Local-level Practices and National-level Policies on

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ABSTRACT

Marine and coastal conservation measures initiated at the grassroots level by local and indigenous communities play a significant role in the efforts of Small Island Developing States (SIDS) against the consequences of anthropogenic activities in the marine

lenges and capitalising on the opportunities available are key to the successful implementation of community-based marine conservation measures in SID - to protect, conserve and sustainably exploit the marine ecosystems.

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LIST OF ACRONYMS

ACNEMC	Associação Comunitária Nova Experiência Marítima da Cruzinha da Garça
BPOA	Barbados Programme of Action
CBD	Convention on Biological Diversity
CBFMP	Community-based Fisheries Management Programme
CITES	Convention on International Trade in Endangered Species
CMPAU	Community Marine Protected Area of Urok
COP	Conference of Parties
COTS	Crown-of-Thorns Starfish
CRIOBE	Centre for Island Research and Environmental Observatory
CWQR	Coastal Water Quality Regulations
DOALOS	Division of Ocean Affairs and Law of the Sea
EBM	Ecosystem Based Management
EEZ	Exclusive Economic Zone
EIA	Environment Impact Assessment
ELI	Education and Leadership Initiative
EPA	Environment Protection Act
EPMA	Environmental Protection and Management Act
ESA	Environmentally

MARPOL	International Convention for the Prevention of Pollution from Ships
MPA	Marine Protected Areas
MSCP	Marine Spill Contingency Plan
MSP	Marine Spatial Planning
MZA	Maritime Zones Act
NGO	Non-Governmental Organization
NOSCP	National Oil Spill Contingency Plan
PIPA	Phoenix Islands Protected Area
RECOMAP	Regional Coastal Management Programme
RFMO	Regional Fisheries Management Organisation
ROV	Remotely Operated Vehicles
SAMOA	SIDS Accelerated Modalities of Action
SDG	Sustainable Development Goals
SGP	Small Grants Programme
SIDS	Small Island Developing States
SST	Sea Surface Temperatures
UN	United Nations
UNCED	United Nations Conference on Environment and Development
UNCLOS	United Nations Convention on the Law of the Sea
UNDP	UN Development Programme
UNESCO	UN Educational, Scientific and Cultural Organisation
UNFCC	United Nations Framework Convention on Climate Change
UNOHRLLS	United Nations Office of the High Representative for the Least Developed Countries, Landlocked Developing Countries and Small Island Developing States
UNSFA	UN Fish Stock Agreement
VMCA	Voluntary Marine Conservation Areas
WCO	Wildlife Conservation Ordinance
WIMA	Women in Mangrove Management
WWF	

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PART TWO

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CHAPTER 1 - National Legal/Policy and Institutional Frameworks and Local-level Practices

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1. INTRODUCTION

Covering 70.8% of the earth surface, the ocean has always been an integral part of the evolution of humankind[1]. Since time immemorial, the ocean was exploited mostly for its resources and navigation. While marine resources ensured food safety, navigation allowed for exploration and trade amongst different continents. Along the course of time, the ocean has provided a number of benefits and has contributed enormously in terms of climate regulation, habitats, food security and livelihoods in general. Currently, the ocean is very vital in providing an extensive range of services to sustain the livelihoods of the coastal communities in areas below 10m above sea level which are inhabited by more than 600 million people around the world[2]. As coastal communities' livelihoods heavily depend on the marine and coastal environment, it is also the responsibilities of these local communities to promote conservation measures to ensure a sustainable future for the next generation.

1.1. Marine and coastal environment and its importance

Comprising approximately 362 million km^2 of ocean area[3] and encompassing 1.63 million

the local coastal communities depend hugely. The marine domain is known to be the lungs of the earth by producing 50-80% of the oxygen[6] and in addition, acts as the largest carbon sinks having the capacity to absorb around 25% (2.8-2.9 billion tonnes) of the

seafarers[13]. As per the International Chamber of Shipping, the world shipping trade value has surpassed US$14 trillion annually. Currently, more than 90% of traded goods are transported via the maritime route and it is predicted that this industry will expand considerably with the transit of more than 18 billion tons of goods by 2030[14]. With this expansion, it is expected that the coastal communities will benefit enormously in terms of employment.

Figure 1: Importance of marine and coastal environment (Source: www.oceanwelth.org)

Marine ecosystem services, such as coastal tourisms and recreational activities are other essential components of the ocean economy. Coastal tourism being one of the rapidly growing sectors of global tourism generates US$ 220 billion globally[15]. Most benefits are generated from activities related to coastal accommodations, ecotourism,

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1.2. Threats to marine and coastal environment

As the earth is currently experiencing the Anthropocene epoch where human activities are the fundamental driving forces, the marine and coastal environment is also being constantly affected by these anthropogenic pressures[17]. As such, the health and productivity of the marine environment are deteriorating and paradoxically, its vulnerability is only realised after the damage is done. With the settlements of 71% of the coastal population within 50 kilometres from the shoreline[18], a number of human activities have been recognised as principal drivers resulting in a wide

destructive fishing methods[24] still being employed during fishing campaigns and are among the reasons for the overexploitation of specific fisheries resources. Technological advancements in fishing methods and have also resulted in overexploitation of specific fisheries resources.

Furthermore, climate change characterised by a shift in temperature and weather patterns over a long period of time due to greenhouse gas emission puts enormous pressures on the marine and coastal habitats. Increasing seawater temperature causes the living algae (zooxanthellae) to be expelled by the coral polyps resulting in coral bleaching and in extreme cases coral death. Likewise, frequent extreme weather conditions such as severe cyclones and tornadoes, storm surges and heat waves directly affect marine and coastal ecosystems. Similarly, as a result of global warming, the sea level is predicted to rise by 0.18 to 0.79m as a consequence of melting of the polar ice caps causing coastal flooding, saltwater intrusion and exacerbating coastal erosion[25].

1.3. Marine and coastal conservation

During the last few decades, the extreme consequences of anthropogenic activities on the marine environment and coastal livelihoods have been alarming. The FAO has recently reported that approximately 20% of mangrove forest have been damaged, 60% of coral reefs are under threat and 90% of marine fish stocks are under pressure of being exploited. These have prompted the global and local communities to resort to conservation measures to protect the marine and coastal resources in a view to mitigate impacts of human activities[29 30].

A number of responses at the global and local level currently exists to adapt to the challenges posed by degradation of the marine ecosystems. At international level, in an attempt to generate economic benefits for human well-being and at the same time, ensure the resilience and sustainability of the marine and coastal ecosystem, the global community has designed and taken commitments to regional and global frameworks and agreements, specifically, the Sustainable Development Goals (SDGs), the United Nations Framework Convention on Climate Change (UNFCCC) and the Paris Agreement. The objectives of these tools are to curb greenhouse gases emission, reduce and adapt to the consequences of climate change and raise the necessary funds for conservation measures[31]. A positive outcome of the commitment of states to these global frameworks and agreements Marine states would be required to amend and enforce their existing legislations, policies and guidelines for the sustainable use and conservation of the marine and coastal domain.

Similarly, adopting an Ecosystem Based Management (EBM) approach as guiding framework towards marine ecosystem conservation and assessing its services and uses have become a current practice[32]. An example, Marine

coastal

in their development paths as small island states."[37] SIDS were first recognised at the 1992 United Nations Conference on Environment and Development (UNCED) held in Rio de Janeiro, Brazil, and as of today, 58 states which are home to 65 million people have been identified as SIDS[38].

A number of features characterises a state as a SIDS. Geographical remoteness, low elevation, small size, lowly populated and lack of economic diversity are the main features of SIDS. They are also regarded as having vast Exclusive Economic Zones (EEZs) and thus, depend heavily on marine and coastal ecosystems. Fisheries and aquaculture, and tourism are the main drivers of the economy of

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Apart from these socio-economic stressors, their physical landscapes render SIDS vulnerable to climate-related hazards and ocean risks such as storm surges, tsunamis, coastal erosion, climate change, global warming, sea level rise and extreme cyclones/storms[41] (Figure 2). The collective and cumulative impacts of these ocean risks have resulted in loss of coastline areas including coastal infrastructures, biodiversity loss, human death, saltwater intrusion and climate refugees. Loss of a number of low-lying islands as a consequence of sea level rise in the near future is currently a challenge and involves cross-cutting issues such as loss of citizenship, relocation of refugees and status of the state's government. SIDS like Kiribati, Solomon Islands, the Marshall Islands, and the Federated States of Micronesia have already experienced the social migration of local coastal communities and this induce or forced displacement is likely to upscale in the coming years[42]. Furthermore, studies have projected that by 2050, the majority of the atolls in the Pacific region would be uninhabitable endangering the safety and security of the local inhabitants[43].

1.5.

wetlands and mangroves[51]. In addition, it has 1.45 km^2 of mangrove forests at a few locations along the coastline[52] and 210 km^2 of seagrass cover in the lagoon[53].

Figure 3: Map showing the Exclusive Economic Zone of Mauritius along with the Joint Management Area with Seychelles (Source: Economic Development Board Mauritius)

As a SIDS with a vast EEZ, Mauritius has a considerable dependence on marine and coastal activities. The blue economy sector of Mauritius contributes around 10% of the national Gross Domestic Product directly employing approximately 16,000 people. Currently, the blue economy is represented by the following traditional key sectors:

- Fisheries: Fishing, Seafood Processing and Aquaculture;
- Seaport related activities: Maritime Transport, Port Infrastructure and Ship building and repairs;
- Coastal tourism: Nautical Activities, Coastal Hotels and Coastal businesses

In a view to double the contribution of the blue economy sector in the medium term and to make the blue economy sector as one of the pillar of the economy, the Republic of Mauritius is working on

[51]John R. Turner and Rebecca Klaus, "Coral reefs of the Mascarenes, Western Indian Ocean", *Philosophical Transactions of the Royal Society A: Mathematical, Physical*

strategies to strengthen the above key traditional sectors and simultaneously, tap into new opportunities such as marine services, marine information and communication technology, marine finance, marine biotechnology, oil and gas exploration/exploitation and Deep Ocean Water Application[54]. The traditional sectors, namely fisheries, shipping and tourism, provide livelihoods and a stable sustainable future to the local coastal communities. For the new emerging sectors, the government will also ensure that the local communities are benefitted in different ways such as employment.

On the other hand, the marine and coastal environment are also subjected to various anthropogenic pressures like all SIDS thereby rendering the strategy of making the blue economy as a major pillar of the Mauritian economy a major challenge (Table 1).

Table 1: Threats, drivers and impacts to marine and coastal environment in Mauritius[55].

Threats	Drivers	Impacts
Coastal Erosion	• Coastal developments such as hotels, bungalows, jetties, breakwater and waterfronts • Sea level rise • Storm surges and cyclones	[redacted]

In this endeavour, the contribution of the local communities in maintaining and conserving the function of the marine and coastal ecosystems is fundamental in laying the basis for the blue economy growth.

1.7. Objectives of the study

In spite of the extensive degradation and transformation of the landscape of the coastal and marine environment in Mauritius, many of the coastal economic activities still depend on its resilience and sustainability. To safeguard and maintain the basic ecological functions and economic

PART ONE

Legal/Policy Frameworks and Local-level Practices on Marine and Coastal Conservation Practices in SIDS

CHAPTER 1
Legal/Policy Frameworks and Case Studies in SIDS

2. SECTION A
International Legal and Policy Frameworks

2.1. International organisations

As a result of the degradation of the marine and coastal environment due to a wide range of anthropogenic pressures, its protection is a concern to the international, regional and local societies. Therefore, many governmental and private organisations at global level have been established an effort to protect, conserve, rehabilitate and regulate in a sustainable way the use of the marine and coastal environment. These international organisations provide a framework through which marine and coastal conservation practices are being initiated as well as laws, regulations and different policies are being promulgated. The huge number of organisations dealing with ocean conservation has made it difficult for the establishment of a consolidated approach. Even though, attempts are being made by international bodies to have a unified approach towards marine conservation based on scientific advice which is mainly an evidence-based decision making process. In general, international bodies can be classified in four categories, discussed below, based on the different governance levels related directly or indirectly to marine conservation[56]. Presently, there is a huge number of international institutions that are involved in good governance in matters related to ocean and marine conservation. As the focus of this study is on local-level conservation measures in fisheries, mariti[7-49] ecosystems and coastal protection, examples of international institutions dealing within these areas are discussed.

2.1.1. Institutions with governance exclusively dedicated to ocean

Institutions that fall under this category are mostly multinational that assemble the world's states and design international conventions and agreements to ensure high level good governance over the mar-

also

collaboration among fishing nations for fisheries conservation and management measures[61]. The Indian Ocean Commission (IOC) is one such RFMO consisting of 31 nation states which thrive for the sustainable exploitation, conservation and management of tuna and tuna-

adopted to have better results. In addition, to facilitate the implementation of these best practices, the proper legal and policy frameworks should be in place both at international and national levels. At international level, treaties and agreements have been designed to codify the behaviours of states in relation to conservation of the marine environment and besides, international customary laws must also be observed[68]. Consequently, it is up to the states which are bound by those rules of custom and also bound to the instruments to which they have consented to be bound to enforce the law at national level. Currently, there are a number of international legal/policy instruments in terms of treaties and agreements present that apply to the conservation of the marine ecosystems. The details of some key international legal/policy instruments, with a focus to fisheries, marine ecosystem and coastal protection, are detailed as follows.

2.2.1. 1982 United Nations Convention on the Law of the Sea

The 1982 United Nations Convention on the Law of the Sea (UNCLOS) is an instrument of public international law negotiated under the aegis of the UN to establish "a legal order for the seas and oceans which will facilitate international communication, and will promote peaceful uses if the seas and oceans, the equitable and efficient utilisation of their resources, the conservation of their living resources, and the study, protection and preservation of the marine environment"[69]. It codifies customary international laws along with modern laws with regards to the rights and duties of States concerning the sustainable management and conservation of the ocean and its natural resources[70] and at the same time, recognises the freedom of high seas to both coastal and land-locked States[71], and the common heritage of humankind in the Area[72]. After 9 years of negotiation, the UNCLOS was signed by 117 States in December 1982 at Montego Bay, Jamaica, and came into force in November 1994. At present, 168 parties have ratified the Convention including the European Union[73]. With 320 articles and nine annexes, UNCLOS deals with diverse aspects of ocean space such as maritime delimitation, scientific research, protection and preservation of marine environment, and disputes settlement concerning ocean matters. Marine conservation is an BT1 0 0 0 1 21X80 Tc[of)ETBT1 0 0 T1m[mβ 235.7[of)ET

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the obligation of coastal states to prevent, reduce and control pollution of any kind, for example, pollution from land-based sources, dumping and oil spill from vessels, in the marine environment. It also emphasises on global and regional cooperation, technical assistance, monitoring and environmental assessment, and enforcement in matters related to marine environment protection. A number of articles (e.g. Article 61(2), 63(2) and 192) in different sections under UNCLOS are also dedicated to

2.2.3. The Convention on Biological Diversity (CBD)

Currently ratified by 196 nations[80], the Convention on Biological Diversity (CBD) is a very important international legally-binding instrument agreed at the 1992 Rio Earth Summit in Rio de Janeiro and is the first global agreement

Denmark, Netherlands and Germany[92]. Another great example is the Great Barrier Reef World Heritage Area in Australia which is jointly managed by the Great Barrier Reef Marine Park Authority and the Queensland Parks and Wildlife Service[93]. This remote area harbours one of the world's most diverse marine life including the endangered Dugong and its protection and management is important for the marine ecosystem.

2.2.6. Convention on International Trade in Endangered Species of Fauna and Flora (CITES)

Observing that terrestrial and marine fauna and flora are under immense international wildlife trade threat and that extreme

Table 2: List of international legally binding and non-legally binding conventions/agreements related to the conservation of the marine and coastal environment.

Convention/Agreement/Protocol	Number of Parties/Members	Year adopted/came into force	Legally binding or non-legally binding	Relevance

CHAPTER 1
Legal/Policy Frameworks and Case Studies in SIDS

3. SECTION B
Legal and Policy Frameworks in SIDS

3.1. Existing legal/policy frameworks in SIDS

With a group of 58 developing states, SIDS were first recognised as a distinct group at the 1992 UNCED held in Rio de Janeiro, Brazil. Due to their small sizes, remoteness,

importance to the engagement of the indigenous and local communities to ensure that the targets set under the different international frameworks are being met.

As this study highlights the local-level conservation practices in three thematic areas, namely fisheries, marine ecosystem and coastal protection, some of the main national laws and regulations related to these areas actually present in

SIDS and are the most vulnerable to the effects of climate change, namely sea level rise, extreme weather conditions and high temperatures[103]. To mitigate and adapt to these extreme conditions, important provisions have been made in national laws and regulations to sustainably exploit and conserve the marine resources and safeguard the marine biodiversity. Due to the strong traditional links and connections with nature of the local communities of Kiribati, conservation and sustainable exploitation of marine resources are important to support local livelihoods.

3.1.1.1. Environment Act 1999 (Amended 2007)

The Environment Act (EA) 1999 (Amended 2007) was the national environmental legislation that was enacted for the protection, conservation and management of the environment of Kiribati to enable communities to provide for their social, economic and cultural well-being[104]. All the objectives of the Act are geared towards the protection and conservation of the marine environment directly or indirectly[105]. Importantly, community engagement is fundamental under this Act as the Minister has been given the responsibility to "promote the participation of the community in environmental decision-making"[106] and "develop a comprehensive community participation policy…and facilitate the implementation of such policy"[107]. Therefore, the existing framework allows for consultative processes involving local communities regarding marine conservation issues. In addition, the EA 1999 also makes provisions for the necessity of an Environment Impact Assessment related to environmentally-significant activities and developments including the monitoring of any impacts on the environment[108]. Another key aspect of the EA 1999 is the legal provisions for the prescription of protected species and protected areas for the conservation of critical ecosystems mainly coral reefs, mangroves and seagrass[109].

3.1.1.2. Phoenix Islands Protected Area (PIPA) Regulations 2008

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marine and terrestrial habitats of the Phoenix Group Island in the Southern Pacific Ocean as an MPA. It is also a UNESCO World Heritage site consisting of approximately 500 species of fish, 200 species of coral, 18 species of marine mammals, and 44 species of birds[110]. For its effective implementation, the PIPA Regulations 2008 gives due consideration to the daily livelihoods of the local communities such as subsistence level harvesting of marine resources by resident communities in designated zones in the protected area[111].

3.1.1.3. Wildlife Conservation Ordinance 1975 (amended in 1997)

Kiribati also has a Wildlife Conservation Ordinance (WCO) 1975 (amended in 1997) providing for conservation of wildlife within the Gilbert Islands. Section 7 of this ordinance provides specific provisions for the protection of turtle within the wildlife sanctuaries.

the marine environment[115]. These legal tools aim to protect over 890 fish species, over 200 corals, several turtles and marine mammals such as dolphins and whales.

3.1.2.1. Land, Surveys and Environment Act 1989

The Land, Surveys and Environment Act 1989 is another piece of legislation which protects the coastal zone by prohibiting (i) the extraction of any silt, sand, gravel, cobble, boulders or coral, (ii) any damaging activity (excavation, dredging, clearing,

fisheries by-laws for conservation purposes[120]. With regards to fisheries conservation and management measures, the Local Fisheries Regulations 1995 clearly describes the minimum size of fish which may be sold or caught[121], the fish species with declared periods of prohibited fishing[122] and the prohibition of the use of certain gears[123]. Furthermore, it provides a list of the fish and invertebrates which are prohibited for sale[124]. All the above measures have been implemented to

manage its marine and coastal environment[127], Seychelles has established standards by developing and implementing several domestic laws.

3.1.3.1. Environment Protection Act 1994

Protection of the marine environment in Seychelles is provided under the Environment Protection Act 1994. The act explicitly states that discharge of effluent and hazardous substance in

Fisheries (Shark Finning) Regulations 2006 to regulate the removal of fins of sharks on-board fishing vessels.

3.1.3.3. National Parks and Nature Conservancy Act (1969)

With 30% in its territorial waters designated as MPAs, Seychelles is ahead of the international targets to conserve its marine space[133]. These MPAs are vital for the sustainability of the country's economy and

cated to pollution control and the necessary mechanisms ("polluter pays" principle) to obtain a pollution control permit for the discharge of effluent[136]. The act also provides for the establishment and management of protected areas which includes the coast and sea[137] and closed areas[138], and designation and protection of wetlands. In addition, it has incorporated the provisions of the International Union for Conservation of Nature (IUCN) on the control and prohibition of the trade of wild fauna and fauna including marine life[139]. As other legislative frameworks in other SIDS, the EPMA 2019 makes provisions for conducting an EIA for development and activities in the marine and coastal environment. A water use classification for Coastal Waters is also provided in Schedule VII Part B. With regards to community engagement, the Minister has the responsibility to encourage and facilitate the participation of local communities and indigenous people in matters

3.1.4.3. Fisheries Regulations 2013

In relation to fisheries conservation measures, the Fisheries Regulations has been proclaimed in 2013

Table 3: Gap analysis in laws related to marine and coastal conservation (Compiled by V. Emrith)

SN	Themes	Laws, Regulations, Policies, Action Plans and

3.2.1. Fisheries

Fisheries management measures related to marine and coastal conservation is very much important to sustain the daily livelihoods of local coastal communities and ensuring the constant availability of animal source proteins to the local population[149]. At the same time, these management measures protect and conserve the marine environment and its resources. As per Table 3, it is observed that the fisheries sector is well regulated with established Fisheries acts and regulations catering for fisheries conservation measures in all four SIDS. Since the fisheries in most SIDS is an open access fishery, legal frameworks must be in place to regulate its exploitation[150]. In this context, it was observed that provisions for a number of fisheries management measures such as closed seasons for fishing and control on the fishing of certain type of marine species and specific sizes, were made under specific legal regimes in all four SIDS under study. In addition, prohibition on the use of destructive fishing methods such as explosives and poisonous substances, and use of special gear for fishing are well managed under the various acts. However, analysis showed that the specific legislations of each country under study do not incorporate

deterring the offences in SIDS.

and implementation of the conservation measures of the FMPs are very important. Thus, it is also imperative to strengthen and support the institutional frameworks of the FMPs to ensure better conservation results.

3.2.2. Marine conservation

Marine conservation in SIDS is very critical for the survival and resilience of the local population because of the various ecosystem services, coastal protection, food and livelihoods the marine environment provides[156]. As the biologically diverse marine ecosystems of SIDS are being impacted by the negative impacts of human activities in this Anthropocene period, marine conservation is viewed as an important tool to mitigate and adapt to the changing environment[157]. As such, to protect their vulnerable marine environment, SIDS have promulgated a number of legislations which comprehensively address a wide spectrum of issues encompassing designation of marine protected areas to the control of marine alien species and marine pollution (Table 3). Nevertheless, shortcomings still exist in these legislations to address current issues related to marine and coastal conservation.

Marine pollution always compromises the marine conservation efforts of local communities in SIDS by affecting the marine environment and its associated resources. To date, a wide variety of laws and regulations have been developed in SIDS to control and prevent marine pollution.

of the largest oil producing areas in the world[161]. Therefore, to have an immediate and effective preparedness and response to an oil spill to

MPAs play a very effective role in deterring illegal fishing and protecting the marine environment for a sustainable livelihood for the local communities.

As most SIDS are considered as biodiversity hotspots, conservation of wildlife, with a due consideration to marine wildlife, is one of their main responsibilities to maintain the biological diversity of the area. To achieve this objective, a number of provisions under different legislations, action plans and strategies have been established in SIDS in relation to

As previously observed, conservation of marine ecosystems is primordial for the survival of coastal communities in terms of food, livelihoods and security. SIDS have strived constantly to devise conservation measures to protect their marine ecosystems and coastlines. Similarly, policy makers have developed legislations to

EIA which was against the Environmental Protection and Management Act 2019 and the Beaches Protection Act 1993[171].

Coupled with marine ecosystem conservation and coastal developments, designation of ESAs along the coastal zones through national legislations/regulations is very important for the protection and conservation of marine ecologically sensitive areas. From the analysis, it was observed that only Seychelles has the legal requirements to designate ESAs under the EPA 1994. This observation is alarming as designation of ESAs in SIDS are very crucial for the protection of the coastal zone areas from coastal developments. This measure also allow the local communities and indigenous people to develop conservation measures and benefit from the ecological services of these ESAs.

3.2.4. Community engagement in ocean governance

With the launch of the SDGs, specifically SDG 14: Life Below Water, many SIDS around the world have been advocating for a better ocean governance to manage and exploit sustainably the marine resources in their maritime domains. To honour the numerous international commitments undertaken towards the sustainable management of the ocean, a number of SIDS have developed and implemented different frameworks for ocean governance with the support of all the relevant different important stakeholders including local communities and indigenous people[172].

distributed under more than one law within the legislative framework of Samoa[173]. Similar overlapping and duplication in regulatory instruments were also observed in the ocean governance framework of Antigua and Barbuda[174]. Therefore, harmonisation of national laws and strategies/policies across relevant institutions and a holistic approach to define the mandates of each institutions must be clearly established to lay the backbone of a good ocean governance framework.

3.2.4.2. ICZM and Marine Spatial Planning (MSP)

As part of the ocean governance strategy, ICZM and Marine Spatial Planning (MSP) are very important aspects that coordinate and integrate the different activities along the coastline in harmony with the marine and coastal environment. ICZM is a framework where activities within the coastal zones are sustainably managed in a dynamic, multidisciplinary and iterative process[175] whereas MSP provides the spatial and temporal distribution of different activities within the marine space[176]. During both processes, the concerns and initiatives of the local communities and indigenous people in marine and coastal planning are recognised by the government. In addition, through ICZM and MSP, local communities and indigenous people are encouraged to initiate and implement their own conservation measures. Even though these governance tools are very important for coastal planning and use by different stakeholders, many SIDS, like Antigua and Barbuda and Samoa, lack a formal ICZM plan and MSP respectively for sustainable coastal zone exploitation. It is also viewed that conflicts between different users of the coastal zones and the local communities are very common in SIDS[177]. Consequently, conservation measures in various coastal zones established by local communities are often compromised for coastal developments and recreational activities thereby the need for these instruments to harmonise the activities. In relation to MSP, it was remarked that, of the different atolls in Kiribati, only Tarawa atoll was covered under the MSP thereby having the needs to extent the programme to other atolls. Likewise, in Seychelles, harmonising the different mandates and activities of relevant regulatory authorities during the implementation of the MSP was viewed as a great challenge[178].

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[173] Anama Solofa, "Ocean governance in Samoa: A case study of ocean governance in South Pacific", Thesis for the United Nations-Nippon Foundation Fellowship Programme, United Nations, 2009-2010.

[174] Antigua and Barbuda, Ministry of Agriculture, Housing, Lands and the Environment, *Action Plan for Implementing the Programme of Work on*

3.2.4.3. Community engagement

3.2.4.3.1. Fisheries

and

Community engagement in conservation measures in SIDS are very common and a number of provisions have been made under various acts to incorporate and give legal recognition to local know-how and conservation practiSrvar

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CHAPTER 2
Local-level Practices in SIDS

4. SECTION A
Best Local-level Practices in SIDS

With their livelihoods and safety at stakes as a result of numerous intense challenges such as climate change, sea level rise and growing pollution concerns, local communities and indigenous people are becoming more and more conscious on the need to protect and conserve the marine and coastal environment for a sustainable future. Conservation of the marine and coastal environment has become an integral part of the daily activities of the local communities and indigenous people during the last few decades. As opposed to the common biodiversity conservation measures in most part of the world, the local traditional conservation system has the objectives of benefitting both the communities and the marine ecosystems

Recognising the importance of the fisheries resources and its overexploitation, coastal communities have engaged in local fisheries conservation practices to support their future livelihoods and ensure its sustainable exploitation[186]. These conservation practices often integrate indigenous or local ecological knowledge and, customary rules and practices. This section illustrates case studies of a number of successful fisheries conservation measures established by local communities or indigenous people in SIDS.

4.1.1. Case Study 1: Implementing a local fisheries management plan: Focus on the Community-based Fisheries Management Programme (CBFMP) in Samoa

Decline in fish stocks due to overexploitation as a lack of management measures and inadequate enforcement actions by the government has emerged as a particular concern to the coastal communities in SIDS[187]. Coastal communities which have either legal or traditional control over the adjacent waters are seen to have the primary responsibilities to protect and conserve the marine and coastal environment[188]. Thus, to manage the fish stocks, coastal communities coalescing various stakeholders such as fishermen and women's groups, have developed their own local fisheries management plans under the Community-based Fisheries Management Programme (CBFMP) using their valuable traditional knowledge and expertise on fish stocks and marine environment with the support of the government and required legislations[189]. Under the CBFMP, a bottom-up approach is being favoured where key issues, probable causes, proposed measures and remedial actions on fisheries management are being addressed by the local communities[190]. Generally, the local fisheries management plans empower the local communities, being the resource users, to take ownership of the marine and coastal environment and implement their own fisheries management measures and enforce their own regulations.

Samoa is an example of one of the numerous SIDS where the village communities have been successfully implementing the CBFMP since 1995 to integrate efficiently their social norms, customs and

[186] Kanae Tokunaga and others, *Ocean Risks in SIDS and LDCs* (United Kingdom, Ocean Risk and Resilience Action Alliance, 2021).

[187] GEF International Waters Learning Exchange

traditions pertaining to the management and conservation of fisheries resources[191]. The village communities had a *de facto* legal or traditional control over the adjacent fishing areas and as such, were enabled to devise fisheries by-laws which were enforceable under the national legislation[192] [193]. The fundamental procedures towards adopting a local fisheries management plan by the village communities involved (i) several rounds of consultations between the village leaders and different groups within the community, namely the fishers, women and untitled inhabitants, and (ii) establishing a village Fisheries Management Committee which would oversee the implementation and enforcement of the management plan[194]. As per the Ministry of Agriculture and Fisheries of Samoa, more than 120 coastal village communities have developed their own fisheries management plans with 80% fully active in executing 100% of their management plans as at date[195]. As conspicuous results of the success of these management plans, the local fisheries communities in the villages implementing the local fisheries management plans benefitted a 55% increase in their catches compared to other villages devoid of any such management plan[196]. These positive results were the consequences of a number of restrictions and guidelines provided under the local fisheries management plans after consultations with different groups in the village communities. These restrictions and guidelines included amongst others adopting minimum mesh sizes for nets[197], prohibiting catch of undersize species[198], releasing females or spawning females[199], banning destructive fishing and restricting the types of gears. Depending on their fisheries management objectives, the local communities implemented all or a combination of these restrictions and guidelines under their respective fisheries management plans. In spite of the success of this local fisheries management measure, there was a need to strengthen the participation of other village communities and to integrate the element of ecosystem approach to fisheries management into current practices. Consequently, the Samoa's Community-based Ecosystem Approach to Fisheries Management was recently approved by the Fisheries department to cater for an integrated

[191] FAO, "FAO reviews community based fisheries management in villages", 5 June 2017.

[192] Ueta Fa'asili and Iuliaa Kelekolo, "The use of village by-laws in marine conservation and fisheries management", *SPC Traditional Marine Resource Management and Knowledge Information Bulletin*, vol. 11 (September 1999).

[193] Fish Information and Services, "Samoa Fisheries receive aid from Germany", 27 May 2014, Available at https://seafood.media/fis/techno/new-techno.asp?l=e&id=68765&ndb=1.

[194] Secretariat of the Pacific Community (SPC), *Fisheries management by communities: A manual on promoting the management of subsistence fisheries by Pacific Island communities* (Noumea, New Caledonia, 2000).

[195] Samoa, Ministry of Agriculture and Fisheries, "Community-Based Fisheries Management Program (CBFMP)", (10 August 2022).

[196] Ministry of Agriculture and Fisheries, *Samoa Coastal Fisheries Management and Development Plan 2013-2016* (Noumea, New Caledonia, SPC, 2013).

[197] The mesh sizes of some communities are larger than the national regulation.

[198] Some communities have their own minimum size limits.

[199] This applies to species where the sex can be differentiated.

approach involving all stakeholders related to the management of coastal fisheries resources[200]. Im-

and allowing target species to attain harvestable size and maturity without human predation[205]. An interesting fact about the recent emergence of *rāhuis* was that apart from being managed by the local communities, they also gained

of local communities and indigenous people have applied moratoria on harvesting over a defined period. SIDS like Barbados, Mauritius and Bahamas have imposed moratoria on harvesting of sea urchin[213], sea cucumber[214] and queen conch[215] respectively with the help of the

who reside or are based in the immediate area."

by Renard (2008) proved that the approach under the management plan was successfully implemented using the appropriate methods and tools and integrating traditional conservation actions[234]. Deservingly, the long and successful efforts of the Urok community in implementing and sustaining the CPMAU was recognised by the UNDP Equator Initiative through the award of the prestigious Equator Price 2019 from a record 847 nominations across 127 countries[235].

(ACNEMC), in the north of the Santo Antão island and initiated a marine turtle conservation programme called “Beauty of the Sea: Conservation of Sea Turtles” in 2006 along the coastal area of Cruzinha da Garça which was an important ground for feeding, growth and reproduction of marine turtles in Cape Verde[241].

local communities in SIDS have taken drastic measures to control these invasive species and one such notable example is the management of

2500 lbs of lion-fish from the marine ecosystem of Carriacou, one of the island in Grenada, to favour the recovery of native species[258]. During these interventions, data, such as size, weight and stomach contents, were collected by the members and shared to the scientific community for

mangroves help

ocean acidification[269]. Climate change and extreme weather events, resulting majorly in mass coral mortalities, mass coral bleaching, coral disease outbreaks and coral destruction, have also threatened the reef ecosystem resilience. The combined effects of these stressors have contributed in the decline in the productivity and sustainability of the reef ecosystem endangering the livelihoods of fishers and coastal communities[270]. As the coral reefs provide a natural barrier to waves, storm surges and coastal floods, the coastal communities have resorted to coral reef rehabilitation, mitigation and adaption measures to prevent loss of life, infrastructural damage and erosion to safeguard their future existence[271].

Coral farming is one of the reef rehabilitation strategies that has gained widespread recognition among the marine scientist communities to restore the degraded coral reefs[272]. Different methods of coral farming with varying colony survival rates have been employed for rehabilitation around the world[273]. One of the successful reef rehabilitation program in the Caribbean region is

planted within the LBCNP which resulted in 10-20 percent annual coral cover increase (with 89 percent survival of the transplanted coral) and about 1 hectare of damaged reef being restored. The success of the project was recognised at the International Coral Reef Symposium in 2016 and by the UN Secretariat for Climate Change through the Lighthouse Activity Award in 2017. Furthermore, FOH was presented the Women as Agents of Change Award from GEF Small Grants Programme (SGP) in 2018[277].

4.3.3. Case Study 3: Community-led seagrass conservation programme in Timor-Leste

Seagrass ecosystems are one of the most important yet endangered ecosystem in maintaining the health of the marine environment in SIDS[278]. Apart from being the nursery and feeding ground for a number of marine life[279], seagrass meadows protect the coastlines against erosion and help dampen the wave energy of storm surges[280]. Along with protecting the shoreline, the seagrass ecosystem provides a number of ecosystem services to the coastal communities[281]. Recognising their importance, local communities in SIDS, particularly in Timor-Leste, have spared no effort in protecting, conserving and rehabilitating the seagrass ecosystem.

Seagrass ecosystem is known as one of the primary source of nutrition and financial well-being of the community in Ataúro Island located in the north of Timor-Leste within the Coral Triangle in Southeast Asia[282]. Home to the vulnerable Dugongs, the seagrass meadows in Ataúro Island is an important component of marine-based ecotourism activities[283]. To safeguard these attributes of the Ataúro Island marine landscape, the

ro

and in the long-term to instill community stewardship over the marine resources. The activities involved the collection of baseline data on seagrass, such as identifying species

(d) Sea level rise, increase sea surface temperature and more frequent and intense storm surges are the realities of climate change and the local and indigenous communities should take appropriate mitigating actions to protect their coastlines and safeguard their livelihoods. For instance, through the mangrove rehabilitation program in Papua New Guinea, coral reef rehabilitation in Belize

global warming, sea level rise, ocean acidification and unpredictable extreme weather events, play a critical role in the long term success and sustainability of marine conservation measures[289]. As these environmental factors are beyond the control of the local communities, they often compromise years of conservation efforts in every coastal state, including SIDS. For example, coral farming programmes may be rendered redundant by (i) coral bleaching caused by an increase in sea surface temperature, (ii) weakening of corals as a result of ocean acidification, and (iii) coral damage caused by frequent storms and hurricanes[290]. The combined effects of these conditions may lead

5.1.3. Lack of knowledge/awareness

Lack of scientific and traditional/pck

5.1.7. Coastal developments/Tourism

Legal exemptions and permissions by relevant authorities for coastal developments to accommodate a number of projects, namely hotels, jetties, fishing

of appropriate amount of resources and funding to maintain the integrity of the conservation areas[313]. Even though involvement of local communities for enforcement of conservation zones has been viewed as effective in certain SIDS, lack of proper financial incentives and appropriate safety equipment has demotivated them to be part of the exercise. Due to this lack of enforcement, the required results of the conservation programmes are usually not achieved. Such failure in the enforcement by the local communities has been observed in Fiji where

with marine and coastal conservation practices that the local communities in SIDS may seize have been derived from the various case studies encountered during this study. In addition, these opportunities are almost identical to those present for local communities in almost all coastal states around the world.

5.2.1. Sustainable and alternative livelihoods

Even though some conservation programmes in SIDS have not been sustainable due to numerous factors[318], some communities have implemented measures that have increased the resilience of the conservation programmes and enhance the environmental, social and economic situations of the region. Increase in the income opportunities coupled with job creation for alternative livelihoods for the local people through the establishment of income-generating activities using locally available resources as part of the conservation objectives is one of the means to sustain the

as an opportunity to achieve the objectives of the conservation programmes and ensure its sustainability, the youth and women's groups should be sensitised and engaged in the conservation efforts. Capacity building and awareness exercises should be carried out to empower these groups to achieve better leaderships[323]. In addition, job opportunities providing economic benefits in line with the conservation practices should be created as incentives for these groups. Empowerment of youth and women as a concrete example can be observed in Melanesia where the Coral Sea Foundation has created the Sea Women of Melanesia, with currently over 40 members, for the protection of 43 marine areas. Empowerment of local women in monitoring exercises coupled with their traditional knowledge have

5.2.4. Awareness of policy makers for new laws and regulations

One of the major issue in SIDS is the lack of awareness of policy makers about the different marine conservation-related issues encountered by local communities and indigenous people. The displaying of the positive results of the marine conservation measures by local communities can, hence, create awareness among policy makers and influence potentially the several policies, regulations and laws related to the conservation of marine and coastal environment[328]. In addition, recognition and acceptance of traditional knowledge and customary rules of local and indigenous communities and their incorporation into local and national legislations are opportunities to be exploited through the awareness of decision makers. This measure can legally strengthen the implementation and enforcement of conservation practices. For instance, in Kiribati, traditional knowledge, innovations and practices related to the conservation and sustainability of the marine ecosystems of the local and indigenous communities have been legally recognised under the Environment Amendment Act 1999 (as amended in 2007) through consultations with policy makers[329].

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issue was addressed by partnering with the Belize Fisheries Department and the Southern Environmental Association, and engaging local tourism operators and fishers[331].

5.2.6. Replicability of projects

Local and indigenous communities figuring to embark in new marine conservation projects are exposed to a number of opportunities to guarantee their successful implementation. Community-led marine conservation programmes which have been a success in different SIDS can be replicated by local and indigenous communities in their own region. Through regional cooperation and knowledge sharing among local communities in SIDS, information on the challenges and lessons learnt can be readily made available to embark on the new projects[332]. Besides, the communities can implement conservation

and pollution, could not be dealt at the local level by the local communities and required an integrated approach at national or international level but, on the other hand, challenges, such as lack of stake-holders' involvement, awareness and institutional support, can

PART TWO

National Legal/Policy and

CHAPTER 1
National Legal/Policy and Institutional Frameworks and Local-level Practices

6. SECTION A
Legal/Policy and Institutional Frameworks, and Current Marine and Coastal Conservation Practices at National Level

With its vast EEZ and numerous islands, Mauritius is considered as a large island nation in the western Indian Ocean. To demonstrate its commitments towards the conservation of the marine and coastal environment, Mauritius has ratified a number of international conventions and agreements (Table 4) over the years[336] [337]. Being party to UNCLOS and pledging commitment to the SDGs, more

legislations related to the protection and conservation of the

6.1.1.1. Environment Protection Act 2002 (Amended 2008)

The Environment Protection Act (EPA) 2002, enacted under the aegis of the Ministry responsible for Environment, is the overarching legislation for the protection and conservation of the environment, including the marine and coastal zones, through an integrated approach by enforcing environmental standards to ensure sustainable development[345]. One interesting aspect of the EPA 2002 is that at the beginning, it favours environmental stewardship stating that every person is responsible to take appropriate measures to protect and preserve the natural environment[346]. Besides, the act makes provision for the designation of an Enforcing Agency for the marine and coastal zones[347] which has the responsibilities to enforce national environment standards, verify compliance with environmental laws and conduct monitoring to ensure compliance with environmental laws amongst others[348]. On the other hand, the act requires the submission of an EIA or Preliminary Environmental Report prior to the approval of any development projects in the marine and coastal domain. In addition, the act allows the civil society to provide its views and comment on the EIAs to an EIA committee through a well-established procedure[349].

The act also caters for spill and environmental emergency on land and at sea in the republic and has provision for the development of contingency plans for different emergencies[350]. Provisions for the issuance of national environmental standards for water, including coastal waters, have been made in the act under Part VI Section 38. Concerning the protection of the marine and coastal zones, the act has provisions for the coastal and maritime zone management which include management, protection and enhancement of the marine and coastal environment and prevention of dumping amongst others[351]. With regards to enforcement measures, the Police de l'Environnement has been given legal responsibilities to carry out enforcement of the EPA 2002 within the republic. A person who fails to comply with the act may be issued an enforcement notice or prohibition notice as required[352]. Likewise, the act makes provision to serve a stop order to a person who carries out any development activity without

[345] Nairobi Convention, "Marine and Coastal Resources Governance – Mauritius Country Profile", (See https://www.nairobi

the relevant licence or permit[353]. A number of other enforcement measures, such as powers of entry, entry and arrest without warrant and penalties for offences, are laid down under the act[354]. Last but not least, the act allows the Minister to make regulations as he thinks fit with regards to the protection of the marine and coastal environment[355].

6.1.1.2. Fisheries and Marine Resources Act 2007

Besides the EPA 2002, the Fisheries and Marine Resources Act (FMRA) 2007 is another important piece of legislation for the management, conservation and protection of the marine and coastal ecosystems and their resources. Formulated under the responsibility of the Ministry of responsible for Fisheries, the act addresses, first and foremost, the management of fisheries and administration which includes the designation of MPAs[356] and establishment of an MPA fund to ensure the financial sustainability of the MPAs[357]. Control of fishing activities is a significant management measure addressed under the FMRA 2002 to exploit the fisheries resources sustainably. These activities encompass (i) prohibition of fishing methods and gears such as poisonous substance, explosive, drift net and spear gun, (ii) prohibition of underwater fishing, (iii) closed periods, (iv) prohibition to fish any undersized fish, and (v) prohibition to fish with the aid of artificial light[358]. At the same time, the act also ensures protection of a number of marine species in the waters of Mauritius. For example, marine turtle, marine mammals, berried crab and lobster are also given special protection under Section 16 of the FMRA 2007.

In addition, to strengthen the fisheries management measures and to reduce fishing pressure to protect and conserve fish stocks, restrictions on the number of licences for different fishing gears as specified in Section 30 of the FMRA 2002 has been adopted to control the fishing efforts in the lagoons of Mauritius and the outer islands[359]. With respect to enforcement, the act legally recognises and gives power, such as warrant to enter and search, search and seizure, arrest and detain and seizure of fish, to the Fishery Control Officer within the republic[360]. Notably, the act f281 0 042h1 067 0 1 317.57 255.77 Tm 0

the aquatic ecosystem, including the maritime zones, from discharge of poisonous substance under Section 69(1). Similarly, special protection is being given to mangroves under Section 69(2) which states that no person is allowed to cut, take or remove a mangrove plant without the prior written

sions to protect and conserve the environment of public beaches through (i) upliftment and landscaping, (ii) enhancement of the quality of seawater and (iii) setting standards and guidelines for beach management[365].

6.1.1.5. Mauritius Oceanography Institute Act 1999

This act was enacted to set up the Mauritius Oceanography institute and one of its objective is to showcase the significance of oceanography in the conservation, maintenance, management, utilisation and development of marine and coastal ecosystems along with their associated resources to the scientific community and the public at large[366].

6.1.1.6. Cabinet Decree on sand removal

Sand mining in the lagoon was a common practice in Mauritius before 2001 where 25 cooperative societies were actively involved in extracting an estimated 800,000 tonnes of sand annually[367]. Due to the high estimated generation rate of sand and the irreversible detrimental effects of the activities to the marine and coastal environment and their associated biodiversity, a policy decision[368], to be effective as from October 2002, was taken by the Government of Mauritius to ban the extraction of sand from the lagoon in October 2001[369] [370]. Prior to the banning of the sand extraction activities, a moratorium up to 2001 was given to the sand miners to stop their activities and search for alternative livelihoods[371].

6.1.1.7. Regulations for marine and coastal environment protection and conservation

The different acts listed above also empower the relevant Ministers to make appropriate regulations, where deemed necessary, to protect and conserve, and sustainably manage and exploit the marine and coastal

6.1.1.8. Policy documents

A number of policy documents have been developed by the Government of Mauritius

Table 5: Regulations currently in force in Mauritius for marine and coastal environment protection and conservation.

Main Acts	Regulations
Environment Protection Act (EPA) 2002	**Environment Protection (Standards for Effluent Discharge) Regulations 2003** These regulations have been made under sections 39 and 96 of the EPA 2002 and prohibit the discharge of effluents into a watercourse or a waterbody, which includes wetland and estuary, unless the effluents meet the permissible limits of the different parameters of the Second Schedule to this Regulation.
	Environment Protection (Standards for Effluent Discharge into the Ocean) Regulations 2003 Legislated under sections 39 and 96 of the EPA 2002, these regulations prohibit the discharge of effluent into the ocean (i) unless it complies with the limits set in the Schedule to this Regulation, (ii) at a distance less than 300 metres off the reef barrier and at a depth of less than 30 metres where there is a lagoon; or (iii) at a distance of less than 500 metres from the high water mark and at a depth of less than 25 metres where there is no lagoon. Furthermore, it states that discharge of effluent should not be carried out at a place where the current would cause the effluent to return into the lagoon.
	Environment Protection (Banni [redacted] Plastic

Fisheries and Marine Resources (Fishing of Sea Cucumbers) Regulations 2009 and Fisheries and Marine Resources (Fishing of Sea Cucumbers) (Amendment) Regulations 2020

These regulations enacted under section 74 of the FMRA prohibits the harvesting/fishing of sea cucumbers from 1 March 2020 to 31 December 2023 except with the authorisation of the Permanent Secretary.

Merchant Shipping(Prevention of Pollution by Oil and Noxious Liquid Substances in Bulk) Regulations 2019
These regulations made under section 228 of the Merchant Shipping Act 2007 state

Merchant Shipping Act 2007

6.1.2. Institutional frameworks

A number of well

with the breeding periods of a wide variety of commercial fish species to achieve a higher annual reproductive output[373]. Currently, a number of close periods targeting different species have been promulgated under the FMRA 2007 and its associated regulations (Table 6) by the Ministry responsible for fisheries. For instance, close periods in the artisanal fishery for large nets or gill nets were effectively implemented with the collaboration of the fishers targeting the pelagic and semi-pelagic fish species in the coastal zones of the republic[374]. Closure of octopus during two seasons per year in Mauritius and Rodrigues islands was also a very successful fisheries management measure implemented by the authority[375]. Recognising the impacts of the close periods on the livelihoods of the fishers, the government made provisions for allowances to be paid to these fishers during the close periods[376]. On the other hand, as a result of the declining abundance of sea cucumbers in the lagoon[377], the Ministry responsible for fisheries implemented a close period in each year for the harvesting of sea cucumbers in the lagoon in 2009. Preventing a collapse of the stock due to overexploitation, the authority banned the extraction of sea cucumbers from 1 October 2009 to 30 September 2011[378] and further extended the period from 2012 to 2016[379]. A moratorium which prevented their fishing has been maintained till December 2023[380].

6.2.2. Marine conservation

6.2.2.1. Establishing MPAs

As previously highlighted, Mauritius had different legislative frameworks for the establishment of MPAs mainly in the form of Marine Parks, Fishing Reserves and Marine Reserves. Because of the sustained pressures on the coastal zones, 18 MPAs, covering about

and 4 as Marine reserves[381]. MPAs were mainly established for the protection of fish and fisheries resources, conservation of marine biodiversity, education, scientific research and regulation of recreational activities[382]. Only limited fishing methods and fishing gears (basket trap and line fishing only), and specific activities such as jetties construction, swimming zones demarcation, display of fireworks and mooring zones delimitation, were permitted within the Fishing Reserves[383]. All the MPAs except the

Legal	Fisheries and Marine Resources Act 2007 Fisheries and Marine Resources (Marine Protected Areas) (Amendment) Regulations 2007 Fisheries and Marine Resources (Prohibition of Removal of Coral and Sea-shell) Regulations 2006 Fisheries and Marine Resources (undersized Fish) Regulations 2006 [redacted] sources (Fishing of Sea Cucumbers) Regulations 2009 and Fisheries and Marine Resources (Fishing of Sea Cu- [redacted] ulations 2020 [redacted] sources (Prohibition of the

Operational

- The Albion Fisheries Research Centre is the technical arm of the Ministry and has the Marine Science, Marine Conservation and Laboratories Divisions that carry out the following activities related to marine and coastal conservation.

- The Marine Science and Marine Conservation Division carry out long-term coral reef monitoring at established sites around the island and provide data to the Regional Coral Reef Monitoring Network and Global Coral Reef Monitoring Network.
- The Marine Conservation Division manages the two Marine Parks and the 6 Fishing Reserves.
- The Marine Science Division carries out the following activities:
  - seagrass mapping
  - mangrove propagation.
  - coral farming projects
  - conservation and management of Marine Turtles and their habitats
- The Laboratories Division monitors the seawater quality around the island.

- The Fisheries Protection Service carries out sea patrol to detect any illegal activities and pollution along the coast.

- The following committees have been set up:
  ( ) National Ocean Council
  (i) National Committee on collaborative project on marine turtle conservation

- The Ministry has the following Divisions related to marine and coastal conservation.

- The ICZM Division has established an ICZM framework for the sustainable management of the coastal zone and its resources. A National Oil Spill Contingency Plan and a Coastal Sensitivity Atlas for Oil Spill Response were prepared in 2003.
- The Climate Change Division is responsible for the development, coordination and implementation of climate change adaptation and mitigation policies, programmes and initiatives.
- The National Environmental Laboratory carries out seawater quality tests as and when required.
- The Pollution Prevention and Control Division ensures compliance to]TJETg[ )]TJETQq16

		(iii) Multilateral Environmental Agreements Co-ordinating Committee (iv) EIA/PER Monitoring Committee (v) ICZM Committee (vi) Environment Liaison Officers Committee (vii) Environment Coordination Committee					

6.2.2.2. Conservation of marine mammals

the local communities and

physical measures, such as beach revetment and beach refurbishment, have been carried out. However, to adopt a more ecologically sound and ecosystem-based approach towards coastal erosion and fulfilling the aim of coastal reforestation of denuded coast[401], the Government of Mauritius through the Fisheries Division promoted the propagation of mangrove around the island since 1995[402]. As previously pointed out, due to its numerous benefits, mangrove is legall

In Mauritius, a number of different NGOs employing the bottom-up approach are involved in a wide variety of local-level conservation practices in the marine and coastal environment. These conservation practices are highlighted in Table 7.

Over the years, with the support of the government along with NGOs and other stakeholders, the local communities have implemented a number of successful marine and coastal conservation measures in Mauritius. To focus on the thematic areas of this study, case studies of marine and coastal conservation successes in the fisheries, marine conservation and coastal protection areas at local level are presented in this section.

7.1. Fisheries

7.1.1. Case Study 1: Managing the octopus fishery at community level

The *Octopus cyanea* is a native and the most commonly encountered species, in the waters around the islands of Mauritius[407]. In Mauritius and Rodrigues islands, octopus fishing has been a very important fishing activity to sustain the daily livelihoods of a significant number of artisanal fishers along the coastal areas[408]. However, an open and unregulated access, overexploitation through unsustainable fishing practices[409] and negative impacts of climate change on its habitats, have constantly diminished the stock of the octopus in the lagoons to near collapse[410] leading the local communities to take immediate measures to address the threatened livelihoods of these fishers[411]. With the introduction of a data collection system for the more intensive and prominent octopus fishery in Rodrigues Island, this decline was confirmed by data collected from 1994 to 2010 by the Fisheries Division[412]. To restore the octopus population to a sustainable level and save the livelihoods of the hundreds of fishers who depended on this fishery, a voluntary co-management approach was adopted in 2012. This approach involved the closure of the fishery by the local communities, mainly fishers, and an NGO known as Shoals Rodrigues Association along with the technical and financial assistance from the Rodrigues

[407] IW:LEARN, “The return of the octopus”, 31 October 2018.

[408] Octopus fishing in Mauritius and Rodrigues islands was initially considered as subsistence fishi5(a2f41 173.78 ETBT9 Tm564E)]T.BETBT1 0 0 1 452.95 483.43 T

Regional Assembly and GEF Small Grants Programme[413]. Awareness and sensitisation programmes by local NGOs, and inclusion of women's groups were key to the

communities of both Mauritius and Rodrigues Islands obtained socio-economic benefits, such as increased income and better livelihoods, from the seasonal closures of the octopus fishery[420]. Additionally, these fishers were supported by the government during the closure periods under the Alternative Livelihood Program through which fishers were provided a sum of Rs 700

the help of the local communities and other stakeholders, shortcomings in VMCAs management, recommendations of the resource users and capacity building opportunities were identified[425].

Within the VMCAs, sustainable recreational and tourism activities such as swimming, snorkelling and glass bottom boat trips could be carried out by the resource

the ocean every minute[430] [431]. Due to its long life-span, plastics are persistent in the ocean environment thereby contributing to a number of impacts on the marine environment such as smothering, injuries through ingestion and entanglement of marine species[432]. To curb the production and use of plastics in Mauritius, the government adopted a regulation to ban the use of plastic bags and single use plastic products[433]. However, this effort alone was not sufficient to tackle the problem and as a result, local NGOs addressed this issue with the collaboration of the local coastal communities which were directly affected by this problem. A number of plastic waste collection campaigns were organised by the local communities and NGOs during recent years along the coast and in the lagoon around Mauritius. These plastic wastes were either dumped in landfills or recycled into

marine and coastal environment and at the same time, (ii) protecting the eyesight of the fishers. The engagement of the local communities was key to the success of this marine conservation project[438].

The project was well appreciated by the local communities and discussions were underway to convert the project into a permanent initiative where other marginalised communities would benefit from re-cycled sunglasses through the collection and recycling of plastic wastes in the future[439]. Valuing the innovative concept in marine conservation, this project was a finalist at the 2022 Cannes Lions Awards for highlighting the circularity initiative

coastal zone which was susceptible to (i) tidal surges, sea level

activities[450] [451]. This decrease in coral cover is endangering the artisanal fisheries and tourism sectors, the pillars of the Mauritian economy, on which the coastal communities depend heavily. To address this issue, the government as well as the local communities embarked on coral reef

Further, Eco-Sud was selected in October 2021 to implement a coral reef rehabilitation program in the Blue Bay Marine Park for the next five years under the project *"Restoring marine ecosystem services by restoring coral reefs to meet a changing climate future"* coordinated by the UNDP in collaboration with the Albion Fisheries Research Centre and the Mauritius Oceanography Institute. The objectives of this project were to train and sensitise around 250 community members in coral rehabilitation techniques and restore 1.6 ha of coral reef in the Blue Bay Marine Park over the next five years to reduce the pressure exerted by climate change and the oil spill on the reef dependent economic sectors in the south east region of the island. To date, a number of activities have already been undertaken with the engagement of 43 community

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marine conservation efforts, in the face of climate change and pollution[462]. Unfortunately,

still in its infancy but monitoring works have been started by the relevant authorities[487]. Even though ocean acidification is not readily conspicuous in the marine space, their effects could be worsened by cyclones and strong currents over time[488]. Therefore, even though this phenomenon is a slow process, its effects may affect the long and tedious conservation efforts, such as coral and seagrass rehabilitation, of the local communities in the long run.

8.1.5. Marine pollution

As discussed previously, pollution is a very important factor that affects the marine conservation efforts of local communities in SIDS[489]. There is no exception in this regard for local communities in Mauritius. With the steady increase in population[490] and continued positive economic transformation in Mauritius[491], the marine and coastal environment have been subjected to immense pressure from different types of land-based pollution such as wastewater, industrial wastes, fertilisers, herbicides, pesticides, plastic, solid wastes and oil[492 493]. Inputs of these pollutants into the marine ecosystems can lead to harmful effects particularly algal blooms, fish kills, coral bleaching and death, and affect mangroves[494]. As such, the marine conservation efforts of local communities may be rendered unsuccessful with marine pollution occurring adjacent to the areas of conservation. For example, during the mangrove clean up campaigns, Eco-Sud noticed recurrent solid waste

8.2. Socio-economic challenges

The different socio-economic challenges faced by local communities in Mauritius are outlined below.

8.2.1. Social acceptability

Social acceptability of marine conservation projects by the local communities is one of the success factors used to determine the effectiveness of the projects[497]. Among the various case studies in Mauritius discussed previously, it was clearly observed that a high percentage of local communities were supportive of a number of marine conservation initiatives. However, grassroots observations generally showed that, even with intensive awareness and sensitisation campaigns, not all members within a community have the same positive attitudes towards the conservation measures set in the context of the program since there is no legal obligation for them to abide by[498]. Consequently, this resulted in lack of participation and in few instances, led to defying the regulations set within the conserved areas by a percentage of those in local communities. Such behaviour was spotted during the recent community-led octopus fishery closure periods in Mauritius and Rodrigues islands during which illegal fishing by some members of the fisher communities was reported even though comprehensive sensitisation campaigns were carried out among the fisher communities[499] [500]. Likewise, despite the fact that widespread sensitisation campaigns and mangrove rehabilitation programs were carried out by an NGO, Education and Leadership Initiative (ELI) Africa, from the north to the south along the east coast of Mauritius, uprooting of juvenile mangrove trees and dumping of garbage in mangrove areas by members of the coastal communities have been unfortunately noticed[501].

[497] Aurélie Thomassin and others, "Social acceptability of a marine protected area: The case of Reunion Island", *Ocean & Coastal Management*, vol. 53, No. 4 (April 2010), Available at https://doi.org/10.1016/j.ocecoaman.2010.01.008.

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[500] Yann Yvergniaux, *Management of the octopus fishery in Rodrigues* (Ebene, SMARTFISH Programme, 2014).

[501] ELI Africa, "Mission propagation of mangroves", Available at http://www.eli-africa.org/2018/12/mission-propagation-of-mangroves/ (17 October 2022).

fishers recognised the socio-economic and cultural importance of the

8.2.5. Long administrative procedures

The marine domain in

lagoon poses a threat to the marine ecosystems through sediment resuspension and oil leaks[520]. In addition, coral and seagrass covers in Mauritius are affected by anchoring of boats during excursions and anchorage and trampling during snorkelling[521]. The local communities usually have no capability to regulate these activities in

CHAPTER 2
Challenges and Opportunities for Local Communities

9. SECTION B
Impacts of National Frameworks/Policies and New Opportunities

9.1. Impacts of national legal and policy frameworks on local-level practices

The legal and policy frameworks that are related to marine and coastal conservation in Mauritiu7.3 625.78 Tm[of

activity[523]. On the other hand, using the legal provisions under the FMRA 2007, the local communities along with other public and private stakeholders in Rodrigues Island could protect nesting marine turtles and their hatchlings along the coast from poachers[524] [525]. Witnessing the success of these regulations

9.1.2. National policy frameworks

Like the national legal frameworks, Mauritius also had a number of different policies and action plans that supported the marine conservation efforts of local communities directly or indirectly (Table 6N4246(fo]TJ

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9.2. New opportunities

As in SIDS, local communities in Mauritius also had numerous opportunities to enhance their conservation programs more effectively and successfully along with securing a sustainable livelihood and better future. The opportunities that local communities in Mauritius could benefit from are discussed below. Most opportunities, derived from the various case studies encountered during this study, were similar to most SIDS but some

these different funding opportunities were present, local communities had to fulfill a number of requirements requested by the funding agencies and undergo a lengthy procedure to secure these funds. In addition,

environment[545]

can be used by local communities in performing effective monitoring and surveillance exercises at the conservation sites. In addition, the use of online tools to display and communicate the success of their conservation efforts has gained much importance during the past few decades[553]. Besides, these tools have been used to carry out sensitisation and awareness campaigns on the protection and conservation of the marine ecosystems. For example, the success stories of the marine conservation efforts of a number of local communities have been illustrated on social media, either through short videos or online blogs[554 555]. The successful use of these technologies in marine conservation measures also required intensive training of the local communities on these new methods, which required a considerable amount of time and effort. Thus, continuous capacity building of the local communities must be carried out to keep the local communities up to date with newly available technological resources.

9.2.7. Recognition of the traditional and local knowledge

As pointed out previously, the integration of traditional and local knowledge of the coastal communities were very important during the implementation of community-led marine conservation programs. These local communities had a diversity of traditional and local expertise that could be tapped to render marine conservation projects

nition of the traditional and local knowledge of the local communities, it is typically felt that the credibility and reliability of their knowledge must be confirmed by scientific information prior to integration into the marine conservation measures.

9.2.8. Awareness of policy makers for new

10. CONCLUSION

Though the marine and coastal environment and its associated resources have been very beneficial for the survival and evolution of humankind in terms of food security, livelihoods and safety, the continued overexploitation and the negative impacts of the ever increasing anthropogenic activities during the last decades were the principal drivers contributing to the alteration of their physical and chemical compositions and have endangered their biological functions[562]. Consequently, these changes presented multiple challenges, such as climate change, sea level rise, coastal erosion and ocean acidification amongst others, to

organisations were observed to provide the proper frameworks to initiate marine and coastal conservation practices in coastal states. In addition, a number of international legal and policy instruments in the form of frameworks, protocols and agreements was observed to have been implemented by states as a response to ensure the resilience and sustainability of the marine and coastal ecosystems along with their sustainable exploitation[566]. Some of the major international legal and policy instruments, such as UNCLOS, UNSFA, CBD, MARPOL and CITES, that were related to the fisheries, marine ecosystem and coastal protection areas were outlined in this study. These instruments provided the coastal states the desired platforms towards protecting and conserving the marine and coastal environment in a concerted approach rather than in isolation. Theing

laws (Table 3). Through these legal provisions, these communities could readily implement their own local and traditional rules and regulations under their respective conservation programs. Being the resource-users and having either legal or traditional control over the adjacent marine and coastal zones, indigenous and local communities also claimed stewardships of these programs[570].

However, through the gap analysis performed (Table 3), it was observed that there was a need to address a number of shortcomings which hindered the active engagement of the local communities in implementing marine conservation measures

10.1.1.3. Mauritius

Addressing a broad spectrum of marine related issues in

10.1.2. Marine conservation practices

10.1.2.1. SIDS

As previously pointed out, a bottom-up approach to marine and coastal conservation practices involving indigenous and local communities in SIDS was favoured to obtain successful and sustainable results. During this study, a number of effective marine conservation practices implemented by indigenous and local communities in SIDS were highlighted as case studies. These marine conservation measures were mainly executed to boost the resilience of the coastal communities to adapt to the impacts of anthropogenic activities along with the sustainable exploitation of the marine resources. Moreover, while implementing these measures, the local ecological knowledge and, customary rules and practices of the indigenous and local communities were given due consideration.

10.1.2.1.1. Fisheries

The case studies discussed under the fisheries thematic area were mainly geared towards the implementation of numerous fisheries management measures by indigenous and local communities to ensure the sustainability of the fisheries stocks and prevent their overexploitation. Some of these implemented management measures were closed periods for fishing, gear restrictions, banning destructive fishing methods and prohibition on fishing specific species. Through these case studies, it was noticed that stakeholders' engagements and collaborations were key to their successes. For example, the CBFMP in Samoa integrated all relevant stakeholders under the Fisheries Management Committee which was responsible for the implementation and enforcement of the plan[576]. In addition, as the indigenous and local communities had legal or traditional control over the conservation areas, they took ownership of the conservation measures and ensured the sustainability of the programs[577]. The results of these conservation measures were conspicuous through the enhancement of the fisheries stocks and the increase in catch of the local communities over the years.

10.1.2.1.2. Marine conservation

Establishment of MPAs, protection of marine life and control of marine invasive species were the examples discussed under the marine conservation thematic area. These case studies emphasised on the engagement of the indigenous and local communities to protect and conserve the marine environment and its associated marine life. By establishing MPAs, the indigenous and local communities

[576] FAO, "Long road leads fisheries consultant back to Samoa", 5 June 2017.

[577] Ueta Fa'asili and Iuliaa Kelekolo, "The use of village by-laws in marine conservation and fisheries management", *SPC Traditional Marine Resource Management and Knowledge Information Bulletin*, vol. 11 (September 1999).

readily acknowledged that the diversity of the marine and coastal environment along with the numerous benefits must be protected from any form of human disturbances. Recognising that these conservation measures would affect the livelihoods of the local communities, much efforts were devoted to develop alternative livelihoods for these communities. For example, fishers employing fishing methods that could endanger the marine turtles in Cruzinha, Cape Verde, adopted alternative livelihoods under the sea turtle conservation program[578]. Furthermore, it was observed that detailed scientific

On the other hand, marine conservation measures were also implemented using a bottom-up approach by engaging local communities to enhance their resilience and livelihoods as in other SIDS. The conservation measures were mostly executed by local NGOs/private sectors with the collaboration of the local communities. These local NGOs and private sectors played an essential role in sensitising and indulging local communities, such as fishers, women and youths, in marine conservation measures and securing the necessary funding required[581]. One main observation was that most of the local community engagements in

as important to educate the various groups, for example fishers, youth and women's groups, within the local communities. Capacity building to community members was also the principle activities within the conservation programs to empower them to take stewardship of the programs. This could be observed during the COTS eradication program where divers were trained on the methods to identify COTS outbreaks and to cull their population[584]. Another important observation was that the private sectors were also very keen to indulge with the local communities towards conservation of the marine ecosystems.

ers' engagements, funding, capacity building, awareness and sensitisation, and institutional and technical supports were the main components for achieving the required objectives. In addition, the successes of the different marine conservation programs and the implementation of economically viable alternative livelihoods were the key factors to encourage community participation.

10.1.3. Challenges and opportunities

A number of challenges and opportunities encountered by local communities while implementing marine conservation measures in SIDS and Mauritius were highlighted from the various case studies discussed during this study. Even though SIDS are different based on their location, size, resources, political background and, in their legal and institutional frameworks, it was observed that their local communities experienced similar challenges and opportunities. This situation also applied to local communities in Mauritius but some of the challenges and opportunities were specific to the country.

The key findings on the challenges demonstrated that the local communities in SIDS were readily affected by environmental conditions such as climate change, global warming, ocean acidification and pollution. Local communities in Mauritius also faced same environmental challenges with torrential rain/floods and cyclones being specific to the island. On the other hand, while coastal developments, tourism and recreational activities, poor involvement of local communities and lack of enforcement were common in most SIDS including Mauritius, lack of knowledge, lack of sustainability of the conservation programs, unavailability of resources, lack of proper regulatory frameworks and insufficient institutional supports were the main socio-economic challenges faced by local communities in most SIDS but not commonly faced by local communities in Mauritius. The main challenges specific to local communities in Mauritius were social acceptability of the conservation programs and time-consuming administrative procedures to obtain authorisation to implement marine conservation measures.

With regards to opportunities available to local communities while implementing marine conservation measures, most of them were common in most SIDS and Mauritius. Empowering youth and women, using new technologies, creating awareness among policy makers, developing sustainable and alternative livelihoods, having access to funding and ensuring the sustainability and replicability of the conservation programs were the common opportunities available to local communities in SIDS including Mauritius. While institutional support was one of the challenges faced by local communities in most SIDS, local communities in Mauritius were encouraged to collaborate with different relevant public and private institutions through different programs for technical and financial supports. In

addition, during the implementation of different marine conservation programs, the local and traditional knowledge of the communities were being duly regarded for better management.

10.2. Recommendations

During this study, the objectives laid down at the outset of this study were achieved and key findings on (i) the legal and policy aspects in relation to marine and coastal conservation, and (ii) the local community-level marine conservation practices in

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5 • Local and indigenous communities were the resource users and

4 • Most community-led marine conversation practices in SIDS did not have sustainable and economically

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