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# Integrated Ocean Management: A Pathway to achieve Sustainable Ocean Governance

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# Abstract

Healthy oceans are essential to human existence and life on Earth. They provide crucial resources like food, medicines, and biofuels, help remove waste and pollution, protect against storm damage, and serve as the planet's greatest carbon sink (United Nations, 2023). However, multiple demands and stressors, such as rising greenhouse gas emissions, changes in ocean chemistry, warming, deoxygenation, overfishing, and pollution runoff, threaten these ecosystems (Brodie Rudolph et al., 2020). These pressures have placed the ocean at risk of experiencing an irreversible and unimaginable crisis (United Nations, 2023).

This looming crisis primarily stems from the failure of the current governance system to address the complexities of socio-ecological marine ecosystems (Haas et al., 2021). Uncoordinated policies and fragmented management regimes often lack effectiveness and fail to balance the economic use of ocean resources with the conservation and health of ocean ecosystems (Mahon & Fanning, 2019).

Recent research identifies Integrated Ocean Management (IOM) as the optimal governance approach to balance these interests (Winther et al., 2020). IOM fosters cooperation among various actors and institutions, connecting existing sectoral governance approaches.

This thesis examines the efficacy of IOM through the analysis of two case studies: Belize and the Coral Triangle Initiative. Drawing from these case studies, the thesis contributes to delineating the conditions necessary for IOM to achieve successful, sustainable Ocean Governance.

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# Introduction

As the global population continues to grow and the pressures on our environment, including ocean ecosystems, intensify due to unsustainable economic practices, the need for effective governance frameworks that balance conservation and economic development has become critical.

However, the current ocean governance framework fails to address the complexities of socio-ecological marine ecosystems due to uncoordinated policies and fragmented management regimes. To address these shortcomings, Integrated Ocean Management (IOM) has been increasingly recognized by scholars as a comprehensive approach to pursue the sustainable management of marine and coastal resources.

The aim of this thesis is to assess the effectiveness of IOM strategies through a comparative analysis of two case studies.

The first case study examines Belize, a small Central American country that has pioneered efforts in the integrated management of ocean and coastal zones over the past two decades. The second case study focuses on the Coral Triangle Initiative (CTI-CFF), a multilateral partnership involving six Southeast Asian and Pacific nations—Indonesia, Malaysia, the Philippines, Papua New Guinea, the Solomon Islands, and Timor-Leste—along with various NGOs, government agencies, and international development partners. The CTI-CFF seeks to align and strengthen existing ocean governance efforts among its member countries, providing an overarching framework for the independent management of their coastal and ocean resources.

Following the presentation of these two case studies, a comparative analysis will highlight the main findings, offering insights into the factors that contribute to the successful implementation of IOM. Based on these findings, the thesis will propose future recommendations for developing an effective IOM strategy.

The structure of the thesis is as follows: Chapter One introduces a scientific definition of the Ocean and its critical importance for human survival, followed by an analysis of the most significant human-induced threats to marine ecosystems. Chapter Two outlines the current ocean governance framework, beginning with the international legal framework, centred on the United Nations Convention on the Law of the Sea (UNCLOS) and complementary international environmental laws (IEL). It then examines regional legal frameworks and the agreements governing 20 distinct regional clusters, concluding with an analysis of the polycentric order that characterizes ocean governance and its inherent weaknesses. Chapter Three presents the IOM approach and its associated toolbox, including ecosystem-based management, integrated coastal zone management, marine spatial

planning, and area-based measures. Afterwards, the chapter introduces the research questions and details the methodology employed to answer these research questions. Chapter Four provides an in-depth analysis of the two case studies: Belize and the Coral Triangle Initiative on Coral Reefs, Fisheries, and Food Security. Finally, Chapter Five presents the findings of the comparative analysis and offers recommendations for the future development of a successful IOM strategy.

# Chapter One

# The Ocean

## 1.1. Scientific Definition of the Ocean

From a scientific point of view, the Ocean can be defined as the "continuous body of salt water that is contained in enormous basins on Earth's surface, covering nearly 71 percent of Earth's surface" (Cenedese et al., 2023).

The ocean is crucial for human survival, as evidenced by the fact that approximately half of the world's population resides within a few tens of kilometers from the coast. Additionally, a significant portion of those living inland are situated near rivers or estuaries that flow into the ocean (Segar, 1998).

The ocean delivers a vast range of ecosystem services (synthetized in Figure 1) that are essential for humans' existence and well-being (Sandifer & Sutton-Grier, 2014).

These essential services provided by the oceans include "supporting services" such as nutrient cycling, which recycles key nutrients like nitrogen and phosphorus within the ecosystem. This process is crucial for maintaining ecosystem health, supporting primary production, and promoting biodiversity. Oceans also offer "regulating services" playing a vital role in carbon sequestration by absorbing large amounts of carbon dioxide from the atmosphere. This helps control the global climate by reducing greenhouse gases responsible for global warming. Marine ecosystems such as mangroves, seagrasses, and phytoplankton are especially important for this function. Additionally, oceans provide "provisioning services", offering resources like seafood, a primary protein source for millions, as well as raw materials and energy resources that drive economic activities such as fishing, aquaculture, and energy production. Finally, the ocean delivers various cultural services, providing

non-material benefits through aesthetic enjoyment, recreation, education, and spiritual enrichment, all of which are important for human well-being and cultural identity.


Figure 1: Ecosystem services provided by the Ocean. Source: Author's own work.

## 1.2. The impact of human activities on the Ocean

Over the past few decades, the scientific community has come to understand that human activities are significantly altering not only terrestrial environments but also the global ocean, atmosphere, and the entire Earth system.

Among the various environmental issues arising from human activity that impact the ocean ecosystem, the most significant and threatening ones are climate change, ocean acidification, and deoxygenation (Laffoley et al., 2020). These problems are all linked to the production of greenhouse gases, primarily released from the burning of fossil fuels (Henson et al., 2016).

### 1.2.1. Climate Change

The most critical form of human-induced pollution affecting the oceans is the release of carbon dioxide into the atmosphere. The ocean absorbs over 90% of the excess heat generated by greenhouse gases, leading to significant warming. This warming has profound effects on various oceanic processes (Henson et al., 2016). Increased temperatures alter ocean circulation and global climate patterns, resulting in changes to precipitation, storm activity, and the intensity and frequency of extreme weather events (Sandifer & Sutton-Grier, 2014). Additionally, the melting of sea ice and

glaciers caused by warming contributes to rising sea levels, posing a significant threat to coastal communities and ecosystems. Moreover, ocean warming threatens the survival of coral reefs, which play a key role in supporting marine biodiversity, providing coastal protection, and benefiting tourism and fisheries (Ainsworth et al., 2016). Indeed, the rise in ocean surface temperatures stresses coral polyps, which respond to this stress by expelling the symbiotic algae living in their tissues (zooxanthellae), which are crucial for the survival of corals: in addition to giving corals their vibrant colors, they perform photosynthesis, supplying coral polyps with oxygen and nutrients necessary for growth (Segar, 1998).

Without these algae, the corals lose their main source of energy and their color, revealing the white calcium carbonate skeleton underneath. For this reason, this phenomenon is known as "coral bleaching".

While corals possess the ability to recover from bleaching events, prolonged exposure to stressful conditions can prevent the return of zooxanthellae, posing a threat to coral survival and consequently, exacerbating the degradation of the reef ecosystem (West & Salm, 2003).

The rapid pace at which these changes are taking place is unprecedented in recent history and is hindering the capacity of marine ecosystems and biodiversity to respond and adapt to these changes on time, potentially driving many marine species to extinction (Ainsworth et al., 2016).

### 1.2.2. Ocean Acidification

As a consequence of absorbing a considerable amount of anthropogenic carbon dioxide, oceans are experiencing acidification (Kelly & Hofmann, 2013). When carbon dioxide dissolves in seawater, it reacts to form carbonic acid, thereby lowering the pH of the water and increasing its acidity (Findlay & Turley, 2021).

Whilst in earlier geological eras the ocean was more acidic than it is presently, the unprecedented pace at which acidification is taking place poses a significant concern.

Indeed, this rapid acidification has profound repercussions for marine life and ecosystems, leading to the extinction of many marine species and a drastic alteration of marine ecosystems (Mostofa et al., 2016).

Ocean acidification endangers particularly those species that rely on calcium carbonate to form their shells and skeletons, such as shellfish and pteropods, a category of zooplankton that plays a key role in marine food webs, serving as a crucial food source for fish, seabirds, larger marine invertebrates, and whales. By weakening their hard structures of calcium carbonate, ocean acidification impairs the growth and survival of these organisms (Hofmann et al., 2010).

Moreover, coral reefs are especially at risk, as the combination of ocean warming and acidification threatens their ability to rebuild and maintain their structures, which are essential for supporting marine biodiversity (Hoegh-Guldberg et al., 2017).

### 1.2.3. Ocean Deoxygenation

Another major threat to ocean ecosystems arises from deoxygenation, that is the reduction in the concentration of dissolved oxygen in ocean waters.
Deoxygenation is mostly caused by the cumulative effect of climate change and the anthropic release of large quantities of nitrogen and phosphorus into ocean waters mostly coming from agricultural runoffs and treated sewage discharges (Sandifer & Sutton-Grier, 2014).
Since ocean deoxygenation is a complex issue, involving various physical, biological, and chemical processes, some scientific background is needed to fully understand it.

The oceans are naturally stratified, with a warm, well-mixed surface layer and a colder, less mixed deep-water layer. The surface layer is in direct contact with the atmosphere, allowing it to exchange gases and maintain its oxygen levels. In contrast, the deep-water layer, isolated from the atmosphere, depends on the slow mixing of oxygenated surface waters for its oxygen supply.
In the deep-water layer, respiration, including microbial decomposition of organic matter, consumes oxygen and produces carbon dioxide. Without continuous replenishment from oxygenated surface waters, these deep layers would become inhospitable for most marine life (Oschlies et al., 2018).

Today, several factors are contributing to a decrease in ocean oxygen levels (Limburg et al., 2020).
Climate warming plays a significant role, as higher temperatures reduce the solubility of oxygen in seawater. Furthermore, increased temperature differences between the surface and deep layers inhibit vertical mixing, preventing oxygen from reaching deeper waters. Warmer waters also enhance “phototrophy”, the process by which marine organisms perform photosynthesis, leading to increased production of organic matter that eventually sinks and decomposes in deep waters, consuming oxygen in the process.

Human activities have exacerbated these effects through the release of large amounts of nitrogen and phosphorus from agriculture and treated sewage (Oschlies et al., 2018). These nutrients boost photosynthesis and organic matter production in the ocean, further depleting oxygen levels in deep waters. This nutrient runoff is particularly problematic in coastal and estuarine areas, where it leads to the formation of "dead zones," areas with such low oxygen levels that marine life cannot survive.

Research indicates that these changes (warming, reduced mixing, and increased organic matter production) are already underway, with significant implications for marine ecosystems (Gong & Zhou, 2021). Hypoxic and anoxic zones, characterized by extremely low or absent oxygen levels, have expanded worldwide, impacting more than 500 coastal regions. These "dead zones" are inhospitable to most marine life, resulting in heightened mortality rates for species unable to flee. The proliferation of these zones carries substantial ecological consequences, disrupting marine food webs and impeding fisheries and other human activities dependent on robust marine ecosystems (Gong & Zhou, 2021).

Deoxygenation, along with acidification, has contributed to past mass extinctions and poses a serious threat to current marine biodiversity. The expansion of dead zones due to nutrient-induced deoxygenation highlights the urgent need to address these environmental changes to protect ocean health and marine life.

### 1.2.4. Fishing

Fishing is recognized as a significant contributor to oceanic environmental degradation, second only to the impacts of anthropogenic carbon dioxide emissions and nutrient pollution. The environmental issues related to fishing go beyond the overexploitation of fish populations (overfishing). Fishing practices also damage marine habitats, particularly through bottom trawling, which involves dragging heavy nets across the ocean floor. This method devastates seabed habitats, including slow-growing deep-sea corals (Pusceddu et al., 2014).

Additionally, the loss or abandonment of fishing gear, such as synthetic nets and lines, poses serious threats to marine life through entanglement and habitat destruction, continues to catch and kill marine organisms, contributes to pollution, impacts the economy by reducing fish stocks, and creates navigation hazards (Gilman et al., 2021).

Furthermore, fishing vessels release pollutants such as oil, bilge water, sewage, and waste into the ocean, adding to the contamination.

### 1.2.5. Oil Spills

Oil spills are disastrous events resulting from oil extraction, transportation, and operational discharges from vessels. Oil quickly spreads across the water's surface, forming slicks that block sunlight and reduce oxygen levels, adversely affecting marine organisms. The toxic components of oil can kill marine life, contaminate food webs, and degrade sensitive habitats like mangroves and coral reefs

(Zhang et al., 2019). Cleanup operations are often challenging and protracted, with long-term impacts on marine environments and coastal economies reliant on fishing and tourism.

### 1.2.6. Plastic Debris

Plastic pollution is a pervasive and persistent problem in the oceans since plastics take extensive periods to decompose. Plastic debris, coming from large items like fishing nets to tiny microplastics, poses severe risks to marine organisms (Andrady, 2022). Indeed, marine animals ingest plastic particles, mistaking them for food, which can cause blockages in the gut, starvation, and death. For instance, turtles often mistake plastic bags for jellyfish. Moreover, plastic debris can act as floating traps that can snare marine animals, causing injury and mortality. The presence of plastics in the marine environment also threatens human health by entering the food chain via fish consumption (Derraik, 2002).

### 1.2.7. Habitat Alteration

Habitat alteration is caused by human activities like filling wetlands, dredging waterways, and beach erosion. For example, approximately half of the historical wetlands in the U.S. have been lost, leading to declines in habitats vital for aquatic birds and juvenile fish. Additionally, human-induced changes in salinity, temperature, and turbidity disrupt species distributions and reduce primary productivity. Reduced freshwater inflows shift salinity ranges and prolong the residence time of contaminants, aggravating pollution and diminishing fish populations (Nagelkerken et al., 2016).

### 1.2.8. Non-Indigenous Species

The introduction of non-native species into marine environments, often via ship ballast water and hull fouling, disrupts local biodiversity. Indeed, these invasive species can outcompete, prey on, or introduce diseases to native populations, leading to declines or extinctions of native species. This disruption can cause cascading effects on food webs and ecosystem functions, compromising the resilience and productivity of marine ecosystems (Çinar, 2014).

# Chapter Two

# Ocean governance

According to numerous scholars, the detrimental conditions that ocean ecosystems are facing are primarily driven by a failure in the current ocean governance system (Young et al., 2007). Issues such as biodiversity loss, ocean warming, and marine pollution largely result from the fragmentation and lack of coordination inherent in the current ocean governance framework, as well as from the temporal mismatch between ocean ecosystem conditions and related decision-making processes. These issues lead to excessive extraction of resources from Ocean and Earth systems, without adequate measures to ensure their health and sustainability.
For this reason, a shift to a sustainable ocean governance model becomes essential to ensure that balance and preserve the rights of future generations (Brodie Rudolph et al., 2020).

This chapter aims to offer an overview of the current ocean governance framework to identify its weaknesses and lay the groundwork for ideating future opportunities for improvement.
First, an overview of the global legal framework will be presented through an analysis of the United Nations Convention on the Law of the Sea (UNCLOS) and the complementary international environmental law (IEL).
Next, the chapter will focus on regional agreements and the various institutions operating at different governance levels, providing a comprehensive analysis of the polycentric order operating within the general legal framework.
Finally, the weaknesses of the current system will be analyzed, setting the stage for potential future solutions, which will be covered in Chapter 3, dealing with Integrated Ocean Management.

## 2.1. The Ocean Governance Framework

The current ocean governance framework can be described as a polycentric system. This term refers to a structure “comprising multiple governing arrangements under a common set of rules” (Mahon & Fanning, 2019) and is characterized by “multiple governing authorities at differing scales rather than a monocentric unit” (Ostrom, 2010).

The foundation of this framework is represented by the United Nations Convention on the Law of the Sea (UNCLOS), regarded as the “Constitution of the Law of the Sea.” UNCLOS provides an

overarching set of rules and principles for ocean governance, detailing the duties and obligations for managing all possible activities related to the ocean. Complementing UNCLOS are various international environmental laws (IEL) that address specific ocean-related issues, thereby supplementing the broad directives of UNCLOS.

Within this overarching global legal framework, the polycentric system is delineated into 20 regions. Each of these regions hosts multiple institutions and organizations, which collectively operate under a total of 166 intergovernmental arrangements at regional or subregional levels (Mahon & Fanning, 2019).

At more localized levels, governance structures include national, provincial, municipal, and community arrangements, aiming at addressing specific issues and implementing policies on the ground.

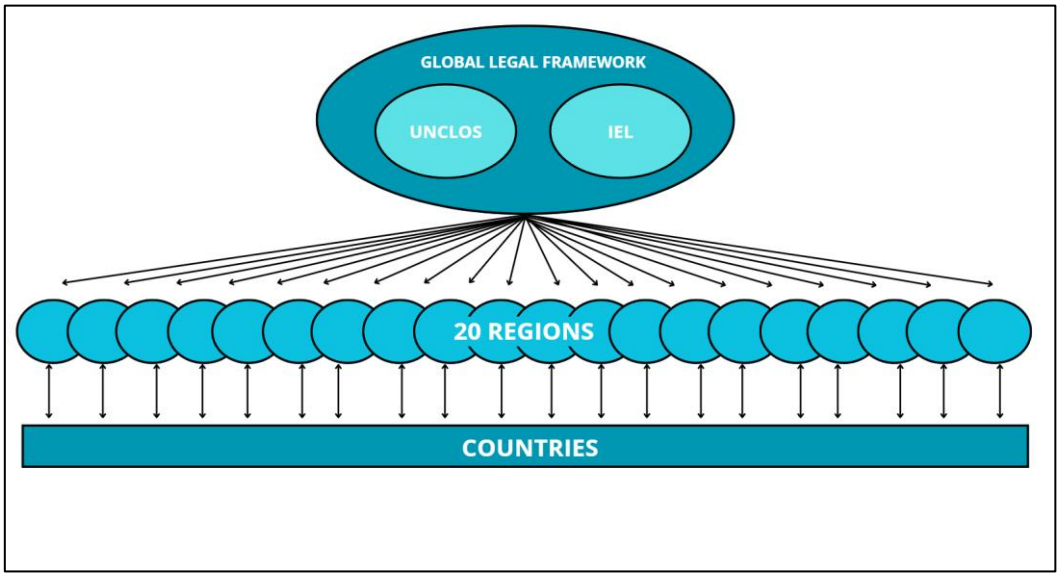


Figure 2: The current ocean governance framework. Source: Author's own work.

The following paragraphs will delve more deeply into each of these governance layers.

### 2.1.1. The global legal framework: The United Nations Convention on the Law of the Sea (UNCLOS)

The United Nations Convention on the Law of the Sea (UNCLOS) is the most important international treaty regulating maritime law. It was adopted during the Third United Nations Conference on the Law of the Sea, which took place from 1973 to 1982.

The main objective was to develop a treaty that could regulate the main issues related to the ocean in a comprehensive and holistic manner, given the lack of a clear legal framework on such topics.

Therefore, UNCLOS was intended to clarify and formalize customary international law, create new regulations for emerging maritime activities, and promote the sustainable and fair use of ocean resources.
The negotiating table included a vast range of ocean-related issues, such as “navigation, fishing, scientific research, seabed drilling and mining, the laying of seabed cables, marine pollution, and territorial and jurisdictional claims” (UN General Assembly, 1982).

One of the main innovations brought about by the UNCLOS is represented by the definition of territory and jurisdiction zones.
These zones outline countries’ sovereignty, rights and responsibilities and specify the conditions to legitimately access specific marine resources. According to the Convention, the state is the sole "property owner" of the sea: the government holds the legal authority and responsibility to issue licenses and permissions under national jurisdiction to regulate the use of marine resources and to ensure the conservation of ocean ecosystems.

The Convention establishes different zones for the seabed and the water column.
The seabed is categorized into two types of zones:

1) the continental shelf (up to 350 nautical miles from the nearest coastal state), where coastal states enjoy exclusive rights of the resources of the seabed and subsoil.
2) “The Area”, which is considered a “common heritage of mankind” and is managed by the International Seabed Authority (Article 136).

The water column is divided into four categories of zones:

i) the territorial sea, which extends up to 12 nautical miles from the baseline (Article 3). This zone represents an extension of the coastal state's sovereignty. However, coastal states must allow for “innocent passage” and “transit passage” of foreign ships.
ii) the contiguous zone (up to 24 nautical miles from the baseline according to Article 33). In this zone, coastal states are empowered to prevent and punish infringements of their customs, fiscal, immigration, or sanitary laws occurring within their territory or territorial sea. They also have the authority to protect objects of archaeological and historical nature within the contiguous zone.
iii) the Exclusive Economic Zone (EEZ), extending up to 200 nautical miles from the baseline, grants coastal states exclusive rights to exploit, conserve, and manage resources in the water column. Despite these exclusive rights, other states retain freedoms of navigation, overflight, and the laying of submarine cables and pipelines.

iv) the high seas (also known as the "Area Beyond National Jurisdiction"), encompass all parts of the ocean beyond the other jurisdiction zones (Article 86). All states enjoy the rights of navigation, overflight, laying of cables and pipelines, construction of artificial installations, fishing, and conducting scientific research in these areas. The convention prohibits sovereignty claims over the high seas, reserving them for peaceful purposes, and places enforcement responsibilities on the flag states of ships.

### 2.1.2. The global legal framework: International Environmental Law (IEL)

To build on the foundational framework provided by UNCLOS, both United Nations and other organizations adopted numerous international treaties over time to address specific ocean-related issues. These treaties cover a wide range of topics, from the prevention of marine pollution to the protection and conservation of marine biodiversity. Table 1 provides a comprehensive overview of the most significant international environmental treaties that complement UNCLOS, highlighting their roles in enhancing the overall governance of ocean ecosystems.

| Convention | Year | Objectives | Content |
|---|---|---|---|
| **International Convention on Civil Liability for Oil Pollution Damage (CLC)** | **Adoption:** November 29, 1969 **Entry into Force:** June 19, 1975 (amended in 1992) | To establish a framework for the liability and compensation for oil pollution damage resulting from maritime accidents. | It establishes strict liability for shipowners in case of oil pollution damage, mandating them to maintain insurance or other financial security. It outlines compensation limits and procedures for claims. |
| **Convention on the Prevention of Marine Pollution by Dumping of Wastes and Other Matter (London Convention)** | **Adopted:** November 13, 1972 **Entry into Force:** August 30, 1975 | To control and prevent marine pollution by regulating the dumping of wastes and other matter into the ocean. | It prohibits the dumping of certain hazardous materials and regulates the dumping of other materials through a permit system. It includes all deliberate disposal at sea of wastes or other matter from vessels, |

| | | | |
|---|---|---|---|
| | | | aircraft, and platforms, but it does not cover disposal from land-based sources. |
| **Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES)** | **Adopted:** March 3, 1973 **Entry into Force:** July 1, 1975 | To ensure that international trade in specimens of wild animals and plants does not threaten their survival | It regulates international trade of endangered species by requiring permits and certificates for export, import, re-export, and introduction from the sea. |
| **The International Convention for the Prevention of Pollution from Ships (MARPOL)** | **Adoption:** 1973 **Entry into Force:** 2 October 1983 | It aims to prevent and minimize pollution from ships, encompassing both accidental pollution and that arising from routine operations. | It includes six technical Annexes, each focusing on different types of marine pollution: 1) Regulations for the Prevention of Pollution by Oil; 2) Regulations for the Control of Pollution by Noxious Liquid Substances in Bulk; 3) Prevention of Pollution by Harmful Substances Carried by Sea in Packaged Form; 4) Prevention of Pollution by Sewage from Ships; 5) Prevention of Pollution by Garbage from Ships; 6) Prevention of Air Pollution from Ships |
| **Convention on Biological Diversity (CBD)** | **Adoption:** May 22, 1992. **Entry into force:** | **It aims to:**<br>o Conserve biological diversity | It includes programs and guidelines for: 1) developing national strategies for biodiversity conservation, 2) establishing protected areas, 3) |

| | | | |
|---|---|---|---|
| | December 29, 1993. | ○ Promote sustainable use of biological resources<br>○ Ensure fair and equitable sharing of benefits arising from using genetic resources. | addressing threats like pollution and invasive species, and 4) promoting public education, research, and international cooperation. |
| **UN Fish Stocks Agreement** | **Adopted:** August 4, 1995<br>**Entry into Force:** December 11, 2001 | To ensure the long-term conservation and sustainable use of straddling fish stocks and highly migratory fish stocks. | It includes guidelines for:<br>1)Conservation and Management Measures for fish stocks (Precautionary and Ecosystem approach)<br>2)Regional and Subregional Cooperation Measures<br>3)Data Sharing and Transparency |
| **International Convention for the Control and Management of Ships' Ballast Water and Sediments (BWM)** | **Adoption:** February 13, 2004<br>**Entry into Force:** September 8, 2017 | To prevent the spread of harmful aquatic organisms and pathogens by controlling and managing ships' ballast water and sediments. | It includes:<br>requirements for a ballast water management plan, adherence to ballast water discharge standards, and the regular conduct of inspections and surveys. |
| **BBNJ (Biodiversity Beyond National Jurisdiction) Agreement** | **Adoption:** 19 June 2023<br>**Entry into force:** Not yet entered into force | To ensure the conservation and sustainable use of marine biodiversity in areas beyond national jurisdiction. | It includes provisions for:<br>1) the fair and equitable sharing of benefits deriving from the use of marine genetic resources; 2) the definition of area-based management tools, including marine protected areas; 3) Environmental impact |

| | | | |
|---|---|---|---|
| | | | assessments; 4) Capacity-building and the transfer of marine technology. |

Table 1: International Environmental Law: the main treaties supplementing UNCLOS. Source: Author's own work.

### 2.1.3. Regional Agreements

Within the global legal framework established by the United Nations Convention on the Law of the Sea (UNCLOS) and International Environmental Law (IEL), there exists a polycentric system composed of 20 distinct regional clusters. Each of these clusters is defined by unique arrangements for ocean governance aimed at promoting the sustainable use of marine ecosystems (Mahon & Fanning 2019).

The agreements within these regions vary, with some being binding and others voluntary, addressing various aspects of marine conservation such as fisheries, biodiversity, habitat protection, pollution, and climate change.

The development of regional ocean governance gained momentum in the 1980s with the creation of UN Environment's Regional Seas Program (RSP) and the UN Food and Agriculture Organization's (FAO) Regional Fisheries Management Organizations and Bodies (RFMOs and RFBs).

Established in 1974, UNEP's Regional Seas Program (RSP) aims to tackle the degradation of oceans and coastal areas through sustainable management and development. This objective is achieved by fostering regional cooperation and implementing action plans with specific measures to protect ocean ecosystems.

On the other hand, RFMOs and RFBs, established by the FAO starting in the mid-20th century, focus on the sustainable management and conservation of fish stocks. These organizations aim to ensure the long-term sustainability of fish populations through science-based management measures and work to protect vulnerable marine ecosystems and species from overfishing and other harmful activities.

The creation of these UN bodies paved the way for the establishment of other numerous regional organizations throughout the 1980s and 1990s, such as the North Pacific Marine Science Organization (PICES), the Commission for the Conservation of Southern Bluefin Tuna (CCSBT) and the Commission for the Protection of the Marine Environment of the North-East Atlantic (OSPAR).

Nowadays, most regions host ten or more regional and subregional arrangements, with many being indigenous arrangements developed internally by the countries within the regions themselves rather than being externally established by global agencies like FAO or UNEP.

### 2.1.4. A polycentric order

Given the existence of different authorities operating at different levels of the governance system, we can define the ocean governance framework as a polycentric order.

According to governance theory, a functional polycentric system must have:

1) overarching rules, represented by UNCLOS and IEL
2) mechanisms for mutual adjustment of activities (integration mechanisms)
3) willingness to experiment
4) trust
5) local action.

For what concerns the second point, the level of integration and coordination varies significantly across the 20 ocean regions.

Four regions (Antarctic, Arctic, Pacific Islands, and South-East Pacific) have established comprehensive integrating mechanisms for the sustainable use of ocean ecosystems. In particular, the Arctic and Antarctic regions benefit from hierarchical governance structures due to their remoteness (Mahon & Fanning 2019).

Most of the remaining regions exhibit different degrees of integration and are working to plan and establish improved integration mechanisms.

Finally, four regions show no signs of integration, with two of them (North-West Atlantic and North-East Pacific) being managed bilaterally by USA and Canada (Mahon & Fanning 2019).

### 2.1.5. Fragmentation and lack of integration: the failure of the current governance framework

Despite the efforts undertaken both by international institutions and regions, the current ocean governance framework results as fragmented: most of the various arrangements that are in place for major ocean governance issues are operating with little or no coordination across sectors or geographic scales.

In particular:

- Sectoral arrangements do not interact to assess the implications of one sector for another

- Different arrangements have responsibility for a geographical area or ecosystem that should be treated as a unit

This lack of coordination leads to various issues, including overlapping and gaps in mandates, duplicated efforts, mismatched governance and ecosystems, inefficient use of human and financial resources, and insufficient use of scientific input.

Efforts to address this problem have been undertaken over time by the UN Oceans initiative, an inter-agency mechanism that aims to strengthen and promote coordination of United Nations system activities related to ocean and coastal areas by fostering collaboration and information-sharing. However, its effectiveness has been limited, primarily due to insufficient resources (Zahran and Inomata 2012). Furthermore, even if the initiative was effective, a significant challenge persists: many global and regional arrangements are indigenous (internally established by countries) and operate independently of UN Oceans, resulting in gaps in coordination and governance.

### 2.1.6. Toward a better polycentric Ocean Governance

The analysis of the current ocean governance model demonstrates a pressing need for an enhanced framework capable of reducing fragmentation and fostering cooperation. An effectively integrated and coordinated polycentric order could yield numerous benefits, including mutual learning, subsidiarity, increased adaptability, and the inclusion of local knowledge in decision-making processes.

To achieve these objectives, various scholars have focused on Integrated Ocean Management (IOM) as a potential solution to the existing fragmentation issue. The next chapter will delve deeper into IOM and its potential to address these challenges.

# Chapter 3

# Integrated Ocean Management (IOM) as a possible solution

## 3.1. IOM: an overview

As discussed in previous chapters, the growing pressures on ocean spaces—exacerbated by the lack of coordination in ocean governance across sectors and geographic scales—highlight the urgent need for a more integrated and comprehensive approach to ocean management.

In recent decades, scholars have increasingly advocated for Integrated Ocean Management (IOM) as a comprehensive solution for sustainably managing marine and coastal resources.

IOM is a holistic approach that seeks to promote a sustainable ocean economy by addressing multiple uses and pressures simultaneously. By engaging key stakeholders from government, business, academia, and civil society across the full range of ocean-related activities—such as petroleum extraction, fishing, aquaculture, shipping, tourism, mining, renewable energy, and conservation—this approach aims to reconcile competing interests and foster collaboration towards a sustainable future for our oceans (Winther et al., 2020).

Therefore, IOM aims to comprehensively address a wide range of issues, including conserving coastal and marine ecosystems, protecting these environments from land-based pollution, managing the impacts of fisheries and tourism, and mitigating/adapting to the effects of climate change (Winther et al., 2020).

To tackle these issues, IOM employs a set of interrelated tools, which often overlap with one another:

- Ecosystem-based management
- Integrated coastal zone management
- Marine spatial planning
- Area-based measures

The following paragraph will explore each of these tools, that are central to the IOM approach.

## 3.2. IOM's Toolbox

### 3.2.1. Ecosystem-based Management

Ecosystem-based management can be defined as the "management of natural resources focusing on the health, productivity, and resilience of a specific ecosystem, group of ecosystems, or selected natural assets as the nucleus of management" (Winther et al., 2020).

Ecosystem-based management differs from traditional resource management for its focus on strategies for entire systems rather than individual ecosystem components. This approach considers the interactions among various parts of the ecosystem and different management sectors and the cumulative effects of diverse ocean-use activities. Crucially, EBM recognizes humans as integral to the ecosystem, acknowledging both the services they derive from it and their influence on ecosystem processes (Long et al., 2015).

| KEY PRINCIPLES |
| --- |
| Focuses on the protection of ecosystem structure, functioning, and key processes |
| Considers the interconnectedness within systems (e.g. between species, sectors etc.) |
| Accounts for the interconnectedness among systems (air, land, sea) |
| Integrates ecological, social, and economic perspectives |
| Considers the cumulative impact on the ecosystem caused by different ocean activities |

Table 2: Key principles of the Ecosystem-based Management. Source: Author's own work.

### 3.2.2. Integrated Coastal Zone Management

Integrated coastal zone management (ICZM) can be defined as "the process of managing the coast and nearshore waters in an integrated and comprehensive manner with the goal of achieving conservation and sustainable use" (Katona et al. 2017).

It is an approach that unites all decision-making agencies to address issues collaboratively, ensuring alignment among their existing policies and plans, with the ultimate goal of preserving, restoring, and

enhancing the quality of coastal ecosystems and the communities that depend on them (CZMAI, 2016).

ICZM can be described as a dynamic and iterative process that encompasses the entire cycle of information gathering, planning, decision-making, management, and monitoring of implementation (Winther et al., 2020).

To be effective, ICZM requires the informed participation and collaboration of all stakeholders to evaluate societal goals within a coastal region and take action to achieve these objectives.

The term "integrated" in ICZM encompasses various key aspects: the merging of objectives and the coordination of various tools necessary to achieve these goals; the integration of all relevant policy areas, sectors, and levels of administration; the coordination of the terrestrial and marine aspects of the target area across both time and space (Ahlhorn, 2017).

| KEY PRINCIPLES |
| --- |
| Ecosystem based and area based |
| Integrated across sectors, agencies, and levels of government |
| Based on scientific knowledge and effective monitoring |
| Continuous and dynamic process that follows adaptive management strategies |
| Based on stakeholder engagement |

Table 3: Key principles of Integrated Coastal Zone Management. Source: Author's own work.

### 3.2.3. Marine Spatial Planning

Marine spatial planning (MSP) is "a public process of analyzing and allocating the spatial and temporal distribution of human activities in marine areas to achieve ecological, economic, and social objectives that are usually specified through a political process" (Ehler & Douvere, 2009).

This planning process aims to create a comprehensive framework that organizes the use of ocean space to minimize conflicts between various economic sectors while ensuring the preservation of the

ocean's ecosystems. This approach involves the careful identification and designation of specific ocean areas that are best suited for different uses and activities, such as shipping, fishing, tourism, energy production, and conservation (Santos et al. 2019).

MSP is increasingly regarded as an effective method for rationalizing the allocation of marine resources and space, helping to manage the competing demands of development and environmental protection. By structuring the interactions between different uses of marine space, MSP seeks to balance economic growth with the sustainable management of marine ecosystems (Winther et al., 2020).

### 3.2.4. Area-based Measures

Area-based measures play a crucial role in ocean management and can be implemented across all the various approaches previously described in this chapter.

The most common area-based measure related to ocean management is represented by marine protected areas.

A marine protected area (MPA) is "a clearly delineated geographical space, recognized, dedicated, and managed through legal or other effective means, to ensure the long-term conservation of nature along with associated ecosystem services and cultural values" (Winther et al., 2020).

These measures serve as regulatory tools for preserving natural and cultural resources and protecting marine ecosystems from excessive pressures exerted by human activities such as fishing, tourism, mining, aquaculture, and intensive coastal development. This goal is pursued through the prohibition or restriction of destructive activities within the marine protected area: some MPAs may impose stricter restrictions, completely prohibiting any human activity within their boundaries; others may set specific limits, such as on permitted fishing catch quotas or on the types of diving or boating allowed (Andradi-Brown et al., 2023).

However, managing marine protected areas in isolation without incorporating them into a comprehensive ocean plan has been shown to reduce their effectiveness. Therefore, it is crucial to integrate the protection of coastal and marine areas into broader ocean management strategies. This integration should occur within the framework of integrated coastal and ocean management, which takes into account land-ocean interactions and other holistic approaches (Winther et al., 2020).

## 3.3. Research question

While there is increasing consensus among scholars on the urgent need for an integrated approach to ocean management, the literature on its practical effectiveness remains limited. Indeed, existing studies often fall short in analyzing the outcomes of IOM implementation and in evaluating how Integrated Ocean Management (IOM) can be effectively applied across diverse geopolitical and ecological landscapes.

This thesis aims to bridge this gap by examining the efficacy of IOM through a detailed case study analysis. By identifying the key drivers of successful implementation, this research seeks to contribute to a deeper understanding of how IOM can be optimized to meet both economic and ecological objectives.

Accordingly, the research questions guiding this study are as follows:

1. Can IOM effectively balance the economic use of ocean resources with the conservation of marine ecosystems?
2. What conditions must be met for IOM to achieve this balance?

By addressing these questions, this thesis aims to provide actionable insights into how IOM can be leveraged to ensure the sustainable management of the world's oceans, thereby contributing to global efforts in ocean conservation and sustainable development.

The following paragraph will delve deeper into the methodology used to address these questions.

## 3.4. Methodology

To address the research questions, this study employs a comparative case study analysis, focusing on two exemplary instances of Integrated Ocean Management (IOM): the country of Belize and the Coral Triangle Initiative. These case studies were selected due to their recognition as best practices within the field of ocean management, providing valuable insights into the effectiveness of IOM implementation.

### 3.4.1. Case Study Selection

Belize was chosen as a case study because of its pioneering efforts in developing and implementing integrated ocean plans over the past two decades. Belize's work is widely regarded as a model in the sector, demonstrating how national-level initiatives can successfully balance economic use and conservation of marine resources.

On the other hand, the Coral Triangle Initiative (CTI) represents a unique regional effort to promote integration and cooperation in ocean management among six countries: Indonesia, Malaysia, Papua New Guinea, the Philippines, the Solomon Islands, and Timor-Leste. The CTI is recognized as a best practice in fostering cross-border collaboration and integrated management of shared marine ecosystems, making it an ideal case study for assessing IOM's broader applicability and effectiveness. Other criteria that were considered in the case study selection are: the diversity of the geographical and socio-economic context; the difference in the scale and scope of the initiatives; the biodiversity and ecological importance of the areas.

Firstly, Belize and the Coral Triangle Initiative represent different geographical contexts: Belize is a single small nation in Central America, and the other is a regional initiative encompassing multiple countries in Southeast Asia and the Pacific. This geographical diversity allows for the examination of IOM implementation across varied environmental, cultural, and socio-economic contexts.

Secondly, while Belize's IOM efforts are concentrated at the national level, the Coral Triangle Initiative operates on a regional scale. This contrast in scale allows for a comparative analysis of IOM's effectiveness in both national and regional contexts. Specifically, it enables an examination of how integration among sectors and national decision-making agencies is achieved in Belize, versus how cross-country collaboration fosters integration in ocean management within the Coral Triangle Initiative.

Thirdly, both Belize and the Coral Triangle are globally recognized for the ecological importance of their ocean ecosystems. Indeed, Belize’s hosts the second-largest barrier reef system in the world, and the Coral Triangle is considered the “world’s epicentre for marine biodiversity”, hosting 75% of the world’s coral species, six of the seven world’s turtle species and 2.000 species of reef fish. The ecological significance of these areas generates global interest in their preservation, attracting both financial resources and expertise from around the world to ensure effective management.

### 3.4.2. Data Collection

To analyze these case studies, a comprehensive literature review was conducted, drawing from a wide range of sources, including peer-reviewed research papers, national and regional ocean management plans, and official websites of the initiatives. This literature review provided a foundational understanding of the context, strategies, and outcomes associated with IOM in both Belize and the Coral Triangle Initiative.

In addition to the literature review, empirical data was gathered through three targeted interviews, which served to deepen the analysis and provide firsthand insights into the governance and implementation processes.

The interviews were conducted as follows:

1. **Governance and Regulatory Framework:**

- **Interview 1:** A semi-structured interview with a professor from the LUISS network with expertise in the field of Public Law, Innovation, and Sustainability. The interview focused on the broader governance and regulatory frameworks of IOM. This interview provided a macro-level perspective on the challenges and opportunities related to ocean governance.
- **Interview 2:** A structured interview with another professor from the LUISS network with expertise in the field of Governance of Innovation and Climate Change. The interview primarily focused on ocean governance, with the key outcome being valuable recommendations for further literature that could enhance the research.

2. **Belize Case Study:**

- **Interview 3:** A semi-structured interview conducted via virtual meeting with a scholar who has actively collaborated with the Belizean government as part of the Stanford University "Natural Capital" project. This individual has contributed to the development of technical models that informed past Belize's Integrated Coastal Zone Management Plans. The interview offered valuable insights into the process of collaborative development of the plan.

Two of the interviews (Interview 1 and 3) were semi-structured interviews conducted through online meetings, allowing for a flexible discussion that could adapt to the emerging themes during the conversation. Interview 2 was a structured interview, with fixed questions answered asynchronously in written form.

### 3.4.3. Methodological Considerations

The combination of literature review and interviews provided a robust methodological approach. The case study method, in particular, was instrumental in examining the specific conditions and contextual factors that contribute to the success of IOM in different settings. However, it is important to acknowledge some limitations, such as the reliance on a limited number of interviews and the inherent challenges of generalizing findings from case studies to broader contexts.

# Chapter Four

# Case study analysis

## 4.1. Case study 1: Belize

### 4.1.1. Overview

Belize is home to an extraordinary natural system: it hosts the world's second-longest continuous reef system, and its coastal zone boasts a rich array of habitats and attractions, including three atolls, numerous coastal lagoons, mangrove forests, and more than 300 cayes (Cho, 2005).

However, the growing pressure coming from issues such as rapid development, overfishing and population growth has been placing these ecosystems at significant risk. This prompted the Belizean government to enact the Coastal Zone Management (CZM) Act in 1998. The act established the Coastal Zone Management Authority and Institute (CZMAI), a body responsible for ensuring the sustainable use of ocean and coastal resources through the development of a National Integrated Coastal Zone Management (ICZM) Plan (Government of Belize, 2000).

However, a dearth of technical capacity led to slow progress until 2010, when CZMAI started a collaboration with the Natural Capital Project (NatCap), a Stanford University initiative that develops tools, methods, and strategies to assist governments, businesses, and communities in recognizing, measuring, and integrating the value of ecosystem services into planning and policy (Verutes et al., 2017). CZMAI and NatCap collaborated closely throughout the entire planning process, which culminated in 2016 with the approval of Belize's first Integrated Coastal Zone Management Plan.

Following the implementation of the Integrated Coastal Zone Management (ICZM) Plan in 2016, the Government of Belize is now focused on advancing marine conservation efforts by working towards the approval of a Marine Spatial Plan (MSP) by 2026. This initiative is part of a broader commitment to sustainable marine resource management, strengthened by a "blue bond" debt conversion agreement signed between the Government of Belize and The Nature Conservancy (TNC) (Fontana-Raina & Grund, 2024). This agreement enables Belize to reduce its national debt while simultaneously increasing investment in marine conservation.

This new MSP process will build on the foundation laid by the ICZM Plan to enhance ocean conservation in Belize. While the 2016 Belize ICZM Plan was focused primarily on coastal zones and development activities within the country's territorial seas, the MSP will expand its scope to include Belize's internal waters, territorial seas, and its Exclusive Economic Zone (EEZ). Furthermore, while the ICZM Plan primarily targeted the mitigation of threats to sensitive coastal

habitats, including coral reefs, seagrass beds, and mangroves, the forthcoming MSP aims to take a more comprehensive approach, incorporating ecological, economic, social, and cultural objectives in the planning process (Belize Coastal Zone Management Authority & Institute, 2024).

### 4.1.2. ICZM Plan: the planning process

The previously mentioned collaboration between the Natural Capital Project and CZMAI led to the co-development of a science-based coastal and marine spatial plan designed to ensure the ongoing delivery of environmental benefits to Belize (Arkema et al., 2015). In particular, the planning process led to the establishment of a zoning framework addressing resource use conflicts and balancing competing interests in the management of Belize's coastal zone. The approach followed to develop the Plan involved several key steps (Verutes et al., 2017):

**1. Process design and stakeholder engagement**

Stakeholder engagement was a pivotal aspect throughout every stage of the planning process. The Coastal Zone Management Authority and Institute (CZMAI) actively involved stakeholders through various channels and at multiple points in time. At the outset, CZMAI collaborated with stakeholders to co-develop a strategic framework for the upcoming planning process. Stakeholders provided valuable input through coastal advisory committees, which were established in nine regional planning areas. These committees included representatives from government, businesses, NGOs, fishing cooperatives, and local communities, ensuring diverse perspectives were integrated into the planning. Initial feedback from stakeholders highlighted the need for a proactive and adaptive planning approach. In response, the Coastal Zone Management Authority and Institute (CZMAI) outlined four key objectives: 1) promote sustainable resource use; 2) support integrated development planning; 3) build alliances for the benefit of all Belizeans; and 4) adapt to the impacts of climate change (Coastal Zone Management Authority and Institute, 2016).

Following the development of this strategic framework, CZMAI launched an extensive stakeholder engagement process. The institute actively participated in numerous committee meetings to identify the most critical issues for coastal zoning. During these initial consultations, stakeholders were asked to pinpoint the primary concerns related to the future development of the coastline and marine ecosystems, as well as to provide input on how human activities should be managed and located moving forward.

The discussions revealed that many of the issues identified were either local or regional in scope, such as subsistence and commercial fishing, tourism, coastal development, and the risks of inundation from tropical storms. To gain deeper insights into stakeholder expectations and priorities, CZMAI

distributed a short survey. This survey allowed respondents to highlight multiple drivers of future change, including climate change, real estate speculation, tourism expansion, and declining fisheries. The survey results provided clear direction for the planning process. Many stakeholders expressed a strong desire to limit development, particularly on barrier islands. The survey also confirmed that most stakeholders were heavily reliant on tourism and fishing for their livelihoods. Three primary benefits of coastal and ocean ecosystems were identified: the provision of catch and revenue from fisheries, the attraction of visitors and their expenditures from tourism, and the protection offered by these ecosystems against storms (Verutes et al., 2017).

These insights played a crucial role in shaping the subsequent phases of the planning process, ensuring that the strategy was closely aligned with the needs and concerns of those most affected by coastal and marine resource management.

A key factor in the success of the stakeholder engagement process was the team's unbiased approach to human activities. By recognizing each sector as a valuable and relevant revenue source, the project aimed to collaborate with sector representatives to strategically plan the future spatial allocation of their activities. This approach effectively broke down barriers, enhanced data accessibility, and fostered collaboration among diverse groups.

A prime example of the success of the stakeholder engagement strategy is the initiation of collaboration between Belize's fisheries department and the coastal management department. Although both departments were located in the same building, they seldom interacted. By introducing meaningful metrics and objectives that extended across ministries, the project sparked discussions on key issues, breaking down silos and fostering collaboration between these previously disconnected groups.

**2. Data collection and mapping**

Following the initial stakeholder engagement, the next phase of the planning process focused on data collection and mapping. CZMAI, in collaboration with NatCap, designed a knowledge acquisition strategy to identify the types of information needed for the planning process and determine how it would be utilized. A significant portion of the data acquisition involved gathering information from various stakeholders to map the diverse uses of coastal and marine areas.

CZMAI identified the following categories of coastal and marine activities: coastal agriculture; coastal aquaculture; coastal development; conservation; cultural and historical sites; marine dredging; fishing (commercial, sport fishing, subsistence, recreational non-sport fishing); marine transportation; marine recreation; oil exploration (Coastal Zone Management Authority and Institute, 2016).

This mapping exercise was instrumental in identifying potential future conflicts or synergies among these activities.

In parallel, an equally important task was to identify critical habitats within the coastal and marine environment. CZMAI highlighted mangrove forests, seagrass beds, and coral reefs as three vital habitats for consideration in the zoning scheme, recognizing their vulnerability to various coastal activities and their essential role in supporting a wide range of human uses.

Both the identification of human activities and key habitats were validated through the Coastal Advisory Committee (CAC) process (Verutes et al., 2017).

After several months of collecting existing data on biodiversity, habitats, and human uses of the marine and coastal areas, CZMAI and NatCap developed the first central data repository characterizing Belize's coastal zone.

A key driver of success in the data collection process was the team's transparency about the final use of the information collected. Indeed, a clear explanation of the purpose and potential applications of the data, even if speculative or based on examples, helped overcome barriers to obtaining sensitive or critical information, as well as build trust with stakeholders. This approach often involved using proxy data to illustrate how the actual information would be utilized, which proved to be a powerful strategy in encouraging cooperation and data sharing.

On the other hand, a challenging situation during the data collection process occurred when sensitive information was requested to an important stakeholder in an urgent and frantic manner due to the slowness of its response. This not only slowed down the process but also required the team to invest time in rebuilding that crucial relationship.

**3. Development of alternative zoning options and scenarios**

Building on the data collected, the next phase involved developing potential management options for the future. The team collaborated to co-create three possible scenarios, informed by existing development proposals and stakeholder preferences. Over several months, they developed three scenarios, each representing a different vision for Belize’s coastal zone (Coastal Zone Management Authority and Institute, 2016).

The first scenario, termed “Conservation,” envisioned a future where ecosystem preservation and biodiversity were prioritized over coastal development and other economic activities. The second scenario, known as “Informed Management,” proposed a balanced approach, integrating economic development with the conservation of critical resources. The third scenario, labeled “Development Heavy,” depicted a future where various competing economic activities were pursued with minimal central coordination, prioritizing development over the preservation of coastal natural resources.

These scenarios were crafted using existing coastal plans, policy documents, and future projections for Belize. Once drafted, the scenarios were presented in public meetings and Coastal Advisory Committee (CAC) meetings across the nine planning regions. Stakeholders provided input, refining the rules, zones, and validating the approach with their local knowledge and existing data.

After developing these scenarios, the team employed the InVEST ecosystem service model, developed by NatCap, to assess how ecosystem service provision would vary across the possible future scenarios. Specifically, they examined how potential locations of human activities might impact coral reefs, seagrass beds, and mangrove habitats, and how these changes could affect storm protection, lobster harvests, and tourism revenues.

**4. Review and iteration**

To enhance the accuracy and legitimacy of the scenarios assessment, the team revisited each step of the science-policy process during three key iterations (August 2012, November 2012, and August 2013). Due to the significant time and partner engagement required, only three iterations were conducted over the project's duration (Verutes et al., 2017).

Initial ecosystem service analyses revealed that the Informed Management scenario posed nearly as much risk to habitats and associated services as the Development scenario. In response, the Coastal Zone Management Authority and Institute (CZMAI) refined the framework, adjusting the allocation of human activities based on feedback from stakeholders and experts (Arkema et al., 2015). By the end of the process, the Informed Management scenario had undergone significant evolution.

Indeed, it offered a balanced approach, projected to increase fisheries revenues by more than 25% compared to the current situation, while tripling tourism expenditures and boosting avoided storm damages by over 50% (Arkema et al., 2015).

**5. Development of the written Plan**

All the information collected, and the analyses conducted over time by CZMAI and NatCap were crucial in guiding the development of Belize’s first Integrated Coastal Zone Management (ICZM) Plan. The final version of the ICZM Plan was endorsed by Belize’s Cabinet on February 22, 2016, and received official approval from Parliament on August 28, 2016.

## 4.1.3. Implementation Outcomes

The implementation of Belize’s Integrated Coastal Zone Management (ICZM) Plan has been characterized by both successful aspects and challenges.

One of its most groundbreaking outcomes was the passage of legislation permanently banning oil exploration within Belize's waters—an unprecedented move for a developing nation (Petroleum Operations (Maritime Zone Moratorium) Act, 2020). Moreover, the plan influenced the shaping of key national policies, including the National Sustainable Tourism Master Plan for Belize 2030 and the Horizon 2030 National Development Planning Framework, all aimed at ensuring sustainable coastal development.

The bold steps taken by the Belizean government set a global precedent for ocean protection and received global praise, with UNESCO recognizing the ICZM Plan as "one of the most forward-thinking ocean management strategies worldwide". This recognition was further underscored in 2017 when the Belize Barrier Reef was removed from the World Heritage Sites in Danger list, thanks to the robust protective measures the plan introduced (UNESCO, 2018).

According to estimates, by implementing the ICZM Plan Belize saved half a billion US dollars in climate damage costs, tourism expenditures, and fisheries revenues (Natural Capital, 2023).

However, gaps remain in tracking the ICZM Plan's long-term ecological impacts. Indeed, the most recent State of the Belize Coastal Zone report covers the period between 2014 and 2018, leaving uncertainty about the current health of the coastal ecosystems. To address this gap, Belize is now working with partners like the Natural Capital Project to develop Key Performance Indicators (KPIs) that will improve the monitoring of environmental progress moving forward (Natural Capital Project, 2024).

According to interviews, the most significant success of the entire planning process has been the enhanced support and trust from stakeholders, fostered by the highly participatory approach adopted. This inclusive strategy not only facilitated greater collaboration across sectors and government departments but also helped break down silos and barriers. By addressing ocean-related challenges in a holistic manner and establishing common objectives and shared metrics, the process strengthened relationships, built mutual respect, and reinforced trust among all parties involved.

Another key success of the project is its "snowball" effect: international recognition and positive media coverage have paved the way for new partnerships and unlocked access to sustainable funding opportunities, such as the Blue Bond Agreement. This global attention has not only enhanced Belize's visibility but also attracted greater support for its conservation and sustainable development initiatives.

### 4.1.4. Next steps

After the implementation of the Integrated Coastal Zone Management (ICZM) Plan, the Government of Belize is now working to develop a legally enforceable Marine Spatial Plan (MSP) by 2026.

The project is focused on achieving several interconnected goals (Belize Coastal Zone Management Authority & Institute, 2024).

First, it aims to establish a science-based, data-driven, and inclusive Marine Spatial Planning (MSP) process that aligns with Belize's commitments under the Blue Loan Agreement and Conservation Funding Agreement. This involves designing a legally enforceable Marine Spatial Plan by November 2026, ensuring the creation of effective governance mechanisms, and fostering public understanding through a comprehensive communication strategy.

In addition, the main goal of the project, which is focused on conservation, is to legally protect up to 30% of Belize's ocean by designating Biodiversity Protection Zones. These zones are intended to safeguard critical habitats and species, with an emphasis on integrating climate-resilient safeguards. Strengthening the Marine Protected Area (MPA) network and enacting the necessary legislation to enforce the Marine Spatial Plan and Management Plans by 2029 are also key objectives.

Another crucial goal of the project is to promote sustainable growth within Belize's blue economy. This involves evaluating ocean spaces for their suitability to support sustainable economic activities and monitoring blue carbon ecosystems to meet conservation goals while leveraging financial opportunities.

Finally, ensuring equity in the planning process is at the foundation of the project.

Indeed, the MSP aims to ensure that all Belizeans have fair and equitable access to the benefits derived from ocean resources. For this reason, the planning team is committed to involving key multi-sectoral interest groups in the process, while considering cultural, indigenous, social, and economic uses in the allocation of ocean spaces.

### 4.1.5. The new governance framework

The governance framework for Belize's Marine Spatial Planning (MSP) process is structured around five key groups (Belize Coastal Zone Management Authority & Institute, 2024).

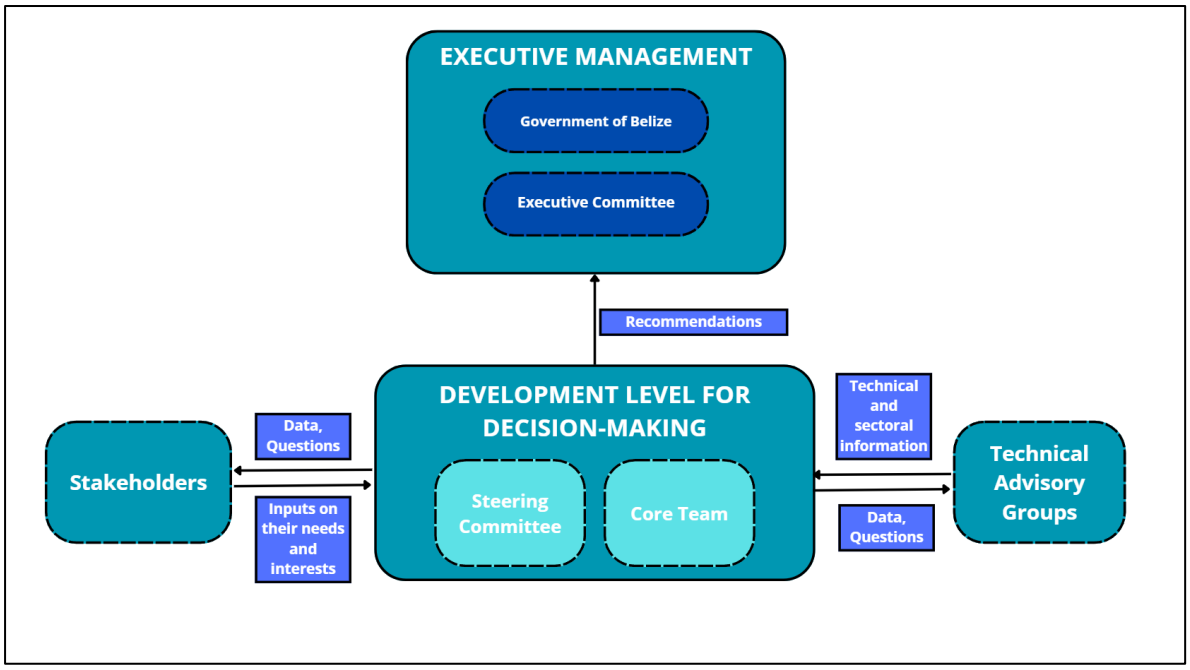


Figure 3: Belize's MSP Governance Structure. Source: Author's own work.

The Executive Committee is the highest decision-making body, composed of top-level officials, including ministers and CEOs from key ministries. This group is responsible for making high-level decisions based on information provided by the Steering Committee, Technical Working Groups, and public input. The Chief Executive Officer from the Office of the Prime Minister chairs this committee. Another crucial body is represented by the Steering Committee, which provides leadership, oversight, and guidance throughout the MSP process. It is tasked with reviewing outputs, providing technical, policy, and legislative input, and ensuring consensus across all sectors involved in the MSP. It submits recommendations to the Executive Committee for final approval. The Steering Committee is chaired by the Chief Executive Officer of the CZMAI and is composed of members representing various governmental, non-governmental, and academic organizations.

The Core Team is responsible for generating spatial and non-spatial outputs that inform the Belize Sustainable Ocean Plan. This team facilitates an interactive process that allows stakeholders multiple opportunities to provide input, ensuring the plan reflects diverse perspectives. The Core Team is chaired by the Chief Executive Officer of the CZMAI and includes members from key organizations involved in the MSP process.

Technical Working Groups (TWGs) provide specialized technical and sectoral information to support the development of planning tools and draft outputs. These groups contribute data, knowledge, and expertise to address ecological and socio-economic issues relevant to their sectors. The recommendations from the TWGs are channelled through their chairs to the Steering Committee for further review and approval by the Executive Committee.

Finally, public stakeholders play a crucial role in providing input throughout the whole MSP process. Their contributions help shape the final outputs, ensuring the plan reflects their needs and expectations. Public engagement is facilitated through various outreach activities such as workshops, surveys, and interviews, with feedback incorporated into the plan's development.

### 4.1.6. Financial sustainability

While Belize's past Integrated Coastal Zone Management (ICZM) plans were funded through a mix of domestic and international sources, such as government budget allocations, grants from international environmental organizations, and contributions from development agencies and donor countries, the new Marine Spatial Plan (MSP) is primarily financed through the innovative "Blue Bond" debt conversion agreement between the Government of Belize and The Nature Conservancy (Fontana-Raina & Grund, 2024). This agreement allows Belize to strategically reduce its national debt while simultaneously enhancing investment in marine conservation.

The shift to the Blue Bond agreement represents a more sustainable and structured framework, ensuring long-term financing for marine conservation compared to the previous funding model for the ICZM plan. Indeed, past funding was often project-based, fragmented, and lacked long-term sustainability, leading to challenges in ensuring continuous and effective management of Belize's ocean and coastal ecosystems.

Through this debt-for-nature swap, Belize refinanced approximately $553 million of external commercial debt, equivalent to 30% of its GDP, resulting in a 12% reduction in its national debt (Natural Capital Project, 2024). This was made possible through the release of a new "Blue Bond," insured by the U.S. Development Finance Corporation (DFC), significantly reducing the perceived risk for investors. The proceeds from the Blue Bond were used to buy back Belize's existing "Superbond" at a discount, freeing up financial resources that were then redirected toward marine conservation efforts (Fontana-Raina & Grund, 2024).

The funds generated through this refinancing are channelled into an independently managed conservation fund to ensure transparency in the use of resources to achieve Belize's conservation goals. The Blue Bond agreement requires Belize to make regular contributions to this fund, which supports long-term marine conservation projects, including the MSP. The agreement is structured with stringent conservation commitments, backed by financial and legal consequences if Belize fails to meet predefined milestones (Fontana-Raina & Grund, 2024).

Through this partnership, TNC collaborates closely with the Belizean government, investors, and international development organizations to ensure that the financial and environmental objectives of

the MSP are integrated. This not only guarantees the financial stability of the MSP but also ensures a continuous commitment to preserving Belize's marine ecosystems, making the debt-for-nature swap an innovative solution that links national debt reduction with environmental conservation.

## 4.2. Case study 2: The Coral Triangle initiative

### 4.2.1. Overview

The Coral Triangle region is recognized as the world's epicentre for marine biodiversity, containing 605 species of reef-building corals—76% of the global total—making it the most diverse coral region on Earth. It is also home to 52% of the world's reef fish species, many of which are found nowhere else (Anugrah & Putra, 2020). Additionally, the Coral Triangle supports a high diversity of other marine species, such as mollusks and crustaceans, as well as critical habitats like mangroves and seagrass beds (Veron et al., 2011). However, the region is facing significant threats, including overfishing, destructive fishing practices, marine pollution, deforestation, and coastal development, that are exerting unsustainable pressure on these ecosystems (Asaad et al., 2018).

To effectively combat these threats in a comprehensive and integrated manner, the countries within this region have joined forces under the Coral Triangle Initiative on Coral Reefs, Fisheries, and Food Security (CTI-CFF).

CTI-CFF is a multilateral partnership that brings together six countries —Indonesia, Malaysia, the Philippines, Papua New Guinea, the Solomon Islands, and Timor-Leste—along with various NGOs, government agencies, and international development partners. These partners include The Nature Conservancy (TNC), the World Wildlife Fund (WWF), Conservation International (CI), the Asian Development Bank (ADB), the Australian Government's Department of the Environment, the United States Agency for International Development (USAID), the Global Environment Facility (GEF), the Coral Triangle Center, and Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ).

Initiated in 2007 and formally launched in 2009, the CTI-CFF aims to promote the conservation of marine biodiversity, sustainable fisheries management, climate change adaptation, and the protection of threatened species across the region.

Before the establishment of CTI-CFF, each of the six member countries had its own marine management and conservation policies, which varied significantly in their stages of development and focus. The CTI-CFF was specifically designed to address the importance of transboundary resources and to facilitate coordinated spatial planning across national borders (Thomas et al., 2017). Unlike Belize's case study, which developed a specific marine spatial plan, the CTI-CFF strengthens and

aligns existing marine governance efforts among the member countries. This initiative provides an overarching framework that allows the six member countries autonomy in managing their coastal and ocean resources (Thomas et al., 2017).

At its inception, the CTI-CFF was established as a voluntary partnership among the Coral Triangle Member Countries (referred to as the CT6), solidified through the adoption of the 10-year CTI-CFF Regional Plan of Action (RPOA) in 2009. The RPOA serves as a living, non-binding document that outlines the mechanism for cross-border collaboration, including information sharing, objective setting, and the establishment of common standards, while preserving each country's independence and sovereignty.

In 2011, the CT6 agreed to formalize the CTI-CFF partnership through a legally binding agreement that established the Regional Secretariat and defined the subscription costs for all six countries, proportionate to their GDP, to support the financial needs of the Secretariat.

After a decade of collaboration, the partnership was reaffirmed with the adoption of a second Regional Plan of Action (RPOA 2.0) in 2021. With more ambitious goals for the next 10 years, the CTI-CFF is committed to ensuring that coastal communities and marine ecosystems in the Coral Triangle region become more resilient to the impacts of climate change and other natural and human-induced threats. The initiative aims to achieve this by enhancing food security, promoting sustainable fisheries, and improving coastal livelihoods (CTI-CFF, 2022).

### 4.2.2. RPOA 1.0

In 2009, at the inception of the Coral Triangle Initiative on Coral Reefs, Fisheries, and Food Security (CTI-CFF), the participating countries adopted a Regional Plan of Action (RPOA), a 10-year strategic plan that articulated the collective priorities and commitments of the six member nations. This plan aimed to establish mechanisms for cross-border collaboration, including information sharing, objective setting, and the creation of common standards, to ensure the conservation and sustainable management of marine resources across the Coral Triangle.

The RPOA outlined five primary goals, each supported by a dedicated Technical Working Group (TWG).

The first goal focused on identifying and effectively managing Priority Seascapes, which serve as focal points for investment and conservation efforts. To achieve this, the partners agreed to collaborate on Seascape Assessments across the region to delineate seascapes and identify those that should be prioritized for investment. Moreover, they agreed to develop investment plans for the previously identified seascapes, alongside a commitment to sustainably manage the coastal and ocean resources within these priority areas.

The second goal of the RPOA was to implement an Ecosystem Approach to the Management of Fisheries (EAFM) and other marine resources. This goal aimed to integrate ecological principles into fisheries management practices, ensuring sustainable fisheries across the region. The EAFM approach strives to balance societal goals by considering the complexities and uncertainties of ecosystems, encompassing their biological, physical, and human components. EAFM principles include minimizing the ecological impact of fisheries, preserving ecological relationships among species, ensuring consistency in management measures across jurisdictions, applying a precautionary approach due to incomplete ecosystem knowledge, and promoting governance that supports both human and ecosystem well-being and equity. To achieve this, CTI-CFF partners committed to strengthening legislative, policy, and regulatory frameworks and improving income, livelihoods, and food security in coastal communities through new sustainable fisheries and poverty reduction initiatives.

The third goal of the RPOA was to establish and effectively manage a regional network of Marine Protected Areas (MPAs). This network, known as the Coral Triangle MPA System (CTMPAS), encompasses a broad range of MPA categories, including strictly protected areas, multiple-use areas, government-managed areas, and locally managed marine areas (LMMAs). These MPAs cover various coastal and marine habitats, including coral reefs, seagrass beds, mangroves, beach forests, and wetlands. After establishing the MPAs, the CTI countries agreed to collaborate on fostering effective management by building capacity and creating a learning network to share tools and practical information.

The fourth goal outlined in the RPOA was to foster Climate Change Adaptation (CCA) measures. The partnership aimed to develop and implement strategies to enhance the resilience of marine ecosystems and coastal communities to climate change. The countries agreed to create an Early Action Plan for Climate Change Adaptation focused on the near-shore marine and coastal environment, conduct capacity needs assessments, and develop capacity-building programs on climate change adaptation measures.

Lastly, the RPOA aimed to improve the status of threatened species within the Coral Triangle. The countries committed to developing regional action plans to protect species such as sharks, sea turtles, and seabirds, strengthening local and national legislative, policy, and regulatory frameworks, and establishing supporting networks and information management systems.

The RPOA served as a foundational framework that each member country adapted into their own National Plans of Action (NPOAs). These NPOAs were customized to address the unique national priorities and challenges of each country, while still contributing to the broader goals of the RPOA.

In doing so, each country developed targeted strategies and actions aligned with the RPOA's objectives, which were subsequently implemented at both national and sub-national levels.

### 4.2.3. Implementation Outcomes

Over time, the CTI countries worked to develop a monitoring and evaluation system known as the Coral Triangle Atlas to track progress towards the RPOA goals through quantitative indicators. However, the datasets from this system, as well as reports detailing the analysis results, are not yet publicly available.

Consequently, there is insufficient information to definitively state that the RPOA's implementation has led to significant improvements in the social and ecological conditions of the region, such as fish biomass, seagrass, mangroves, coral conditions, or income and livelihoods. Nonetheless, several studies on RPOA 1.0, which analysed its outcomes are available (Pietri et al., 2015; Christie et al., 2016; Thomas et al., 2017; Hemraj, 2020).

According to Thomas et al. (2017), while the MPA goal has seen considerable progress since the adoption of the CTI-CFF RPOA, the goals related to Seascapes, EAFM, Climate Change, and Threatened Species have been slower to materialize, with activities being less operationalized and M&E indicators still underdeveloped.

A key challenge arose due to the inclusion in the RPOA of objectives that reflected NGOs partners vision and areas of work, such as the Ecosystem Approach to Fisheries Management (EAFM) and Seascapes, which were not always fully understood by the CT6 governments. This lack of clarity led to disagreements over terminology and strategies, ultimately slowing progress on these goals.

In contrast, the MPA goal within the RPOA enjoyed strong support from all CT6 countries, as the concept was well understood, and consensus was easily reached. This consensus led to the successful establishment of numerous MPAs in each country. The success of this initiative was partly due to the CTI-CFF's endorsement of the Coral Triangle MPA System (CTMPAS), which aims to create a region-wide network of effective and ecologically linked MPAs that enhance fisheries and are resilient to climate change. The agreed-upon mechanism for categorizing MPAs across the CT6, along with the nomination of MPAs into the CTMPAS based on shared criteria and standards, has provided strong incentives for each country to improve MPA management and strengthen ecological coherence within national MPA networks (Thomas et al., 2017).

From a legislative perspective, the implementation of the RPOA led the CT6 governments to pass more legislation related to conservation in the Coral Triangle region (Hemraj, 2020). However, consultations on the outcome of RPOA 1.0 indicate that the enactment and enforcement of legislation

and regulations to manage human-related threats need to be improved and accelerated (Hemraj, 2020; Thomas et al., 2017). Enforcement remains a significant challenge across the CT region, but the severity of this issue varies between countries. For instance, Pacific Island countries have very few patrol boats, making it difficult to maintain a strong presence and prevent infringements.

Another major criticism of RPOA 1.0 is that it did not sufficiently prioritize improving livelihoods, despite the urgent need for capacity building, education and financial support in local communities. This is particularly significant given that a substantial portion of the population in the Coral Triangle region lives below the poverty line, making it essential to enhance opportunities for sustainable or alternative livelihoods. Without addressing these socioeconomic challenges, actions to conserve ocean resources risk being undermined by the immediate needs of the communities that depend on them.

According to studies, CTI-CFF's greatest success has been its strong collaborative approach and the political will of the CT6 to cooperate despite significant differences between them (Pietri et al., 2015; Christie et al., 2016; Thomas et al., 2017). These collaborative mechanisms have built strong partnerships, interpersonal working relationships, trust, and mutual respect.

The strengthening of relationships has led to successful capacity-building initiatives, supported by a series of Regional Exchanges where partners shared ideas and knowledge on specific themes, such as MPAs and sustainable marine tourism.

These Regional Exchanges provided opportunities for CTI-CFF countries and partners to share their respective approaches and best practices. For example, Indonesia’s development and application of its MPA Management Effectiveness tool was adopted and enhanced by Malaysia as a result of technical working group discussions. Additionally, within the CTI-CFF collaborations, careful partnership pairs were established between Coral Triangle countries to ensure capacity building. Higher-capacity countries often partnered with lower-capacity ones to organize and host meetings or chair working groups, taking on greater financial and organizational responsibilities while strengthening collaborative practices (Thomas et al., 2017). These initiatives also led to the empowerment of local leaders, as well as historically marginalized people in the Coral Triangle region (Christie et al., 2016).

### 4.2.4. Next steps: RPOA 2.0

After a decade of collaboration, the CT6 countries have decided to renew their partnership by adopting a second Regional Plan of Action (RPOA 2.0), which will be implemented between 2021 and 2030. Building on the foundation of the first RPOA, this new agreement places greater emphasis

on critical contemporary issues, including climate change adaptation, resilience, blue carbon, marine debris, illegal, unregulated, and unreported (IUU) fishing, as well as maritime security and sovereignty.

Moreover, RPOA 2.0 prioritizes aspects that extend beyond biophysical measures, such as food and nutrition security and the improved well-being of coastal communities. It is also designed to align more closely with the policy frameworks of the United Nations Framework Convention for Climate Change (UNFCCC) and to address key thematic areas such as women's empowerment and the natural carbon capture and storage capabilities of mangrove forests and seagrass beds.

To achieve significant impact at the regional level, RPOA 2.0 is structured around four main strategies for the 2021-2030 period.

These core strategies include: i) supporting the development of policies and regulations aligned with the CTI-CFF goals and vision, ii) engaging and motivating all stakeholders—especially coastal communities and the private sector—to take action in support of the CTI-CFF, iii) enhancing partnerships at international, regional, national, and local levels to build capacity and empower key stakeholders, and iv) establishing a clear resource mobilization plan to achieve the CTI-CFF goals.

RPOA 2.0 is organised on a three-level structure: goals, objectives and targets.

It has two main goals: a five-year intermediate goal and a ten-year ultimate goal.

By 2025, the aim is to enable coastal communities and marine ecosystems in the Coral Triangle region to cope with the impacts of climate change and other natural and human-induced threats.

By 2030, the goal is to further strengthen the resilience and adaptive capacity of these communities and ecosystems, enhancing food security, sustainable fisheries, and coastal livelihoods.

The objectives of RPOA 2.0 are threefold.

First, by 2030, it seeks to improve the health of coastal and marine ecosystems in the Coral Triangle region through effective management actions, targeting healthier coral, seagrass, and mangrove habitats, as well as the improved status of threatened species and sustainable fisheries.

Second, it aims to enhance risk resilience and socioeconomic conditions, particularly in terms of food security and coastal livelihoods, while also focusing on gender equality, social inclusion, and climate-resilient communities.

Finally, the plan seeks to strengthen CTI-CFF governance, leadership, and partnerships throughout the ten-year period.

### 4.2.5. Governance framework

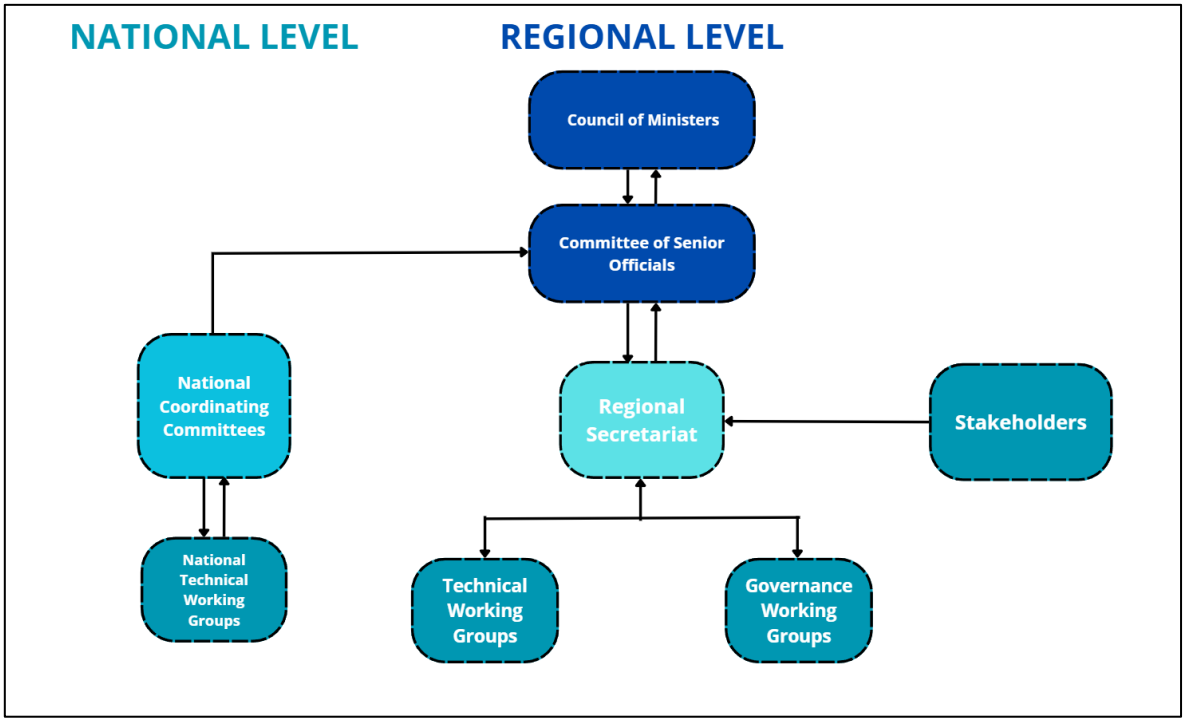


Figure 4: CTI-CFF Governance Structure. Source: Author's own work.

The governance structure of the CTI-CFF is designed to facilitate collaboration among the CT6 countries and their partners through a multi-tiered engagement system (Heck, 2022).

At the highest level is the Council of Ministers (COM), which serves as the formal decision-making body. Comprising the Ministers and Heads of State from the CT6 countries, the COM meets every two years during Ministerial Meetings (MM) to approve and adopt CTI-CFF resolutions. The chairmanship of the COM rotates every two years among the member countries.

Beneath the COM is the Council of Senior Officials (CSO), composed of designated senior government officials from the six countries. The CSO meets annually at the Senior Officials Meeting (SOM) to review and provide guidance on decisions, ensuring that the initiatives align with the CTI-CFF goals. The CSO also oversees the activities of the Regional Secretariat (RS), which plays a central role in facilitating and coordinating the implementation of the RPOA 2.0. The RS acts as the primary communication platform for all stakeholders and organizes technical meetings across various levels.

At the technical level, the structure includes Technical and Governance Working Groups. These groups are made up of representatives from key national agencies and technical advisors from non-governmental sectors. They meet regularly to discuss specific thematic issues relevant to the CTI-CFF, with the Technical Working Groups (TWGs) focusing on themes such as Seascapes, Fisheries,

Marine Protected Areas (MPAs), Climate Change, and Threatened Species. Governance Working Groups (GWGs) address non-technical aspects of coordination, including finance, monitoring and evaluation, and institutional coordination. Both TWGs and GWGs are supported by Cross-Cutting Initiatives (CCIs), which provide additional scientific and thematic expertise.

Each of the CT6 countries has a National Coordinating Committee (NCC), composed of officials from various government agencies and development partners. The NCCs are tasked with leading multi-stakeholder processes within their respective countries to coordinate and promote the implementation of both national and regional CTI-CFF action plans. They identify national priorities, coordinate actions and funding, and facilitate joint activities among NCC members. The NCCs also play a critical role in forming Technical Working Groups that proactively lead the decision-making process on prioritizing CTI-CFF activities, with support from the RS. Additionally, the NCCs organize national CTI-CFF stakeholder forums and serve as coordination points for external partners and stakeholders.

### 4.2.6. Financial sustainability

The Coral Triangle Initiative's financial structure has historically relied heavily on external funding from donors, such as non-governmental organizations and international development agencies. Indeed, the initiative's creation was made possible by more than USD 500 million in international contributions (Heck, 2022).

Since the financial contributions from the six Coral Triangle countries (CT6) fall short of what's required to implement the Regional Plan of Action (RPOA), the financial sustainability of the CTI-CFF remains closely tied to external donor support.

This dependency has allowed donor organizations to exert considerable influence over the RPOA's development, often shaping priorities and activities in ways that align with their interests. However, this has occasionally caused delays and disagreements over goal interpretation, slowing progress toward the initiative's objectives.

A key challenge of this reliance on external funds is the lack of long-term funding. Donors tend to allocate resources toward specific activities they are interested in, leading to uneven funding across the initiative's broader goals. Moreover, donor funding is not always guaranteed to be renewed, and the structure of financial flows is sometimes inefficient. The inconsistency in funding further underscores the initiative's ongoing struggle to achieve financial independence.

Some donors view the CTI-CFF's conservation-focused goals as a financial liability, or "sunk costs," rather than as investments that generate long-term returns. As a result, the initiative has not yet reached a stage where its financial sustainability can be ensured (Thomas et al., 2017).

To address these challenges, instruments like debt-for-nature swaps have been suggested as potential solutions. For instance, a debt-for-nature swap between the USA, Indonesia, and various NGO partners has been agreed to conserve Indonesian coral reefs (U.S. Department of the Treasury, 2024). However, no similar agreement exists at the broader Coral Triangle Initiative level.

The CT6 governments are actively exploring options to strengthen the CTI-CFF's financial architecture. Proposed measures include establishing a business development unit and a project preparation facility to enhance the financial capacity of the CT6. Additionally, the possibility of creating a region-wide sustainable funding mechanism, such as a trust fund, is being considered (Thomas et al., 2017). By standardizing accounting practices and agreeing on average costs for activities (e.g., managing marine protected areas or organizing regional workshops), the CT6 can better develop business plans and diversify their funding sources.

# Chapter Five

# Discussion

## 5.1. Findings

The case study analysis of Belize and the Coral Triangle Initiative (CTI) provides a valuable opportunity to examine the implementation of Integrated Ocean Management (IOM) strategies in two distinct contexts and at different governance levels.

On one hand, Belize, a small country in Central America, has spent the past 20 years developing a comprehensive national Coastal Zone Management (CZM) Plan. This plan informs all of Belize's policies and regulations to ensure sustainable coastal development and the responsible use of ocean resources. The country is now advancing these efforts by developing a Marine Spatial Plan (MSP), which aims to integrate ecological, economic, social, and cultural objectives.

On the other hand, the Coral Triangle Initiative on Coral Reefs, Fisheries, and Food Security (CTI-CFF) represents a regional partnership among six Southeast Asian and Pacific countries: Indonesia, Malaysia, the Philippines, Papua New Guinea, Timor-Leste, and the Solomon Islands. Unlike Belize's nationally-focused approach, the CTI-CFF aims to strengthen and align existing marine governance efforts among member countries to address shared challenges in managing transboundary marine resources.

Despite the differences in governance frameworks—one being a national initiative and the other a regional partnership—there are several common elements between the two case studies. These will be explored in the following paragraphs, focusing on governance structures, capacity building, ecological and social outcomes, and financial sustainability.

### 5.1.1. Governance

As previously mentioned, while the two case studies operate at different governance levels - one national (Belize) and the other regional (the Coral Triangle Initiative) - a comparative analysis of these initiatives offers a valuable opportunity to examine Integrated Ocean Management (IOM) frameworks in diverse contexts. Despite their differences, both initiatives share many common elements that provide important insights into effective ocean governance.

In both case studies—Belize and the Coral Triangle Initiative (CTI)—non-governmental organizations (NGOs) play a pivotal role, serving as essential partners in the development and implementation of Integrated Ocean Management strategies. In the governance structure, NGO representatives participate in the technical working groups of both initiatives, contributing technical expertise and recommendations to decision-making bodies. In Belize, representatives from various NGOs also serve on the Steering Committee, which offers leadership, oversight, and guidance throughout the MSP process by providing technical, policy, and legislative input.

The strong collaboration with NGOs is not only evident in the execution of these plans but is also reflected in their overarching goals, which have a strong focus on conservation and reflect the NGOs interests and priorities. For instance, Belize's new Marine Spatial Plan (MSP) includes the ambitious goal of designating 30% of its marine areas as biodiversity protection zones. Similarly, the CTI RPOA focuses on the establishment of Seascapes and Marine Protected Area (MPA) networks, objectives that are at the top of the agenda of the main NGOs involved.

This could have a negative impact if the goals developed do not consider the national and local context or fail to reflect the interests of other stakeholders. For example, in the case of the CTI, weak stakeholder engagement—particularly with local communities—has sometimes led to the perception that the CTI's objectives align more with the interests of international NGOs than with those of local populations. This disconnect has caused misunderstandings and slowed progress toward achieving the initiative's goals.

On the contrary, Belize's approach has been highly participatory from the outset, actively involving stakeholders from various sectors—government, businesses, NGOs, fishing cooperatives, and local communities—to ensure the plan reflects the diverse priorities of these groups. This inclusive strategy

has fostered broad-based support, legitimacy, and trust, ultimately contributing to more effective implementation.

Despite these differences, both case studies underscore the importance of strengthening partnerships and fostering collaboration among various actors. In Belize, enhanced cooperation between previously siloed government departments, such as the Fisheries Department and the Coastal Zone Management Authority, has resulted in more cohesive efforts toward shared conservation and sustainability objectives. Similarly, the CTI has helped improve relationships among member countries that previously faced tensions, fostering a more united front in addressing regional marine conservation challenges.

The strengthening of these partnerships has not only facilitated better cooperation on the ground but also enhanced the international recognition and relevance of both initiatives. This, in turn, has bolstered their influence on the global stage, providing them with greater leverage in international negotiations focused on marine conservation and sustainable development.

### 5.1.2. Capacity building

In both cases, a key success of the initiative was the improved capacity for ocean resources management. In Belize, when the Coastal Zone Management Authority (CZMAI) was mandated to develop an integrated coastal and ocean management plan in 1998, it initially lacked the capacity and coordination to do so effectively. Ministries and stakeholders worked with no coordination, and there was no centralized data repository to inform the planning process. Therefore, progress during the first decade was slow.

The collaboration with the Natural Capital Project (NatCap) effectively addressed these challenges by providing the technical skills and expertise that were needed to develop a science-based coastal and marine spatial plan. This partnership led to the creation of a unique data repository that consolidated previously scattered information, crucial for developing the ICZM Plan. The team also developed a robust stakeholder engagement strategy, establishing Coastal Advisory Committees that involved representatives from government, businesses, NGOs, and local communities to ensure diverse perspectives were integrated into the planning.

The engagement process facilitated the identification of key coastal issues, informed the zoning framework, and helped align objectives among stakeholders. By building trust and fostering collaboration, the partnership successfully developed a comprehensive ICZM Plan, balancing sustainable resource use with economic development.

In the case of the Coral Triangle Initiative (CTI), strengthening relationships among the CT6 governments and their partners facilitated capacity building through a series of Regional Exchanges.

These exchanges created valuable opportunities for CTI-CFF countries and partners to share approaches, best practices, and lessons learned on important themes such as sustainable tourism or the management of MPAs.

Higher-capacity countries often collaborated with lower-capacity ones to co-organize and host meetings or chair working groups, assuming greater financial and organizational responsibilities while fostering a culture of collaboration. These efforts also contributed to the empowerment of local leaders and historically marginalized communities within the Coral Triangle region.

### 5.1.3. Ecological and social outcomes

While both initiatives have made progress in strengthening collaboration, building capacity, and promoting certain conservation measures, there is currently no available data to quantitatively assess their ecological and social impacts. For example, there is insufficient information on the condition of critical habitats like mangroves, seagrass, and corals, or on improvements in livelihoods and climate resilience in communities. Consequently, it is not yet possible to determine through quantitative metrics whether the implementation of Integrated Ocean Management (IOM) in these cases has effectively balanced the economic use of ocean resources with the conservation of marine ecosystems.

To address this gap, both Belize and the CT6 governments are working towards developing robust monitoring and reporting systems. This will provide access to data-driven insights that will enable metrics-based sustainable financing in the future.

### 5.1.4. Financial sustainability

The two case studies share both similarities and differences regarding financial sustainability. Both the Belize and CTI initiatives have been funded through a combination of domestic and international sources, with a significant portion coming from development agencies and donor countries. This heavy reliance on donor funding poses challenges, such as uncertainty about long-term financing and significant donor influence over decision-making and the activities undertaken.

While the CTI-CFF continues to depend on donor funding, Belize adopted a different approach in 2021 by signing a "nature-for-debt" swap agreement with The Nature Conservancy. This innovative financing model helps secure the financial stability of Belize’s coastal and marine planning process, allowing for a more sustained and long-term commitment to preserving the country’s marine ecosystems.

## 5.2. Future recommendations

Despite the current unavailability of monitoring and reporting systems to quantitatively assess the effectiveness of these governance frameworks, the analyzed initiatives provide valuable insights into good governance practices for implementing IOM.

This paragraph provides recommendations for future IOM strategies, drawing on the analyzed case studies to highlight conditions that could support achieving a successful balance between the sustainable economic use of ocean resources and conservation efforts.

A critical component of successful Integrated Ocean Management (IOM) is adopting a science-based approach. Effective IOM planning should be driven by close collaboration between governments, policymakers, scientists, and field experts. This collaboration ensures that decisions are grounded in the best available scientific knowledge, which is vital for addressing the complex and interconnected nature of ocean-related issues. For developing countries, in particular, this approach is crucial as it facilitates the sharing of knowledge, technology transfer, and the development of digital infrastructure. These countries often face resource constraints and may lack access to advanced scientific data and tools, making such collaborations essential for capacity-building and informed decision-making.

Adopting an integrated and ecosystem-based approach is fundamental to addressing ocean management challenges holistically. This approach requires comprehensive and integrated datasets that include information on the geographical allocation of ocean uses, the biophysical characteristics and conditions of marine ecosystems, and the interrelationships between them. For example, understanding how various ocean uses impact ecosystem conditions and how ecosystem services, in turn, support human activities is critical for sustainable management. Without robust, integrated data, it would be impossible to develop effective, evidence-based strategies that balance conservation and economic use of ocean resources.

Therefore, increasing collaboration with scientists and experts is essential to creating a comprehensive data framework that supports integrated ocean management. Such a framework would enable the systematic collection, analysis, and sharing of data, ultimately leading to better-informed policies and sustainable ocean governance.

Another crucial factor for successful Integrated Ocean Management (IOM) is adopting a participatory approach. Engaging all stakeholders within the quintuple helix framework—government, industry, academia, civil society, and the environment—from the outset of the planning process is essential for fostering collaboration, building trust, and ensuring that diverse perspectives are considered. This

inclusive approach helps to integrate and reconcile the varied needs and interests of stakeholders, leading to more comprehensive and effective IOM strategies.

A key aspect of this approach is incorporating the insights and active involvement of local stakeholders. National efforts to enhance ocean management are unlikely to be effective without carrying out initiatives at the local governance level, adapting strategies to suit the unique environmental, socioeconomic, and governance conditions of each area.

For example, coastal communities that depend on marine resources for their livelihoods have unique needs and concerns that must be addressed to gain their support and cooperation.

Moreover, goals and objectives that do not resonate with the needs and priorities of local communities are likely to face resistance, leading to conflicts, misunderstandings and delays in achieving the established goals. The case study analysis has shown how participatory approaches increase the legitimacy and acceptance of management plans, reduce conflicts, and help building trust and respect among stakeholders.

By involving stakeholders throughout the process, decision-makers can ensure that strategies are not only ecologically sound but also socially equitable, leading to faster and more sustainable progress toward IOM goals.

Investing in strengthening partnerships across different levels of governance is a critical component of a successful IOM strategy. In particular, it is important to establish partnerships at the national level—among the various sectors involved in the ocean economy—and the regional level—among countries within a shared geographical area that should be managed as a unique ecosystem.

Strengthening these partnerships is crucial to foster capacity building.

Firstly, investing in strong partnerships among sectors and institutions enables social capacity by increasing trust and mutual respect, resulting in more cohesive and coordinated efforts toward conservation and sustainability goals.

Secondly, strong partnerships foster human and technical capacity through the exchange of knowledge, information, and expertise, along with the sharing of best practices and innovative tools, models, and approaches.

Thirdly, institutional capacity would be strengthened by elevating the international profile of the partners, thereby increasing their impact on the global stage and enhancing their influence in international negotiations.

Finally, strong partnerships would increase financial capacity. Indeed, on one hand, partners can pool their resources, thereby increasing the internal funds available to support various initiatives. On the other hand, the visibility and credibility gained through robust partnerships can lead to increased

international recognition, that could in turn, attract external funding from global institutions, governments, and investors.
For all these reasons, strengthening partnerships is an essential component of successful IOM.

Ensuring long-term financial sustainability is another critical element. Lessons learned from case studies highlight the importance of addressing the excessive reliance on donations from international development organizations and NGOs. To achieve this goal, it is essential to diversify funding sources by incorporating innovative sustainable finance instruments, such as the nature-for-debt swap that is being implemented in Belize. By complementing traditional donations with these types of instruments, projects can secure long-term funding that supports the initiative as a whole, rather than being limited to specific activities or initiatives backed by donors. This holistic funding approach can significantly increase the likelihood of a successful Integrated Ocean Management (IOM) strategy.

Finally, for Integrated Ocean Management (IOM) to be effective, it must adopt an adaptive management approach. Oceans are dynamic ecosystems that evolve over time, particularly as the impacts of climate change become increasingly significant. Therefore, the strategies used to sustainably manage ocean ecosystems must be flexible and responsive to these ongoing changes. Achieving this adaptive approach requires substantial investment in scientific research and the strengthening of institutions. Additionally, the development of robust and integrated datasets on the condition of these ecosystems and on the impact caused by human uses is essential.

Together, all these elements (a science-based, participatory and adaptive approach, based on strong partnerships and financial sustainability on the long term) hold the potential to ensure a management strategy that not only generates positive outcomes for the ocean environment but also supports a vibrant economy able to sustain the communities that depend on it.

# Conclusion

This thesis aimed to evaluate the effectiveness of the Integrated Ocean Management (IOM) framework through a comparative analysis of two case studies: Belize and the Coral Triangle Initiative (CTI-CFF). The examination of these cases helped identify key success factors and challenges associated with IOM strategies.
Although neither case study offers comprehensive datasets or reports to quantitatively assess progress toward their goals—making it difficult to measure changes in ocean ecosystem conditions and the

impact of their implementation—important insights can still be drawn to guide future efforts in sustainable ocean governance.

Both case studies demonstrated the significance of strong partnerships and a collaborative environment. In Belize, this cooperation facilitated coordination among previously isolated government departments and fostered partnerships with local communities. In the Coral Triangle, collaboration enabled countries that had experienced tensions in the past to work together on shared conservation goals. These strengthened partnerships not only promoted more unified and coordinated conservation efforts but also increased international visibility, attracting global funding and investment, and bolstering their influence in marine conservation discussions. Additionally, both cases benefited from capacity building through the exchange of knowledge, technology, skills, and best practices, which supported sustainable ocean management.

The Belize case also highlighted the importance of actively engaging local communities throughout the planning process. This engagement fostered greater trust and support from local stakeholders, enhancing the legitimacy of the authorities and their initiatives. Conversely, the CTI-CFF case showed a need for improved local community involvement, as some objectives were misunderstood due to being proposed by international NGOs without adequately considering local stakeholders' needs and interests.

This case study analysis highlighted how successful IOM requires a science-based, participatory, and adaptive approach grounded in strong collaboration among partners and stakeholders, as well as long-term financial sustainability. Incorporating these elements into IOM strategies can serve as a valuable guide for future efforts in sustainable ocean governance.

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