



MARCH 2021

Maritime Economy Plan

Antigua and Barbuda



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Ministerial Statements

Ministerial Statement on behalf of the Antigua and Barbuda government

The Ministry of the Blue Economy was officially established in recognition of the increased importance of the marine space to our nation's future prosperity. The events of 2020, most notably the COVID -19 pandemic has brought home the urgent need to diversify our economy so that our island nation can better handle the shocks or such unprecedented events. In one fell swoop, our foremost contributor to our nation's economy, tourism, was significantly impacted with little or no notice. Our government, cognizant of the need to identify new economic sectors which will result in growth, innovation, jobs and investment while safeguarding healthy ecosystems is very grateful for the work of the Commonwealth Marine Economies Programme (CME), the UK Government and the many local stakeholders who made this document possible. We also commend the supportive agenda of the CME Programme which was established to assist Caribbean nations conserve their marine environments and make the most of their maritime resources to catalyse sustainable economic development.

Antigua and Barbuda's maritime space is quite significant relative to that of our neighbours and in light of the growing interest in the sector, it is essential that a clearly defined set of policies and guidelines are developed to facilitate the best results in the fastest time frame possible with minimum conflict. It is therefore incumbent upon us to position ourselves to steer this new sector in a direction which is founded on a philosophy which empowers our people while respecting our environment, the rule of law and established conventions and best practices.

The Ministry of the Blue Economy and by extension, the Government of Antigua and Barbuda, is determined to ensure that this plan be more than just another strategy, and instead be a robust and credible plan to deliver targeted actions to support more local companies to export more, to market our nation's maritime offer, and attract new business to our shores.



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Through the actions set out in this plan, private and public sectors, working together, will realise ambitious goals to attract foreign direct investment into the sector. With artisan maritime economic activities uniquely tied to our coastal communities on the mainland as well as for the entire island of Barbuda, realising the growth potential set out in this plan will support economic development across all parts of our island nation. This plan provides a background of the sector, the cross-cutting issues which exist, the key messages, priorities and most importantly the implementation mechanism for making the sector a viable and sustainable one. We look forward to working with all stakeholders to position Antigua and Barbuda as a leading, competitive, regional maritime nation well into the future.

As the Minister with responsibility for the Blue Economy, I am therefore pleased to endorse this Maritime Economy Plan. I look forward to a brighter future for our island nations across the Commonwealth.



Hon. A. Dean Jonas MP

Minister of Social Transformation,
Human Resource Development and The Blue Economy



Ministerial Statements

Ministerial Statement on behalf of the UK government

The ocean is where life began and is essential for all life on Earth. It regulates climate and weather patterns, provides our food, medicine, energy and other valuable resources, facilitates marine transport and trade, and is full of wonders we have hardly begun to understand. Mangroves, seagrass beds and coral reefs also offer natural protection from the effects of climate change.

There is strong scientific evidence that effective ocean protection will be game-changing in turning things around for climate, for nature, and people. For many nations, especially Small Island Developing States (SIDS), or ‘Large Ocean States’ that is even more important, since the ocean is at the very heart of their sustainable economic development and the future of their people.

This Maritime Economy Plan presents a holistic view of the opportunities presented by the ocean for developing Antigua and Barbuda’s ‘blue economy’ sustainably. It addresses issues such as the need for responsible and sustainable coastal development to protect lives and homes in the event of extreme weather events; improved fisheries management for enhanced food security that protects vulnerable fish stocks; and the provision of diverse training and job opportunities within the blue economy to ensure that future generations continue to reap the ocean’s benefits.

We are delighted that the UK has been working in partnership with the Government of Antigua and Barbuda to develop this bespoke national Maritime Economy Plan under the Commonwealth Marine Economies (CME) Programme.

The CME Programme has also been supporting Antigua and Barbuda through the delivery of capacity building and scientific data collection, through the UK Hydrographic Office, the Centre for Environment, Fisheries & Aquaculture Science, and the National Oceanography Centre. This research has provided much needed information about the health and status of the marine environment. For example, the newly created Caribbean Fisheries Climate Change Report Card defines the risks and threats associated with climate change to the fisheries sector and options for adaptation; and satellite data has been used to assess the impacts of Hurricane Irma on Antigua and Barbuda



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and is being used to support the development of the National Adaptation Plan. This important work builds a critical foundation for the recommendations contained in this Maritime Economy Plan.

As Presidents of the 26th United Nations Climate Change Conference, the UK will make the case for ocean protection at every opportunity. We are pleased to be partnering with a number of Large Ocean States on the frontline of climate change to inspire climate action. There is simply no path to net zero emissions, or the sustainable development goals, or the recovery of nature, without effective ocean protection and sustainable management of the marine environment.

Ambitious and co-ordinated actions, like those outlined in this Maritime Economy Plan, are critical for the future health of our ocean. We welcome this Maritime Economy Plan, as well as Antigua and Barbuda's work to establish a dedicated Ministry of Blue Economy and a Centre of Excellence in Oceanography and the Blue Economy. By working in partnership through the CME Programme, and through projects supported by our new British High Commission in St John's, the UK and Antigua and Barbuda are supporting commitments made at CHOGM 2018. That includes the Commonwealth Blue Charter, which helps Commonwealth countries work together on a fair, inclusive and sustainable approach to ocean protection and economic development.

The UK Government remains committed to maintaining its track record as a reliable and committed development partner with Antigua and Barbuda in navigating this rapidly developing maritime sphere. We share one global ocean – so we need a whole earth effort to sustain it.



A handwritten signature in black ink, appearing to read "Zac".

**Lord (Zac) Goldsmith of
Richmond Park**
Minister for Pacific and
the Environment



A handwritten signature in black ink, appearing to read "Tariq Ahmad".

Lord (Tariq) Ahmad of Wimbledon
Minister for South Asia and the
Commonwealth and Prime Minister's
Special Representative on Preventing
Sexual Violence in Conflict.



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Abbreviations and Acronyms

- ABS – Access Benefit Sharing (of genetic resources)
- ADOMS – Antigua & Barbuda Department of Marine Services and Merchant Shipping
- CAF – Development Bank of Latin America
- CARICOM – Caribbean Community
- CBD – Convention on Biological Diversity
- CCA – Climate Change Adaptation
- CCCCC – Caribbean Community Climate Change Centre
- CCCCE – Caribbean Coastal Capital Centre of Excellence
- CDB – Caribbean Development Bank
- CDEMA – Caribbean Disaster Emergency Management Agency
- Cefas – Centre for Environment, Fisheries and Aquaculture Science (of the United Kingdom)
- CeRMES – Centre for Resource Management and Environmental Studies
- CHAPA – Central Housing and Planning Authority
- CIMH – Caribbean Institute for Meteorology and Hydrology
- ComSec – Commonwealth Secretariat
- CME – Commonwealth Marine Economies
- CPD – Continued Professional Development
- CRFM – Caribbean Regional Fisheries Mechanism
- CTO – Caribbean Tourism Organisation
- DCA – Development Control Authority
- DoE – Department of Environment
- DSM – Deep Sea Mining
- DRRM – Disaster and Risk Reduction Management
- EAG – Environmental Awareness Group
- EASME – European Agency for Small and Medium-size Enterprises
- ECROP – Eastern Caribbean Regional Ocean Policy
- EC\$ – Eastern Caribbean Dollar (used locally as national currency)
- EEZ – Exclusive Economic Zone
- EIA – Environmental Impact Assessment
- ENSO – El Niño Southern Oscillation
- EU – European Union



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- FAD – Fish Aggregating Device
- FAO – Food and Agriculture Organisation
- FCDO – Foreign, Commonwealth & Development Office
- GDP – Gross Domestic Product
- GEF – Global Environment Facility
- GESTER – Governance, Environment, Social, Technology, Economy, Resilience & Risk (analysis)
- ICZM – Integrated Coastal Zone Management
- IDB – InterAmerican Development Bank
- INNS – Invasive Non-Native Species
- ISM – Island Systems Management
- IRENA – International Renewable Energy Agency
- ITCZ – Inter-Tropical Convergence Zone
- JICA – Japan International Cooperation Agency
- MAFBA – Ministry of Agriculture, Fisheries and Barbuda Affairs
- MEP – Maritime Economy Plan
- MEPA – Marine Ecosystem Protected Areas Trust Inc.
- MoSTBE – Ministry of Social Transformation and the Blue Economy
- MPA – Marine Protected Area
- MSC – Marine Stewardship Council
- MTDS – Medium-Term Development Strategy
- MW – Megawatt
- NEMMA – North East Marine Management Area (in Antigua)
- NEMO – Nucleus for European Modelling of the Ocean
- NEOC – National Emergency Operations Centre
- NDC – Nationally Determined Contribution
- NGO – Non-Governmental Organisation
- NOC – National Oceanography Centre (of the United Kingdom)
- NOGC – National Ocean Governance Committee
- NOP – National Ocean Policy
- NPA – National Parks Authority
- O&G – Oil and Gas
- OECS – Organisation of Eastern Caribbean States
- ORE – Offshore Renewable Energy



OTEC – Ocean Thermal Energy Conversion

PAHO – Pan-American Health Organization

PV – Photovoltaic

SDG – Sustainable Development Goal

SEAP – Sustainable Energy Action Plan (of Antigua & Barbuda)

SIDS – Small Island Developing State

SIRMZP – Sustainable Island Resource Management and Zoning Plan

SWAC – Sea Water Air Conditioning

UKHO – United Kingdom Hydrographic Office

UNCLOS – United Nations Convention on the Law of the Sea

UNCTAD – United Nations Conference on Trade and Development

UNEP – United Nations Environment Programme

USD / US\$ – United States Dollars

UWI – University of West Indies

WCR – Wider Caribbean Region



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The Commonwealth Marine Economies Programme

The Commonwealth Marine Economies (CME) Programme was launched in 2016 and aims to support 17 Caribbean and Pacific Small Island Developing States (SIDS) in conserving their marine environments and making the most of their maritime resources to catalyse sustainable economic development. It is designed to promote growth, innovation, jobs and investment whilst safeguarding healthy seas and ecosystems, and it helps to address climate change, the UN Sustainable Development Goals and the Paris Climate Change Accord.

The CME Programme broadly comprises three components:

- > **Government Engagement and Dialogue:** The UK Government is committed to working in partnership with SIDS Governments of individual countries.
- > **Scientific Research and Capacity Building:** To sustainably manage and use marine resources, it is vital to understand them. As a demand-led initiative, since 2016 the Programme has been collecting data, undertaking scientific research and delivering capacity building activities against a clear action plan developed from country requests.
- > **Preparation of national Maritime Economy Plans:** Where requested by SIDS Governments, and in partnership with them, the Programme will assess the existing national economies and identify the opportunities and obstacles to development. Bespoke national Maritime Economy Plans (MEPs) will be developed to enable individual countries to address economic growth and alleviate poverty.

The UK's Foreign, Commonwealth & Development Office (FCDO) is leading this programme, which since 2016 has showcased UK world-leading expertise in marine science through delivery partners at the United Kingdom Hydrographic Office (UKHO), the Centre for Environment, Fisheries and Aquaculture Science (Cefas) and the National Oceanography Centre (NOC). The programme has also engaged a team of technical experts who are working in partnership with SIDS Governments to develop national Maritime Economy Plans. Examples of the work carried out in partnership with Antigua and Barbuda are provided in Section 1.5.

At the Commonwealth Heads of Government meeting in April 2018, 53 countries agreed the landmark **Commonwealth Blue Charter**, a bold commitment that sets out how member states will lead international efforts to sustainably develop and protect our ocean. The CME Programme supports the aims of the Commonwealth Blue Charter and is an integral part of the UK's effort to protect the health of the world's oceans and promote the growth of blue economies.



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Executive Summary

This Maritime Economy Plan is a partnership initiative between the Governments of the UK and Antigua and Barbuda. It provides an overview of the existing maritime economy of Antigua and Barbuda and sets out priorities and actions that aim to help the country demonstrate a clear vision and direction that takes account of national issues, international commitments and the challenges of a Small Island Developing State. Actions support economic growth, support livelihoods and jobs and reduce losses from natural hazards, weather events and climate change. The overall objective is to help grow the national economy in a way that reflects the aims of the Commonwealth Charter, including good governance, sustainable development, gender equality and recognising the needs of small and vulnerable States.

The principles of **low carbon, resource efficiency** and **social inclusion** have been used to shape the development of this Plan. This is compatible with the concept of the ‘blue economy’, which first emerged at the 2012 Rio+20 United Nations Conference on Sustainable Development and recognises the need to maximise the vast economic potential of the ocean while also preserving it for current and future generations. Progress towards a blue economy can help achieve a range of UN Sustainable Development Goals (SDGs), including SDG 14 (Life Below Water), SDG 5 (Gender Equality), SDG 8 (Decent Work and Economic Growth), SDG 7 (Affordable and Clean Energy) SDG 11 (Sustainable Cities and Communities), and others.

The maritime economy includes established sectors such as fisheries, tourism and shipping as well as emerging activities such as offshore renewable energy, aquaculture and marine biotechnology. It also includes the policies and management of these sectors and of the coastal and marine environment on which these sectors rely. This Plan describes the maritime economy in terms of Bedrock / Traditional sectors and Emerging sectors, although other reports may describe it using different categories (there is no internationally agreed way to describe maritime economy sectors).

Bedrock/traditional sectors	Emerging sectors
Energy – O&G ^a , desalination	Energy – renewables, storage, hydrogen, OTEC ^b , SWAC ^c
Shipping, ports	Biopharmaceuticals
Fisheries and aquaculture	New fisheries and aquaculture incl. macroalgae
Tourism – cruise, yachting, beach / all inclusive	Tourism – eco tourism
Minerals / aggregates	Deep sea minerals / minerals



This Maritime Economy Plan has been produced as a result of several months of desk work, structured questionnaires, a consultative mission to Antigua and Barbuda and discussions with a range of Government, NGO, and other stakeholders. It is therefore very much a strategic overview of Antigua and Barbuda's maritime economic potential. Each maritime economy sector was subject to a bespoke **multicriteria analysis** using the information collected from all the sources to consider **governance, environment, social factors, technology, economy and resilience and risk.**

The draft Maritime Economy Plan was subject to review, feedback and update during 2020 / 2021, in consultation with the Government of Antigua and Barbuda. Due to the COVID-19 pandemic and associated travel restrictions, engagement with stakeholders was carried out remotely through a series of online meetings, phone calls and emails. The Ministry of Social Transformation and the Blue Economy (MoSTBE) has acted as the focal point for engagement on the Maritime Economy Plan.

Key findings for Antigua and Barbuda's maritime economy are:

- > **Tourism** is the most important economic sector contributing over 50% of GDP and more than 45% employment. Although the tourism offer is fairly diverse making the economy less vulnerable to market changes, there is still potential for further growth and diversification in the sector.
- > **Coastal infrastructure** (marinas, jetties), **businesses** (fishing, small shops) and **communities** are vulnerable to extreme weather events and there is a need to include 'soft engineering' and natural coastal protection approaches as part of a national capacity building effort in coastal protection.
- > **Fishing** contributes approximately 2% of GDP and artisanal fishing for domestic consumption is important in the context of a sustained demand for fish from the tourism sector.
- > The **coastal** and **marine area** is busy and has many different users and designated sites (e.g. mangroves, fishing areas) but there is no integrated approach. A comprehensive **marine governance** arrangement for the marine space could help the economy grow and marine activities develop sustainably.
- > The **COVID-19 pandemic** has had a significant impact on the economy of Antigua and Barbuda and the Caribbean as a whole. Economic activity in 2020 is estimated to have dropped by 17%. Previous good economic growth has helped to cushion the impact on the economy, but it will take several years to recover to pre-pandemic levels.

Actions, primary actors (who should **be responsible for the actions**) and desired outcomes are presented for each maritime economy sector. These are high **level actions** that are of strategic importance for the sector and the country as a whole. Each sector is given a prioritisation category – Urgent, New / Needs Attention or Well Established.

25 sectoral actions are identified. The Coastal Development sector requires **urgent** attention. The coastal infrastructure, businesses, and communities are vulnerable to natural hazards and require climate resilient policies, plans and management that are linked to a national marine governance system.

Ecosystem services underpin the tourism and fishing sectors, and these services are under pressure from coastal development and other marine activities. Restoring and maintaining a high-quality environment and integrating the value of **ecosystem services** into coastal development would also benefit the well-established **fishing** and **tourism** sectors. Understanding the state of the marine environment is key to supporting sustainable growth of these sectors.

Shipping and ports would benefit from an integrated approach to the marine space and from developing human and physical capabilities to cater for the growing industry of cruise ships and leisure vessels.

The establishment of a **Blue Economy Department** within the Ministry of Social Transformation and the Blue Economy (MoSTBE) is an **overarching action** that will help to act as a driver and focal point to integrate the concept of the blue economy across government and facilitate an **integrated approach** across Ministries and Departments to effectively manage, protect and enhance the marine area and the economic opportunities it provides, alongside the ongoing development of a National Ocean Policy (NOP).

The actions, issues and outcomes identified in this Maritime Economy Plan are **high level, strategic issues that require further discussion and development** before they can be implemented. Appropriate sources of funding need to be identified to support this process. The Maritime Economy Plan has been able to identify organisations potentially able to provide suitable funding, however, it was beyond the scope of this initial high level approach to develop the actions and identify specific funds at this stage.

The next step along the pathway towards a blue economy is for Antigua and Barbuda to work across government to identify those actions that are highest priority and which the country is most able to develop and implement in order to create **detailed implementation plans** and **funding applications** capable of achieving success with regional and national development agencies and funds. Such packages should create synergies with Antigua and Barbuda's NOP development, link to regional activities and goals in the Caribbean (e.g. Eastern Caribbean Regional Ocean Policy, SAMOA Pathway) and meet the aims and objectives of donor countries and organisations; and funding programme priorities. This is a significant task and should be addressed in a partnership approach across government and with regional organisations. The UK Government supports the aims of the Commonwealth Blue Charter through the Commonwealth Marine Economies (CME) Programme. The CME Programme is supporting Caribbean and Pacific Small Island Developing States (SIDS) to preserve their marine environments and make the most of their maritime resources to catalyse sustainable economic development, whilst safeguarding the health of the ocean.



1. Introduction



1. Introduction

1.1. What is the Maritime Economy?

A maritime economy can include diverse components, from established ocean industries such as fisheries, tourism and maritime transport, to emerging activities such as offshore renewable energy, aquaculture, deep sea mining, and marine biotechnology. The mix will depend on national circumstances but will provide social and economic benefits for current and future generations, restoring and protecting the diversity, productivity, resilience and natural capital of marine ecosystems.

In the context of developing Maritime Economy Plans, the terms marine or maritime economy and **blue economy** are considered synonymous, such that the focus on the maritime economy, and plans to support its development and growth, encompass the sustainability and equity concepts of the blue economy.

Blue economy has been defined as, “economic activities that (i) take place in the marine environment or that (ii) use sea resources as an input, as well as economic activities that (iii) are involved in the production of goods or the provision of services that will directly contribute to activities that take place in the marine environment”¹.

At its simplest, the blue economy includes all economic activities (existing and potential) that depend on the existence of the ocean, either directly or indirectly. For Small Island Developing States, the blue economy often comprises the majority of the national economy, with so many economic activities dependent on the ocean. Interactions between economic, ecological and social interests on land and at sea, therefore, become symbiotic and difficult to disentangle, such that a development on one side of the land/sea interface affects the other.

1.1.1. Sectors in the Maritime Economy

The maritime economy can be divided and subdivided in many ways, with high-level generic divisions such as ‘Harvesting of resources’, ‘Trade and commerce’, and ‘Ecosystem services’ giving way to more detailed categories based on specific and established ocean industries such as ‘fishing’, ‘shipping’ or ‘tourism’. These can be subdivided further – ‘fishing’ can be divided by vessel size, catch method or target species and can include onshore activities such as selling and processing or supporting activities such as netmaking and repair or chandlery and vessel maintenance.

A key step in the development of sustainable Maritime Economy Plans is to analyse existing maritime sectors, known as ‘bedrock’ or traditional sectors, to help their transition to more sustainable practices, where needed. Consideration is given to the potential for developing new sustainable maritime activities to replace those that are in decline or diversify the economy. Natural capital/ecosystem services are also taken into account as these underpin so many economic sectors and activities.

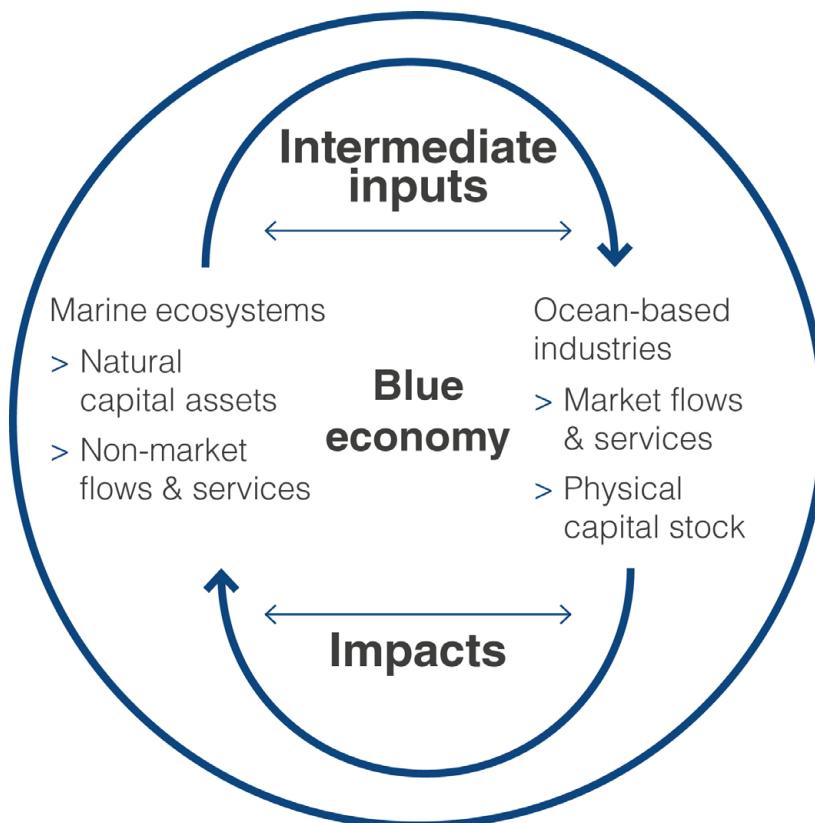


Figure 1 – A conceptual diagram of the sectors and interactions within the blue economy²

Marine ecosystem services

Natural resources and the economic benefit derived from them, whether specifically measured and included in economic valuations or not, are often termed '**ecosystem services**' and are also considered as part of the blue economy.

These traditionally non-monetised resources, such as the coastal defence benefit derived from reefs, are increasingly being explicitly considered in management decisions and, are integral to the value and support of the blue economy, as they underpin and support many of the traditional sectors such as fishing and tourism.

1.2. What is a Maritime Economy Plan?

There are many types of plan used and applied in the management of the marine area. Most countries have some form of planning in their marine area already, even if they are not specifically called a ‘Marine Plan’ e.g. designation of shipping/navigation lanes or the identification of protected areas for conservation or fishing. Planning helps to communicate and achieve objectives. Planning, as a process, is important for a range of reasons:

- > Increases efficiency by avoiding activities that do not work towards the stated objectives of the plan and by helping to organise resources.
- > Facilitates coordination between organisations – everyone knows what the objectives are and helps to define roles and responsibilities.
- > Helps to maintain management control over activities.
- > Helps facilitate consistent decision making.

1.3. How to use this Plan

- > This Plan only considers sustainable (blue) practices and is concerned with **finance** and **economics** of the Antigua and Barbuda Marine Area. It focuses on opportunities and risks to sustainable economic development and areas where there are greater opportunities / risks.
- > It may be used to support decisions about **strategic Government / financial support** bodies or mechanisms for sectors to develop e.g. should there be financial support for a new fishery, for fleet renewal, for renewable energy supply chain development. Ideally, a Maritime (or Blue) Economy Plan should sit underneath and assist the implementation of a National Ocean Policy.
- > It is **not** the intention that this Plan will be used to inform **individual management decisions** by regulators about which individual activities should / shouldn't be permitted in a particular place / time - this is the role of a Marine Spatial Plan.
- > It does **not set priorities for all activities / uses** - there are activities that take place in the marine area which don't have a 'traditional' economic benefit that are not included (e.g. cultural use, landscape/ seascape, non-use values, recreation, health benefits). Such activities and uses will however be enshrined within a National Ocean Policy (which may sit above this plan) or be presented within a Marine Spatial Plan, which might sit **alongside** this document.
- > It does not contain management measures, but may identify **how management can be financed** e.g. user access fees for recreational diving areas, blue bonds, etc.



1.4. Benefits of a Maritime Economy Plan for Antigua and Barbuda

Maritime Economy Plans (MEPs) enable an analysis of existing maritime sectors to be undertaken in order to help the transition to more sustainable practices, where needed, and to consider the potential for developing new, sustainable marine activities. The work identifies the bedrock / traditional sectors of the maritime economy, the emerging sectors and the natural capital / ecosystem services utilised.

Having a Maritime Economy Plan helps to demonstrate that there is a clear vision and direction for the development of a sustainable maritime economy that takes account of national issues, international commitments, such as working towards the achievement of the UN's **Sustainable Development Goals (SDGs)**, with particular reference to SDG14 – Life Below Water, and the challenges associated with a number of themes shared by Antigua and Barbuda and other SIDS, such as:

- > High dependency on imports for energy – the main source of energy is from hydrocarbons that have to be imported.
- > High dependency on imports for food supply.
- > Reliance on one or a few economic sectors (e.g. fishing, tourism, etc).
- > Large ocean resource, with potential for new / emerging sector growth (e.g. biotechnology, renewable energy, minerals, etc).
- > Capacity constraints to effectively manage / exploit sustainably a large ocean area / resource - relatively small population, government, resource (e.g. navy, research / exploration capability).
- > Vulnerable to economic and environmental shocks (e.g. earthquakes), including those driven by climate change (e.g. hurricanes, sea level rise, ocean acidification) with low resilience / ability to recover.
- > Regional co-operation and organisations are well established (these may be sector specific e.g. fisheries, or more wide ranging).
- > Remote locations – increases costs for both imports and exports of goods and services.
- > High levels of poverty / social inequality – need to make growth inclusive to benefit all.
- > High country debt and high relative proportion of government budget on servicing debt.
- > The overall objective is to grow the national economy, such that the country becomes economically resilient and less reliant on financial aid. It is also intended to reflect the aims of the Commonwealth Charter, including good governance, sustainable development, gender equality and recognising the needs of small and vulnerable States.

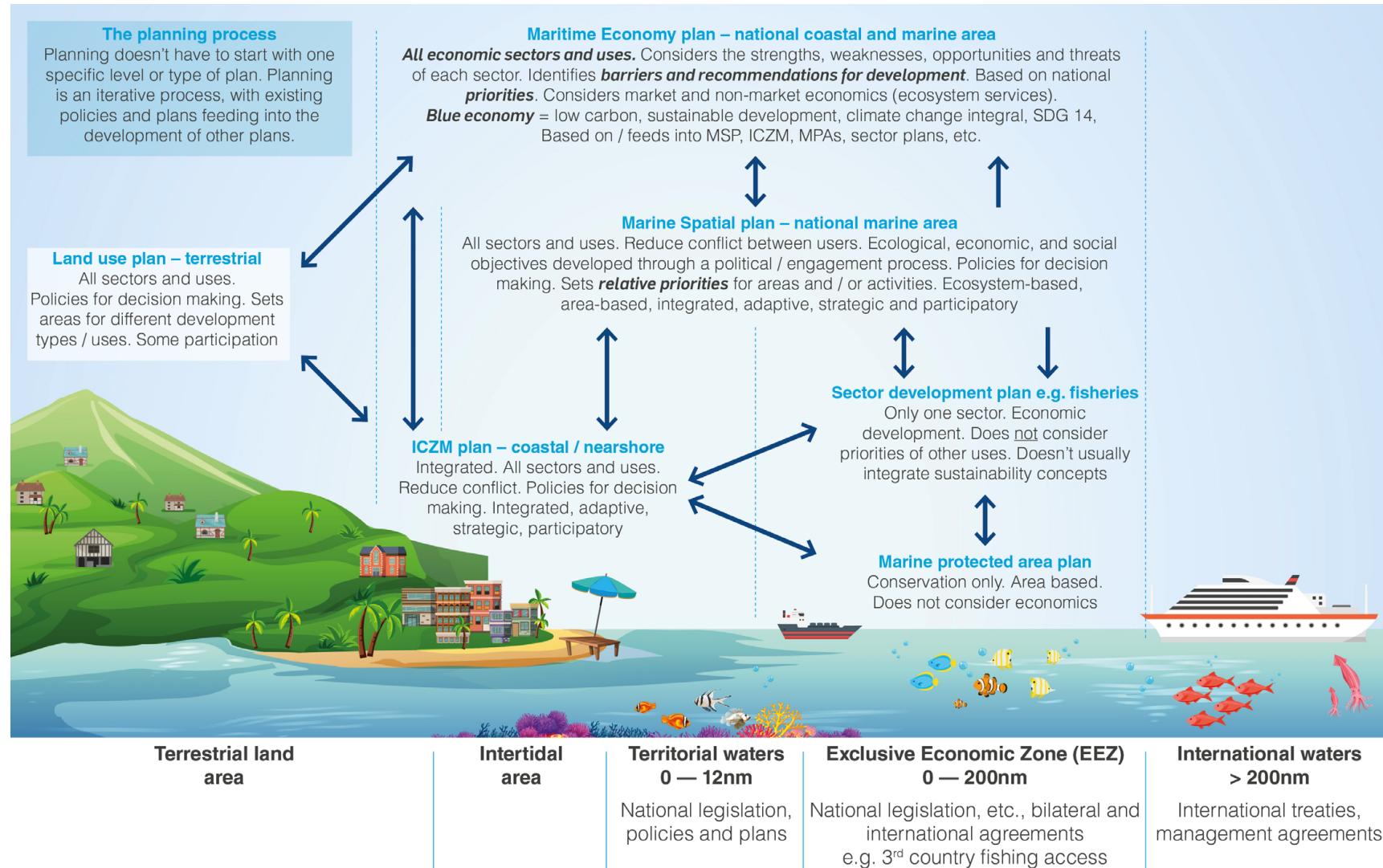


Figure 2 – Types of marine plan and how they relate to each other



1.5. The Commonwealth Marine Economies Programme in Antigua and Barbuda

A number of activities have been carried out in Antigua and Barbuda under the CME Programme, following national engagement on country priorities in 2016. These include:

- > Provision of seabed mapping equipment and training to develop local hydrographic capabilities to undertake seabed mapping to international standards. This new capability will support local government requirements for baseline marine data to fulfil international obligations and the development of evidence-based policy / decision making.
- > Creation of habitat maps to improve biodiversity assessments and conservation, including a workshop to identify practical uses for the maps and data by relevant government departments, including the Department of Environment, National Parks, Antigua and Barbuda Defence Force, Ministry of Fisheries, and Survey and Mapping Division.
- > Baseline biodiversity data collection to inform national climate change adaptation planning and inform hurricane change assessments.
- > Satellite data has been used to assess the impacts of Hurricane Irma and to support the development of the National Adaptation Plan.
- > Development of data sets critical to national adaptation planning such as coastal topography, nearshore bathymetry and seabed and habitat data to develop habitat maps.
- > Assessing the impact of potential coastal inundation on Antigua's coastal infrastructure using newly developed terrain and drainage models.

Regional Caribbean initiatives:

- > Ocean modelling and monitoring using the Caribbean regional NEMO (Nucleus for European Modelling of the Ocean) model to validate water level, currents, temperature and salinity data to support climate change resilience and decision-making.
- > Development of the Caribbean Regional Climate Change Report Card to clearly define the risks and threats associated with climate change in vulnerable areas. This report card was used as a formal submission by the region into the UNFCCC process.
- > Provision of data on oil spill emergency response and non-native species introduction risk to national and regional disaster management teams.
- > Hydrographic governance training and action planning to help identify and prioritise hydrographic data gaps and capacity requirements, based on economic risks, opportunities, safety at sea (e.g. shipwrecks), environment and crisis management.
- > Development of a risk register, list of case studies and guidance to improve the planning, design, and installation of subsea cables to reduce risk from hazards. This will improve understanding of the impact of hazardous events to communications cables and their causes; and therefore, improve telecommunications resilience.
- > Production of a fisheries Report Card for the Caribbean on increasing the resilience of the sector to climate change.
- > Development of a spiny lobster larval dispersal model for the Caribbean to inform the assessment of the potential for spiny lobster aquaculture in the region (Antigua and Barbuda, Dominica, Grenada, St Lucia, St Vincent & the Grenadines).
- > Development of a report and workshop to raise awareness of renewable energy opportunities in the Caribbean.



2. Antigua and Barbuda's Maritime Economy



2. Antigua and Barbuda's Maritime Economy

2.1. Background

Antigua and Barbuda is formed by three large islands located in the Eastern Caribbean (Lesser Antilles). Antigua is the main island with 108 square miles. Barbuda is a flat coral island of approximately 68 square miles located 30 miles north of Antigua. The third and smallest island Redonda, is an uninhabited nature reserve, located 30 miles west of Antigua (antigua-barbuda.org)³. It has a population of nearly 100,000 people distributed approximately 80:20 between the islands of Antigua and Barbuda.

Although Antigua and Barbuda is tropical and drier than most of the West Indies, little remains from its original vegetation after land was extensively cleared for sugar plantations (Commonwealth Secretariat website)⁴.

Today, the economy is dominated by tourism (mostly luxury resorts), which generates half of the GDP. Other important economic activities are offshore financial services, some assembly manufacturing centres for export (e.g. producing transport vehicles), and the domestic construction sector (fuelled by the tourism industry).

The economy of Antigua and Barbuda had decades of prosperity in the 1970s and early 1980s based on tourism, which replaced sugar as the main source of foreign currency and primary source of employment. Like the sugar industry, tourism has been mostly controlled by foreign capital. This dependence on a single industry, combined with slow growth in the 1990s and a series of devastating hurricanes that destroyed parts of the tourism infrastructure, meant that the country went into recession despite efforts to diversify the economy. The Government established state enterprises in order to develop economic sectors, such as infrastructure, that had historically not been attractive to foreign investors.

A stringent economic recovery programme introduced by the Government in 1996 led to debt alleviation and stimulation of the private sector. Antigua and Barbuda cut public expenditure, increased their offer of offshore financial services, and improved tax collection. Tax to GDP ratio in Antigua and Barbuda is the lowest in the Eastern Caribbean at 16%. The Government's 2021 budget aims to increase this to at least 18%.

The Government has continued to encourage the tourism sector as the main source of revenue but has also encouraged manufacturing of electronic components and household appliances for export, while manufacturing furniture, paint, paper, food and beverages for the domestic market⁵. Driven by the tourism sector, the construction industry has become a large employer and important contributor to the national economy.

Maritime Economy Plan Antigua and Barbuda



Source: <https://www.worldometers.info/maps/antigua-and-barbuda-maps/>
 Figure 3 – Map of Antigua and Barbuda



The economy grew steadily in the 2000s until the global financial crisis (2008 - 2010), which affected Antigua and Barbuda through a sharp reduction in tourism. Vulnerability to natural disasters and international oil prices (for import of goods and energy) contributed to the economic decline and general shrinking of the economy with successive contractions of the GDP. Since this time the country has bounced back and by the end of 2016 showed an annual GDP growth of 5.6% (World Bank)⁶. Today the main economic sectors are tourism and financial services.

Agriculture used to be the main employer and was dominated by sugar plantations but today, besides some highly profitable cotton exports, agriculture is mostly focused on small family plots who supply the local market. A small amount of sugar is still harvested, but most of the agricultural land has been converted to the production of beans, carrots, cucumbers, mangoes, plantains, squash, tomatoes and yams. The Government has encouraged self-sufficient agriculture to reduce the dependency on imports.

Fishing has always been primarily for local consumption, with the exception of spiny lobster, (exported to the USA and Europe), and some fish (exported to neighbouring Guadalupe and Martinique). Fish products must often be imported to satisfy the large tourism demand.

Like some other Caribbean countries, Antigua and Barbuda has an economic Citizen by Investment programme to attract foreign investment.

The COVID-19 pandemic has had a significant impact on the economy of Antigua and Barbuda and the Caribbean as a whole. The GDP of the Eastern Caribbean Currency Union (ECCU) dropped by 16.2% in 2020 as a result mainly of the decline in the tourism sector. In the 2021 National Budget Statement, the Prime Minister estimated that economic activity in 2020 dropped by 17%, compared with 5% growth in each of the preceding five years, however, this growth has helped to cushion the impact of the pandemic on the economy.

The number of tourism visitors was reduced by over 60% in 2020 compared to 2019, resulting in a reduction in the hotel and tourism sector in 2020 by over 60% and leading to a significant fall in employment in the sector. The Government anticipates the ongoing effect on travel and tourism to continue for the first half of 2021, but makes a conservative estimate that it will return to 2019 levels by 2024, from where annual growth of 6% is predicted over the medium term.

Construction has declined by 22%, Transport, Storage & Communications by 25% and the Wholesale and Retail sector by over 13%. The Citizen by Investment Programme continued in 2020, but with reduced applicants, however, the Government aims to increase the number of applicants over the coming years. The Agriculture, livestock and forestry industry saw a 1% growth in 2020.



Table 1 – Gross Domestic Product (GDP) by Industry at Current USD (\$million)

	2012	2013	2014	2015	2016
Agriculture, Forestry & Fishing	10.63	10.88	11.15	11.20	11.75
Mining & Quarrying	8.00	11.22	11.73	10.45	11.65
Manufacturing	24.90	32.33	34.40	35.83	39.06
Electricity and water supply	41.60	40.35	43.78	56.27	64.82
Construction	96.37	101.20	112.22	117.23	140.33
Wholesale and retail trade	153.83	149.76	161.66	166.19	168.66
Hotels and restaurants	134.05	134.23	138.58	141.96	157.06
Transport, storage and communications	123.92	116.79	124.00	140.44	153.02
Financial activities (financial intermediation)	107.43	82.41	82.77	89.32	94.17
Real Estate, renting and business services	138.01	144.90	155.34	173.18	174.69
Public administration, defence and social security	92.62	92.34	107.21	111.32	118.92
Education	57.00	63.06	66.10	62.42	73.87
Health and social work	32.70	32.59	35.14	37.54	40.23
Recreational, cultural and sporting activities	n/a	n/a	n/a	n/a	n/a
Other community, social and personal services	26.09	28.35	29.47	30.12	29.95
Activities of private households as employers	5.77	5.79	5.67	4.64	4.21
Less Financial intermediation services indirectly measured	31.49	24.11	20.01	20.30	22.11
TOTAL GDP AT BASIC PRICES	1033.57	1035.05	1108.73	1178.16	1271.13
Plus taxes on products	186.35	166.41	175.31	189.42	201.79
Less Subsidies on Products	9.62	9.62	9.62	9.62	9.62
GROSS DOMESTIC PRODUCT AT MARKET PRICES	1210.30	1191.84	1274.41	1357.95	1463.29

Source: Antigua and Barbuda Statistics Division⁷. Converted to US\$ on 09/07/2019
www.xe.com



2.2. Existing Economic Sectors

2.2.1. Context

Every aspect of a Small Island State's economy can be considered as being linked to the maritime economy because of the dependence on maritime actors in importing necessary equipment and exporting produce to local and wider markets.

Tourism is the most important economic sector in Antigua and Barbuda contributing more than half of the GDP and providing numerous jobs in hospitality services and the construction sector associated with new hotels and tourism facilities. The national tourism offer caters predominantly to the high-end tourism (e.g. luxury resorts, regattas, villas, yachts), and to the growing cruise industry.

The tourism sector, and most of the economy of Antigua and Barbuda, relies on a healthy and resilient **natural environment** with effective ecosystem services and control of invasive species.

Financial services and the Citizen by Investment programme make significant and important contributions to the economy. These sectors are not dependent on the marine area.

Fishing remains an important bedrock sector that provides employment and contributes approximately 2% GDP. Activity is mostly small scale, artisanal and an important domestic food source. The majority of registered fishing vessels are not active and fishers shift between fishing and construction depending on the availability of jobs. Imports of fish products are high, as demand cannot be met domestically, often to serve the tourism industry.

Coastal **infrastructure** (marinas, jetties, etc.), businesses (fishing) and communities are vulnerable to extreme weather events, and the country has limited expertise for coastal developments and coastal protection / assessment. The construction of new infrastructure is putting pressure on marine resources making the need for appropriate environmental impact assessment important.

2.2.2. Maritime economy

This section describes Antigua and Barbuda's maritime economy, using the general economic sectors set out in Table 2.

Table 2 – Maritime Economy sectors

Bedrock/traditional sectors	Emerging sectors
Energy – O&G, desalination	Energy – renewables, storage, hydrogen, OTEC
Shipping, ports	Biopharma
Fisheries and aquaculture	New fisheries and aquaculture incl. macroalgae
Tourism – cruise, yachting, beach/all inclusive	Tourism – eco tourism
Minerals/aggregates	Deep sea minerals/minerals

The following tables provide details of current economic activities via a sectoral overview and summary of economic contribution along with a short description of emerging opportunities.

2.2.2.1. Bedrock sectors

ENERGY	<p>Antigua and Barbuda is highly dependent on imported fossil fuels for power to support its economy, particularly for transportation and energy-intensive facilities, including desalination works to provide fresh water for drinking, manufacturing, and construction industries; making the country vulnerable to global oil price fluctuations and dependent on trade agreements with oil-producing countries, like the PetroCaribe oil agreement held with Venezuela. Peak electricity demand is forecasted to be about 55MW in 2025 (IREMA)⁸.</p> <p>There is potential for solar photovoltaic (PV) and solar heating systems and wind energy generation. A few small-scale projects have taken place. There are about 80 PV systems distributed across the country with a total capacity of approximately 0.85 MW. The Ministry of Energy is encouraging the use of daytime PV and battery use for storage. The Green Barbuda Project aims to improve energy infrastructure following Hurricane Irma. This includes +750kw power, two further diesel generators and bulk battery capability.</p> <p>Energy from locally produced charcoal and some biodiesel is also used by private individuals in scattered locations, but there is no hydropower or known geothermal potential.</p>
Economic contribution	<p>In 2013, the country spent up to 13.7% of its GDP on imported fuels. In 2017, the GDP of Antigua and Barbuda was US\$1.51bn, and the largest import expenditure was for refined petroleum (US\$ 66.5m)⁹. The fluctuation in oil prices can affect the national economy but this may be offset as greater renewable energy generation capacity comes online.</p> <p>There are no publicly available, published statistical data on employment in the energy sector but most employment can be attributed to the private import and distribution of fossil fuels through Antigua Power Company Limited and public sector employment in the Antigua Public Utility Authority. Growth in the tourism market will increase the demand for energy.</p>
Emerging opportunities	<p>The Government is seeking to diversify energy sources by reforming market frameworks, establishing targets for renewable energy production (15% electricity supply by 2030), and creating incentives and market mechanisms to facilitate private investment in renewables, including support for education and training (National Energy Policy - SEAP, 2013)¹⁰. A mix of different sources of energy would make the country more resilient to hurricanes by allowing it to restart generating energy quicker after a natural disaster.</p> <p>Offshore Renewable Energy generation (ORE) is considered further under 'Emerging Sectors'.</p>
Cross-cutting issues	<p>Climate change and extreme weather events: Increased frequency and strength of tropical storms can deter private investment in large scale renewable energy installations such as solar farms and set-back progress in their roll-out. The Government remains committed to continue supporting renewable energy. After Hurricane Irma destroyed nascent renewable energy facilities in Barbuda, the Government announced that it would make the island 100% renewable by 2023 (The Daily Observer, 2018)¹¹.</p>

SHIPPING & PORTS	<p>St. John's is the main port for the country, located in Antigua, it includes docking facilities for large cruise ships. This is the only port capable of handling container cargo. Several ports in the Caribbean compete as transhipment points and containerisation is a necessary condition to increase trade in the region. The port recently benefitted from a large investment to upgrade facilities and increase the navigable depth and size of the turning basin.</p> <p>English Harbour and Falmouth Harbour, two natural harbours located next to each other, are the preferred anchoring location for large leisure crafts, such as yachts, catamarans, or speedboats. This area is also used if the St. John's piers are all occupied and it is popular for mooring during inter-island travel. Jolly Harbour, a berthing area located on the western part of Antigua, also hosts an important number of leisure crafts (A&B Port Authority)¹². Ferries from Antigua connect with Monserrat, and with Barbuda which is 90 minutes away but only has a few jetties and limited cargo capacity.</p> <p>The number of ships in the national fleet has contracted from around 1,250 ships in 2013, to about 950 ships in 2017. The carrying capacity of these ships has also decreased by 9.7% between 2005 and 2017. It decreased further to 2018 (UNCTAD-1)¹³. The national Shipping Registry still holds over 800 vessels which is a relatively large number in the regional context. The shipping registry has been successful by targeting and attracting small to medium size vessels (ADOMS, Pers. Comm. July 2019).</p> <p>Local shipyards are small. They are capable of carrying out repairs but not construction of new (medium - large size) vessels.</p>
Economic contribution	<p>The national economy of Antigua and Barbuda is dominated by the tourism industry. Thus, besides merchant shipping infrastructure, facilities capable of catering for cruise-ships and large numbers of pleasure crafts are also important to capture foreign currency.</p> <p>There is no statistical data for employment figures on maritime transport and ports, nor recent statistics for similar sectors. It is assumed that some people are employed in the cargo sector, but even more in the maintenance and servicing of leisure craft; with a significant number also benefiting indirectly from servicing large cruise liners.</p>
Emerging opportunities	<p>The Government aims to develop the capabilities of the Island of Antigua to cater for cruise ships and leisure vessels. Development projects include the construction of facilities for cruise terminal passengers and improvement of desalination capacity to be able to provide potable water for smaller cruise and leisure ships. Suitable waste treatment and reception facilities for leisure crafts could enable growth in the sector. A national Maritime Transport Policy will be developed in 2021.</p>

Cross-cutting issues

Climate change: Globally, ports are increasingly attuned to the requirement for long-term low-carbon and climate resistant development. Antigua and Barbuda's ports and shipping operations may be vulnerable to stronger El Niño patterns, increased frequency / intensity of storms, damaging infrastructure and disrupting routines. Changes in fuels and other mechanisms to lower ships' emissions to air are being introduced. Shipping lines are likely to expect ports to be able to accommodate with these changing requirements.

Coastal development: the need for high quality EIA to inform planning decisions and the enforcement of planning conditions to protect the environment is relevant to all coastal development, including ports and harbours.

FISHERIES

Sector overview

Fisheries in Antigua and Barbuda are artisanal or small scale, targeting demersal or reef-based resources, which make up at least 85% of capture production by weight (Georges et al, 2015)¹⁴. Trap fishing is the most common method of fishing, followed by hand lining and gill netting. Capture production has been relatively stable at around 3,000 tonnes between 2005 and 2014 (FAO, 2016).

The main species that are targeted include the Caribbean spiny lobster (*Panulirus argus*), conch (*Lobatus gigas*), groupers (*Serranidae*), grunts (*Haemulidae*) and snappers (*Lutjanidae sp.*) (Georges et al, 2015), while the Parrot fish (chub) is also important (Fisheries Division, Pers. Comm. July 2019).

There are currently over 2,000 fishing vessels, but the number of active vessels goes up and down due to the high level of part-time and occasional fishers working in the tourism and construction sectors. Fishing vessels are only deregistered if they are completely destroyed or no longer used for fishing operations, however, it is not uncommon for vessels to be inactive for an extended period (greater than 6 months) (Fisheries Division statistics¹⁵).

The most active landing sites in Antigua are Jolly Harbour / Mosquito Cove, Point Wharf, Urlings, Shell Beach, Parham Harbour and Falmouth Harbour. The most active landing site on Barbuda is Codrington Wharf.

Economic contribution

The fisheries sector contributes approximately 2% GDP. It is an important source of employment and domestic food source. It is expected that Marine Stewardship Council (MSC) accreditation will increase revenue from exports.

Imports of fish products are high, as the sector cannot meet demand driven by the tourism sector.



Emerging opportunities	<p>Several initiatives are underway to improve stock management, including MSC accreditation, under the CME Programme and a marine zoning and management plan, with the assistance of Blue Halo (a collaboration between the Sustainable Fisheries Group and the Waitt Institute). More resources are required for data collection on stock health, management and enforcement (Caribbean Network of Fisherfolk Organisation, Pers. Comm., July 2019).</p> <p>Small scale fisheries management is limited, as the country only uses the Caribbean Community Regional Fisheries Policy and has no policy of its own for small scale fisheries (Caribbean Network of Fisherfolk Organisation, Pers. Comm., July 2019). It is important that small scale fisheries are not overlooked in the development of marine planning and management measures. Development of a lionfish fishery may offer an opportunity for small scale fishery development, while helping to control this invasive species. Adding value, improving the value chain, selling into the tourism sector and improving exports, all provide opportunities.</p>
Cross cutting issues	<p>Environmental limitations: The growth of the sector may be hindered by the prevalence of ciguatera in the region (food poisoning caused by eating fish contaminated by the ciguatera toxin), and natural disasters causing set-backs to individual fishers. The presence of lionfish (invasive species) which preys on smaller fish and competes for food is also affecting fish populations and damaging the sector.</p>



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MARINE MINERAL EXPLOITATION & DEEP SEA MINING (DSM)	<p>There is no large-scale commercial mining in Antigua and Barbuda, however some materials are extracted from quarries, such as limestone, clay, barite, and volcanic stone which is mostly used for local construction. Small amounts of salt and phosphate are mined from Barbuda and Redonda respectively.</p>
Sector overview	<p>The largest mining activity relates to sand mining on the island of Barbuda (Nexus)¹⁶. Sand mining in Antigua and Barbuda began in 1976 (IPS)¹⁷. The tourism industry, which includes several large resorts, is constantly upgrading buildings or constructing new ones, and this requires a supply of construction material, including sand. Sand mining has been the major industry in Barbuda for years, but extraction of sand from beaches has caused erosion, leaving parts of the island more vulnerable to sea level rise and waves from tropical storms. By the mid-1990s, environmental reports were warning that the extent of mining was causing irreparable damage (IPS). Sand mining is commercially attractive - Antigua Aggregates Limited is believed to have mined ~US\$300m sand from Barbuda between 1980 and 1997 (when it was stopped by a judge order) (Observer, 2013)¹⁸.</p> <p>Because of the ample availability of sand on beaches that can be easily reached by excavators, marine dredging for aggregates is not generally carried out in Antigua and Barbuda. Dredging is only used for increasing navigational depths or for coastal development construction, under the responsibility of the Development Control Authority (DCA).</p> <p>Deep sea mining does not take place and there are no known resources that would make this activity of commercial interest.</p>
Economic contribution	<p>There are no data for the economic contribution of marine mineral exploitation, but the values are deemed to be small. While in Antigua sand mining is regulated and prohibited in most cases, in Barbuda the practice has been both allowed and banned at different times with mixed results.</p> <p>Aggregates, such as sand, are for most cases a free resource, but their extraction can come at the expense of other sectors, such as tourism or fishing livelihoods (through beach erosion and destruction of fish habitats), houses or coastal infrastructure. Sand for construction is imported mainly from Guyana and Montserrat (DoE press release)¹⁹.</p>
Emerging opportunities	<p>While the mining of beach sand for construction remains controversial, the overall mining sector has currently limited prospects for growth. It could instead maintain the industry output level and operate within environmental safeguards.</p>
Cross-cutting issues	<p>Climate change: predicted sea level rise and surge in tropical storms is likely to increase the need for sand and aggregates to remain on the beaches and on the nearshore to naturally protect coastal infrastructure and slow down impacts from climate change.</p>



TOURISM	Tourism is exceptionally important to the economy, generating half of the country's GDP and is the primary driver of economic growth. The main tourism markets are the USA, Canada, Europe and the Caribbean. There is strong competition for these markets from other Caribbean countries. In 2017 Antigua and Barbuda attracted over a million visitors ²⁰ , arriving predominantly by sea (70%). The tourism offer focuses on high-end resorts, beaches, yachting, regattas, sport fishing, spas, cultural heritage, and increasingly on the cruise industry. Accelerating economic growth in Antigua and Barbuda relies on the development and competitiveness of the tourism industry upon a healthy and resilient marine environment. As Barbuda is sparsely populated, it attracts tourists looking for empty beaches, birdwatching, reef fishing, kite surfing, wreck diving and generally to enjoy the more 'unspoiled' environment. Wreck diving is particularly popular, where the reefs have led to the sinking of several vessels in the past.
Economic contribution	In 2017 tourism directly supported 5,000 jobs (13.5% of total employment). This was expected to remain unchanged in 2018 and rise by 3.2% per year to 7,000 jobs (16.8% of total employment) in 2028 (WTTC, 2018). The total contribution of tourism to employment in 2017, including jobs indirectly supported by the industry, was 46.1% (17,000 jobs). This was expected to rise by 1.1% in 2018 to 17,000 jobs and rise by 3.1% per year to 23,000 jobs in 2028 (56.9% of total) (WTTC, 2018) ²¹ . The total contribution ²² of travel and tourism to GDP (direct and indirect) was EC\$ 2,091.7m (US\$774.7m), or 51.8% of GDP in 2017, and was forecast to rise by 4.1% in 2018, and by 4.9% a year to EC\$ 3,517.2m (US\$1,302.7m) or 63.9% of GDP in 2028 (WTTC, 2018). COVID-19 has had a significant effect on the tourism industry, reducing visitor numbers, economic activity and employment. Visitor numbers are not expected to increase for the first half of 2021, and conservatively the government predicts a return to pre-COVID-19 levels by 2024.
Emerging opportunities	Opportunities include: (1) scope for growth in existing yacht facilities (if managed sustainably) to provide for this growing sector. (2) Ship wrecks in Barbuda and MPAs provide an opportunity for heritage as well as nature-based snorkelling and diving (NPA, Pers. Comm., July 2019). (3) Improve cruise ship service capacity in terms of fresh water (desalination) and facilities (e.g. waste reception/recycling). There is also opportunity to improve the tourism value chain by encouraging and supporting local communities to develop cultural, heritage and environment tourism interests.



Cross-cutting issues

Climate change: The location of many tourism resorts, accommodation and activities on or near the coast puts them at risk from coastal flood, erosion and hurricanes, as well as longer term impacts from sea level rise. Extreme weather events damage properties, hotels, solar farms and suppliers (local and imports), water and utility bodies and result in travel bans, cancelled flights and disruption.

Environmental pressure: Human-made risks such as pollution, marine litter and the dumping of waste in coastal environments also pose threats and challenges, potentially damaging the very environmental features that tourists come to enjoy. Although identified as one of the most important drivers of economic growth in the country, the tourism sector is also generating pressure on existing infrastructure, particularly fresh water supply, roads, energy and waste management operations. The need for high quality EIA to inform planning decisions and the enforcement of planning conditions to protect the environment is required for all coastal developments.

Invasive species: Sargassum and lionfish are having damaging effects on the tourism and fishing sectors. Both may also present opportunities – Sargassum for agricultural use, fuel, etc.; lionfish as a potential fishery / sports fishery.



2.2.2.2. Emerging sectors

OFFSHORE RENEWABLE ENERGY (ORE)	<p>The Government recognises the importance of renewable energy and energy efficiency in reducing costs for the country and supporting the strategically important tourism industry. It aims to harvest the country's considerable wind and solar energy and establish Barbuda as a model for 100% sustainable 'green energy' development. In 2010 the Government carried out an assessment of potential opportunities for renewable energy and the conclusion was that the potential of ORE was limited, preferring the development of wind and solar technologies.</p> <p>Minesto signed an agreement with authorities in Antigua and Barbuda in 2019 to explore the feasibility of generating electricity from ocean currents around the islands, as Minesto's technology is well-suited to low velocity flows.</p> <p>Ocean Thermal Energy Converter (OTEC) technology has potential, as high average temperatures at the surface and low deep water temperatures provide the conditions required for the technology. Although still in early stages of development and not currently present in the country, there are several pilot or research OTEC projects underway in the Caribbean, including in the US Virgin Islands, Martinique and Cayman.</p> <p>The Development Bank of Latin America (CAF) has identified the potential use of Sea Water Air Conditioning (SWAC) systems in the Caribbean. Hotels and resorts are large electricity consumers with conventional air conditioning (A/C) systems accounting for around 40% of the energy consumption in such buildings. A prefeasibility study in 8 Caribbean locations in the Dominican Republic, Jamaica, Guadalupe and Martinique indicates that SWAC is economically viable and competitive against conventional A/C in several of the sites. The calculated simple pay-back time is 4 to 6 years for the 4 most attractive sites (OTECnews, 2015)²³.</p>
Economic contribution	Offshore renewables are of minor importance in the country- onshore renewables are much cheaper, with large opportunities to increase supply from small scale solar and onshore wind. At a national level, the priority should be focussed on energy security, connectivity and a move to low carbon energy generation. The focus should be on onshore and small-scale renewables generation and improved resilience to extreme events. This is a terrestrially driven priority but will support the maritime economy.
Cross-cutting issues	Antigua and Barbuda already has an extremely high exposure to hurricanes and tropical storms in the August - November wet season, although they are less common during El Niño periods. Renewable energy generation equipment can be badly damaged by natural events and unable to contribute to national requirements for some time, thus reinforcing the country's dependence on fossil fuels, meaning hurricanes and storms are limiting factors for future offshore energy generation in Antigua and Barbuda.



MARICULTURE

Sector overview

Aquaculture is very limited in Antigua and Barbuda, however there has been some success with the seaweeds *Eucheuma* sp. and *Gracilaria* sp. In 2007 there was a single small-scale operator on the northeast coast of Antigua (FAO, 2007)²⁴ and there have been proposals for farming tilapia in Barbuda²⁵.

There is currently a proposal which is supported by the Government called Antigua Sustainable Aquaculture which intends to upscale offshore fish production in Antigua²⁶. Aquaculture production has been 10 tonnes each year between 2015 and 2017 from freshwater production²⁷.

There has been a recent focus on aquaponics linked to the growing tourism sector (Ministry of Agriculture Fisheries and Public Affairs, pers. comms. July 2019). The practice refers to the system which uses a combination of aquaculture with hydroponics as a symbiotic environment between the plants and animals.

Economic contribution

There is no data available on the mariculture / aquaculture sector.



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BIOPHARMA

Sector Overview

Marine biotechnology is based on biological materials originating from the marine environment. The marine environment represents a unique environment for pharmaceutical and cosmetic discovery. Rich biological and genetic diversity has potential for biotechnological applications related to drug discovery, environmental remediation, seafood supply and safety, and developing new resources and industrial processes.

The key to future biotechnology is the systematic search for biopharmaceuticals in marine organisms from the sea, along the coast, the seabed or beneath the seabed. The technological journey involved in the search for biopharmaceuticals, from finding an organism with biotechnological potential to having a product that is marketable, can be a complex, time-consuming and expensive procedure. It is important that the search for biopharmaceuticals does not take valuable resources without compensating the communities from which the samples have come, or whose knowledge led to a valuable discovery.

Protection for such activities, via ‘Benefit Sharing’ are enshrined in the Nagoya Protocol on Access to Genetic Resources and the Fair and Equitable Sharing of Benefits Arising from their Utilization (ABS) to the Convention on Biological Diversity (CBD). Antigua and Barbuda is a Party to the Protocol and was the first Caribbean island state to sign the Nagoya Protocol in 2011. Antigua and Barbuda introduced legislation in 2019 that regulates access to its sovereign genetic resources and ensures that benefits are accrued and shared.

The closest Antigua and Barbuda has to legislation regulating access to genetic resources is the Environmental Protection and Management Act (No.10 of 2019). This act seeks to ‘ensure that decisions pertaining to the environment are made in an integrated manner, in collaboration with appropriate authorities, non-governmental organisations and other persons, provides for preventive and remedial measures for the control and mitigation of all forms of environmental degradation or pollution, and promotes and encourages among all persons a better understanding and appreciation of the environment. The Act also regulates the social relations with regards to collection of, and access to, environmental information and the rights and the obligations of the State, the municipalities, the juristic and natural persons in respect of environmental protection’²⁸.

Before the implementation of the act, a formal Biomaterial Access Agreement had to be issued by the Plant Protection Unit for the removal of any genetic resources in and out of the country²⁹.

There are currently no known bio-pharmaceutical enterprises based on marine resources operating in Antigua and Barbuda.

Economic contribution

There are no publicly available, published statistical data on the economic contribution of the biopharmaceutical sector, however the legislation introduced in 2019 requires that annual payment of royalties and other financial benefits to the Government of Antigua and Barbuda are made.



3. Cross Cutting Issues



3. Cross Cutting Issues

A number of issues cut across the different economic sectors previously highlighted and deserve consideration in their own right. Individually, they are significant enough for a SIDS with a small and static population, a geographically-expansive but constrained resource area and highly volatile and changing geomorphology. However, their inter-connections increase their individual effects: as a result, these interactions need to be actively considered as part of the recommendations contained within a Maritime Economy Plan.

3.1. Regional Organisations in the Caribbean

Countries in the Wider Caribbean Region (WCR) have a strong tradition of working together to achieve shared goals and this is a particular feature in relation to ocean governance and management. The **Caribbean Community (CARICOM)**, is an economic bloc of 14 member countries that allows for the implementation of common approaches and collaboration including the use of marine resources. CARICOM has several associated agencies that deal with issues of relevance to maritime economy sectors or concerns, including the Caribbean Regional Fisheries Mechanism (CRFM), Caribbean Community Climate Change Centre (CCCCC), Caribbean Tourism Organization (CTO) and the Caribbean Institute for Meteorology and Hydrology (CIMH).

The **Organisation of Eastern Caribbean States (OECS)** was established by several CARICOM states. These countries share a common approach to policy areas such as trade, health, education and the environment, including matters relating to the sea and its resources. The OECS also provides the basis for the delivery of the Principles of Environmental Sustainability under the St. George's Declaration, making it a significant driver to achieve SDGs in the Eastern Caribbean.

In 2013, the OECS approved and adopted the **Eastern Caribbean Regional Ocean Policy (ECROP)** to promote a common approach to ocean governance in all member states and mandated that each member develop a National Ocean Policy (NOP) to support the regional policy. The ECROP has a number of priorities and goals, of which many find synergy with the SDGs.



3.2. Current State of Marine Planning and Management in Antigua and Barbuda

At present, there is no marine plan or overarching maritime policy framework for Antigua and Barbuda, although consultation with stakeholders suggests there is strong support for the development of a marine spatial plan or similar framework for the governance and management of the marine area.

The Government of Antigua and Barbuda has a vision for '*a harmonious, prosperous, and modern Antigua and Barbuda founded on the principles of sustainability and inclusive growth; where equality of opportunity, peace, and justice prevail for all citizens and residents.*'

The Government has identified the better utilisation of its marine space as one of the seven priorities in its Medium-Term Development Strategy (MTDS) (Ministry of Finance and Corporate Governance, 2015). Antigua and Barbuda has established the majority of their international maritime boundaries, with the exception of Anguilla and Monserrat. Although Antigua and Barbuda is not part of the OECS Caribbean Regional Oceanscape Project (CROP), a draft maritime policy statement was developed in 2017 to be consistent with the Eastern Caribbean Regional Ocean Policy. This maritime policy statement is currently being updated to create a National Ocean Policy, with the support of the Commonwealth Secretariat.

The Department of Marine Services and Merchant Shipping (ADOMS), at the National Maritime Administration of Antigua and Barbuda, has been identified as the lead agency to oversee the management of maritime activities under the guidance of a National Ocean Governance Committee. The National Ocean Governance Committee is made up of representation from across sectors in Antigua and Barbuda. ADOMS Chairs the Committee (ADOMS, Pers. Comm., July 2019).

The draft maritime policy statement has three principal aims:

- > To promote diversification of the maritime sector of Antigua and Barbuda.
- > To ensure that opportunities for existing maritime sectors are enhanced.
- > To develop the knowledge base necessary to apply international best practices and standards in the management and exploitation of marine resources.

The purpose of these aims is to achieve the following three principal objectives:

- > Future development will lead to the sustainable use of the marine space enabling the economic growth of a maritime sector, while preventing environment deterioration.
- > A system of governance, management and planning that is underpinned by the best available information allowing for the sustainable and equitable exploitation of resources.
- > To have a system of monitoring and surveillance that promotes the safe and sustainable use of the marine space of Antigua and Barbuda.

The NOP is being developed initially as a Policy Statement that will update the draft maritime policy statement to reflect the principles of the revised ECROP (2019) and mirror the format of NOPs produced by other countries in the region during 2019. The policy statement is due for completion by the end of March 2021.

As there is currently no national legislation that directly supports the implementation of a maritime policy, it may be necessary to develop legislation that requires all public authorities taking authorisation or enforcement decisions that affect or might affect the Antigua and Barbuda maritime area to do so in accordance with the maritime policy statement, unless relevant considerations indicate otherwise (e.g. through the creation of a duty on public authorities) (Coastal Matters, 2016).

The draft maritime policy statement contains a number of draft policies that would be applied to the marine area, and to associated land-based activities (such as onshore infrastructure that supports maritime sectors). These policies cover matters such as supporting blue growth, ensuring decisions do not adversely impact on other sectors or the environment, and promoting co-existence of activities.

While the maritime policy statement was in draft and prior to the development of the NOP, the National Land Use Plan and the incorporation of an EIA process in the development of coastal areas has sought to better manage and protect areas of the marine area. In addition to the three new marine protected areas (the NEMMA, Palaster Reef and Cades Bay Marine Reserve), a framework for defining protected areas and the potential for establishing a centralised unit to manage them is being developed by a Global Environment Facility (GEF) funded project (DoE, Pers. Comm., July 2019).

Antigua and Barbuda has established a Ministry with specific responsibility for the blue economy, in recognition of the increasing focus on the seas as an important economic driver for island and coastal states and the need to integrate the blue economy concept more widely across government (termed the ‘blue economy transition gap’). The concept of the blue economy naturally overlaps with other Ministries and agencies such that co-operation across multiple sectors will be needed, along with the implementation of appropriate legislation, regulation and policy, under the NOP.

There is strong support for marine planning in Antigua and Barbuda as evidenced by feedback from several stakeholders during consultation in July 2019 and during 2020 / 21. Some of the issues highlighted through this consultation were:

- > The need to create a Department for the Blue Economy to act as a driver and focal point for the continued development and expansion of the concept of the blue economy in Antigua and Barbuda; to co-ordinate and develop co-operation on blue economy actions across government and departments to integrate the blue economy into the existing organisational framework.
- > The need for education, awareness raising and capacity building on the importance of the marine sector and for future managers and decision makers (A&B Sport Fishers Assoc., ADOMS, DoE, National Office of Disaster Services, National Parks Authority).



- > The need to incorporate the views of small scale coastal fishers into decision making (A&B Sport Fishers Assoc., Department of Fisheries).
- > A pilot area for a marine spatial plan (National Office of Disaster Services, DoE).
- > Increased resource for management and enforcement in the marine area, across a range of sectors (A&B Sport Fishers Assoc., ADOMS, DoE, National Office of Disaster Services).
- > The need for community education and awareness raising of the importance of the blue economy to Antigua and Barbuda and for community engagement in decision making and management of the marine area on which livelihoods rely.

In October 2020, the Government of Antigua and Barbuda announced it was supporting the establishment of a Centre of Excellence for Oceanography and the Blue Economy at the Five Islands campus of the University of the West Indies (UWI). A Memorandum of Understanding (MoU) was agreed between the Government of Antigua and Barbuda, UWI and the Association of Commonwealth Universities (ACU) in January 2021. The Ministry of the Blue Economy has supported the development of an action plan for the creation of the Centre of Excellence, with inputs from the Commonwealth Enterprise and Investment Council (CWEIC), ACU, the Antigua and Barbuda High Commission, UWI, the University of Dalhousie (Canada), the University of Southampton (UK), James Cook University (Australia), the University of Queensland (Australia) and trade experts from Trade and Investment Queensland.

The Centre of Excellence would help to strengthen institutional capacity in marine science and the blue economy and help develop economic opportunities across the Caribbean. It presents an opportunity to develop skills and research to support the blue economy and to facilitate working relationships with other regional initiatives, skills and training facilities; and act as a focus for marine science research across the Caribbean and internationally.

Maritime Economy Plan Antigua and Barbuda



Table 3 – Ministries, Departments and Bodies with a role in marine planning and management

Ministry / Department / Organisation	Role in marine planning / management
National Ocean Governance Committee (NOGC)	Inter-ministerial body advising on ocean governance and marine policy and planning
Ministry of Social Transformation and the Blue Economy	Responsible for social and community services with an emphasis on combating poverty, enhancing equality and improving the standard of living for all citizens, with a specific focus on the role the blue economy plays.
Antigua and Barbuda Department of Marine Services and Merchant Shipping (ADOMS), in the National Maritime Administration	Operates vessel registry services for the country. Chair of the NOGC.
Ministry of Health, Wellness and The Environment (Environment Division)	Regulates aspects of coastal and marine planning regarding pollution and the environment; promotes creation and management of MPAs
National Parks Authority	Manages protected areas
Ministry of Agriculture, Fisheries and Barbuda Affairs (Fisheries Division)	Administers and manages offshore and coastal fisheries, aquaculture; promotes MPAs; manages marine planning in Barbuda (e.g. lagoon)
Ministry of Foreign Affairs, Immigration and Trade	Administer international borders, surveillance
Ministry of Tourism and Investment (Antigua and Barbuda Tourism Authority)	Promotes and advises on tourism development and investment on the coast and marine area
Ministry of Works	Administers and manages coastal infrastructure works and sea defences
Ministry of Public Utilities, Civil Aviation and Energy	Regulates electricity generation and transmission including offshore energy generation
Antigua Port Authority	Administers and manages ports, cargo safety
Department of Marine Services and Merchant Shipping Registration	Manages shipping, routes and vessel registration
Central Housing and Planning Authority	Manages and advises on coastal development
Ministry of Finance and Corporate Governance	Leads strategic national development including ocean and marine policies
Antigua & Barbuda Marine Ecosystems Protection Area Trust (MEPA)	A non-governmental ecological restoration body concerned with sustainability and managing ecosystem services
Environmental Awareness Group (EAG)	A non-governmental body concerned with promoting awareness of the importance of environmental conservation
Barbuda Council	Represents the interests of Barbuda and governs the affairs of the island.

3.3. Weather events and Climate Change

Antigua and Barbuda is regularly affected by the El Niño Southern Oscillation (ENSO)³⁰ phenomenon and the intensification of the Inter-Tropical Convergence Zone (ITCZ). Mean rainfall over Antigua and Barbuda has increased significantly since 1960 in all seasons, but most substantially in September - November when an average increase of 19.0mm per month (11.0%) per decade has occurred.

The country is exposed economically, environmentally and socially to current and projected climate change impacts. Climate change projections for the islands show accelerated coastal erosion and inundation, lower average annual rainfall, but increased rainfall intensity causing flooding, and a likely increase in tropical storm intensity.

Antigua and Barbuda lacks fresh water resources and is particularly vulnerable to water scarcity. Drought is typically experienced during the ENSO events; and the threat of increased drought in Barbuda will likely further limit the existing availability of fresh water.

Floods and landslides can decrease the availability or accessibility of quality water, through contamination and infrastructure damage. During extreme rain events, mountainous areas in Antigua are vulnerable to floods and landslides. Furthermore, sea level rise and storm surge could introduce saline water into freshwater resources in low-lying areas.

Damage to water and sanitation infrastructure during hurricanes will likely increase as storms become stronger and more intense.

The mean annual temperature is projected to increase by 0.4 to 2.1°C by the 2060s, and 0.9 to 3.5 degrees by the 2090s.

3.3.1. Opportunities and plans for climate action

Antigua and Barbuda's Nationally Determined Contribution (NDC) climate change mitigation and adaptation policies and actions³¹:

Mitigation:

- > Gases covered in the mitigation measures include CO₂, CH₄, N₂O and HFCs, and the estimated cost of implementation of measures is US\$ 220 million³².
- > Vehicle Fleet: By 2020, establish efficiency standards for the importation of all vehicles and appliances (conditional³³).
- > Renewable Energy: By 2030, achieve an energy matrix with 50 MW of electricity from renewable sources both on and off-grid in the public and private sectors (conditional).
- > Waste-to-energy: By 2020, finalise the technical studies with the intention to construct and operationalise a waste to energy (WTE) plant by 2025³⁴ (conditional).
- > Energy Efficiency: Improve energy efficiency in production and consumption of energy (conditional).
- > Wetlands: By 2030, all remaining wetlands and watershed areas with carbon sequestration potential are protected as carbon sinks (conditional).
- > Buildings: Update the Building Code (unconditional).



Adaptation:

Adaptation in the water sector is of national priority. Complementing the Sustainable Island Resource Management and Zoning Plan (SIRMZP), the adaptation targets presented in Antigua and Barbuda's first NDC are incremental efforts to the national physical development plan, as the targets elevate ambition beyond development, to build resilience through adaptation interventions in preparation for projected climate impacts. The estimated cost of implementation is US\$ 20 million³⁵ per year until 2026.

- > Water Supply: Increase seawater desalination capacity by 50% above 2015 levels, by 2025, from approximately 5.4 million to over 8 million US gallons per day to counteract freshwater scarcity in Antigua and Barbuda³⁶.
- > Buildings: By 2030, all buildings are improved and prepared for extreme climate events, including drought, flooding and hurricanes (conditional); by 2020, update the Building Code to meet projected impacts of climate change (unconditional).
- > Renewable Energy: By 2030, 100% of electricity demand in the water sector and other essential services (including health, food storage and emergency services) will be met through off-grid renewable sources to enhance resilience to drought and hurricanes (conditional).
- > Health: Disease Surveillance and Control: By 2030, all waterways are protected to reduce the risks of flooding and health impacts including vector-borne and water-borne diseases.
- > Disaster Risk Management (DRM): Disaster Preparedness: By 2030, an affordable insurance scheme is available for farmers, fishers, and residential and business owners to cope with losses resulting from climate variability.



3.4. Ecosystem Services

There are no published data compiling the value of ecosystem services for Antigua and Barbuda. The Japan International Cooperation Agency (JICA) funded an ecosystem-service-valuation project to be implemented by MEPA and the Department of Environment, but unfortunately, the project was not completed (MEPA, Pers. Comm., July 2019). The Biodiversity Is Our Business Project, aimed to estimate the value of biodiversity and ecosystem services on the Island of Antigua for its contributions to: recreation and aesthetics; water purification services; resilience; contributions to local livelihoods and sustenance; genetic resources; and carbon sequestration and storage. The project also included an education and awareness raising element to communicate the knowledge and lessons learned to a diverse audience, including businesses, government officials, and community members (UN Oceans Conference website). ³⁷

The Government of Antigua and Barbuda recognises the importance of coastal ecosystems and their continued health to support the strategically important tourism industry and the economy as a whole. Most industries are either directly or indirectly reliant on some aspect of the coastal/marine environment to function. Inland / upland agricultural practices and run off, particularly of nitrates, can impact on coastal and marine ecosystems. Changes to land management and a catchment-based approach to water management could improve water quality in coastal locations. This approach would align with the Island Systems Management approach under the ECROP initiative and the developing NOP.

The InterAmerican Development Bank (IDB) is helping to fund work to create a Caribbean Coastal Capital Centre of Excellence (CCCCE), with the objective to strengthen the regional capacity for the monitoring, valuation, assessment and restoration of coastal capital. The CCCCE will build on existing regional capabilities, such as that of the University of the West Indies' (UWI) Centre for Resource Management and Environmental Studies (CeRMES).

3.4.1. Economic contribution

Coastal and marine ecosystems provide a variety of ecological functions that directly and indirectly translate to economic services and value to humans. Examples for Antigua and Barbuda include the following:

- > **Subsistence food provision** – Subsistence fishing refers to using marine and coastal resources to supply food to local populations, rather than selling products. Fish is consumed by the fisher, their family, given as a gift or bartered locally. Landings data from subsistence fishing are frequently underestimated or missing completely from national statistics³⁸. Subsistence fisheries are not paid a wage, but their time has value.
- > **Commercial food harvesting** – The majority of commercial fishing in Antigua and Barbuda is inshore fisheries and includes a high level of part-time and occasional fishers that also work in other sectors, predominantly tourism or construction). Fisheries production statistics for 2014 – 2015 resulted in landings worth almost EC\$40 million³⁹.
- > **Mineral and aggregate mining** – Minerals and aggregates can sometimes be removed from beaches, reefs, lagoons and the ocean floor without detrimental effects to the coast. The Government of Antigua and Barbuda is restricting and reducing the permitted extraction of beach sand, while also targeting illegal extractions. There is no data for the value of this ecosystem service.

> **Tourism** – Tourism is the most important economic sector in Antigua and Barbuda, contributing EC\$2,091.7m (51.8% of GDP) in 2017 (WTTC, 2018). Inappropriate and poorly controlled coastal development contributes to the degradation and destruction of coastal habitats important to the maintenance of biological resources.

Coastal protection – Coastal ecosystems in Antigua and Barbuda help protect the shoreline from erosion and storms. The coastline of Antigua is indented with numerous creeks, inlets, associated reefs and wetlands. A large portion of the east and south coasts are protected by fringing reefs. The coastline of Barbuda is less varied but also has extensive reef systems. Mangroves play an important role in coastal risk management as well as providing habitat vital to marine and terrestrial species, including commercially important fisheries species (Gore-Francis, 2013)⁴⁰, thus supporting other ecosystem services.

At least some of the decline in reef habitat / health is due to the chronic and cumulative impact of sediment loads resulting from land degradation (leading to washing away of soils) and mangrove removal (lack of natural filtration and capture of sediments).

Carbon sequestration – The oceans absorbs and stores carbon dioxide (CO₂). Mangrove forests, seagrass beds and salt marshes can store high amounts of carbon. Antigua and Barbuda has one of the most extensive networks of mangrove wetlands in the Eastern Caribbean. The carbon benefits gained through the protection of mangroves at risk of destruction could be marketed and sold as carbon offsets. The costs of verifying and managing these protected areas would need to be assessed on a case-by case basis. The National Land Use Plan and the incorporation of an EIA process in the development of coastal areas has sought to better manage and protect areas of mangrove. No value for carbon sequestration is available for Antigua and Barbuda.

Research and education – In the Caribbean Islands there has been a significant flow in grants and aid money into ocean management and development work. Marine and coastal ecosystems offer unique learning opportunities for students and researchers. The Biodiversity Is Our Business Project had an estimated value of US\$180,000 (UN Oceans Conference website). Investment in the Centre of Excellence for Oceanography and the Blue Economy provides the opportunity to expand the UWI and help diversify the economy.

The national Department of Environment was involved in a four-year GEF funded project in 2008 to map coastal and marine habitats, the resources available from these habitats, and the uses made of the resources⁴¹. The overall goal of the project was to ensure the sustainability and maintenance of island ecosystem integrity, health, and function through integrated planning and management of the islands' resources, thereby providing a basis for continued sustainable economic development. A total value could not be estimated for research and education due to lack of information.



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3.5. Coastal and Disaster Risk Management

The National Office of Disaster Services leads on disaster management in Antigua and Barbuda. The management and administrative board of the National Office of Disaster Services is the National Disaster Council. During disasters, the National Emergency Operations Centre (NEOC) is activated. This consists of many key stakeholders across government ministries and civil society. The NEOC plans and coordinates the appropriate risk management measures based on the type and location of disasters. The actions of the NEOC are guided by the National Disaster Risk Management Plan (Gore-Francis, 2013).

There has been significant progress in building resilience to hurricanes and tropical storms since 1999 when Hurricane Lenny hit Antigua and Barbuda and caused extensive damage and intensive rainfall that contaminated the freshwater supplies. Most advances in this area have been in raising awareness of disaster risks and responses. The physical infrastructure and facilities have also seen a build-up in resilience (through improved building techniques and better selections of locations), but these structures are still vulnerable to these events (Simpson et al, 2012)⁴².

Antigua and Barbuda is a subscriber to the Caribbean Catastrophic Risk Insurance Facility, which offers liquidity and relief in the event that the policy is triggered, to protect the public sector. The private sector relies on commercial underwriters, most notably the tourism industry, where an estimated 80% of enterprises are insured (Global Facility for Disaster Reduction and Recovery, 2010)⁴³. Other sectors, such as agriculture, transport and housing remain vulnerable.

The country has adopted the Comprehensive Disaster Management Strategy of the Caribbean Disaster Emergency Management Agency (CDEMA), for the development of its policies and disaster planning, and disaster risk is slowly being incorporated into public policy. This is particularly relevant in coastal planning and development.

No formal development guidelines exist for coastal resilient structures (or marine infrastructure), nor advice on how to mainstream Disaster Risk Management (DRM) or Climate Change Adaptation (CCA) into construction in the marine environment. A study to identify potential sites for development has been undertaken but it did not include a component about CCA (e.g. future flooding, realignment, development set-back, etc.) (DCA, Pers. Comm., July 2019). The historic consequences of this are being felt in the country. Antigua's main landfill site is located close to Hanson Bay and during heavy rainfall events, runoff drains into the bay, impacting on water quality and marine resources.

The Central Housing and Planning Authority (CHAPA) works closely with the DCA to develop affordable housing. CHAPA is looking to use alternative technologies, building materials and techniques for their alternative housing projects and already includes climate change considerations into their designs, however, given that tourism and high-income developments prefer prime coastal locations, few CHAPA projects are located on the coast.

Antigua and Barbuda has one of the most extensive networks of mangrove wetlands in the Eastern Caribbean. Mangroves play an important role in coastal risk management and the National Land Use Plan and the incorporation of an EIA process in the development of coastal areas has sought to better manage and protect areas of mangrove. In addition, three new marine protected areas have been created (the NEMMA, Palaster Reef and Cades Bay Marine Reserve) (Gore-Francis, 2013).



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The preparation and use of high quality EIAs that cover new types of marine structures and building methods to inform planning and development control decisions is needed to ensure that any future coastal developments do not add to the pressure on Antigua and Barbuda's coastal environment and ecosystem services.

Sector specific DRM plans are starting to be developed with support from CDEMA for the health and education sectors (supported by the Pan-American Health Organization (PAHO) and UNICEF respectively). The FAO is also encouraging the agriculture sector to have a sector specific DRM plan.

3.5.1. Resources and training

The National Office of Disaster Services is responsible for predicting and responding to natural disasters such as hurricanes and tropical storms. It is closely linked to the Meteorological Office and together they have developed protocols and procedures to communicate warning to the communities, including through the use of a Facebook page to publish urgent messages, as part of their Disaster Risk Reduction and Management activities.

Awareness raising is key to the management of disaster risk and Antigua and Barbuda has included disaster education as part of the school curricula. Supported by the Disaster Management Act, the National Office of Disaster Services also works closely with vulnerable communities to enable them to identify and manage their own risk levels and help them build resilience to natural disasters.

There are no coastal engineers in country to help provide the technical design needs required for the defence works, breakwaters or other similar structures (Antigua Port Authority, Pers. Comm., July 2019).

There is a need to raise awareness of the importance of evidence-based decision making and EIA in planning and development control decisions; for trained practitioners to be able to carry out such assessments; and for staff within government to implement and enforce the use of EIA and planning conditions.

St George's University and the proposed Centre of Excellence for Oceanography and the Blue Economy at the Five Islands campus of the University of the West Indies (UWI) present potential resources to provide training for new professionals and to upskill the existing workforce in a range of sectors to support the blue economy and implement the developing NOP.



3.6. Gender Equality

The UN SDG 5 aims to achieve gender equality and empower all women and girls. There are nine targets, with at least one indicator each, that aim to achieve the overarching goal. Maritime industries are traditionally male-dominated areas, particularly in bedrock sectors of fishing, ports / shipping, marine aggregates. Commercial and offshore fisheries remain a male-dominated sector worldwide. Women's roles and activities in these bedrock sectors tend to be in supporting onshore roles, such as fish processing, food preparation and service sector roles.

Women's role in subsistence nearshore / coastal fishing is often unpaid and, therefore, undervalued in economic data. A move towards valuing ecosystem services and the economic contribution that ecosystems make in supporting the economy will help to highlight the value of the roles of women to the economy. The stewardship and management of ecosystem services and the creation of new small scale business opportunities can also provide additional opportunities for women and more rural or remote island communities, such as through small scale aquaculture.

Tourism is one maritime economy sector that offers a wider range of opportunities for women to take an active part of the economy. The opportunity to diversify and expand the tourism offering creates the opportunity for women and rural / remote communities to engage in the economy.

The UN has highlighted the gender equality issues around the COVID-19 pandemic, noting that the majority of caregivers, at home, in communities and in health care, are women. Although those most affected by COVID-19 are reportedly men, the elderly, and people with chronic diseases and weak immune systems, women and girls are disproportionately impacted by both the disease and the public health measures to contain it. Women are at increased risk of infection due to their caregiving role; and loss of livelihood, due to their jobs tending to be in service sectors that have been closed; or in part time or informal work.

The development of this Maritime Economy Plan has included consideration of how gender equality currently affects the maritime economy sectors as part of the multicriteria analysis carried out (see section 4.1).



4. Analysis and Plan Development

4. Analysis and Plan Development

This Plan has been produced as a result of several months of desk work combined with a consultative mission to Antigua and Barbuda, during which intensive discussions were scheduled with wide a range of Government, NGO, and Private Sector Stakeholders. It is therefore very much a strategic overview of Antigua and Barbuda's maritime economic potential. Often such swift approaches and taking a 'helicopter view' can be a highly beneficial mechanism for succinctly cutting through detail and prioritising needs. The draft Maritime Economy Plan was subject to review, feedback and update during 2020 / 2021, with the MoSTBE acting as the focal point for engagement.

This document is presented as a basis for further dialogue and to support Antigua and Barbuda along the difficult but necessary pathway towards the realisation of a blue economy.

The draft Plan was subject to wide-ranging scrutiny and consultation and following associated revisions, it is anticipated that it will ultimately assist Antigua and Barbuda in the implementation of its developing maritime policy.

4.1. Methods

The following methods were developed and applied to assist consultation and discussions with stakeholders and the analysis of information:

- > To help gather information during country visits and seek the views and opinions of stakeholders to inform the development of the maritime economy plan, a series of **structured questions** was developed. Questions were grouped by sector (e.g. fisheries) or theme / issue that is common to many Small Island States or that has the potential to affect the maritime economy (e.g. disaster risk, infrastructure and engineering).
- > Where appropriate, stakeholders where aided in the process of prioritising maritime sector issues with the help of a **Card Sorting exercise (see Figure 4)**. 'Card sorting' prioritisation of maritime economy sectors and discussions of priorities were held with stakeholders, either individually, in groups, or in workshops. Discussions focussed on four 'key drivers' for the country's maritime economy, their relative importance and any potential tensions between the key drivers, to understand the over-arching issues of importance affecting all maritime economy sectors. Figure 4 presents the key drivers.
- > Information collected through the structured interview questions; desktop study of published and grey literature and reports and data provided by the departments and ministries contacted was subject to a **bespoke multicriteria analysis** developed to help inform the maritime economy plan process. The multicriteria analysis was termed a **GESTER analysis** (see Table 4).
- > Traditional and emerging maritime economy sectors were subject to the GESTER of the current situation or status of the sector, considering both positive and negative aspects of the sector. The analysis served to **expose the process to basic environmental and social screening**.

The criteria against which each sector was considered are shown in Table 4. Card sorting (Figure 4) provided a series of lenses for examining different sectors. The Maritime Economy Plan was then drafted following this analysis.



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Table 4 – Multicriteria (GESTER) analysis

Criteria	What is considered/included?
Governance	Regulation, management, monitoring, enforcement, resources (human and technology)
Environment	Impacts/risks to the environment from the sector, dependency on environmental quality/risks from other sector impacts to the environment
Social	Consider gender, rural and urban, educational factors, health and safety, community issues, skills and training of workers today, access to training/education for future workforce, availability of workforce locally, loss of workforce overseas, influx of workers from overseas
Technology	Consider impacts of new technology on the sector, technology requirements for the sector, if low tech can achieve similar outcomes
Economy	The effects on the economy, or economic effects on this sector – local and global factors, resilience to economic change
Resilience & Risk	To/from natural hazards (earthquake, tsunami, extreme weather) and climate change (increase in extreme weather, sea level rise, ocean acidification, sea temperature rise), preparedness and response to events, integration across policy/government



Beach in Antigua



Which of these broad themes are most important to your future maritime economy?

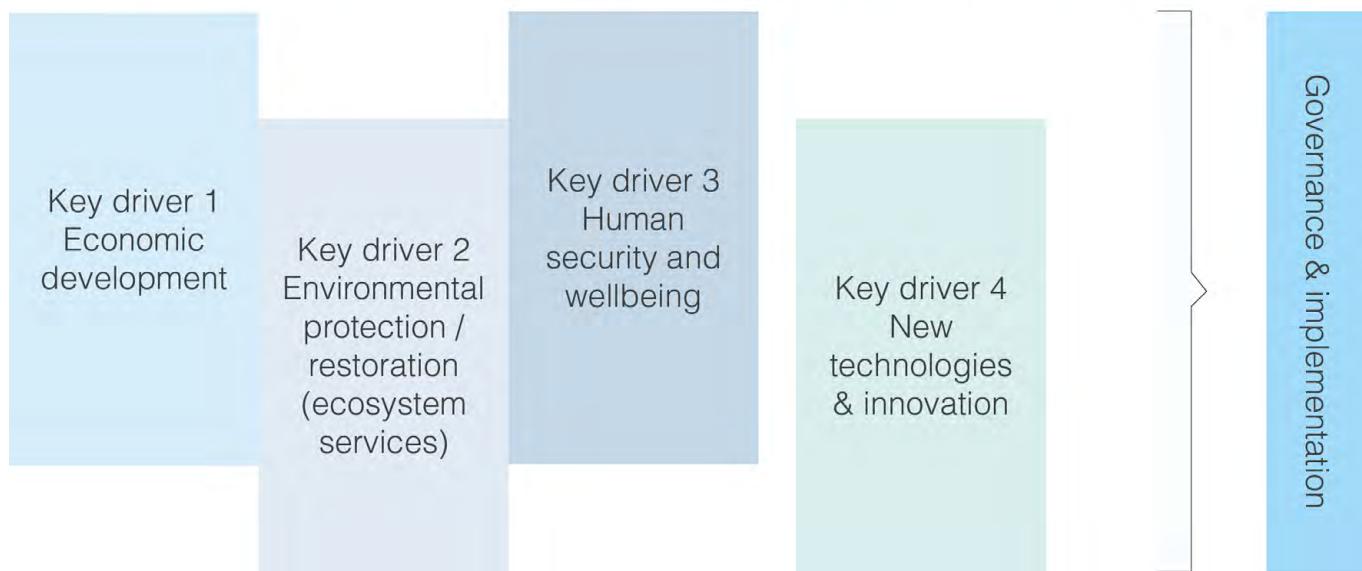


Figure 4 – Card sorting key drivers

Building a vibrant and productive maritime / blue economy may be assisted by concerted focus upon key maritime economic sectors. These sectors may then be aligned with a series of over-arching Principles that once adhered to will assist a country to follow a clear and inclusive pathway to sustainable maritime economic growth (see Figure 5).

The United Nations has adopted ocean development as part of its **Sustainable Development Goals (SDGs)**. SDG 14 aims to “*Conserve and sustainably use the oceans, seas, and marine resources for sustainable development.*” The blue economy interlinks with the majority of the SDGs including SDG5, SDG11, SDG8, SDG7 and others. Aquatic and marine resources play a crucial role in supporting maritime economic sectors. Progress towards a blue economy can help achieve a range of SDGs. In the next three pages after Figure 5, we illustrate some of the linkages between blue economy development and the 17 SDGs⁴⁴.



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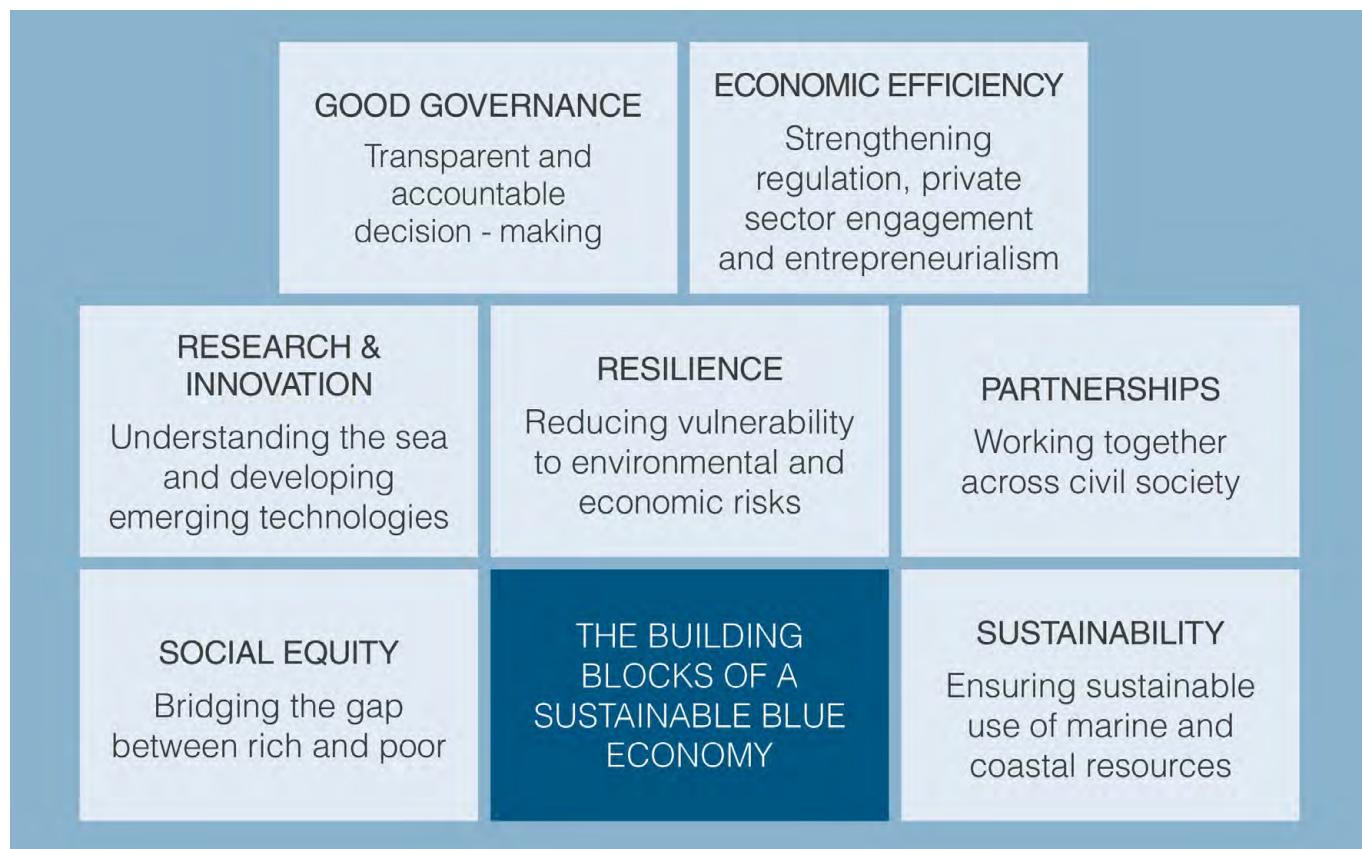


Figure 5 – Principles of a sustainable Blue economy⁴⁵



Sustainable development Goals:

- SDG 1 – No poverty
- SDG 2 – No hunger
- SDG 3 – Good health and wellbeing
- SDG 4 – Quality education
- SDG 5 – Gender equality
- SDG 6 – Clean water and sanitation
- SDG 7 – Affordable and clean energy
- SDG 8 – Decent work and economic growth
- SDG 9 – Industry innovation and infrastructure
- SDG 10 – Reduced inequalities
- SDG 11 – Sustainable cities and communities
- SDG 13 – Climate action
- SDG 14 – Life below water
- SDG 15 – Life on land
- SDG 16 – Peace, justice and strong institutions
- SDG 17 – Partnerships for the goals



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Potential positives of proper development of the Blue Economy:

SDG 1 – Improved livelihoods and employment. Investment in enterprises.

SDG 2 – Enhanced sustainable food production. Improved food distribution

SDG 3 – Improved water quality. Increased funding to health services. Improved occupational safety of seafarers

SDG 4 – Enhanced knowledge infrastructure. Increased funding for the education sector.

Skill development

SDG 5 – Increased equal rights to economic resources. Increased participation in decision making

SDG 6 – Increased funding for access to clean water and sanitation Investments in nature-based water provision services

SDG 7 – Enhanced access to renewable energy Improved knowledge base to build and maintain infrastructure

SDG 8 – Job creation. Economic diversification

SDG 9 – Increased and improved infrastructure. Technological progress

SDG 10 – Enhanced benefit distribution. Enhanced participatory engagement of all stakeholders

SDG 11 – Improved cycling, harvesting, and use of water. Cities have access to clean renewable energy

SDG 13 – Removal of inefficient fossil-fuel subsidies. Promotion of more equitable trade of goods and services

SDG 14 – Enhanced health of aquatic and marine ecosystems Increased stock abundance supporting sustainable fisheries

SDG 15 – Increased water security. Enhanced sustainable transboundary water sharing

SDG 16 – Improved governance. Promotion of continental peace and security

SDG 17 – Improved partnerships between public, private, and civil society actors. Strengthened continental cooperation



Potential negatives of improper development of the Blue Economy:

- SDG 1 – Space conflict. Marginalization
- SDG 2 – Increased food waste. Harmful commoditization of food
- SDG 3 – Pollution. Weak revenue capture at national level
- SDG 4 – Outsourcing of skilled labor. Unwillingness to invest in local training and education
- Brain drain
- SDG 5 – Increased gender disparity in wages. Proliferation of income gap
- SDG 6 – Water pollution. Destruction of nature-based water provision services
- SDG 7 – Continued incentivisation of carbon-based energy. Population displacement.
Environmental impacts
- SDG 8 – Wealth concentration. Over-reliance on quantitative growth
- SDG 9 – Environmental impacts. High dependency on technology
- SDG 10 – Business as usual. Concentration of influence
- SDG 11 – Increased pressure on freshwater. Resources Pollution
- SDG 13 – Unsustainable production practices Increased waste flows. Transition to low carbon economies. Resilience to uncertain climate future
- SDG 14 – Overexploitation of aquatic and marine resources. Environmental degradation
- SDG 15 – Nutrient pollution. Biodiversity loss
- SDG 16 – Resource conflicts. Failure to implement and enforce laws and regulations. Dutch disease and resource curse
- SDG 17 – Insufficient partnerships. Bureaucratic complexity



5. Key messages, Priorities and Actions



5. Key messages, Priorities and Actions

This section of the Plan sets out the key messages and priorities for the maritime economy of Antigua and Barbuda. It highlights the overarching messages and key drivers for the country and for each of the maritime economy sectors, taking account of the current economic activities, opportunities and risks and consultation with stakeholders.

5.1. Key messages and drivers for Antigua and Barbuda's Maritime Economy

The overarching drivers of Antigua and Barbuda's maritime economy are closely linked to the strategies and vision of the Medium-Term Development Strategy (MTDS) (2016 to 2020). Related to this is the creation of the National Ocean Policy Statement (due for completion in 2021); and then development of a National Ocean Policy that is aligned to the Eastern Caribbean Regional Ocean Policy (ECROP). The development of the NOP will help achieve the 'Sustainable Development Dimensions' (SDD)⁴⁶ in the MTDS and can be developed with the MEP actions in mind as this process progresses, with the input of the NOGC.

It is recognised that the best development results for all citizens of Antigua and Barbuda cannot be accomplished by focusing on purely economic issues. Success is inextricably linked to creating a cohesive and secure society, coupled with a sustainable and healthy natural environment. This will only be achieved through a sustainability framework based on four interlinked dimensions: optimal generation of national wealth (SDD1), enhanced social cohesion (SDD 2), improved health of the natural environment and sustained historical and cultural assets (SDD 3), and enhanced citizen security (SDD 4).

- > An **integrated approach** across Ministries and Departments is required to effectively manage, protect and enhance the marine area and to take advantage of opportunities for the sustainable development of the maritime economy. Establishment of a **Blue Economy Department** within MoSTBE will help to act as a driver and focal point for the continued development and expansion of the concept of the blue economy; to co-ordinate and develop co-operation on blue economy actions across government, departments and communities to integrate the blue economy into the existing organisational framework and close the 'blue economy transition gap'.
- > **Tourism** is the most important economic sector, supporting over 50% GDP and 46% employment. Travel earnings account for 40% of total exports of goods and services. Although the economy is highly reliant on this sector (making it potentially vulnerable to changes in the market), the tourism offering is diverse with potential to expand / diversify further.
- > **Coastal infrastructure** (marinas, jetties, etc.), **businesses** (fishing) and **communities** are vulnerable to extreme weather events. Antigua and Barbuda lacks in-country engineering expertise for coastal developments and coastal protection / assessment, including 'soft engineering' and natural coastal protection and environmental restoration's role in coastal protection.

- > **Fishing remains an important bedrock sector** that provides employment and contributes approximately 2% GDP. Fishing is mostly small-scale, artisanal and an important domestic food source. The majority of registered fishing vessels are not active and fishers shift between fishing and construction depending on the availability of jobs, which may affect stock management. The lack of inshore fisheries management specific to Antigua and Barbuda is limited. Imports of fish products are high, as it is not always possible to meet demand nationally.
- > Use of Antigua and Barbuda's marine area is concentrated in certain areas – **there is a large ocean space for opportunities**. Activities (tourism, port infrastructure and services, desalination and habitat protection) are almost exclusively coastal. Fisheries are confined to shallow banks or the margins of the banks or continental shelf. There are currently no designated shipping lanes through the waters of Antigua and Barbuda except on the approaches to harbours. The area of the EEZ to the west and south west of the islands and the deeper waters that make up the majority of the EEZ are largely devoid of activity (apart from some shipping).
- > Legislation relating to the development of a maritime economy, the management and control of marine space and environmental protection exists in Antigua and Barbuda. Implementation of legislation falls under the remit of multiple agencies. There are **gaps in legislation**, but there is no strategic picture of where legislative improvements are needed to support individual implementing agencies but also to facilitate coordination of actions to improve overall ocean governance.
- > **Training, education and research** is required to support the development of the blue economy. This is needed to investigate the potential for new / developing sectors e.g. aquaculture, but also to raise awareness of the blue economy concept and the range of opportunities for employment in these sectors. UWI and the new Centre of Excellence for Oceanography and the Blue Economy provide opportunities for research and higher / further education. Schools, vocational training and on-going career development training provides further opportunities to support skills development.



5.2. Priorities

The priorities here are cross-sectoral and identify where actions are required to move towards a sustainable blue economy. Priorities are compatible with the developing NOP, relevant international treaties and the ECROP. Relevant priorities are shown below:

- > Attaining macro-economic stability (including addressing fiscal and financial sector sustainability) and improving fiscal space for the financing of other development efforts.
- > Improving the efficiency of the public service and strengthening the planning, budgeting and implementation framework.
- > Renewing and upgrading critical infrastructure, especially sea ports and airports, and improving waste disposal systems as foundation elements to repositioning the tourism sector and enhancing its competitiveness regionally and internationally.
- > Attracting investments for the renewal, upgrade and expansion of the tourism infrastructure.
- > Other measures deemed critical for the repositioning of the tourism industry.
- > Increasing access to housing as an important catalyst for poverty reduction and improved social cohesion.
- > Improving efficiency by reengineering business processes and enhancing governance. In this regard, there will be particular emphasis on enhancing efficiency and governance in the public sector.
- > These priorities and themes are picked up in many of the actions identified for maritime economy sectors in section 5.3.

Priority One: A strong tourism industry as an economic anchor

The aim is to reposition Antigua and Barbuda as a premier world class destination that is sufficiently differentiated from other destinations.

Priority Two: Better utilisation of the marine area

Develop options and expand existing efforts to explore new opportunities to make more use of the marine space and resources. New opportunities could include the generation of energy from ocean currents, wave motion and temperature differences as well as exploration and sustainable extraction of minerals.

Priority Three: Improve collaboration to support the Blue Economy

A Cabinet endorsed NOP will help create the required policy framework to deliver coordinated action on marine management, including this MEP. The formally established National Ocean Governance Committee (NOGC) will help improve linkages between current policies and plans and across Ministries with responsibilities for marine management, protection and economic development. The establishment of a **Blue Economy Department** within MoSTBE will help to act as a driver and focal point for the integration of the blue economy concept across government and beyond to the communities of Antigua and Barbuda.

Review the recommendations and actions set out in this MEP to ensure guidance specific to Antigua and Barbuda can be prepared and disseminated for inter-departmental mainstreaming into sectoral work plans. Guidance should be articulated in a way that it is understood and able to be incorporated into departmental business with minimal impact.



Priority Four – Adopting an Island Systems Management approach

An integrated approach to planning and decision making at the island level, taking a ridge to reef, or Islands Systems Management (ISM) approach is essential to ensure that activities taking place in Antigua and Barbuda do not adversely impact the wider marine environment, or other maritime economy sectors.

The current regulatory system of marine environmental management and requirements of the MTDS (2016 - 2020) should be reviewed, gaps identified, and actions taken to improve the regulations. This will help provide the basis for the coordinating mechanism with ICZM to provide a link between land and marine planning in Antigua and Barbuda that embraces climate and disaster resilience.

To this end, the NOGC must ensure that any future Marine Spatial Plans and / or Coastal Master Plans contain tangible actions to support the principles of the NOP as it is developed. Such plans will need to be compatible with and cognisant of the need to ensure that inappropriate types of development are not permitted in those areas most vulnerable to coastal change, or to flooding from coastal waters, while also improving resilience of existing developments to long term climate change. Robust, high quality EIA and implementation of planning decisions is needed to support and ensure actions take place on the ground.

The proposed National Ocean Policy for Antigua and Barbuda, which will update the draft national Maritime Policy, will act as planning policy guidance to link between future Marine Spatial Plans and existing and future land-use plans. This MEP can support the development of the NOP and could be fully integrated into the Policy, be adopted as a supporting appendix, or remain a stand-alone document to be reviewed and updated separately. How this MEP can best support the NOP and be used effectively by Antigua and Barbuda will be a decision for the NOGC. The NOGC will need to work in partnership with MoSTBE and not undertake this alone.



Port of St. John's



Priority Five: Promotion of environmental stewardship

As the marine environment of Antigua and Barbuda is extremely rich and varied, and underpins the tourism sector and fisheries, every effort is needed to ensure that management and development of maritime economy sectors in the marine area do not undermine the provision of vital ecosystem goods and services. Sustainable management of the marine area is fundamental to supporting sustainable development and ensuring social and economic benefits for all.

A natural capital evaluation of Antigua and Barbuda's marine and coastal environment may be beneficial to help understand the value of marine ecosystem services overall and inform decision making and marine management.

5.3. Action Plans

Actions, primary actors and desired outcomes are presented for each maritime economy sector in the following pages. Recommendations and actions have been drafted to be relevant and applicable to both women and men, and to all of Antigua and Barbuda's communities. Key messages and recommendations that could provide opportunities for women are highlighted. Each sector is given a prioritisation for action based on the categorisation below.

■	This work is urgent. It is critical to both GDP and /or Antigua and Barbuda's ability to adapt to climate change.
●	This work is new / needs attention. Sustainably developing it further now would help to build a future sustainable maritime economy 'game changer' for Antigua and Barbuda.
▲	This work is well established and already very important to Antigua and Barbuda's sustainable maritime economy. Attention to implementation plan suggestions will further strengthen the sector.



Shirley Heights, Antigua view

5.3.1. Coastal Development

Status – Bedrock (Established)



SUGGESTED PRIORITY

This work is urgent. It is critical to both GDP and / or the ability to adapt to climate change

The coastal area of Antigua and Barbuda is vulnerable to climate change effects and extreme weather events, with an urgent need to ensure that future and existing development is planned in a way to mitigate and adapt to ensure resilience. There is a desire to increase development in the coastal area to support government policy associated with sustainable tourism and infrastructure.

Key messages:

- > Consider updating and formalising development guidelines to promote resilient coastal structures and marine infrastructure. This is important as much of the national housing is located in, or near known or defined disaster risk areas. This is a major cause for concern, particularly as many structures (prior to Hurricane Irma in September 2017) were not built to hurricane or seismic-resistant specifications. Unplanned developments continue to escalate despite Government's interventions to regularise this practice. There are concerns that some coastal developments are being progressed without issues being given proper consideration in EIAs, or EIAs not being given appropriate weight in the balance of decision making. There is a need for the importance of development control to be mainstreamed across government and beyond – to communities and developers.
- > Create new advisory notes on how to mainstream Disaster Risk Reduction Management (DRRM) and Climate Change Adaptation (CCA) into construction in the coastal and marine environment.
- > Demonstrate the benefits of coastal ecosystem restoration and rehabilitation through adoption of an ecosystem-based approach, to increase the resilience of communities and key coastal resources.
- > Consider all relevant climate resilience or coastal management plans or policies when developing any coastal or marine spatial plans.
- > Ensure that policy and regulatory delivery is integrated between relevant ICZM policy and the future NOP.
- > There is no national coastal engineering resource. As a result, there is also no strategic level prioritisation of coastal risk areas or coastal protection schemes. Previous funding programmes have provided short term training but there is a lack of established courses to offer this as a career opportunity.
- > Consideration should be given to banning all marine sand extraction due to its potential to adversely influence shoreline resilience to flooding and combat the adverse effects of climate change, as well as its potential to adversely affect the tourism sector.

Improving the guidance on development control and resilient development in the coastal area and the adherence to such guidance through training and capacity building to regulate and enforce planning and development is imperative to achieve sustainable coastal development.

Coastal Development Implementation Pathway

Suggested Strategic Requirement – Any future NOP should support and continue to build on the plans and policies to work towards sustainable coastal development and realise the full value for Antigua and Barbuda's economy, society and natural environment.

Track 1 – Manage the increasing risk of coastal hazards through climate resilient policies, plans and management of the coast.

Primary Issue(s): Need to review and update existing and future climate resilient policies, plans and management policies of the coastal zone that may be in place.

Primary Actors: Chief Town & Country Planner – Development Control Authority (DCA). National Office of Disaster Services. Ministry of Housing, Lands and Urban Renewal, ADOMS. The suggested timescale for this Track is 1 to 3 years.

Track 2 – Develop and implement national systems of coastal and spatial planning to improve planning and control of coastal development and integration of EIA.

Primary Issue(s): Need to raise awareness of the importance of EIA. Training and resource improvements for assessment and enforcement.

Primary Actors: Chief Town & Country Planner – DCA. Ministry of Public Utilities, Civil Aviation, Transportation and Energy. NPA, DoE.

The suggested timescale for this Track is 3 to 5 years.

Track 3 – Maximize the benefits of restoring and conserving coastal ecosystems to increase the resilience of communities and key assets using Ecosystem-Based Adaptation.

Primary Issue(s): Training / capacity / awareness raising for current / future staff for monitoring, valuation, assessment and restoration of coastal capital.

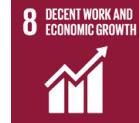
Primary Actors: Marine Ecosystem Protected Areas Trust Inc. NPA, CCCCE, EAG, DoE, schools

The suggested timescale for this Track is 5 to 10 years.

Desired Outcomes – Protection of life, property and ecosystem services

5.3.2. Shipping and Ports

Status – Bedrock (Established)



SUGGESTED PRIORITY

 This work is well established and already very important to Antigua and Barbuda's sustainable maritime economy. Attention to implementation plan suggestions will further strengthen the sector.

Antigua and Barbuda's ports and shipping operations may be vulnerable to stronger El Niño patterns, increased frequency and intensity of storms, damaging infrastructure and disrupting routines. Changes in fuels and other mechanisms to lower ships' emissions to air need to be introduced.

Key messages:

Facilities capable of catering for cruise-ships and large numbers of pleasure craft are important to capture foreign currency and support the tourism industry.

The lack of data on employment in maritime transport, ports and supporting sectors (e.g. cargo handling, maintenance and servicing of leisure craft, cruise support sector) is underestimating the importance of this sector to the economy.

Leisure / yacht and cruise traffic is predicted to increase and is being encouraged to grow the tourism sector. The requirements needed to support this growth sustainably need to be considered strategically, including:

Port / harbour and onshore infrastructure and facilities to support the growth e.g. potential new shipping routes, berthing facilities, accommodation, transport, need for increased cargo / shipping, etc.

Ability of existing and future port / harbour facilities to increase resilience to / adapt to climate change as they are developed / expand.

Spatial, social and environmental impacts of predicted increases and the need to manage / mitigate these. This includes both terrestrial and marine issues, such as navigational safety, access to areas for other activities (e.g. fishing), conservation and management (e.g. MPAs, reefs, etc.).

Capacity building for Governmental staff to strategically plan, manage, monitor and enforce port / harbour development, operation and navigation (e.g. ADOMS, NPA). This requires staff, training and equipment.



Shipping and Ports Implementation Pathway

Suggested Strategic Requirement – Shipping and ports play an important role in supporting the activities taking place within the marine environment of Antigua and Barbuda.

Track 1 – Maintain effective maritime situational awareness, coordinated compliance and enforcement capability to secure, exercise and protect rights and jurisdiction over marine areas and resources.

Primary Issue(s): Need to create a National Ocean Policy that protects the rights and jurisdiction of marine areas and resources.

Primary Actors: ADOMS, Port Authority, Antigua & Barbuda Defence Force (Coast Guard).

The suggested timescale for this Track is 1 to 3 years.

Track 2 – Develop the capabilities of Antigua & Barbuda to cater for cruise ships and leisure vessels.

Primary Issue(s): Growing need to initiate projects to construct facilities for cruise terminal passengers etc.

Primary Actors: ADOMS, Ministry of Tourism, Port Authority and National Parks.

The suggested timescale for this Track is 3 to 5 years.

Track 3 – Develop a strategy to enhance capacity-building and training.

Primary Issue(s): Demand for marine jobs in line with international standards and national needs. (ADOMS seeking new Satellite Campus of the Caribbean Maritime Institute).

Primary Actors: Antigua and Barbuda Dept. of Marine Services and Merchant Shipping (ADOMS), Port Authority and National Parks.

The suggested timescale for this Track is 5 to 10 years.

Desired Outcomes – Implementation of specific maritime transport related policies as defined within an overarching National Ocean Policy for Antigua and Barbuda (post 2020)



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5.3.3. Fisheries

Status – Bedrock (Established)

SUGGESTED PRIORITY

 This work is well established and already very important to Antigua and Barbuda's sustainable maritime economy. Attention to implementation plan suggestions will further strengthen the sector.

Fishing has become an increasingly important source of employment since the decline of agriculture. Currently, limited facilities exist for processing, ice production and storage, which can result in post-harvest loss when these facility services are not available or inaccessible to fishers.

Key messages:

- > Resources are required for data collection on fish stock health, management and enforcement. This would support both the inshore fleet and sustainable development of sport fishing to support tourism development. This would support the continued MSC accreditation, Blue Halo and Steward Fish programmes to demonstrate the sustainability of fisheries and potentially increase revenue from catches. The economic benefits of accreditation should be fully assessed.
- > Antigua and Barbuda suffers from some of the highest rates of ciguatera poisoning in the Caribbean. The prevalence of ciguatoxins limits economic potential and increases pressure on other fish stocks. A ciguatoxin management programme for the area would help to develop new fishing opportunities and reduce serious health impacts from intoxication.
- > There are national fisheries legislation and fisheries management in place, including Marine Reserves at Cades Reef and Diamond Reef where fishing is prohibited and the North East Marine Management Area, which incorporates fishing management zones. However, integration of fisheries management with other sectoral issues, including protected areas management, could be improved. The installation of Fish Aggregating Devices (FADs) has led to significant increase in catches of large migratory pelagic fish.
- > **Sargassum** management is a cross-cutting issue affecting fisheries, tourism, ports and harbours. Collaboration is needed across government and sector participants to address this. **Sargassum** is an issue that is greater than Antigua and Barbuda. Finding the source of and the solutions to the issues posed by Sargassum are most appropriately dealt with at a **regional level** as they are likely to be outside of Antigua and Barbuda (and the Caribbean) and beyond Antigua and Barbuda's immediate and direct control. Engagement with regional Caribbean / international projects is required.
- > Lionfish presents a potential market development opportunity, as does improving the value chain, increasing value added and sales into higher value tourism / restaurant sector.

Fisheries Implementation Pathway

Suggested Strategic Requirement – Economic opportunities that consider fisheries should be developed in a sustainable manner to realise the full value for Antigua and Barbuda's economy, society and natural environment.

Track 1 – Improve fisheries management, stock assessments and human and equipment needs. Improve cooperation across Govt. to benefit natural resource management and economic opportunities.

Primary Issue(s): Need to improve capacity in data acquisition, monitoring control and surveillance; and collation / management of data.

Primary Actors: Ministry of Agriculture, Fisheries and Barbuda Affairs. Antigua and Barbuda Sport Fishers Association, DoE. Coastguard and NOGC.

The suggested timescale for this Track is 1 to 3 years.

Track 2 – Manage the impact of human activity on ecosystem goods & services, ensuring biological diversity and the sustainable use of marine resources. Address shared issues of Sargassum, Lionfish and INNS.

Primary Issue(s): Improve links with other sectors for more integrated management of resources & challenges.

Primary Actors: MAFBA, DoE, Caribbean Network of Fisherfolk Organisation, NPA, DoE, Ministry of Tourism.

The suggested timescale for this Track is 3 to 5 years.

Track 3 – Formalise maritime boundaries to secure, exercise and protect rights and jurisdiction over marine areas and resources.

Primary Issue(s): Capacity gaps and opportunities currently apparent for well trained maritime administrators on UNCLOS.

Primary Actors: Ministry of Agriculture, Fisheries and Barbuda Affairs. Coastguard and NOGC

The suggested timescale for this Track is 5 to 20 years.

Track 4 – Develop and implement ocean governance training programme including MPA management, fisheries management and marine spatial planning.

Primary Issue(s): Capacity gaps and opportunities that exist to improve training for fisheries managers and natural resource managers.

Primary Actors: Ministry of Agriculture, Fisheries and Barbuda Affairs, NPA, DoE. Coastguard.

The suggested timescale for this Track is 1 to 3 years.

Track 5 – Encouraging fishing fleet to target lionfish as a food fish and develop the route to market for lionfish (domestic). Consider niche products (e.g. jewelry) that provide opportunities for women.

Primary Issue(s): Invasive lionfish management action nationally and regionally.

Primary Actors: Ministry of Agriculture, Fisheries and Barbuda Affairs. Antigua & Barbuda Sport Fishers Association, other Caribbean countries.

The suggested timescale for this Track is 3 to 5 years.

Desired Outcomes – The Government remains committed to the conservation and sustainable use of fisheries resources for the benefit of all the people of Antigua & Barbuda

5.3.4. Aquaculture & Mariculture

Status – Bedrock (Not Established)



SUGGESTED PRIORITY

This work is new / needs attention. Sustainably developing it further now would help to build a future sustainable maritime economy ‘game changer’ for Antigua and Barbuda.

There has been no reported commercial aquaculture production in Antigua and Barbuda for the last decade and there is only one marine finfish project in the country. Aquaculture is currently a low government priority, but there is opportunity to grow.

Key messages:

- > There has been a recent focus on aquaponics linked to the growing tourism sector (Ministry of Agriculture Fisheries and Public Affairs, Pers. Comm. July 2019). This system uses a combination of aquaculture with hydroponics as a symbiotic environment between the plants and animals.
- > Data collection and feasibility work is needed to help determine locations, techniques and what species would be commercially viable to support the sustainable development of this sector.
- > The location and potential impacts of operations should be considered in any decisions about where to locate new aquaculture developments. This links to the more general need for coastal development guidance and an Island Systems Management (ISM) approach to planning and decision making.



Aquaculture & Mariculture Implementation Pathway

Suggested Strategic Requirement – Explore the potential for aquaculture and mariculture development in Antigua and Barbuda in line with the principles and goals set out clearly in a future National Ocean Policy.

Track 1 – Feasibility assessment to determine location, species and market for aquaculture / mariculture industries.

Primary Issue(s): Lack of information on the mariculture / aqua culture sector and market potential.

Primary Actors: Ministry of Agriculture, Fisheries and Barbuda Affairs. Caribbean Network of Fisherfolk Organisation.

The suggested timescale for this Track is 1 to 3 years.

Track 2 – Update National Fisheries Policy and supporting legislation to support mariculture line with findings from Track 1.

Primary Issue(s): Legislative review and regulatory updates are required as part of an updated National Ocean Policy.

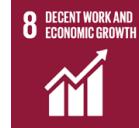
Primary Actors: Ministry of Agriculture, Fisheries and Barbuda Affairs.

The suggested timescale for this Track is 3 to 5 years.

Desired Outcomes – Use more of the marine space of Antigua and Barbuda sustainably for the benefit of all people. Opportunities outside of fisheries and tourism that complements / supports these sectors.

5.3.5. Tourism

Sector Status – Bedrock (Established)



SUGGESTED PRIORITY



This work is well established and already very important to Antigua and Barbuda's sustainable maritime economy. Attention to implementation plan suggestions will further strengthen the sector.

Accelerating economic growth in Antigua & Barbuda relies on the development and competitiveness of the tourism industry on a healthy and resilient marine environment.

Key messages:

- > The tourism industry is both dependent on, and poses a risk to, the marine environment. An integrated Island Systems Management (ISM) approach and integration with EIA, planning and mainstreaming of DRRM / climate resilience into decision making is important to deliver tourism policy aims sustainably, particularly on Barbuda / to achieve the MTSD aims. The importance of EIA in coastal development planning and control decision making needs to be raised more widely and actively included to inform evidence based decisions.
- > *Sargassum* management is a cross-cutting issue affecting fisheries, tourism and ports / harbours. Collaboration is needed across government and sector participants to address this. This should link to more general need for an Invasive Non-Native Species (INNS) management planning. *Sargassum* is an issue that is greater than Antigua and Barbuda. Finding the source of and the solutions to the issues posed by *Sargassum* are most appropriately dealt with at a regional level as they are likely to be outside of Antigua and Barbuda (and the Caribbean) and beyond Antigua and Barbuda's immediate and direct control. Engagement with regional Caribbean / international projects is required.
- > Tourism as an industry offers potential employment opportunities to women and communities outside of traditional sectors / locations. The tourism strategy requires an update. This should link to / recognise the MTDS priorities.
- > Consideration and management of the carrying capacity of the marine, coastal and terrestrial environments in planning and managing the demand for new tourism services or activities and targeted increases in visitor numbers is needed.
- > Natural capital valuation of marine tourism ecosystems and interactive Climate Smart public awareness activities will support ISM and sustainable tourism development.
- > Water quality poses a potential risk to sustainable tourism development by posing risks to environmental and human health. Water quality monitoring and improvements are required to meet regional / international standards for recreational water quality and to reduce the risk to ecosystems and food fisheries.

The tourism industry is both dependent on, and poses a risk to, the marine environment. Sustainable tourism and recreation can only thrive with a well-managed, healthy and safe marine environment.

Tourism Implementation Pathway

Suggested Strategic Requirement – Tourism continues to be a major contributor to blue economic growth with decision making based on data and information supporting sustainable policies.

Track 1 – Develop and implement national systems of coastal and marine spatial planning to support sustainable tourism development at the coast / marine area.

Primary Issue(s): Inadequate control of development at the coast. Lack of climate / disaster resilient developments. Risk to people, environment and livelihoods.

Primary Actors: Chief Town & Country Planner – Development Control Authority (DCA). Ministry of Tourism and Investment. National Hydrographic Office.

The suggested timescale for this Track is 1 to 3 years.

Track 2 – Manage the risk of coastal hazards and climate change.

Primary Issue(s): Lack of compliance with National Adaptation Plans, ICZM.

Primary Actors: DoE, Ministry of Tourism and Investment.

The suggested timescale for this Track is 3 to 5 years.

Track 3 – Integrated infrastructure needs assessment for strategic tourism development, incl. transport, accommodation, sanitation, electricity, water, resilience and EIA.

Primary Issue(s): Lack of resource / training for current and future staff. Possible regional approach to HFE and CPD for all Caribbean countries.

Primary Actors: DCA, Ministry of Education, Ministry of Tourism and Investment.

The suggested timescale for this Track is 3 to 5 years.

Track 4 – Understand the state of the marine environment, both nationally and regionally, from a tourism development perspective.

Primary Issue(s): Lack of effective and coordinated monitoring, with no strategy for future research or data collection activities.

Primary Actors: Department of Environment. Ministry of Tourism and Investment. Antigua & Barbuda. Tourism Authority. Development Control Authority.

The suggested timescale for this Track is 1 to 10 years.

Track 5 – Identify, promote and support opportunities for increasing the health and wellbeing benefits of the coast to citizens.

Primary Issue(s): Poor ICZM related planning guidance in place to establish and ensure access to beaches and the coastal zone is sustained into development planning.

Primary Actors: Ministry of Tourism and Investment. Ministry of Health, Wellness and The Environment.

The suggested timescale for this Track is 1 to 10 years.

Desired Outcomes – A climate resilient and sustainable tourism sector. A trained, skilled workforce to plan and manage sustainable tourism development.

5.3.6. Energy (including Renewable Energy)



Bedrock (Diesel Import). Emerging (Renewable Energy)

SUGGESTED PRIORITY

 This work is well established and already very important to Antigua and Barbuda's sustainable maritime economy. Attention to implementation plan suggestions will further strengthen the sector.

On a global scale Offshore Renewable Energy (ORE) is attracting great technology and project development interest. Small islands can make strong cases for piloting new technologies or showcasing new technological solutions, attracting investors and sponsors.

Key messages:

- > The Government recognises the importance of renewable energy and energy efficiency in reducing costs for the country and supporting the strategically important tourism industry. The Government seeks to harvest the country's considerable wind and solar energy and establish Barbuda as a model for 100% sustainable 'green energy' development.
- > In 2010 the Government carried out an assessment of potential opportunities for renewable energy. Offshore renewables are deemed of minor importance in the country and onshore renewables are concluded as being much cheaper, with large opportunity to increase supply from large and small scale solar and onshore wind. At a national level, the priority should be focussed on improving energy efficiency and low carbon energy generation. The Ministry of Energy is focussing on grid load flow, stability, energy efficiency and increasing solar energy.
- > Renewable energy generation equipment may be badly damaged by natural events and unable to contribute to national requirements for some time, following a disaster, thus reinforcing the country's dependence on fossil fuels. Hurricanes and storms are limiting factors for future offshore energy generation in Antigua and Barbuda.
- > This is a terrestrially driven priority but will support the development of the maritime economy. There is a key link with the maritime economy in increasing alternatives to Liquefied Petroleum Gas (LPG) and hydrocarbon fuels for shipping.

There are opportunities for marine renewables, but the focus of low carbon, low cost energy generation should be a terrestrial-driven policy priority.



Energy Implementation Pathway

Suggested Strategic Requirement – The Sector is in total compliance with the CARICOM Energy Policy and the Caribbean Sustainable Energy Roadmap and Strategy (C-SERMS)

Track 1 – Continued research and development and investment (as nationally determined through a new NOP) into renewable energy technologies and encourage energy efficiency.

Primary Issue(s): Commitment and private sector engagement into the energy portfolio.

Primary Actors: Ministry of Public Utilities, Civil Aviation and Energy.

The suggested timescale for this Track is 1 to 10 years.

Track 2 – The National Energy Policy is updated to clearly set out the direction of energy policy, based on the assessment of renewables potential (2010).

Primary Issue(s): Commitment and private sector engagement into the energy portfolio.

Primary Actors: Ministry of Public Utilities, Civil Aviation and Energy

The suggested timescale for this Track is 1 to 10 years.

Desired Outcomes – Reduced reliability on fossil fuels in Antigua & Barbuda.

Energy security for all citizens and businesses.

5.3.7. Biopharma

Status - Emerging (Not Established)



SUGGESTED PRIORITY

This work is new / needs attention. Sustainably developing it further now would help to build a future sustainable maritime economy ‘game changer’ for Antigua and Barbuda.

Biopharma is not a priority development area. It is not likely to be a significant economic development opportunity in Antigua and Barbuda.



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Biopharma Implementation Pathway

Suggested Strategic Requirement – Consideration of biopharma is incorporated in a (future) new National Ocean Policy.

Track 1 – Include supporting research into biopharma as part of a new marine research agenda for Antigua & Barbuda.

Primary Issue(s): No clear strategy or research agenda is defined for this sector.

Primary Actors: Ministry of Information, Broadcasting, Telecoms & Information Technology. Ministry of Education, Science & Technology. Department of Environment.

The suggested timescale for this Track is 1 to 3 years.

Track 2 – Creation of a new National Ocean Policy that embraces supporting future research as a policy goal.

Primary Issue(s): Need to align new National Ocean Policy with revised ECROP (2019).

Primary Actors: Antigua & Barbuda Department of Marine Services and Merchant Shipping – (ADOMS)

The suggested timescale for this Track is 1 to 3 years.

Desired Outcomes – Recognition and inclusion of biopharma as a potential maritime sector in a (future) new National Ocean Policy.



5.3.8. Ecosystem Services

Status – Emerging (Not Established)



SUGGESTED PRIORITY

This work is new / needs attention. Sustainably developing it further now would help to build a future sustainable maritime economy ‘game changer’ for Antigua and Barbuda.

While ecosystem services are ubiquitous and support both bedrock and emerging maritime economy sectors, their integration into decision making and attempts to quantify their value, are not yet mainstreamed. They are therefore described as ‘emerging’.

Key messages:

- > Ecosystem services underpin the tourism industry, which is fundamentally important to the economy of Antigua and Barbuda. The sector also puts pressure on these ecosystem services from activities such as coastal development, water use, waste / waste water disposal, accidental / deliberate damage. An integrated ISM approach and integration with EIA, planning and mainstreaming of DRRM / climate resilience into decision making is important to deliver tourism policy aims sustainably and ensuring that all sectors are given sufficient consideration in the decision making process.
- > Natural capital valuation is needed to understand the value of ecosystem goods and services and use this information to inform decision making.
- > Ensure that any coastal or marine spatial planning process aligns with existing mechanisms by considering areas and features of importance for nature conservation and wider biodiversity in developing policies and locations for other marine activities, and in permitting new development.
- > Take account of existing spatial management for conserving biodiversity and comply with obligations associated with them.
- > Protecting & enhancing ecosystem services will help deliver nature-based solutions to climate change.

The value of ecosystem services needs to be better understood and incorporated into decision making.



Ecosystem Services Implementation Pathway

Suggested Strategic Requirement – Ensure that marine and coastal ecosystems are sustainably managed and protected to minimise adverse impacts, including strengthening their resilience, and take action for their restoration, to achieve healthy and productive oceans.

Track 1 – Additional information required to support policies and strategies to enhance ecosystem service delivery.

Primary Issue(s): There is no data for the a number of ecosystem services of relevance to A&B current economic sectors.

Primary Actors: Marine Ecosystem Protected Areas Trust Inc. NPA, EAG, DoE.

The suggested timescale for this Track is 1 to 3 years.

Track 2 – Manage impacts to coastal / marine ecosystems through ISM / EIA and planning processes influencing decision making.

Primary Issue(s): Concerns that coastal developments are being progressed without robust EIAs, or EIAs are not given appropriate weight during decision making.

Primary Actors: Development Control Authority (DCA). Central Housing and Planning Authority (CHAPA), DoE.

The suggested timescale for this Track is 3 to 5 years.

Track 3 – Ensure that land and marine based sources of pollution are effectively monitored and controlled in line with national, regional and international commitments.

Primary Issue(s): Often EIAs for new developments fail to consider land and marine based pollution sources and how impacts need to be monitored and mitigated with suitable measures.

Primary Actors: Development Control Authority (DCA). Central Housing and Planning Authority (CHAPA), DoE.

The suggested timescale for this Track is 5 to 10 years.

Desired Outcomes – Ecosystem Based Management principles from the revised ECROP (2019) should be embraced by NOGC and included in an updated Maritime Policy / future National Ocean Policy.

5.3.9. Summary of all recommended actions

The table below summarises the recommended actions and outcomes for all the maritime economy sectors in Antigua and Barbuda.

Sector	Priority	Actions	Outcomes
Coastal development 	This work is urgent. It is critical to both GDP and / or the ability to adapt to climate change.	<ul style="list-style-type: none"> > Manage the increasing risk of coastal hazards through climate resilient policies, plans and management of the coast > Develop and implement national systems of coastal and spatial planning to improve planning and control of coastal development and integration of EIA > Maximise the benefits of restoring and conserving coastal ecosystems to increase the resilience of communities and key assets using Ecosystem-Based Adaptation 	<ul style="list-style-type: none"> > Protection of life, property and ecosystem services
Shipping and ports 	This work is well established and already very important to Antigua and Barbuda's sustainable maritime economy. Attention to implementation plan suggestions will further strengthen the sector.	<ul style="list-style-type: none"> > Maintain effective maritime situational awareness, coordinated compliance and enforcement capability to secure, exercise and protect rights and jurisdiction over marine areas and resources > Develop the capabilities of Antigua & Barbuda to cater for cruise ships and leisure vessels > Develop a strategy to enhance capacity-building and training 	<ul style="list-style-type: none"> > Implementation of specific maritime transport related policies as defined within an overarching National Ocean Policy for Antigua and Barbuda



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Sector	Priority	Actions	Outcomes
Fisheries 	<p>This work is well established and already very important to Antigua and Barbuda's sustainable maritime economy. Attention to implementation plan suggestions will further strengthen the sector.</p>	<ul style="list-style-type: none"> > Improve fisheries management, stock assessments and human and equipment needs. Improve cooperation across Government to benefit natural resource management and economic opportunities > Manage the impact of human activity on ecosystem goods and services, ensuring biological diversity and the sustainable use of marine resources. Address shared issue of Sargassum, Lionfish and other INNS > Formalise maritime boundaries to secure, exercise and protect rights and jurisdiction over marine areas and resources > Develop and implement ocean governance training programme including MPA management, fisheries management and marine spatial planning > Encourage fishing fleet to target lionfish as a food fish and develop the route to market for lionfish (domestic). Consider niche products (e.g. jewellery) that provide opportunities for women 	<ul style="list-style-type: none"> > The Government remains committed to the conservation and sustainable use of fisheries resources for the benefit of all the people of Antigua and Barbuda



Sector	Priority	Actions	Outcomes
Aquaculture and mariculture 	This work is new / needs attention. Sustainably developing it further now would help to build a future sustainable maritime economy 'game changer' for Antigua and Barbuda.	<ul style="list-style-type: none"> > Feasibility assessment to determine location, species and market for aquaculture / mariculture industries > Update National Fisheries Policy and supporting legislation to support mariculture in line with findings from the feasibility study 	<ul style="list-style-type: none"> > Use more of the marine space of Antigua and Barbuda sustainably for the benefit of all people > Opportunities outside of fisheries and tourism that complements / supports these sectors
Tourism 	This work is well established and already very important to Antigua and Barbuda's sustainable maritime economy. Attention to implementation plan suggestions will further strengthen the sector.	<ul style="list-style-type: none"> > Develop and implement national systems of coastal and marine spatial planning to support sustainable tourism development at the coast / marine area > Manage the risk of coastal hazards and climate change > Integrated infrastructure needs assessment for strategic tourism development, incl. transport, accommodation, sanitation, electricity, water, resilience and EIA > Understand the state of the marine environment, both nationally and regionally, from a tourism development perspective > Identify, promote and support opportunities for increasing the health and wellbeing benefits of the coast to citizens 	<ul style="list-style-type: none"> > A climate resilient and sustainable tourism sector > A trained, skilled workforce to plan and manage sustainable tourism development



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Sector	Priority	Actions	Outcomes
Energy (incl. Renewable energy) ▲	This work is well established and already very important to Antigua and Barbuda's sustainable maritime economy. Attention to implementation plan suggestions will further strengthen the sector.	<ul style="list-style-type: none"> > Continued research and development and investment (as nationally determined through a new NOP) into renewable energy technologies > The National Energy Policy is updated to clearly set out the direction of energy policy, based on the assessment of renewables potential (2010) 	<ul style="list-style-type: none"> > Reduced reliability on fossil fuels in Antigua and Barbuda > Energy security for all citizens and businesses
Biopharma ●	This work is new / needs attention. Sustainably developing it further now would help to build a future sustainable maritime economy 'game changer' for Antigua and Barbuda.	<ul style="list-style-type: none"> > Include supporting research into biopharma as part of a new marine research agenda for Antigua & Barbuda > Creation of a new National Ocean Policy that embraces supporting future research as a policy goal 	<ul style="list-style-type: none"> > Recognition and inclusion of biopharma as a potential maritime sector in the new National Ocean Policy



Sector	Priority	Actions	Outcomes
Ecosystem services ●	This work is new / needs attention. Sustainably developing would help to build maritime economy 'game changer'.	<ul style="list-style-type: none"> > Additional information required to support policies and strategies to enhance ecosystem service delivery > Manage impacts to coastal / marine ecosystems through ISM / EIA and planning processes influencing decision making > Ensure that land and marine based sources of pollution are effectively monitored and controlled in line with national, regional and international commitments 	<ul style="list-style-type: none"> > Ecosystem Based Management principles from the revised ECROP (2019) should be embraced by the NOGC and included in an updated Maritime Policy / future National Ocean Policy



6. Implementation



6. Implementation

6.1. Transition to a Blue Economy

Applying blue economy principles and strengthening the contribution that the maritime sector makes to national GDP is one of the most positive interventions that small island states can make in response to climate change. With much of the communities and infrastructure in the coastal zone, Antigua and Barbuda is at threat from sea level rise and negative climate change impacts. The more that Antigua and Barbuda is able to look out to sea for its climate adaptation solutions the more resilient it will be.

Figure 6 below shows an example of a desirable blue economy framework. This shift in the way of thinking about the maritime economy allows a country to move away from a linear, compartmentalised, and sectoral approach to ocean management, with weak connections, linkages, and synergies between various scales of intervention (global, international, and national). It facilitates a move towards a more integrated, systemic, dynamic, inclusive, participatory, and ecosystem-based approach, in which sectoral barriers are minimised, at both the participants' and governance levels. This new way of thinking recognises that environmental, social, and economic dimensions are intertwined and pursued collectively for all blue maritime economy activities.

The blue economy (of which this Maritime Economy Plan represents a key building block) adheres closely to the principles of Integrated Coastal Zone Management (ICZM). This centres on the ecosystem approach and embeds the principles of the UNEP 'Green Economy in a Blue World' report and sustainable development. It takes into account the three pillars of environmental, economic, and social sustainability, as highlighted in the 2012 Rio+20 outcome document, 'The Future We Want', and the UN five-year Action Agenda 2012–2016.

The blue economy promotes the conservation of aquatic and marine ecosystems and the sustainable use and management of resources. It builds on principles of equity, low carbon development, resource efficiency, and social inclusion.

The concept integrates the blue economy sectors through a socially inclusive process aimed at sparking a structural transformation, promoting integrated development, and improved regional cooperation and coordination.

The transformative work required to move towards full application of Blue Economy Planning principles in Governmental Strategy, Policy and Implementation is potentially a difficult but necessary step. Whilst Blue Economy concepts are beginning to become mainstream, particularly across Island Nations, very few countries have begun to prepare national level Maritime Economy Plans, and all remain some way off implementation.

As a nation that is on the climate change front line, yet also growing in terms of overall national GDP, Antigua and Barbuda is well placed to play an exemplary role in blue economic transformation, with the MoSTBE taking a lead role in facilitating the change. This Maritime Economy Plan lastly explores briefly the critical subject of accessing finance and concludes via a brief review of the potential situation and distance to travel in embedding the Principles of a Sustainable Maritime Economy in societal decision-making. This is presented diagrammatically in section 6.3.

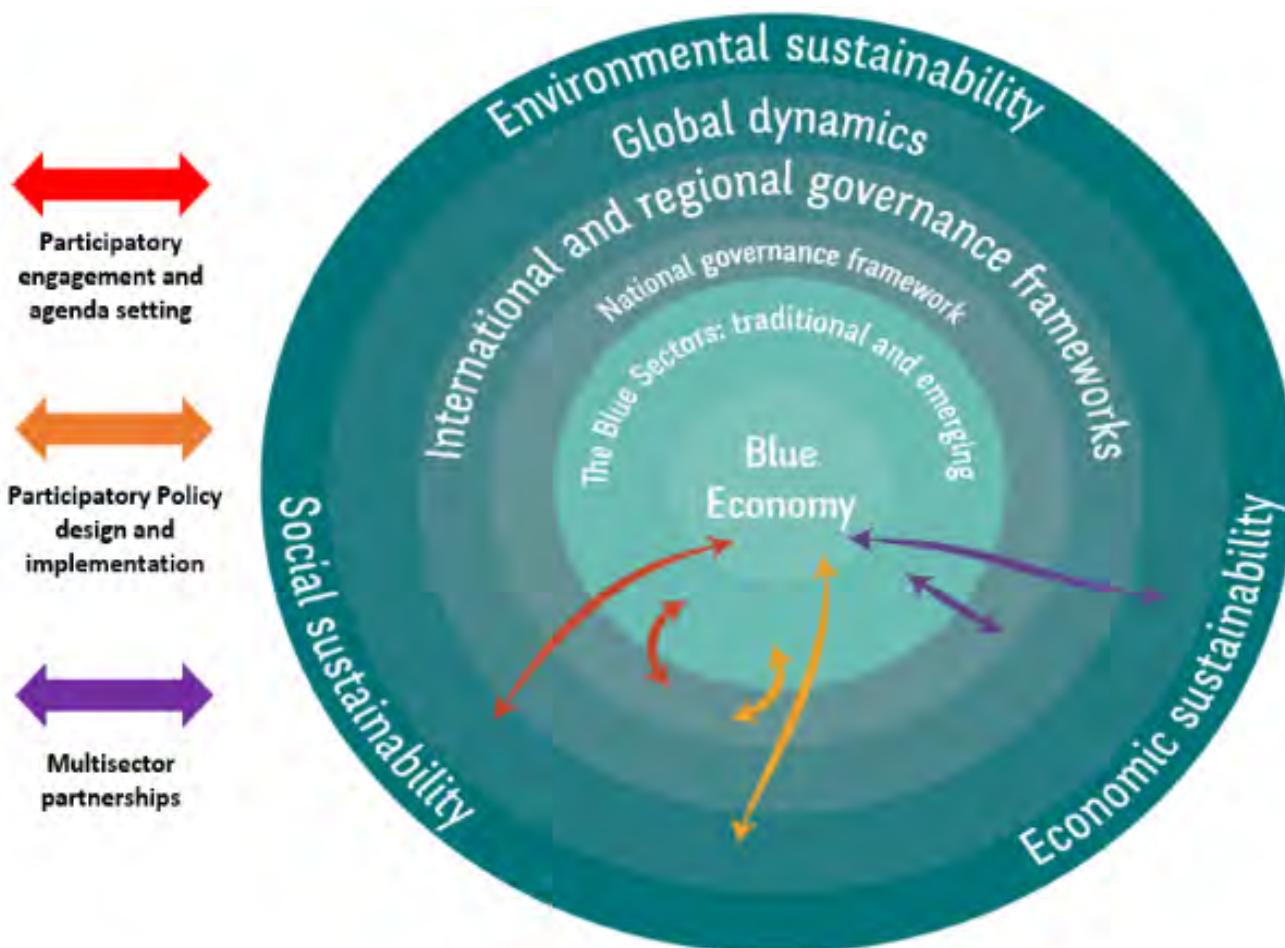


Figure 6 – A Desirable Blue Economy Framework



6.2. Accessing Oceans and Climate Finance

A key benefit of strategic planning of any kind is that it can provide greater clarity and strength as a basis for coordinated bilateral and multilateral funding. This Maritime Economy Plan has been drafted with an eye to potential funding streams and it is anticipated that following consultation and finalisation this plan may be used by the Government of Antigua and Barbuda to assist bid prioritisation and coordination.

Antigua and Barbuda already receives external funding support and has experienced success in this area. The following instruments and types of fund, are likely to prove valuable at implementation stage:

- > Many development partners operate in the region and most include aspects of the maritime sector in their areas of support. Major development partners in the region include the **Caribbean Development Bank (CDB)**, **Inter-American Development Bank (IDB)**, **EU**, **UN**, **World Bank** as well as national agencies such as **USAID (USA)**, **GIZ (Germany)**, **JICA (Japan)** and the **UK (FCDO, CME, CIF)**.
- > Antigua and Barbuda has gained access to climate and development finance from a range of international funding sources, particularly the **Adaptation Fund** and the **Green Climate Fund**, both of which are of relevance to the implementation of this Maritime Economy Plan.
- > Antigua and Barbuda, like many Caribbean countries, operates a Citizenship-By-Investment (CBI) programme, which is used to support national economic growth. The Government aims to increase revenue from the programme. This could be targeted towards blue maritime sector development.
- > A **blue bond** is a debt instrument issued by governments, development banks or others to raise capital to finance marine- and ocean-based projects that have positive environmental, economic and climate benefit. Other small island nations are already exploring the potential of Blue Bond creation and revenue as part of their maritime economy support mechanisms e.g. Seychelles, Fiji.
- > Funding from the Commonwealth Secretariat (ComSec) has been made available to help Antigua and Barbuda to update its draft Maritime Policy to develop a Policy Statement for its National Ocean Policy. Additional support may be available to continue to assist in the development of the NOP and align with the ECROP approach and build on this MEP.



It is recommended that the following suggested **Implementation Pathway Activities** will benefit from coordinated proposals for development assistance:

- > Adoption of the NOP Policy Statement and continued development of a National Ocean Policy in line with the OECS guidance. Establishment of a Blue Economy Department within MoSTBE to work with the National Ocean Governance Committee (NOGC) to help act as a driver to foster co-operation and collaboration across government to close the 'blue economy transition gap'. The Department should have the resources and remit to develop and implement the NOP, working with the NOGC, to integrate specific MEP recommendations and actions; and, to deliver integrated marine spatial planning with sustainable blue economic growth.
- > Update and implementation of environmental regulation for EIA and integration into planning / development process and a training and development programme / scheme to ensure it has cross-departmental understanding, uptake and enforcement to deliver strategic development outcomes as well as inform individual planning decisions.
- > Update and formalise development guidelines to promote resilient coastal structures and marine infrastructure. Incorporate environmental regulation for EIA into guidance. Develop an awareness raising and training scheme across Government to ensure cross-departmental understanding, uptake and enforcement to deliver strategic development outcomes. Consider also the need for Higher and Further Education and Continued Professional Development (CPD) needs for EIA, coastal engineering and strategic planning, possibly in collaboration / partnership with other Caribbean countries with similar needs and requirements.
- > Undertake a natural capital valuation to understand the value of ecosystem goods and services and underpin / integrate into decision making and planning.
- > Carry out a mariculture feasibility study, including location, species, markets, technical and training requirements. Market understanding should link to existing fisheries products and accreditation to ensure complementarity.
- > Develop a cross-sectoral / cross Government Sargassum working group to address joint issues relating to Sargassum. At a minimum, this should include fisheries, tourism and ports sectors. Consider working with other Caribbean countries with similar issues and learning from their approaches, if any e.g. Belize's Sargassum Task Force. Potential to investigate economic opportunities for agricultural use, fuel, biopharmaceutical uses through marine research.

6.3. Achieving the Principles of a Blue Economy

Blue Economy Principles	ECROP Policy Outcomes (2019)	Considerations for Antigua & Barbuda
GOOD GOVERNANCE	Coastal and marine spatial planning and integrated management of marine and coastal resources is adopted	Antigua & Barbuda aspires to produce their own National Ocean Policy (NOP) to replace the current Maritime Policy. This new NOP shall be guided by the policy outcomes presented within the recently revised 2019 ECROP. This shall help Antigua & Barbuda towards achieving the necessary formal governance arrangements to ensure success. There is therefore a need to improve upon institutional, policy and legal arrangements through improved coordinating mechanisms for a new NOP delivery in Antigua & Barbuda which shall seek to improve collaboration between sectors and institutions on ocean governance matters.
	Limits of maritime jurisdiction are established	
ECONOMIC EFFICIENCY	Sustainable socio-economic development is achieved	Alignment of NOP must consider the 2030 Agenda, the SDGs and SAMOA Pathway, with implementation of activities phased to be consistent and supported by a Strategic Action Plan. Commitment is also needed towards international agreements that seek to mainstreaming ocean governance into national sustainable development commitments (such as SDG14).
RESILIENCE	Resilience in the region is strengthened to mitigate the effects of climate related hazards and environmental change	The existing Sustainable Island Resource Management and Zoning Plan (SIRMZP) should be developed and implemented to embrace the adaptation targets set within the first NDC and aligned to the national physical development plan, to better build resilience through adaptation interventions that embrace projected climate impacts for both Antigua and Barbuda.



Blue Economy Principles	ECROP Policy Outcomes (2019)	Considerations for Antigua & Barbuda
SOCIAL EQUITY	Sustainable socio-economic development is achieved	An updated tourism strategy is required that offers potential employment opportunities outside of traditional sectors / locations. An integrated island development plan is required with robust environmental principles and planning whilst mainstreaming of disaster and climate resilience into decision making, particularly on Barbuda to achieve the MTSD aim.
PARTNERSHIPS	Ocean stewardship, awareness, participation and wellbeing of the citizens of OECS Member States is increased	There is a need to improve awareness on the importance of good ocean governance for all aspects of society from the highest level of government to local communities on all related issues and using a range of communication tools and techniques.
RESEARCH & INNOVATION	Decision-making across the region is informed by the best available evidence	There is a need to develop, as part of a new NOP, a marine research strategy framework, in collaboration with UWI and the new Centre of Excellence, that includes both national and regional actions aligned to the ECROP and progress towards a blue economy.
SUSTAINABILITY	Ecosystem integrity of the region is maintained and improved	Sustainable tourism, adopting a ridge to reef approach is a high priority to ensure that activities on land do not adversely impact the marine environment. This must be incorporated into policy development, ICZM and MSPs that may need to be produced in Antigua and Barbuda in the future that inculcate strong linkages to existing planning and management regimes.



7. Footnotes

- a** Oil and Gas
- b** Ocean Thermal Energy Conversion
- c** Sea Water Air Conditioning
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- 8** International Renewable Energy Agency (IREMA), 2016. Antigua & Barbuda Renewable Readiness Assessment. Accessed at https://ab.gov.ag/services/energy/pdf/IRENA_RRA_Antigua_and_Barbuda_2016.pdf [18/02/2019]
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- 14** Georges, J., Ramdeen, R., Zyllich, K and Zeller, D. (2015). Reconstruction of total marine fisheries catch for Antigua and Barbuda (1950-2010). Available Online <http://www.searounds.org/doc/publications/wp/2015/Georges-et-al-Antigua-Barbuda.pdf>
- 15** Provided by the Fisheries Division during the July 2019 consultation visit
- 16** Nexus. Commonwealth Network. Antigua and Barbuda: Mining and minerals. Accessed at http://www.commonwealthofnations.org/sectors-antigua_and_barbuda/business/mining_and_minerals/ [27/02/2019]

- 17** Desmond, B. Inter Press Service (IPS), June 2013. Facing Tough Times, Barbuda Continues Sand Mining Despite Warnings. Accessed at <http://www.ipsnews.net/2013/06/facing-tough-times-barbuda-continues-sand-mining-despite-warnings/> [27/02/2019]
- 18** Antigua Observer, January 2013. Barbuda wants help to find its own economic model Accessed at <https://antiguaobserver.com/barbuda-wants-help-to-find-its-own-economic-model/> [27/02/2019]
- 19** DoE press release, Illegal Sand Mining on the increase in Antigua, <http://www.healthwatchtiguaandbarbuda.com/illegal-sand-mining-on-the-increase-in-antigua>
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- 22** The total contribution of Travel & Tourism includes its ‘wider impacts’ (i.e. the indirect and induced impacts) on the economy. The ‘indirect’ contribution includes GDP supported by Travel & Tourism investment spending – an important aspect of both current and future activity that includes investment activity such as the purchase of new aircraft and construction of new hotels; Government ‘collective’ spending, which helps Travel & Tourism activity e.g. tourism marketing and promotion, aviation, administration, security services, resort area security services, and Domestic purchases of goods and services by the sectors dealing directly with tourists – including, for example, purchases of food and cleaning services by hotels, of fuel and catering services by airlines, and IT services by travel agent. The ‘induced’ contribution measures the GDP and jobs supported by the spending of those who are directly or indirectly employed by the Travel & Tourism industry.
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- 32** Although Antigua & Barbuda recognizes that this figure requires further analysis.
- 33** Conditional upon international provision of means of implementation – finance, capacity building and technology transfer.
- 34** This waste to energy target is not considered part of the 50 MW renewable energy target.



- 35** Amount requires further analysis.
- 36** Desalination reliance has already grown to account for 60% of national water supply, and this is the most viable option for enhancing freshwater resources.
- 37** UN Oceans Conference website, Marine Ecosystems Protected Area (MEPA) Trust's Biodiversity Is Our Business Project - Valuing Ecosystem Services for Biodiversity Protection <https://oceanconference.un.org/commitments/?id=20968>
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- 39** Fisheries Division active fishing vessel statistics, provided by Fisheries Division, Pers. Comm., July 2019
- 40** Gore-Francis, J., 2013, Antigua & Barbuda SIDS 2014 Preparatory Progress Report, prepared in collaboration with the Environment Division, Ministry of Agriculture, Housing, Lands and the Environment.
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A small rectangular logo in the bottom right corner featuring the Union Jack flag above the text "Funded by UK Government".