supermarket, and other places, we can see plastic. Plastic waste in the shoreline we can say a lot, mostly bottle plastic and plastic bags, because when people going to have a picnic in the sea they just littering they did not put their garbage in the proper place, so, my opinion plastic waste now in Timor Leste is higher." |
| | "The condition of the truck is that it is only covered with a tarp; when the wind is coming, it will blow away to the street and everywhere." |
| | "Even we already have a government program regarding zero plastic policy in Timor Leste, but people still use it because there is no consciousness or awareness from the community." |
| | "Timor Leste currently does not yet have the rule to serve as a guide on marine plastic debris management." |
| | "There is some group that transforms plastic waste, such as bottle plastic, into a creative product." |

### 4.3.2. Understand the role and responsibilities of the government and other Institutions in addressing marine plastic debris.

One of the study's objectives is to obtain each organization's role and responsibilities in addressing marine plastic debris through structured interviews. Various roles and responsibilities from government and institutions were discussed to address marine plastic debris, including organizing beach clean-ups, transforming plastic waste through the recycling process, raising awareness, educating people, socializing, advocating, and creating and implementing the law. However, all seven respondents (R1, R2, R3, R5, R&, R8, and R9) agree that the marine plastic debris problem and the environmental problems are government and other institutions' responsibilities and everyone's hands and responsibilities.

Despite their various roles and responsibilities to address marine plastic debris, they think an initiative could minimize the spread of plastic waste in the ocean. Six responses (R2, R3, R7, R8, R9, and R11) mentioned creating laws and enforcing the

law, and R3, R4, R9, and R10 stated bringing their bags when groceries are the best way to reduce the circulation of the plastic in the environment. Another initiative is establishing the recycling industry expressed by R1, R3, R4, and R6 as an excellent initiative to reduce marine plastic debris. Other responses (R11) said to make standard garbage bins all around the territory of Timor Leste. Moreover, the Watergate system net to prevent garbage and plastic waste from flowing into the ocean from rivers could become an excellent initiative to control marine plastic debris in Timor Leste (R3). Besides, remote sensing boats to detect the trash at sea is another initiative to be implemented in the future (R4 and R5).

**Table 3: Excerpts on the role and responsibilities of government and other institutions in addressing marine plastic debris in Timor Leste.**

| Respondent | Quotation |
|---|---|
| R1 | "HASATIL works closely in agriculture and environment protection. We dedicate ourselves and participate in the waste collected and organize youth people. Together with the movement group, we do the beach clean-up every Saturday and Sunday and manage all the plastic waste to transform into creative products such as paving, flowers, and other innovative products. The waste issue, especially plastic waste, is everyone's responsibility." |
| R2 | "We are trying to do small actions but have a big impact because we are volunteers, we are a non-profit organization, and we have our profession in our team. I am trying to unite/gather them and how we can do something based on our profession to the environment. Our specific example, we are doing the beach clean-up". This issue needs to be concerned by all the people." |
| R3 | "We are focused on a project, especially nutrition. We are concerned about nutrition, and we are concerned about plastic pollution affecting the fish nutrition among land and also the ocean. We dive to clean or remove the plastic in the ocean, but 100% we cannot clean all the rubbish; if we see the plastic we clean, we don't see we cannot clean it if we see we take it. One prioritizes that deal with this is not me, not you, but as a Timorese, as islanders, we must empower one each other especially coastal community, to work on this issue." |
| R4 | "The roles and functions of the Secretary of State of Environment are to make management policy, information policy to disseminate the information to the community to raise awareness to dump the waste or garbage into the proper place, some waste we can utilize, some waste we can make into something that has economic value. Right now, we are preparing a new policy named zero plastic." |
| R5 | "As a volunteer movement organization, MTM has a mission to fight against plastic waste in the country. We are a volunteer agency that plays a role in advocating, socializing, and doing cleaning activities on the coast but on a very small scale. We explain to the community the importance of awareness, and we call personal training on the marine environment to increase their knowledge. I think everyone should play a role so that Timor Leste can overcome the waste problem and can save our oceans for generations to come." |
| R6 | "Conducting awareness to the community to not throw garbage into the ocean environment, we have a section in the fisheries department name pollution prevention section who work close to control and combat plastic waste enter to the ocean environment, control fisheries company by requesting them to report the garbage that they brought with them when they came back to ensure that they do not dump it to the sea, make sure there is no plastic waste discharge in the aquaculture farming and coordinate with local community leader, community and NGO to do beach clean-up." |

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| R7 | "To make people aware not to throw plastic waste carelessly in the sea and on the beach, we always socialize to port users and ferry users, not to throw away plastic waste and plastic bottles. We recommend not to use plastic bags to travel by ferry, and we recommend using non-plastic bags. The reduction of plastic does not depend on the government or companies, but on the awareness of the entire community, So the green, clean and healthy environment is the responsibility of all citizens." |
| R8 | "So our role is only to manage domestic waste or solid waste, but we are not looking specifically regarding plastic waste that spreads in the sea. If the plastic waste discharges in the shoreline, I think we can collect it. We can hire a company to collect all the garbage on the coastline. But if the plastic waste dumps into the ocean, we have to make a difference or separate it. But I think if the garbage that discharges in the coastline, of course, it is everyone's responsibility." |
| R9 | "MSA function is to give Competence for fiscal management through Current District Administration. The President Municipal Authority/Municipal Administrator to control and pay full attention to the hygiene and cleaning in the area the people live in as well as in the public area in the capital city. We all know that plastic waste in the sea is everyone's concern at this time, especially in the Timor Leste Ocean." |
| R10 | "To do the management of plastic waste originating from marine tourism activities and organizing and conducting beach clean-up." |
| R11 | "We, as a private company working to clean the beach in Oecusse, we have equipment like a tractor especially to clean the beach. If the government continues to trust our company to clean all the beaches, we have the plan to order more equipment to clean the beach and assign a team that focuses on collecting marine plastic debris and transforms it into a creative product through the recycling process." |

**Table 4: Excerpts on initiatives in addressing marine plastic debris in Timor Leste.**

| Respondent | Quotation |
|---|---|
| R1 | "To get a reference from other countries on how to recycle." |
| R2 | "The things that need to be trying to solve the problem is in the law the strict on the law, some people that maybe complain a little bit and after that one of two weeks everyone will follow the system." |
| R3 | "Fine people who throw the rubbish when they do the picnic and law enforcement." |
| | "Stop exporting plastic all over the world." |
| | "Bring own bag to the supermarket (kohe/bote, traditional bag." |
| | "Watergate is the best way; it is aimed to put all the nets into the river also drainage to catch all the rubbish from the river." |
| | "If we have those things like recycling industry Timor Leste one of the country south Asia that recovering from plastic pollution." |
| R4 | "We inform all communities to use "Bote" when they do the shopping. Because it is a long-lasting product, we can use as many as we can, not like plastic that we use only one time and throw it away when we don't need it anymore." |
| | "The government also has an alternative to how to manage waste. As we all know, globally, people are talking about plastic recycling". |
| | "We need to have a boat or ship with the standard capacity that utilizes GPS or remote sensing to indicate that this area has a lot of garbage." |
| R5 | "It all needs modern equipment, and the boat includes equipment for picking up debris in the ocean." |
| R6 | "Create regulations to combat plastic waste, especially to the marine environment." |
| | "Other alternatives on how to utilize plastic waste to turn into something valuable." |
| R7 | "Yes, it would be better if the government was stricter and gave a serious number of fines (administrative fines) to the people who were still violating the policy." |
| R8 | "To maintain waste management, especially to the plastic waste that spreads on the beach or shoreline, we call everyone who has their picnic on the beach to collect all waste and put it in the proper bins." |
| R9 | "Yes, Government through MSA have the initiative to rigorous control for urban solid waste management system so, we can feel that capital city that clean, healthy, protect Environment and biodiversity in the ocean and land." |

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| | "Utilize friendly environment bags when shopping." |
| R10 | "Use "Bote" (Timor Leste traditional bag/bucket) to go shopping." |
| R11 | "The government has to play a role decisively to create a law that fines people when they are littering so the people will be afraid of littering." |
| | "Make a good and standard waste bin so garbage will not spread around the environment." |

### 4.3.3. Identify the policy and actions undertaken by the government and other institutions to control and reduce marine plastic debris.

The study also explores policies and action plans that the government and other institutions are undertaking to control and reduce marine plastic debris through a structured interview with an indicated respondent.

The study addresses what policy instruments are used *(e.g., legislation, regulation, guidelines, incentives)* to address marine plastic debris in Timor Leste. According to respondent R5 Timor Leste has a traditional law called "Tara Bandu" it is like an instrument and customary law to regulate between humans and nature but not specifically discuss marine plastic debris. R8 added there is a decree-law no. 2/2017 regarding Approves the Urban Solid Waste Management System and Government Resolutions no. 32/2016 regarding Investment Strategy for Solid Urban Waste Management in Dili nevertheless not specific to managing marine debris.

However, six responses (R1, R2, R3, R4, R6, and R9) mentioned Timor Leste right now has decree-law 37/2020 and the zero plastic policy to control plastic consumption. The zero plastic policy means that no more plastic goes to the bin and spreads in the environment but will be transformed into something that has economic value through the recycling process. R7 and R9 also mentioned several decree-law and international conventions that have been ratified as a basic principle for marine environment defenses and development, such as the UN Framework Convention on Climate Change and the Kyoto Protocol; The International Convention to Combat Desertification; The International Convention Biological Diversity; The Convention of Vienna to protect the Ozone Layer, and the respective Montreal Protocol. Decree-Law no. 26 of 2012

(environment law) and Constitution of the Republic Democratic of Timor Leste (Article 6, 61, 139).

The study also tested if any policy and action plan had been developed to control marine plastic debris in Timor Leste. Some respondents have answered like R1 mentioned that they have an action plan to reactive volunteer groups to respond to plastic marine debris through plastic recycling activity. Moreover, according to R11, they plan to establish a recycling department to reduce plastic waste in the bin and spread it to the ocean environment. Furthermore, R2 and R3 mentioned that they have an action plan, with the slogan 'small action but big impact,' which is to raise people's awareness by educating them, providing reading with images and videos regarding the effects of plastic debris on the ocean, and affect marine life. In addition, R4 mentioned they prepared a moratorium in 2019 until 2023 to support decree-law no 37/2020. They expect that in 2023 the plastic waste in the environment will be reduced at least from 18% to 10%. According to R6, they are now trying to create policies to coordinate with other relevant institutions with the same program on combating plastic waste. Because plastic waste is not directly discharged into the ocean, some are generated from the land. That's why they have to collaborate and integrate to combat plastic in the sea. Another plan from R8 is to place a signing board at the beach to call everyone who has their picnic on the beach to collect all their waste and put it in the proper bins.

**Table 5: Excerpts on the policy and actions are undertaken by the government and other institutions to control and reduce marine plastic debris.**

| Respondent | Quotation |
|---|---|
| R1 | "Decree-law 37/2020 zero plastic policy". |
| | "We are trying to bring alive the spirit of volunteerism to contribute to reducing plastic waste, reutilizing waste that is unused through recycling, and creating a job for ourselves. Reactivate the group (Sangar Masin) to continue their activity in protecting the marine environment" (R1) |
| R2 | "The Secretary of State of Environment is doing a good job to stop the styrofoam starting from this February." |
| | "To keep people aware, and my idea is to give the people reading, how we make a short video to local TV to always aware people how they can do to aware people/community." |
| R3 | "We have a plastic policy." |
| | "I educate people to understand the impact of rubbish on the ocean. Raising awareness, how plastic affects marine life. It is like small action but a big impact". |

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| R4 | "We have decree-law on eliminating plastic packaging but this provisory we also make moratorium, this moratorium we can say that we give time period because we consider that some plastic has already imported to Timor Leste and has circulated in the territory, so we give them (small kiosk, supermarket) a time limit until 2021 to finish it, then we will ban the import of plastic packaging totally. These are the processes that we have been through and hope that in 2023 we will reduce plastic waste from 18% to 10% step by step." |
| | "We are right now focusing more on the Secretary State of Environment on decree-law 37/2020 regarding Disposal, Import and Production of Bags, Packaging and other Plastic Objects entered in Timor Leste". |
| | "Besides, we are waiting for the ocean policy, and we can say generally ocean policy objective is to control the ocean. But, we are right now focusing more on the Secretary State of Environment on decree-law 37/2020 regarding Disposal, Import and Production of Bags, Packaging and other Plastic Objects entered in Timor Leste. Environmental decree-law article 39, regarding solid waste management. It is the basic environmental law. The decree-law covers the general context of waste disposal and waste management to minimize waste in the environment. We also have Government resolution no 32/2016 regarding the Investment Strategy for Solid Waste Management Dili, and it belongs to the Ministry State Administration. We also have penal code no 9/2019. This penal code is the strongest one because it is related to crime". |
| R5 | "Traditionally in East Timor, there is "Tara Bandu," whereas we know that "Tara Bandu" is like a regulatory instrument between humans and nature. So it can be said that we should not describe "Tara Bandu" as a guideline to fight plastic waste. In terms of state legality, there are also examples such as the blue economy; there are many documents. Many guidelines explain a lot about the sea, including management and marine biodiversity but do not focus on discussing marine debris". |
| R6 | "We have decree-law on using reusable plastic or bringing your plastic bag to go shopping." |
| | "We are now trying to create policies to coordinate with other relevant institutions that have the same program on how to combat plastic waste. Because the plastic waste is not directly discharged into the ocean, some are generated from the land. That's why we have to collaborate and integrate to combat plastic in the sea". |
| R7 | "United Nation Framework Convention on Climate Change and the Kyoto Protocol; The International Convention to Combat Desertification; The International Convention Biological Diversity; The Convention of Vienna for the protection of the Ozone Layer and the respective Montreal Protocol; Decree-Law no. 26 of 2012, the Basic Law on the Environment and Constitution of the Republic Democratic of Timor Leste (Article 6, 61, 139)". |
| R8 | "We are planning to place a signboard to call everyone that comes to the beach." |
| R9 | "The Government of Timor Leste right now adopts a zero plastic policy to implement decree-law no 37/2020". |
| | "Resolution Government No. 16/2016, 18 of May regarding National Urban Mobility Policy; Resolution Government No. 32/2016, 5 of October regarding Investment Strategy for Solid Urban Waste Management in Dili; Decree-Law no. 33/2008, 27 of August regarding Hygiene and Public Order; Decree-Law no. 5/2016, 28 of December regarding Advertising Message Licensing; Decree-Law no. 2/2017, 22 of March regarding Approves the Urban Solid Waste Management System; Decree-Law no. 37/2020, 23 of September regarding Disposal, Import and Production of Bags, Packaging and other Public Objects". |
| R11 | "Right now, we have a plan to establish a recycling department." |

### 4.3.4. Identify the challenges and barriers in implementing policy and action to address marine plastic debris and overcome them.

Another objective of this study is to identify if there are any challenges and barriers when implementing those policies that have been mentioned before. Five responses (R4, R6, R7, R8, and R9) show that the challenges and barriers to implementing

policies and action plans that have been identified are lack of people consciousness or awareness. R8 added that the challenge is the lack of law enforcement from the government. The government must take the issue seriously and enforce the zero plastic policy to ban any plastic item from being brought to the beach.

Moreover, establish recycling industry identify as the policy and action plan to address marine plastic debris in Timor Leste. In order to implement the recycling program according to R1 as a volunteer small recycling group, the challenge is the lack of sufficient material and human resources. However, according to the R11, as a private company, they have invested in human resources and equipment for recycling; the challenge is they depend on the government when the government decides to entrust them and invest in the recycling industries. In addition, R2, R3 has mentioned 'small action big impacts' include raising awareness and education through reading with images and videos regarding the effects of plastic debris on the ocean that affect marine life is the action plan to tackle marine plastic debris. However, they face the challenge as a volunteer organization is lack of sponsors to prepare the brochures and booklet design.

To overcome the challenge and barriers of implementing policy and action plans, most of the responses (R3, R4, R5, R7, R8, and R9) agree that raising the public's awareness through education, socialization, and campaigns about plastic would be the key to overcoming the challenge. In addition, four responses (R4, R5, R6, and R11) are mentioned to invest in recycling industries, three responses (R7, R8, and R4) state that applying law enforcement, and three other responses (R1, R2, and R3) added that fundraising is another way to overcome the challenge of implementing policy and action plans.

**Table 6: Excerpts on the challenges and barriers in implementing policy and action to address marine plastic debris and how to overcome them.**

| Respondent | Quotation |
|---|---|
| R1 | "The challenge is there is no investment in this kind of activity, lack of material resources (machine for processing) and human resources (lack of training and capacity building for people involved in this program or activity). If our government sees the potential of this activity and gives the full support, we can achieve two things first, create job opportunities for young people. Another one is contributing to reducing the plastic waste problem in our country." |
| | "Fundraising from product recycling and support in material and funding from agency and government." |
| R2 | "Challenge is the booklet the design, how people can sponsor to do the printing. The main challenge is the fund to sponsor, and we can do anything but lack of a sponsor." |
| | "To find the sponsor so we can make our plan come true." |
| R3 | "Law enforcement. Chinese is cover around South East Asia, mainly in TL; we don't have the policy to reaffirm that this is too much plastic you cannot sell it anymore because we don't have a recycling industry in TL." |
| | "To minimize it is through education, I was making an ocean hub about plastic recycling. I was making "eskola kiik" or a small school in a coastal community." |
| | "We compete for the fundraising from youth South East Asian Leadership Award, especially on the marine project." |
| | "We start the project since may last two months, and we face some challenges; some of the fishermen don't understand that green turtles can eat plastic; when you talk, mount to mount they don't believe it we must show image and some video. They don't care about plastic is the biggest case; they don't know what is going to happen in Timor Leste right now; they don't believe in marine pollution; they say when the rubbish is going to the ocean, it will wash away by the current and they say the ocean can recovery by itself, so this is their local knowledge." |
| | "Stop importing, especially Chinese; they bring a lot of rubbish come here to TL; that's the big problem." |
| R4 | "The principal thing is people's consciousness because if we want to change people's consciousness, it will take time." |
| | "First, we have to raise people's awareness, and the important things are recycling, educating our community regarding environmental education, and expanding all information by all means." |
| | "If Timor Leste has big recycling industries to transform waste to be something then the waste has an economic value, people will not throw bottle plastic they put it together brings to weight it and get the money like 5c, 10c, or 0.50c means that the waste has an economic value because we have a way to solve it." |
| | "We are clear that the duration period from 2018 the law is approved and in 2020 we will do the implementation and law enforcement until 2023".<br>"If the process recycling is there, we will band but the only target for a few numbers." |
| R5 | "What is clear is that we look at the context of Timor Leste, which is knowledge and education. With education, we can increase that knowledge which is the basis for us to go through it gradually before we enter the stage of implementing the policy itself, where many countries want to implement it, especially regarding waste." |
| | "I think we focus on environmental education. It is most likely that in the school curriculum its implementation must start from kindergarten to university level, so that's all if we start from now surely they already understand the impact of the waste, and how the effect will be like. We need environmental education, personal training for the environment, with all that to raise public awareness". |
| | "We have to be serious, so we can plan and then implement all actions properly, which can have a positive impact on the marine debris problem. As I have stated that there is a need for investment, as we know that other countries are also fighting the same problem." |
| R6 | "Lack of understanding and awareness in the society regarding plastic waste. If we still do that, this will have a big impact on biodiversity". |
| | "Proper recycling for plastic waste so people can utilize it for other purposes." |

| | |
|---|---|
| R7 | "Continuously increase public awareness on how to organize household waste; Improve public education on how to live a healthy life and promote a healthy culture from the beginning to the younger generation through schools, youth organizations and other social institutions." |
| | "Increase socialization not to use plastic bags and other plastics, in accordance with the government's policy on "O" (zero) plastics." |
| | "There are quite a few challenges and obstacles, and this is due to the lack of public awareness of environmental cleanliness." |
| | "There is a need for sanctions for those who do not comply with the rules regarding improper waste disposal." |
| R8 | "So we will not use plastic in the market or anywhere else, but still, we face a challenge that is related to people's behaviour." |
| | "If we are talking about zero plastic, then the government must be serious about that. For example, if we go to the beach it is better don't bring items that are made from plastic, because people sometimes neglect and ignore them and they tend to throw plastic waste in the sea and sometimes to burn there, especially to those who do the picnic in the beach that results in that place full of waste." |
| | "First is we have to do a campaign on how to overcome this issue so it will not damage our biodiversity in the ocean. We need to campaign to everyone through television, news, paper or disseminate the information about the importance of plastic waste management and how to reduce that plastic in everyday life in the village and rural area." |
| | "Most of the people depend on their everyday life on the ocean, so we don't want to damage our natural resources in the ocean, and if the government also takes action, then they also must apply law enforcement." |
| R9 | "Lack of people consciousness how to dump the waste in the proper place; Local market still use plastic to a customer when they make transaction sale and buy; Small kiosk still provides plastic bags to the customer; Restaurant still provides plastic container food to the customer; Timor Leste still imports drinking water bottle plastic; People still throw plastic waste into the river, sewers and public space because people do not use to dump the waste into the place that has prepared by the MSA in the station in each area." |
| R11 | "I just want to say that there is no law enforcement to implement zero plastic in Timor Leste; that's why we can see people still use plastic in the market and everywhere." |
| | "Our plan is to have big recycling industries, and we have equipment that will support our plan. Second, we have prepared human resources, so we only need a decision from the government to entrust PAX to bring about a big change in Dili city." |
| | "As a private sector, we have prepared everything like sufficient equipment and human resources and are willing to work with the government in the recycling industries with clear TOR." |

## 4.4. Discussion

From the analysis of the first research objectives, it can be observed that Timor Leste's high dependence on imported goods such as plastic packaging, bottle plastic, and styrofoam can be seen everywhere, especially in the ocean environment. This is in accordance with previous studies from Woodall et al. (2014); Rhinane (2019); Fitria (2020) mentioned that human behavior and activities in production and consumption, plus with the people's custom that leaves everything in the environment that leads all the waste to find its way into the ocean environment and become marine debris. Though, there is no extensive research on marine plastic debris in Timor Leste.

However, some studies show that about 13 percent of the waste stream from Timor Leste is from plastics. Poor waste management of non-flexible plastics and lightweight plastic products consumed daily enter the ocean by inland rivers or wastewater outfalls or are blown away by wind and tides, becoming marine debris (PRFI, 2018).

According to the interview, a lack of waste management systems in the urban areas and inadequate waste disposal infrastructure has led to the issue of marine plastic debris reaching a crisis point in Timor Leste besides lack of public awareness that has contributed additionally to the problem in the area. This finding is in line with previous scholarly study Viega et al. (2016); Gjyli et al. (2020) identified that inadequate urban and industrial solid waste management are the primary sources of marine debris that find their way into the ocean. Through rivers, canals, drains, sewage outlets, winds, tides, and stormwater outflows, marine debris finds pathways to the coastal environment (Gjyli et al., 2020). There are no proper guidelines or standards that regulate marine plastic debris in Timor Leste. However, efforts have been made by the government and other institutions to tackle the problem through beach clean-ups, recycling processes, raising public awareness, providing education, and implementing a zero plastic policy.

The analysis of the second research objectives describes the various roles and responsibilities of the government and institutions discussed to address marine plastic debris, including beach clean-ups, raising people's awareness, educating people, socializing, and creating and implementing the law. However, all respondents agree that the marine plastic debris problem and the environmental problem are not only the responsibility of the government and other institutions but also are in the hands of the people of Timor Leste. This is in accordance with Garcia et al. (2019) that government efforts to tackle plastic pollution in the oceans involve an "all hands on deck" approach that includes multi-level and stakeholder strategies, as well as targeted regulatory and non-regulatory action.

Furthermore, many initiatives have been put in place globally since 1970 to either directly or indirectly address MPD and the inputs from land and sea-based sources (Thevenon, F., & Carroll, C., 2015). According to the interview, they also think several initiatives could address marine plastic debris in Timor Leste, including creating laws and enforcing them, banning plastic products and giving out fines, bringing your own bag when grocery shopping, and establishing recycling industries. In addition, making a standard garbage bin, Watergate management system, and remote sensing vessels could become an excellent initiative to control marine plastic debris in Timor Leste.

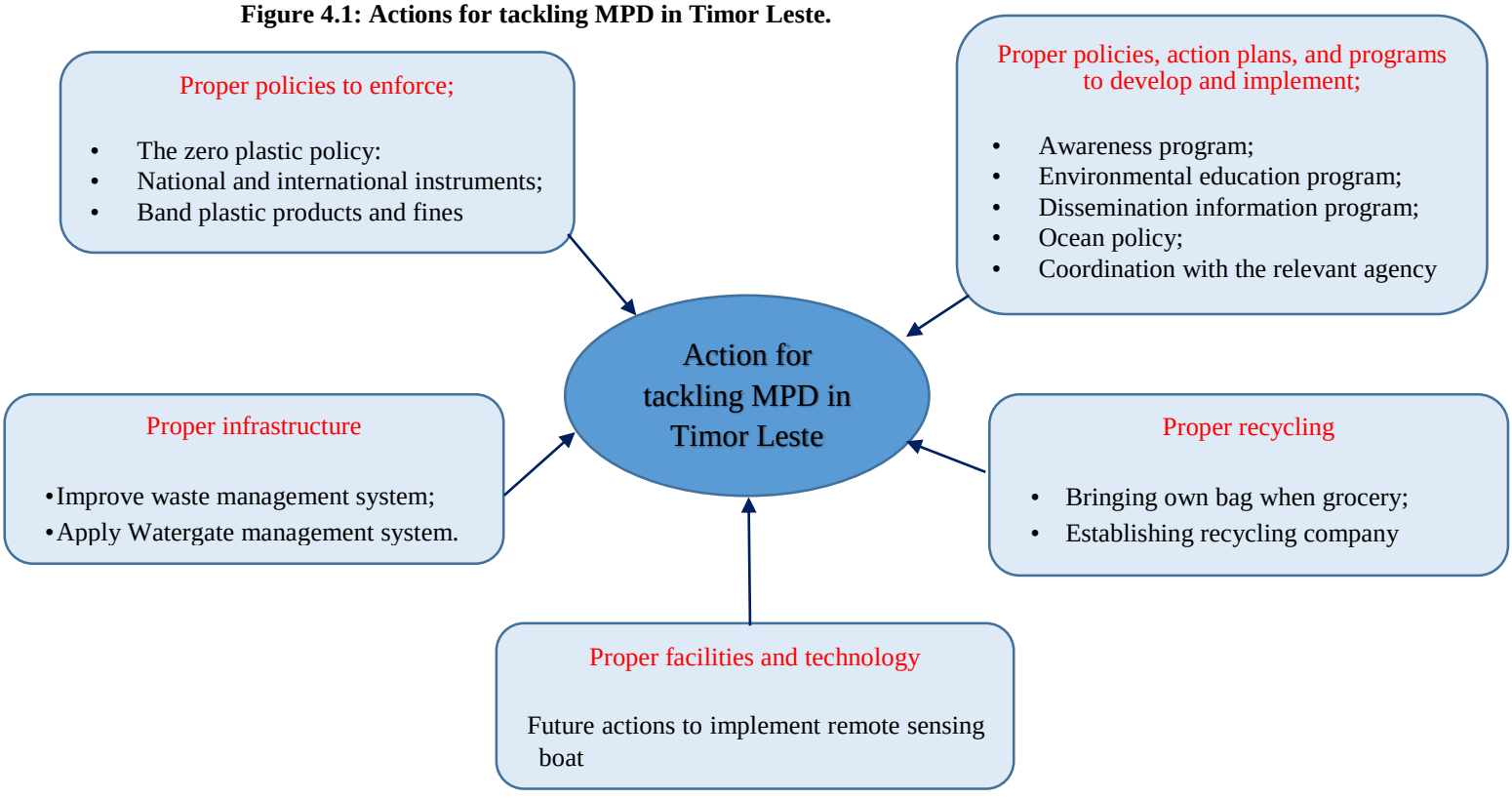
Many instruments have been adopted at national, regional, and international levels to tackle marine debris problems. These instruments compose conventions, regulations, agreements, strategies, guidelines, action plans, and compulsory or voluntary programs (Chen, 2015). From the analysis presented above, the zero plastic policy, national and international instruments, raising awareness programs, environmental education programs, disseminating information programs, and establishing recycling industries are identified as policies or actions plans undertaken to control and reduce marine plastic debris in Timor Leste. In addition, ocean policy and action plans in coordination with the relevant agency can help control and reduce marine plastic debris.

From the fourth research objective discussed above, several challenges and barriers have been identified, including a lack of people's awareness and knowledge regarding the impact of plastic waste on the environment, especially in the ocean environment. Moreover, a lack of law enforcement to regulate people and a lack of investment in recycling industries are identified. Furthermore, Timor Leste is still open to importing a plastic product and lacks sponsors for a volunteer organization to implement their action plan. However, based on the interview, some respondents mentioned that in order to overcome the challenges and barriers to implementing these policies that have been identified, they would need to work on raising people’s awareness through environmental education, socialization, and campaigns to disseminate information

regarding the importance and benefits of the ocean to humans; invest in recycling industries; include law enforcement and organize fundraising for the project. Previous studies from Axelsson & Sebile (2017) highlight that a key policy area for reducing the amount of plastic that effortlessly flows into the ocean in coastal cities is education. Moreover, controlling the amount of plastic in the streets can be addressed through recycling schemes and an anti-littering campaign to dissuade people from littering. Furthermore, funding the project was a significant priority for a volunteer (Storrier & McGlashan, 2006).

According to the findings, the study respondents have identified several actions to tackle marine plastic debris in Timor Leste, including enforcing policies such as the zero plastic policy, national and international instruments, band, and fines. Moreover, proper infrastructure (e.g., improving the waste management system and applying the Watergate management system). In addition, develop and implement policy and action plan including awareness program, environmental education program; dissemination information program; ocean policy; coordination with the relevant agency. Further, proper recycling is bringing own bag for groceries, establishing a recycling company, and adequate facilities and technology to apply in the future, such as remote sensing boats. The diagram of actions for tackling marine plastic debris is shown in figure 4.1.

**Figure 4.1: Actions for tackling MPD in Timor Leste.**



# Chapter 5: Summary and Recommendation

## 5.1. Introduction

This chapter contains a summary of the main points of the dissertation, and recommendations, followed by the conclusion, contributions from the studies, and possible future research and developments arising from the dissertation.

## 5.2. Summary of the main point of dissertation

The study's main objective is to examine the current status of marine plastic debris in Timor Leste and understand the roles and responsibilities of the relevant agencies and institutions in addressing the issue. It also aims to identify the policies and action plans to control marine plastic debris, the challenges and barriers faced in implementing it, and how to overcome them. In addition, four research questions were created to achieve the objective of the study. The study used the qualitative method and utilized primary data through structured interviews to answer the research questions. The interviewees chose purposely, and they consisted of representatives from various key experts and high-level ministries, local non-governmental organizations, the youth movement, and the private sector.

This study discussed the current status of marine plastic debris in Timor Leste and found that the lack of waste management systems in the urban areas, inadequate disposal infrastructure, and equipment combined with a lack of awareness among people as the major contributors to the fact that marine plastic debris is at a crisis point in Timor Leste. The study, therefore, discusses the role and responsibility of the government and other institutions and suggests that the problem of plastic waste in the sea and the environmental problems associated with this are the responsibility of the government and other institutions, and everyone has a role to play.

In addition, the study identifies the policies and actions required to tackle marine plastic debris in Timor Leste. Solutions such as a zero plastic policy, national and international instruments, public awareness programs, environmental education

programs, and information dissemination programs are identified as policies or action plans undertaken to control and reduce marine plastic debris in Timor Leste. In addition, establishing recycling industries and developing ocean policy and action plans in coordination with the relevant agency can help control and reduce marine plastic debris.

Further, the study discusses the challenges of implementing these policies and the ways to overcome them. The study concludes that a lack of people awareness among the people and knowledge regarding the impact of plastic waste on the environment, especially in the ocean environment. Moreover, this study concludes a lack of law enforcement to regulate people and an investment in recycling industries. Furthermore, Timor Leste is still importing plastic products; and the lack of sponsors for volunteer organizations to implement their action plan is the several challenges that the study brought up. In order to overcome the challenges, it is necessary to increase awareness through environmental education and leading campaigns to disseminate information regarding the importance of the ocean and its benefits to humans, investments made in the recycling industries, enforcing laws, and raising funds to finance necessary projects.

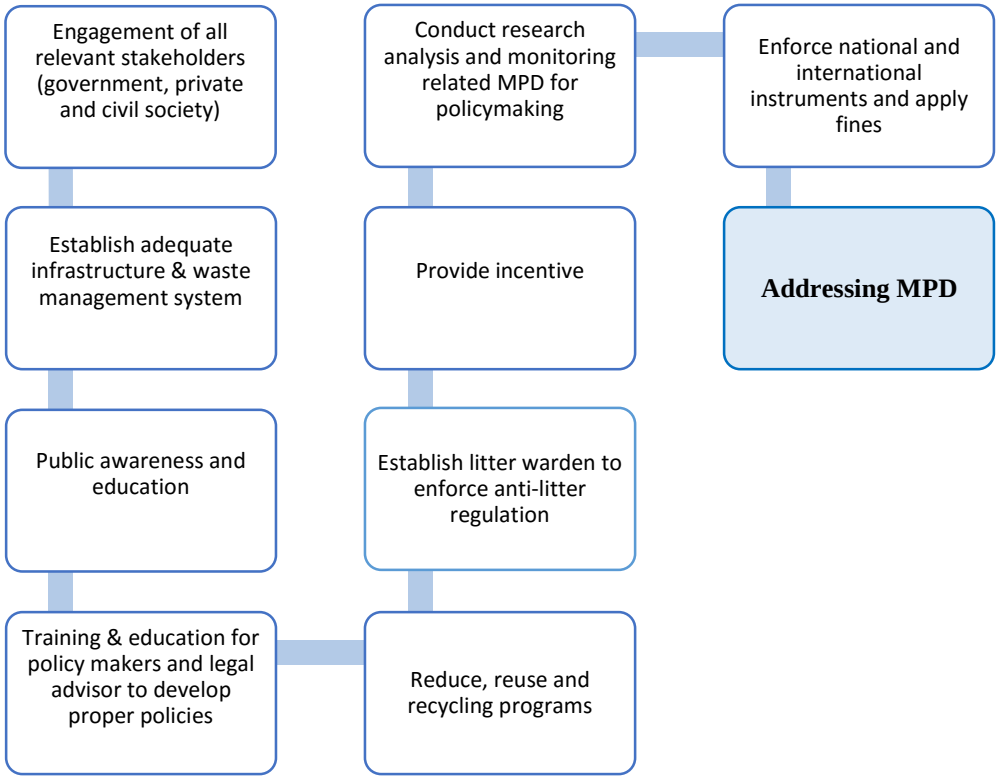
### 5.3. Recommendation

Approximately 80 percent of marine plastic debris results in activity from the land; therefore, this study recommended addressing marine plastic debris by engaging relevant stakeholders from diverse groups such as government, private, and civil society actors to effectively manage, reduce and control marine debris and its environmental impacts. In addition, adopt and apply an adequate waste management system. This study suggests that all the waste must be managed to start from the household by separating or segregating the waste (plastic, food, or wet and dry). It also suggests replacing the manual waste bin that is freely open to the mobile waste bin, allowing sanitation collectors to collect easily and avoid the spread of waste in the environment. Another recommendation is to focus on raising public awareness and

educate them on how to segregate the waste and dump it in the proper place by socialization or using prompts to remind people that sometimes forget (Kennedy, 2010) through signboards, media, brochures, and verbal appeals (Huffman et al., 1995). The point is if people keep being shown the same things, then gradually they will change.

Furthermore, the study also recommends the important aspect is to provide training and education to politicians and legal advisors to help them understand the marine plastic debris issue in order for them to develop proper legislation and policies and conduct research analysis and monitoring on MPD as a guide for policymaking. Additionally, to provide incentive programs to reduce plastic waste and establish litter wardens to enforce anti-litter regulations in public areas and beaches. To reduce the import of goods by banning plastic products, reusing plastic products, and developing recycling programs to handle all plastic waste are also recommended. Lastly, this study also highly recommends implementing and enforcing national and international rules and regulations and applying fines to better address marine plastic debris in Timor Leste and other small development ocean states. The diagram of the recommendation is shown in figure 5.1.

**Figures 5.1: Recommendation to tackle marine plastic debris**




## 5.4. Conclusion

This study is building upon the Interactive Governance Theory. Interactive governance involves interactions of multiple actors such as civil, public, and private to solve the problem, not only through single efforts or doing it alone. In other words, environmental governance is a multi-level interaction between local, national, international, or global, but not limited to the interaction between the three main actors: government, private, and civil society. No single actor has all the knowledge and information required to solve this diverse, complex, and dynamic problem. Only by working together they will have all the resources and capabilities they need to fulfill a governing task (Kooiman et al., 2008). The theory of Interactive Governance supports the framework of this study. It is reflected in the study that the government collaborates with other institutions, which are composed of the youth movement, local NGOs, and

the private sector, together to address marine plastic issues through the implementation of various actions and programs.

In addition, the theory of interactive governance recognizes the participation of different actors because they are the most important ones. Using the role theory of Ralph Linton (1893-1953), these roles and the responsibilities of the actors (government and other institutions) explain the social interactions of the actors who play according to their cultural circumstances. They are each given a role to play an identity that distinguishes the differences between individuals about how they act in certain situations. Therefore, the government and other institutions such as the local NGOs, youth movements, and the private sector are expected to act according to their roles.

Partelow et al. (2020) argued that these interaction activities are carried out formally and informally in policy formulation and implementation to respond to community demands and suggestions regarding the environment to create a sustainable environment. Based on the study, the interaction activities that have been identified include the implementation of a zero plastic policy, awareness programs, environmental education programs, and information dissemination programs. In addition, recycling programs and interactions to coordinate with relevant agencies help control and reduce the amount of plastic litter in the ocean.

### 5.5. Research contribution, limitation, and future research development

This study is a first step towards identifying policy responses for marine plastic debris in Timor Leste. The study results have helped to understand the complex problem of plastic debris in the ocean and identify potential policies and action plans to address the issue. In addition, this can contribute to helping policymakers, and decision-makers understand the appropriate measures that need to be taken in order to address marine plastic debris in Timor Leste.

The limitation of the study was the small number of participants interviewed. A future study can involve more participants and take a mixed-method approach, namely combined interviews with surveys to boost the reliability of the findings. Furthermore, there is a zero plastic policy which is still new and lacks socialization. It is recommended that any future research should examine the implementation process and effectiveness of the zero plastic policy in Timor Leste, and additional empirical data will be needed regarding marine plastic debris in the ocean environment.

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# Appendices

## Appendix A: WMU Research Ethics Committee (REC)

JERONIMO VIANA, Maria <w2005209@wmu.se>

**REC DECISION # REC-21-25(M)**

2 messages

**Email, PhD** <PhD@wmu.se> 18 June 2021 at 11:38
To: "JERONIMO VIANA, Maria" <w2005209@wmu.se>
Cc: Aspasia Pastra <asp@wmu.se>

Dear Maria,

This is to let you know that the members of the WMU Research Ethics Committee (REC) have now approved the (revised) research related documents that you submitted to this office on 17 June 2021 concerning your research study involving human participation.
You are now free to start your data collection work in consultation with your supervisor(s).

With kind regards/Med vänlig hälsning/Με εκτίμηση/Ystävällisesti/祝好/Amicalement/Atentos saludos/Atenciosamente/ Saygılarımla/Уважением/ Mit besten Grüßen/Distinti saluti/Serdeczne pozdrowienia/Venlig hilsen/Met vriendelijke groet/敬具/ سپاس

Carla Escalante Fischer
Faculty Support Officer
Research Projects and Doctoral Programs
REC Secretary
World Maritime University

Malmö, Sweden
Tel: +46 40 35 63 91
Fax: +46 40 12 84 42
E-mail: phd@wmu.se

On Thu, Jun 17, 2021 at 1:55 PM JERONIMO VIANA, Maria <w2005209@wmu.se> wrote:

> Dear Carla,
>
> Please find the correct document revised.
>
> Regards,
> Maria Viana

**JERONIMO VIANA, Maria** <w2005209@wmu.se> 18 June 2021 at 11:54
To: "Email, PhD" <PhD@wmu.se>

Noted with deep many thanks.
[Quoted text hidden]

## Appendix B: Information sheet

Establish under the auspices of the International Maritime Organization
a specialized agency of the United Nations

**PARTICIPATION INFORMATION SHEET**
**(Employee)**

Project title: Policy Response for Marine Plastic Debris in Timor Leste
Researcher: Maria Jeronimo Viana
Supervisors: Dr. Aspasia Pastra

**PURPOSE OF RESEARCH STUDY**

My research study aims to examine the current status of marine plastic debris in Timor Leste and understand the relevant authorities and institution roles and responsibilities. Moreover, to identify policy and actions undertaken to control marine plastic debris and the challenges and barriers for implementing marine plastic debris policy.

My name is Maria Jeronimo Viana. Currently, I am studying at World Maritime University for a Master of Science in Maritime Affairs specialized in Ocean Sustainable, Governance, and Management. You are being invited to take part in a research study about Policy Response for Marine Plastic Debris in Timor Leste. We believe that you can make an important contribution to the research.

**INTERVIEW REQUEST**

The aim of this interview is to acquire your knowledge and insight into marine plastic debris in Timor Leste. In particular, I would like to discuss the roles and responsibilities of your ministry/organizations to address marine plastic debris; what are the policy instruments used? *(e.g., legislation, regulation, governance mechanisms, guidelines, incentives)* to address Marine Plastic Debris in TL.

**PROCEDURE**

The interview will follow a semi-structured format, either face-to-face or over video conference. The interview will require 45 minutes to an hour and consist of questions prepared by the researcher supplemented with anything else that you might choose to share. As the interview proceeds, we may ask questions for clarification or further understanding. Still, our part will mainly listen to views, opinions, experiences, or knowledge on the matter at hand. The interview will be recorded via handwritten notes and an electronic audio recording device. However, you may opt-out of the electronic audio recording.

**USE OF DATA**

The data collecting during the research study will be used to complete the master's thesis research and the thesis's production. Data may also be used in the publication or presentation of a thesis. Data may also be used in publications or presentations arising from the thesis. A summary of the thesis will be made available to you to receive a copy, which will be sent through email.

**CONFIDENTIAL**

The information collected from participants will be kept private with strict confidence. You are given the option to be named in research. If you do not wish to be named in the research, then your identity will be excluded from academic publications and presentations arising from this research. I will ensure that every possible effort will be made to confirm your identity remains anonymous. However, due to the small number of participants and the specialized nature of your role, it still may be possible your identity will be identifiable by the nature of your comments.

**BENEFITS**

There will be no direct benefit to you if you participate in this interview. However, the possible benefits of your participation in society include the potential development of legislation or regulations to reduce marine plastic debris in Timor Leste. It will improve the health and well-being of marine life and reduce the number of toxins in the food chain, therefore benefiting human health. Other benefits include a possible reduction of the amount of plastic waste along our coastline. You will not receive any compensation for participating in the interview.

**DATA STORAGE**

All data relating to the study will be stored securely and kept until the completion of this study. The audio recordings taken during interviews will be kept on a computer protected by a password. Data will also be stored on a secure University computer with a server backup. Hard copies of data (i.e., transcript, notes) will be securely stored in a locked filing cabinet. Consent forms will be stored in a locked cabinet in the supervisor's office on the University premises. All material will be retained for the research period and will be either deleted or shredded. The material you provide will only be used for this research project, and it will only be disclosed with your permission.

**VOLUNTARY PARTICIPATION**

Please read this carefully and ask any questions or more information before deciding whether or not to participate.

Your participation is voluntary in this research study. If you don't wish to participate, you don't have to. However, if you decide to participate in the research project, you will be asked to sign the consent form. By signing in, you are telling us that you:

- Understand what you have read
- Consent to take part in the research project

**WISH TO WITHDRAW**
You will be permitted to withdraw from the interview at any time without giving a reason.

Thank you very much for your time. If you wish to know more and ask a question, please feel free to contact my supervisor or me at:

**CONTACT INFORMATION**
Researcher:
Maria Jeronimo Viana
Ocean Sustainable Governance and Management
World Maritime University
Malmo, Sweden
Email: w2005209@wmu.se
Mobile TL (WA): +670 7754 1005
Mobile Sweden: +46 73 589 7121

Supervisor:
Dr. Aspasia Pastra BSc, MBA, MSc, PhD
Post-Doctoral Fellow, Policy Analyst
World Maritime University (WMU) of the International Maritime Organization (IMO), a Specialized Agency of the United Nations.
Email: asp@wmu.se
Telephone: +46 40 356 367
Mobile: +46 70 617 8758

## Appendix C: Interview questions

**QUESTIONNAIRE**

**PART A: PERSONAL INFORMATION**

1. Location : ……
2. Gender (sex) : 1). Male 2). Female
3. Age : ……..Years
4. Highest level education:
   1). Senior High School/Equivalent
   2). B.Com/B.Sc/B.A / Equivalent
   3). M.A/MSc/ M.Com
   4). PhD
5. Occupation
   1). Government Service
   2). Non-Government Organization/NGO
   3). Self Employed/Business/private service
   4). Academic
   5). Student
   6). Others
6. Position : ……
7. Work experience : ……..

**PART B: QUESTIONS FOR KEY INFORMANT**

**(questions will be asked to all participants of the study)**

1. What is your current knowledge of marine plastic debris in Timor Leste?
2. What is the process of solid waste management, including the collection, transport, treatment and disposal of solid waste in Timor Leste?
3. How is marine plastic debris being managed in Timor Leste?
4. What are the roles and responsibilities of your organization in controlling marine plastic debris in Timor Leste?
5. Are there any initiatives that you would like to see to address marine plastic debris in Timor Leste?
6. What are the policy instruments used *(e.g., legislation, regulation, governance mechanisms, guidelines, incentives)* to address marine plastic debris in Timor Leste?
7. What policies or action plans have been developed or planned to develop to controlling marine plastic debris in Timor Leste?
8. What are the current challenges and barriers to implementing policy and actions to address marine plastic debris in Timor Leste?
9. How your opinion, how could these challenges in implementing policy and actions to addressing marine plastic debris in Timor Leste be overcome?

## Appendix D: Consent form

Dear Participant,

Thank you for agreeing to participate in this research survey, which is carried out in connection with a Dissertation which will be written by the interviewer in partial fulfilment of the requirements for the degree of Master of Science in Maritime Affairs at the World Maritime University in Malmo, Sweden.

The topic of the Dissertation is Policy Response for Marine Plastic Debris in Timor Leste

The information provided by you in this interview will be used for research purposes, and the results will form part of a dissertation, which will be published online and made available to the public. Your personal information will not be published. You may withdraw from the research at any time, and your personal data will be immediately deleted.

Anonymized research data will be archived on a secure virtual drive linked to a World Maritime University email address. All the data will be deleted as soon as the degree is awarded.

Your participation in the interview is highly appreciated.


Student's name: Maria Jeronimo Viana
Specialization: Ocean Sustainable Governance and Management
Email address: w2005209@wmu.se


* * *

I consent to my personal data, as outlined above, being used for this study. I understand that all personal data relating to participants is held and processed in the strictest confidence and will be deleted at the end of the researcher's enrolment.

Name: .....

Signature: .....

Date: .....

## Appendix E: Email invitation of participants

JERONIMO VIANA, Maria <w2005209@wmu.se>

**Request for Interview**
4 messages

**JERONIMO VIANA, Maria** <w2005209@wmu.se> 22 June 2021 at 13:29
To: 3rsoldier@gmail.com
Cc: "Pastra, Aspasia" <asp@wmu.se>

Dear Coordinator of 3R Soldier

Ocean Environment Concern

Timor Leste

I trust this email finds you well.

By way of introduction, my name is Maria Jeronimo Viana, an MSc level student in Maritime Affairs, specializing in Ocean Sustainable, Governance, and Management, of the World Maritime University- Sasakawa Global Ocean Institute in Sweden.

I am currently conducting research, as part of my thesis, on *Policy Response for Marine Plastic Debris in Timor Leste*. The study aims to examine the current status of marine plastic debris in Timor Leste and identify the roles and responsibilities of the relevant authorities and organizations. An assessment will be made on the policies and actions undertaken to control marine plastic debris and on the challenges for implementing marine plastic debris policy.

Your professional expertise and views could make a substantial contribution to the study. In furtherance of the foregoing, I would be grateful if you could engage in an online meeting at a time of your convenience and offer your views on the marine plastic debris in Timor Leste.

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Please do not hesitate to contact me if you have any questions.

Many thanks in advance for your time and consideration.

Sincerely,

Maria Jeronimo Viana

***Maria Jeronimo Viana***
Ocean Sustainable Governance and Management
World Maritime University
Malmo, Sweden
Email:w2005209@wmu.se

Mobile TL (WA): +670 7754 1005

Mobile Sweden: +46 73 589 7121

***Supervisor: Dr. Aspasia Pastra*** *BSc, MBA, MSc, PhD*
Post-Doctoral Fellow, Policy Analyst
World Maritime University (WMU) of the International Maritime Organization (IMO), a Specialized Agency of the United Nations
Email: asp@wmu.se
Telephone: +46 40 356 367
Mobile: +46 70 617 8758

JERONIMO VIANA, Maria <w2005209@wmu.se>

**Request for Interview**
1 message

**JERONIMO VIANA, Maria** <w2005209@wmu.se> 22 June 2021 at 10:40
To: guterres_acacio@yahoo.com, guterresacacio03@gmail.com, ivosergiobarros5@gmail.com
Cc: "Pastra, Aspasia" <asp@wmu.se>

Dear Mr. Acacio Guterres

Directorate General of Fisheries

Timor Leste

I trust this email finds you well.

By way of introduction, my name is Maria Jeronimo Viana, an MSc level student in Maritime Affairs, specializing in Ocean Sustainable, Governance, and Management, of the World Maritime University- Sasakawa Global Ocean Institute in Sweden.

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JERONIMO VIANA, Maria <w2005209@wmu.se>

**Request for Interview**
1 message

**JERONIMO VIANA, Maria** <w2005209@wmu.se> 21 June 2021 at 10:41
To: menoneves@gmail.com
Cc: "Pastra, Aspasia" <asp@wmu.se>

Dear Mr. Belarmino Filomena Neves

Direçao Geral Da Desentralisacão Administrativa

Ministerio da Administrasaun Estatal-Timor Leste

I trust this email finds you well.

By way of introduction, my name is Maria Jeronimo Viana, an MSc level student in Maritime Affairs, specializing in Ocean Sustainable, Governance, and Management, of the World Maritime University- Sasakawa Global Ocean Institute in Sweden.

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JERONIMO VIANA, Maria <w2005209@wmu.se>

**Request for Interview**
1 message

**JERONIMO VIANA, Maria** <w2005209@wmu.se> 21 June 2021 at 10:53
To: railulik@yahoo.com
Cc: "Pastra, Aspasia" <asp@wmu.se>

Dear Mr. Gil Horacio Boavida

HASATIL Coordinator

(Ocean Environment Concern)

I trust this email finds you well.

By way of introduction, my name is Maria Jeronimo Viana, an MSc level student in Maritime Affairs, specializing in Ocean Sustainable, Governance, and Management, of the World Maritime University- Sasakawa Global Ocean Institute in Sweden.

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JERONIMO VIANA, Maria <w2005209@wmu.se>

## Request for Interview

8 messages

**JERONIMO VIANA, Maria** <w2005209@wmu.se> 22 June 2021 at 13:42
To: jakelasi87@gmail.com
Cc: "Pastra, Aspasia" <asp@wmu.se>

Dear Mr. Justaquio Lasi

English Conversation Course & National Youth Development Program

Ocean Environment Concern

Timor Leste

I trust this email finds you well.

By way of introduction, my name is Maria Jeronimo Viana, an MSc level student in Maritime Affairs, specializing in Ocean Sustainable, Governance, and Management, of the World Maritime University- Sasakawa Global Ocean Institute in Sweden.

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JERONIMO VIANA, Maria <w2005209@wmu.se>

**Request for Interview**
1 message

**JERONIMO VIANA, Maria** <w2005209@wmu.se> 21 June 2021 at 11:04
To: jelino.soares@yahoo.com
Cc: "Pastra, Aspasia" <asp@wmu.se>

Dear Mr. Jelino Soares

Director General of Tourism

Ministry of Tourism-Timor Leste

I trust this email finds you well.

By way of introduction, my name is Maria Jeronimo Viana, an MSc level student in Maritime Affairs, specializing in Ocean Sustainable, Governance, and Management, of the World Maritime University- Sasakawa Global Ocean Institute in Sweden.

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JERONIMO VIANA, Maria <w2005209@wmu.se>

**Request for Interview**
4 messages

**JERONIMO VIANA, Maria** <w2005209@wmu.se> 21 June 2021 at 10:23
To: soaresjoaocarlos73@gmail.com, soaresjoaocarlos92@yahoo.com
Cc: "Pastra, Aspasia" <asp@wmu.se>

Dear Mr. Joao Carlos

General Directorate of Environment

Timor Leste

I trust this email finds you well.

By way of introduction, my name is Maria Jeronimo Viana, an MSc level student in Maritime Affairs, specializing in Ocean Sustainable, Governance, and Management, of the World Maritime University- Sasakawa Global Ocean Institute in Sweden.

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**2 attachments**

Participation Information.docx
38K

JERONIMO VIANA, Maria <w2005209@wmu.se>

## Request for Interview

3 messages

**JERONIMO VIANA, Maria** <w2005209@wmu.se> 22 June 2021 at 13:25
To: rosa_lino63@yahoo.com
Cc: "Pastra, Aspasia" <asp@wmu.se>

Dear Mr. Lino Barreto

Director National Directorate Maritime and Transport

Timor Leste

I trust this email finds you well.

By way of introduction, my name is Maria Jeronimo Viana, an MSc level student in Maritime Affairs, specializing in Ocean Sustainable, Governance, and Management, of the World Maritime University- Sasakawa Global Ocean Institute in Sweden.

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JERONIMO VIANA, Maria <w2005209@wmu.se>

**Request for Interview**
1 message

**JERONIMO VIANA, Maria** <w2005209@wmu.se> 21 June 2021 at 11:10
To: tilmanmario1@gmail.com
Cc: "Pastra, Aspasia" <asp@wmu.se>

Dear Mr. Mario Viegas Tilman

Direitor Departamento Pescas e Ciencia Marinha

University of Timor Leste

I trust this email finds you well.

By way of introduction, my name is Maria Jeronimo Viana, an MSc level student in Maritime Affairs, specializing in Ocean Sustainable, Governance, and Management, of the World Maritime University- Sasakawa Global Ocean Institute in Sweden.

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JERONIMO VIANA, Maria <w2005209@wmu.se>

**Request for Interview**
1 message

**JERONIMO VIANA, Maria** <w2005209@wmu.se> 22 June 2021 at 14:16
To: movimentotasimos@gmail.com
Cc: "Pastra, Aspasia" <asp@wmu.se>

Dear Mr. Gally Soares Araujo

Movimento Tasi Mos

Ocean Environment Concern

Timor Leste

I trust this email finds you well.

By way of introduction, my name is Maria Jeronimo Viana, an MSc level student in Maritime Affairs, specializing in Ocean Sustainable, Governance, and Management, of the World Maritime University- Sasakawa Global Ocean Institute in Sweden.

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JERONIMO VIANA, Maria <w2005209@wmu.se>

## Request for Interview

4 messages

**JERONIMO VIANA, Maria** <w2005209@wmu.se> 21 June 2021 at 10:47
To: rhdili.mae@gmail.com
Cc: "Pastra, Aspasia" <asp@wmu.se>

Dear Mr. Gaspar Soares

Presidente Authoridade Municipio Dili

Ministerio da Administrção Estatal-Timor Leste

I trust this email finds you well.

By way of introduction, my name is Maria Jeronimo Viana, an MSc level student in Maritime Affairs, specializing in Ocean Sustainable, Governance, and Management, of the World Maritime University- Sasakawa Global Ocean Institute in Sweden.

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JERONIMO VIANA, Maria <w2005209@wmu.se>

## Request for Interview

8 messages

**JERONIMO VIANA, Maria** <w2005209@wmu.se> 5 July 2021 at 10:18
To: paxgroups.tls@gmail.com, paxclening@gmail.com

Dear Mr. Director PAX

Timor Leste

I trust this email finds you well.

By way of introduction, my name is Maria Jeronimo Viana, an MSc level student in Maritime Affairs, specializing in Ocean Sustainable, Governance, and Management, of the World Maritime University- Sasakawa Global Ocean Institute in Sweden.

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World Maritime University I Fiskehamnsgatan 1 | P.O. Box 500 | 201 24, Malmö, Sweden

JERONIMO VIANA, Maria <w2005209@wmu.se>

**Request for Interview**
1 message

**JERONIMO VIANA, Maria** <w2005209@wmu.se> 22 June 2021 at 10:50
To: simoesbastian2@gmail.com, guidaarmonteiro@gmail.com
Cc: "Pastra, Aspasia" <asp@wmu.se>

Dear Mr. Sebastião C.R.S Simões

Chefe Gabinete MCAE

Ministerio Coordenador dos Assuntos Economicos

Timor Leste

I trust this email finds you well.

By way of introduction, my name is Maria Jeronimo Viana, an MSc level student in Maritime Affairs, specializing in Ocean Sustainable, Governance, and Management, of the World Maritime University- Sasakawa Global Ocean Institute in Sweden.

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