

The Blue Economy in Practice - Raising Lives and Livelihoods



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NLA INTERNATIONAL



THE BLUE ECONOMY IN PRACTICE - RAISING LIVES AND LIVELIHOODS

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1 THE BLUE ECONOMY IN PRACTICE – MAP OF CASE STUDIES

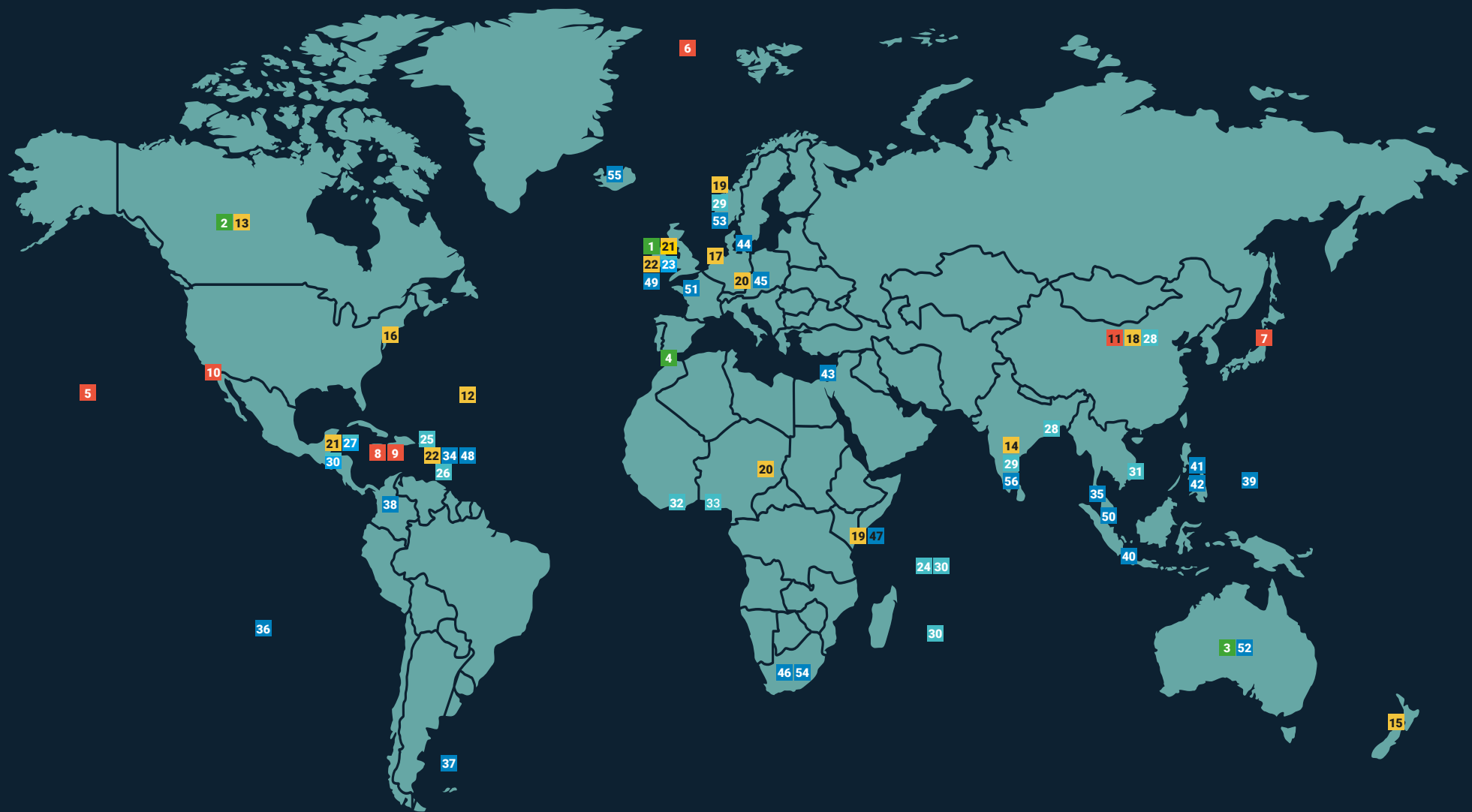


Figure 1. Map of international case studies and resources

Map and Measure Ocean Wealth	Assess Ocean Risks and Impacts	Establish Blue Economy Governance framework	Develop a Blue Economy plan	Implement and Monitor the Blue Economy plan
<ol style="list-style-type: none"> 1. The UK's Marine Natural Capital Accounts. 2. Canada's Ocean Accounts pilot. 3. Australia's Ocean Accounts pilot. 4. Morocco's fisheries natural capital accounts. <p>GLOBAL / MULTINATIONAL:</p> <ul style="list-style-type: none"> • Nippon Foundation-GEBCO Seabed 2030 project. • The Census of Marine Life. • UNESCO-IOC's Ocean Data Portal. • C4IR Ocean's Ocean Data Platform. • FAO's Artificial Intelligence for a Blue Planet. • Global Fishing Watch. • Windward. • OceanMind. • Marine Traffic. • Lloyds List Intelligence's Seasearcher. • National Accounting for the Ocean and Ocean Economy. • The Global Ocean Accounts Partnership. 	<ol style="list-style-type: none"> 5. Understanding ocean sewage pollution in Hawaii. 6. Mapping plastic debris in the Arctic. 7. Mapping plastic emissions in Japan. 8. UNCTAD – climate change impacts in Caribbean coastal transport infrastructure. 9. The World Bank's natural capital risk assessment in the Caribbean. 10. Port of Los Angeles' Sustainability plan. 11. China's marine pollution action plan. <p>GLOBAL / MULTINATIONAL:</p> <ul style="list-style-type: none"> • IUCN's Ridge to Reefs programme. • Allen Coral Atlas. 	<ol style="list-style-type: none"> 12. The Bermuda Ocean Prosperity Programme. 13. Canada's Blue Economy Strategy. 14. India's Draft Blue Economy Policy Framework. 15. New Zealand's fisheries subsidy lobbying. 16. US DoD's investment in Reefense. 17. Dutch Central Bank's biodiversity risk modelling. 18. China's blue carbon economic development action plan. 19. Kenya-Norway Blue Economy collaboration. 20. African Union-European Union Blue Economy collaboration. 21. Belize-UK Blue Economy collaboration. 22. Antigua and Barbuda-UK/ Commonwealth Blue Economy collaboration. <p>GLOBAL / MULTINATIONAL:</p> <ul style="list-style-type: none"> • The Commonwealth Blue Charter. 	<ol style="list-style-type: none"> 23. UK's integrated ocean policy framework. 24. Seychelles' Blue Economy approach 25. The Virgin Islands' Strategic Blue Economy Roadmap. 26. Grenada's Sustainable Blue Growth agenda. 27. Belize's Integrated Coastal Zone Management Plan. 28. Bangladesh and China's collaborative Marine Spatial Planning. 29. India and Norway's collaborative Marine Spatial Planning. 30. Seychelles and Mauritius' collaborative Marine Spatial Planning. 31. Vietnam's National Action Plan for management of marine plastic. 32. Regional MCS Centre in Ghana. 33. Engaging young people in MCS in Nigeria. <p>GLOBAL / MULTINATIONAL:</p> <ul style="list-style-type: none"> • UNEP's plastic pollution roadmap. 	<ol style="list-style-type: none"> 34. Antigua and Barbuda's plastic litter policies. 35. EASOS – Marine Watch. 36. Chile's Rapa Nui MPA. 37. Argentina's MPAs. 38. Colombia's National Carbon Tax. 39. Palau's Monitoring, Control and Surveillance plan. 40. Indonesia Maritime Information Centre. 41. The Bantay Dagat in the Philippines. 42. Fisheries capacity building in the Philippines. 43. Blue Economy training in Port of Beirut. 44. Copenhagen Business School's Blue Economy Post-doctorate. 45. EU-CONEXUS' Minor in Blue Economy and Growth. 46. South Africa's Ocean Economy Skills Summit. 47. Kenya's Blue Economy college courses. 48. Environmental awareness course in Barbados school. 49. Innovate UK. 50. Hatch. 51. Blue Oceans Partners. 52. Ocean Impact Organisation. 53. Katapult Ocean. 54. Ocean Hub Africa. 55. Iceland's 100% Fish project. 56. India's Blue Economy Coordinating Committee. <p>GLOBAL / MULTINATIONAL:</p> <ul style="list-style-type: none"> • UNDP's Ocean Innovation Challenge.



2 EXECUTIVE SUMMARY

The theme for World Oceans Day 2021 is Life and Livelihoods. The contribution of NLA International (NLA) to this occasion is to present some of the excellent work underway by governments across the world's ocean to develop national Blue Economies which faithfully embrace the triple-win premise for people, planet and prosperity. We also frame these efforts within a set of guiding steps and principles with the desire to inform future efforts and distil the essence of a blue approach.

We propose that “a Blue Economy approach to sustainable use of ocean spaces and resources is both ecologically regenerative and socially just, accounting for the needs of current and future generations. It includes all sectors of society in planning for ocean activities and balances the needs of different constituencies to equitably share in the benefits of the ocean, a global commons. A Blue Economy approach recognises ocean-climate interactions; it anticipates and plans for the effects of climate change on coastal and marine resources and conserves or regenerates these natural resources to increase resilience.”

Formulating national approaches to a Blue Economy requires fundamental shifts in thinking and a re-imagination of what success looks like, to transcend business-as-usual and raise national aspirations towards higher goals and values. The doughnut economics concept provides a helpful reference. Between the minimum social foundation determined by the SDGs and the ecological ceiling determined by the planetary boundaries (Rockström 2009) lies a safe and just space for humanity to thrive. These inner and outer rings of the “doughnut” provide guard-rails for steering a more balanced, regenerative, equitable and sustainable Blue Economy into the future.

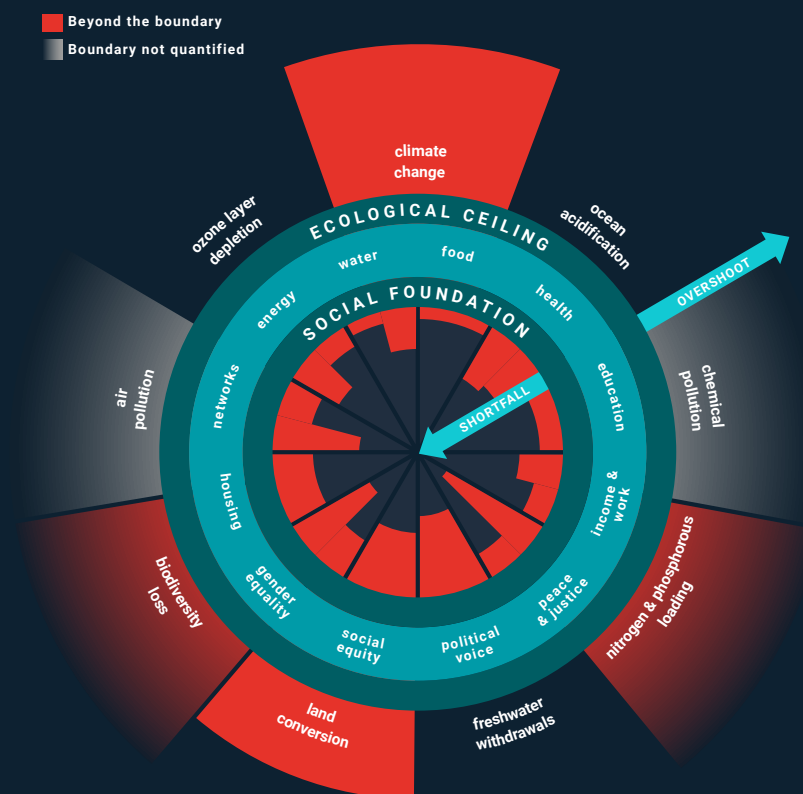


Figure 2. The Doughnut of social and planetary boundaries, Kate Raworth and Christian Guthrie. CC-BY-SA 4.0

Recalling that the economy is embedded within society, which in turn is embedded in the natural environment, the doughnut model poses new ethical considerations for Blue Economy approaches and democratic political and governance processes.

We propose that an authentic Blue Economy approach embraces several core principles to guide ocean governance and policy which **RAISE** ambition, involvement and collective action and set out to **RAISE** the quality of the marine environment, ocean and human life and livelihoods. To ensure this we suggest that Blue Economy activities should be:

REGENERATIVE in conserving and restoring the vitality of the ocean environment

ADAPTIVE to a changing climate, new knowledge and new ways of working

INCLUSIVE of all stakeholders, especially those who depend the most on marine resources

SUSTAINABLE environmentally, socially and economically

EVIDENCE-LED based on a holistic range of knowledge and data sources



Acknowledging that each national Blue Economy vision and journey towards its realisation are unique, and that there is no one-size-fits all approach, we nonetheless recognise that setting out a pragmatic step-wise approach to key aspects of developing a national Blue Economy may be useful. We propose such an approach below. The case studies we have featured illustrate the value of each of these steps in embedding the **RAISE** principles above.



Figure 3. A proposed Blue Economy step-by-step approach which is regenerative, adaptive, inclusive, sustainable and evidence-led. The authors.

We are under no illusions that policy-makers face many urgent challenges. Building sustained prosperity takes time and calls for a focus on the meaningful, rather than the expedient. Judicious balancing of existing and new Blue Economy sectors in terms of their combined social, environmental and economic impacts requires careful consideration.

Fortunately, new tools are at hand to balance trade-offs; new pilot approaches are showing how existing datasets can be meaningfully combined to provide new holistic insights on ocean wealth and international collaboration between governments to leverage resources, provide peer learning opportunities and co-develop Blue Economy initiatives are increasingly evident. By making use of all of these and focusing on maximum leverage points within the Blue Economy ecosystem, along with investing in national capacity for enabling activities, significant progress can be made. In particular a focus on ocean nature-based solutions to deliver triple wins for people, planet and prosperity should be considered a priority. A mind-set of going beyond net zero and “do no harm” to one of “we can produce more by protecting more” helps shape a focused national ocean vision for effective protection, sustainable production and shared prosperity. The 14 member countries of the High Level Panel for a Sustainable Ocean Economy have each committed to 100% sustainable management of their Exclusive Economic Zones by 2025. Including ocean nations as culturally and geographically diverse as Australia, Canada, Chile, Portugal, Namibia, Indonesia and Palau, they provide inspiring examples of commitment to concerted action for a healthy ocean and Blue Economy.

The ocean belongs to no one and everyone. It holds a uniquely special place in our individual and collective imagination, raising our spirits, our wellbeing and our inspiration. Building a Blue Economy that is just and sustainable is a uniquely inspiring endeavour.



This dialogue on the Blue Economy is not just for one generation. It concerns us all. It concerns our parents and grandparents. It concerns our children.

James Alix Michel, Former President of Seychelles

3 INTRODUCTION TO THIS REPORT

3.1 Why is this report needed?

The concept of the Blue Economy has been rising steadily in recent years.

At the macro level, many of the major development banks and regional bodies have championed the development of the Blue Economy to protect marine resources at the same time as driving various levels of socio-economic development and countering the challenges of climate change. The European Union, for example, produces an [annual status report on Blue Growth](#), and many other agencies are establishing their own Blue Economy units and leadership.

At national level, the Blue Economy has found increasing verbal and policy support from many countries' leaders or senior ministers and much discussion has begun on how the Blue Economy must be elevated to be included in the standard discourse around nations' aspirations and integrated development plans.

At individual sector level, more industry leaders, financiers, environmentalists and academics are beginning to engage seriously with the Blue Economy, framing their aspirations within the broad concept and lobbying for inclusion and a faithful interpretation of its core principles in emerging plans.

There is currently a missing tier of analysis, evidence of what is beginning to work in practice in the approaches being driven by governments, funders, industry associations, NGOs and civil society organisations. By shining a light on some of the various practical efforts underway to translate the broadest strategic understanding of the Blue Economy concept into deliverable plans that unite key stakeholders around a set of actionable activities with immediate focus and long-term vision, and place such activities within a strategic framework that aids coherence, we aim to provide those developing their own Blue Economy strategies with multiple points of reference.

3.2 About NLA International

NLA International champions the implementation of Blue Economies in order to create sustainable ocean environments for the people and economies that depend upon them.

The NLA team comprises a diverse skill set with a breadth of experience from varied sectors, disciplines and geographies that include scientists, operators, mariners, navigators, engineers, lawyers, accountants, designers, hydrographers, researchers, writers and policy-makers, all experts in their fields, all with a shared passion for sustaining the ocean.

Blue Economy Pulse is a project from NLA International to track, synthesise and raise awareness of new initiatives related to the Blue Economy globally. It aims to identify common themes in the development of sustainable ocean activities and – crucially – to shine a light on successful practice that others may build on. This will enable ocean stakeholders all over the world to keep their fingers on the pulse of positive Blue Economy activity of greatest relevance to them.

You can sign up to follow Pulse at: www.nlai.blue/pulse and www.linkedin.com/showcase/blue-economy-pulse.



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4 INTRODUCTION TO THE BLUE ECONOMY

4.1 What is a Blue Economy?

The term “Blue Economy” grew out of the Rio+20 United Nations Conference on Sustainable Development (UNCSD) in 2012. It has its roots in the Institutional Framework for Sustainable Development and the “Green Economy” concept, both of which were framed in The Future We Want (UNCSD 2012). The Green Economy in a Blue World Report (UNEP 2012) produced in the run-up to Rio+20 elaborated on the need for applying the Green Economy approach to the ocean and examined case studies related to industries such as aquaculture and marine mining. Elements of this report and subsequent publications defining the Blue Economy contain common concepts which we further elaborate on here.

It is interesting to note that these concepts were developed in the wake of the 2008 global financial crisis and once again following the global crisis caused by the Covid-19 pandemic attention has been drawn to the ocean as a source of economic recovery. Drivers of a growing ocean economy include (EIU 2015) an increasing familiarity with the ocean; new technologies making it economically viable to access ocean resources; long-term growth and demographic trends such as an increasing human population, increasing affluence and demand for goods and services which are increasing the need for food security, alternative energy and mineral resources, seaborne trade, and coastal urbanisation.

Marine science has and continues to provide increasing evidence of ocean degradation as a result of the past economic paradigm of over-exploitation of marine resources at the cost of the natural capital represented by coastal and open ocean ecosystems (UNEP 2012), (EIU 2015), (UNEP 2016), (World Bank 2017). Business-as-usual and a singular focus on GDP has led to the climate emergency, the biodiversity crisis and the covid-19 pandemic, by over-exploiting natural resources, over-polluting the environment and undermining the stable functioning of the biosphere. The greatest community of ocean users by far are the 39 million fishers around the globe, the great majority of whom are small-scale fishers (FAO 2020). In employment numbers they outweigh industrial fisheries (Teh 2013), oil and gas, shipping, and tourism combined (Smith H. 2019) and 50% of workers are estimated to be women, when post-harvest activities are included (FAO 2020). Many of these people remain amongst the poorest in society and their livelihoods are threatened by over-extraction and climate change (Lam 2020). Productive fisheries, like other commercial sectors in the ocean economy, depend on a healthy ocean (UNEP 2012).

Thus, the concept of the Blue Economy recognises and respects the ecological limits which determine the safe operating space for economic activities and the minimum social standards that a fair economic model should address. It effectively decouples socio-economic development from environmental and ecosystem degradation (Smith-Godfrey 2016), (World Bank 2017). It provides an economic framework attuned to the UN Sustainable Development Goals (SDGs) which enables people and nature to thrive in a balanced way, transparently acknowledging and addressing trade-offs based on the best available scientific evidence.

There have been several definitions of what the Blue Economy is, for example:

"The Blue Economy is one which 'improves human wellbeing and social equity while significantly reducing environmental risks and ecological scarcities'." (UNEP 2012).

"A sustainable ocean economy emerges when economic activity is in balance with the long-term capacity of ocean ecosystems to support this activity and remain resilient and healthy." (EIU 2015).

"The Blue Economy is the sustainable industrialisation of the oceans for the benefit of all." (Smith-Godfrey 2016).

"The Blue Economy seeks to promote economic growth, social inclusion and the preservation or improvement of livelihoods while at the same time ensuring environmental sustainability of oceans and coastal seas." (World Bank 2017).

"The Blue Economy aims to balance sustainable economic benefits with long-term ocean health in a manner consistent with sustainable development and its commitment to intra- and intergenerational equity." (Keen 2018).

Despite the numerous definitions of the Blue Economy existing in the literature there are considerable differences in the way that different states and other stakeholders interpret what it means operationally. In many cases, countries still emphasise economic gains in the ocean economy with little or no regard for social inclusion or environmental sustainability (Okafor-Yarwood I. 2020). In Africa, for example, there are examples of large-scale ocean economy projects that have marginalised local communities and severely degraded the environment (see examples in Okafor-Yarwood et al., 2020). In these cases, top-down control of coastal infrastructure projects has ignored the needs of local communities and resulted in destruction of the very coastal ecosystems on which they rely for their livelihoods (Okafor-Yarwood I. 2020).

New economic models are now needed to stimulate policy-making which directs investment into activities that regenerate marine and coastal ecosystems and provide greater support to communities whose essential needs for nutritious food, energy and decent working conditions have not been met (Sumaila 2021). The Doughnut Economics model (Raworth 2017) provides such a framework and encourages policymakers to "be agnostic about growth". Growth at all costs is inherently unsustainable on a finite planet. Instead, policy-makers can, for example, provide regulatory and fiscal signals to phase out unsustainable activities such as fossil fuel extraction and distant-water fishing and initiate new regenerative activities such as coral reef and mangrove conservation and restoration activities, offshore renewables and value-added activities with associated livelihood opportunities. This approach allows more people to thrive, fosters climate resilience and reduces the future costs of climate-change impacts under a business-as-usual scenario as shown on the next page.

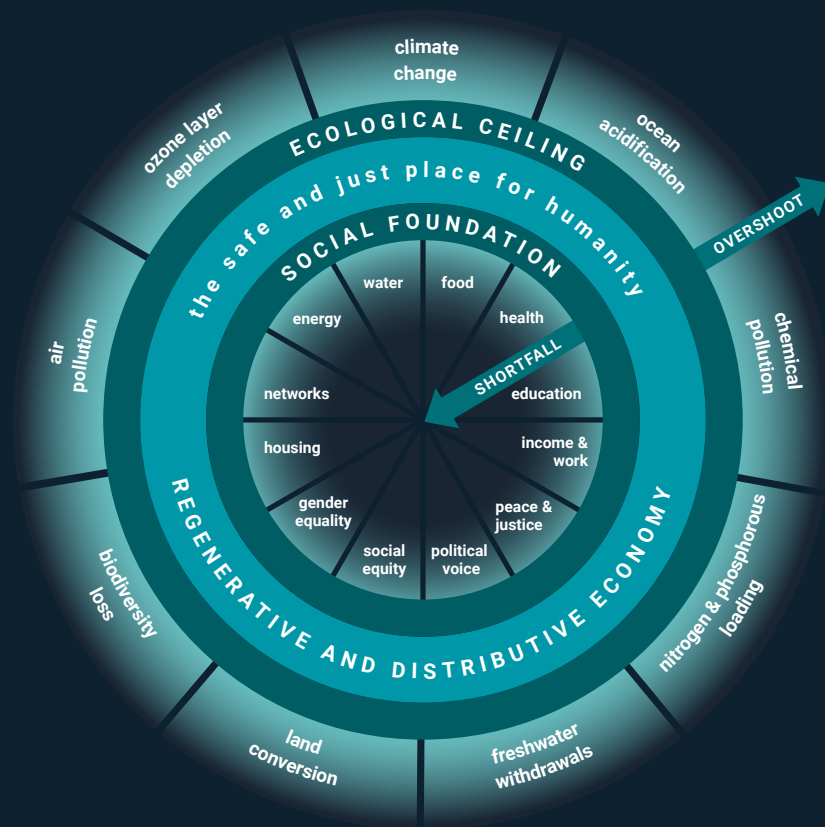


Figure 4. The Doughnut of social and planetary boundaries, Kate Raworth and Christian Guthrie. CC-BY-SA 4.0
Between the minimum social foundation determined by the SDGs and the ecological ceiling determined by the planetary boundaries (Rockström 2009) lies a safe and just space for humanity to thrive.

4.2 A working definition to guide success

Based on an analysis of existing definitions and examples of successful Blue Economy projects we propose the following working definition of a Blue Economy approach:



A Blue Economy approach to sustainable use of ocean spaces and resources must be both ecologically regenerative and socially just (Bennett 2019), accounting for the needs of current and future generations (Sumaila 2005). It includes all sectors of society in planning for ocean activities and balances the needs of different constituencies to equitably share in the benefits of the ocean, a global commons. A Blue Economy approach recognises ocean-climate interactions (Cheung 2013); it anticipates and plans for the effects of climate change on coastal and marine resources and conserves (Barange 2014) (Sumaila 2019) or regenerates these natural resources to increase resilience.

Alongside this we propose that an authentic Blue Economy approach embraces several core principles to guide ocean governance and policy which RAISE ambition and action, enabling people and planet to thrive. We suggest that Blue Economies should be:

REGENERATIVE: Ambitious conservation and restoration initiatives including protecting at least 30% of the ocean via networks of effective marine protected areas are essential to support a pathway towards greater resilience to a changing climate. Climate change and biosphere integrity are “core” planetary boundaries which are fundamental to a stable earth system and we have surpassed both boundaries (Steffen 2015), along with land use and biogeochemical flows (nitrogen and phosphorous). The need for action to halt and reverse the trends in climate heating and biodiversity loss is urgent and both goals can be met simultaneously by protecting more of the ocean. Ocean protection and regeneration should be approached in a holistic sense, combining fully protected areas with sustainable fisheries management and measures to safeguard migratory species which play key roles in ecosystem function and health.

ADAPTIVE: The ocean’s influence on climate is significant, and vice versa. Climate change is triggering increases in ocean temperature, sea level rise, ocean acidification and deoxygenation, in turn driving changes in ecosystem function and the distribution and extent of marine species. Ocean climate solutions such as more marine protected areas, restoring coastal blue carbon ecosystems and seaweed farming should be prioritised in national “net zero” mitigation and adaptation agendas and Blue Economy strategies since they provide triple wins for people, planet and prosperity. Marine plans should be regularly refreshed based on the best-available scientific knowledge of the ocean-climate nexus and anticipate change.

INCLUSIVE: New approaches to ocean governance and policy are required which are inclusive, gender-balanced and participatory rather than top-down, to secure holistic and balanced decision-making processes. Climate change and biodiversity loss are systemic challenges which need systemic solutions. Empowering local communities and inviting wider sectors of society including entrepreneurs, commerce, academia, NGOs and impact investors to engage in solutions provides new insights and bottom-up innovation to inform policy measures. These should seek to redress existing inequities and conflicts in accessing to and gaining value from ocean resources and foster co-management of coastal ecosystems, for example (Bax N. 2021).

SUSTAINABLE: Policy measures should seek to refocus existing ocean activities to halt the over-exploitation of ocean resources and of marine fisheries in particular. Over a third of assessed fish stocks are at biologically unsustainable levels (FAO 2020) and overfishing has been the main driver of a 71% reduction in shark numbers since 1970, such that three-quarters of shark species are threatened with extinction (Pacoureau 2021). Overall, overfishing and the destructive effects of fishing are the main current drivers of biodiversity loss in the ocean (Rogers 2020). It is estimated that the overall capture of large fish during the period 1950-2014 has prevented the sequestration of around 22 million tonnes of carbon from the sinking carcasses of fish which would otherwise fall to the seabed. This is in addition to direct emissions from fishing over the period of 730 million tonnes of CO₂ (Mariani 2020). Technical measures can be introduced to reduce the environmental damage from activities such as fishing (e.g. bycatch-reduction measures; (Rogers 2020)). Support should be given to wasting less fish and seafood since over a third is currently lost (FAO 2020). Circular economy approaches should be applied to stem the flow of waste into the ocean and extract new economic value from waste materials. A precautionary approach to new ocean-based activities should be adopted which fully considers climate and biodiversity impacts and circular economy alternatives in decision-making.

EVIDENCE-LED: Decisions should be made based on user needs and from a foundation of the best-available natural and social science, data and existing knowledge, including indigenous knowledge. To gauge the success of a Blue Economy approach, new holistic measures of progress are required over and above GDP, which reflect ocean health and wealth, together with associated human wellbeing and prosperity. Policy-makers should monitor these values over time and adapt policies to ensure that nature and society are thriving in a more balanced way and that the needs of future generations can be met.

5 A FRAMEWORK FOR BLUE ECONOMY ACTION

While this report focuses on Blue Economy progress in practice, an overarching model is required as a reference point within which to place those activities. The schematic below presents a proposed pragmatic step-wise approach to key aspects of developing a national Blue Economy.



Figure 5. A proposed step-wise and iterative approach to developing a national Blue Economy. The Authors.

5.1 Map and measure ocean wealth

We suggest that policymakers start with an understanding of their ocean wealth, by collating data which maps and measures the extent and condition of natural resources, together with socio-economic data from national statistics on ocean activities. This holistic data collection provides the basis for compiling a set of measures on ocean wealth, which forms the foundation from which to define which Blue Economy activities are achievable and sustainable and to inform decision-making over time.

5.2 Assess ocean risks and impacts

This should be accompanied by an assessment of risks and impacts on the ocean and coastal zone, including climate change impacts and the effects of land-based sectors such as agriculture, water quality management and waste management. This exercise should extend to activities on the high seas such as distant-water fishing, in addition to those activities which fall within a country's Exclusive Economic Zone (EEZ).

5.3 Establish a holistic and integrated Blue Economy governance framework

The starting point of ocean health, wealth, benefits, threats and impacts provides the essential context from which to frame a nation's ambition for its Blue Economy. Appropriate and inclusive governance structures can then be devised which include inter alia representatives of all key ministries required to contribute to policy and finance.

5.4 Develop a Blue Economy plan

A Blue Economy vision can thus be articulated which respects ecological limits under a changing climate and aspires to improve the quality of life for those where minimum social standards are not yet met. National objectives can be set out together with a plan for implementation, knowledge-gathering and sharing, and resourcing.

5.5 Implement and monitor the Blue Economy plan

This plan is implemented through policy and fiscal measures to conserve and restore ocean wealth, address key threats to marine resources and provide economically sustainable livelihood opportunities. As part of the ocean governance process the implementation of the plan is monitored and evaluated alongside measures of ocean wealth and assessments of key risks, to establish the relative management success of measures and policies adopted.

This is a cyclical process in which all steps are iterative. Monitoring and evaluating progress against objectives on a regular basis is key, to check what works in practice and adapt to lessons learned and natural events. Each of these steps is elaborated in more detail in the next section, highlighting where progress is being made in practice.



Map and measure ocean wealth

- Map extent and condition of ocean natural assets over time
- Quantify natural capital and ecosystem services from ocean resources
- Collect and synthesise socio-economic information on existing ocean sectors and users
- Create ocean accounts, a holistic dashboard of ocean wealth including historic information
- Monitor ocean wealth over time and adapt marine spatial planning and policy as necessary



6 THE BLUE ECONOMY IN PRACTICE: MAPPING AND MEASURING OCEAN WEALTH

6.1 Rationale for mapping and measuring ocean wealth

Measurement leads to management: Creating a dashboard of ocean wealth which is rich in socio-economic information including the values of ocean natural capital and associated social benefits derived from it serves a number of purposes. It paints a picture of the past, current and potential values of a country's Blue Economy and supports a more complete and contextualised view of a national economy and its dependencies. Together with information on the current and predicted future risks and impacts on the marine environment, it can inform national investment and policy priorities. A fuller understanding of the economic and social contribution of the Blue Economy is critical for informed ocean management.

Completeness of information for decision-making: Comprehensive ocean accounts should set out to bring into view the full contribution of the ocean to all sectors of society and vice versa, including for example the values of small-scale fisheries to a national economy, such as food security, responsible stewardship of the marine environment, sustainable methods in terms of fuel use and bycatch, and higher employment ratios relative to industrial fishing activity (UNEP 2012). The frequent failure to include small-scale fisheries in national statistics results in a negative feedback loop where insufficient financial resources are directed towards those who most need them (Porrás 2019).

By creating a fuller suite of indicators on natural and human wealth connected to the ocean, ocean accounts can provide a clearer and more complete understanding of the overall national economy. This provides more robust information from which to determine priorities and to weigh the benefits and trade-offs of investing in cross-cutting areas such as offshore renewables, waste management and port infrastructure.

Investment case for nature and people: Comprehensively valuing all aspects of ocean wealth provides policy-makers and financiers with the evidence base to justify investments in managing, protecting and developing ocean resources. For example, effective marine protection secures the long-term recovery of fish stocks (McClanahan 2021) and improves fishery profitability (Lynham 2021). It is therefore appropriate to consider marine protected areas as stocks of natural capital that can yield high and sustained returns in terms of flows of surplus fish and carbon sequestration, and therefore a high-value natural asset that should be invested in. Private sector inward investment can further accelerate and amplify local solutions.



GDP is the wrong tool for assessing the sustainability of the ocean.

“National Accounting for the Ocean and Ocean Economy” prepared for the High Level Panel for a Sustainable Ocean Economy



Due to its fluid transboundary nature the ocean represents a riskier investment environment than other economic sectors and a lack of effective monitoring and enforcement heightens this risk. Key barriers to private sector investment in the Blue Economy include lack of effective and cohesive ocean governance, lack of strong and enforced regulatory frameworks and a lack of information on the economic, social and environmental values of the ocean (Sumaila 2020). Increasingly the finance sector is assessing whether risks to marine ecosystems such as coral reefs and fisheries are being addressed before investing in the Blue Economy. Transparently publishing ocean accounts helps to overcome some of these barriers and identify opportunities for action.

Disclosing, managing and investing in ocean assets should ultimately serve to build ocean wealth over time for current and future generations. The purpose of ocean accounts is to provide a scorecard to check on progress and the effectiveness of policies and their implementation.

6.2 Map extent and condition of ocean natural assets over time

There are huge gaps in our understanding of the ocean. The sheer scale of the world's ocean and the difficulties of access make mapping the ocean a grand global challenge. This presents a challenge to nations attempting to build holistic, evidence-based Blue Economy strategies. Fortunately the responsibility for this endeavour does not rest solely on the shoulders of governments, with energetic ocean mapping efforts being led by a range of stakeholders.

The [Nippon Foundation-GEBCO Seabed 2030 project](#), launched in 2017, has to date leveraged the global community of hydrographic offices, navies and scientific institutions around the world to map, to a high resolution, just under 20% of the seabed. This vast space roughly equates to [72 million square kilometres](#), leaving 290 million square kilometres still to survey and chart. That's just mapping the seabed; mapping ocean life, including on and underneath the seafloor as well as in the water column presents a similar challenge. Whilst science has recorded approximately [230,000 ocean species](#) it is estimated that this could represent as little

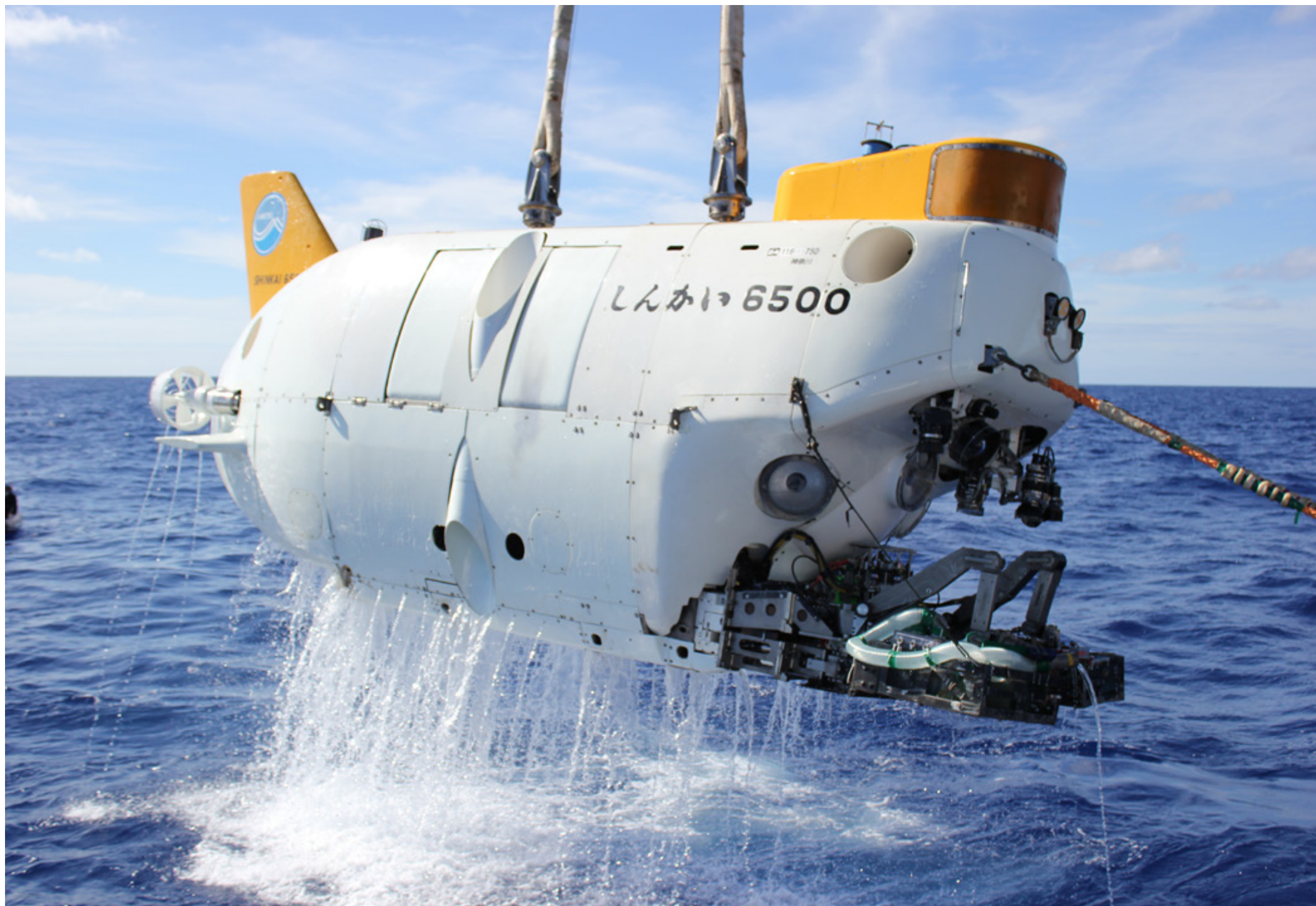
as 10% of ocean life (Mora 2011). [The global Census of Marine Life \(CoML\)](#) funded by the Sloane Foundation ran for 10 years, reporting in October 2010. CoML coalesced the efforts of 2,700 scientists in more than 80 countries recording more than 30 million new records of marine life and collecting possibly more than 6,000 new species. The programme leveraged significant funding from public and private funding sources leading to 540 scientific expeditions. However, the scale of life in the ocean means that more such global programmes, human resources and infrastructure are required to map life in the ocean, to understand how it relates to ecosystem functions and ultimately to nature's contribution to people.

There has been a rapid increase in the creation of ocean data services which take advantage of the proliferation of AI and the growth in cloud storage, representing different perspectives and user needs. Some are provided via international organisations such as the UNESCO-IOC International Oceanographic Data and Information Exchange's [Ocean Data Portal](#) and some are developed by non-profit organisations such as the [Ocean Data Platform](#) provided by the Centre for the Fourth Industrial Revolution Ocean (C4IR Ocean).

AI is also being increasingly applied to drive marine autonomy, with ocean science and data gathering being a notable feature of the marketplace. The International Maritime Organisation is actively engaged in the [regulation of autonomous vessels](#) and the [Mayflower 400](#) is undergoing final testing before its first transatlantic voyage scheduled for June 2021. This remarkable vessel is one of a growing number of larger, sensor-laden, long range marine autonomous systems seeking to reveal the secrets of the ocean.

In June 2021 the FAO will lead the global forum [Artificial Intelligence for a Blue Planet](#). The forum promises to initiate an ambitious global collaboration to scope the development of an AI platform with the capacity to share the knowledge required to produce tools to empower citizen science. Such events, taking place under the umbrella of the [Decade of Ocean Science](#), underline a recognition that the world needs more actionable information about the ocean to achieve SDG14.

Confident decision-making and investment in the Blue Economy relies on





sound knowledge and understanding of the marine environment, whether that be at strategic and policy level or at operational and tactical level. Whilst sizeable gaps remain, much ocean data exists in global repositories such as GEBCO and the Ocean Biodiversity Information System (OBIS) and work continues at pace as outlined above to make such data openly and easily accessible. These sources can be combined with regional and local datasets from academia, NGOs, the private sector and others to glean a picture of the known and unknown elements of a given seaspace. Assembling this knowledge base is essential to mapping ocean wealth.

6.3 Quantify natural capital and ecosystem services from ocean resources

Mapping and measuring ocean wealth and the associated benefit streams over time is a key step towards improved management of marine ecosystems and spaces and regenerating and sustaining ocean wealth. It provides policy-makers with the evidence base to assess the measures required to proactively manage ocean resources to deliver sustained prosperity. A key step in this process is to take the data acquired during the mapping phase and lead an assessment of natural capital.

6.3.1 The United Kingdom's Marine Natural Capital Accounts – national scale accounts

In 2011 the UK Government committed to incorporating natural capital within its Environmental Accounts by 2020 and in April 2021 it released its latest Marine Natural Capital Accounts. The government highlighted the following key points from its accounts:

- The UK marine natural capital assets for which we can estimate a value have an asset value of £211 billion.

- Marine carbon sequestration is significant and requires more research to fully understand it. It is estimated at between a little over one-third and more than double the carbon removed by terrestrial habitats.
- The value of marine renewable energy production grew in value by 37 times from 2008 to 2018.
- In 2018 there were over 400 million day trips to the coast.
- Since 2016, sustainable fishing has been more profitable per tonne than unsustainable fishing.

The accounts include condition metrics relating to levels of marine protected areas and estuary and coastal water quality over time. Provisioning services include fish catch data, including levels of sustainably caught fish (although wider externalities from fishing are excluded); renewable energy generation; fossil fuel production together with an estimate of the carbon cost of this production; and marine aggregates (sand and gravel resources). Regulating services include flood protection in terms of physical areas and properties protected together with the value of these flood defences; nutrient remediation services to remove human input of nitrogen and phosphorous from urban wastewater; and carbon sequestration services. Three coastal blue carbon ecosystems - saltmarsh, sublittoral sands and sublittoral muds - are conservatively estimated to capture between 10.5 and 60.1 million tonnes of carbon dioxide equivalent annually, with an estimated value of between £742 million and £4,259 million. This compares with gross carbon sequestration from terrestrial habitats of 28 million tonnes per year. Finally with respect to cultural services provided by coastal and marine natural assets, the accounts include numbers of visits per year to coastal and non-coastal areas and the effect of sea-views on property prices.



The asset value of marine services in 2018 was £211 billion

Asset value of marine services, £ million, 2019 prices, UK, 2018

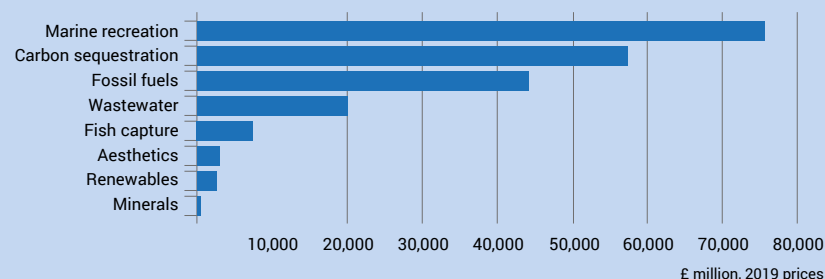


Figure 6: Extract from UK government Marine Natural Capital Accounts 2021.
Source: Office for National Statistics

Notes: 1) The asset value for carbon sequestration is based on a 2019 annual valuation; 2) The asset value for aesthetics is based on a 2016 annual valuation.

A striking outcome of these accounts is the relatively small economic contribution from fishing, which is perhaps the most obvious Blue Economy sector, when compared to the values from cultural services and regulating services, namely climate regulation, wastewater remediation and natural hazard protection. Furthermore, several of these values are underestimated or have a large range of uncertainty, particularly so for carbon sequestration which excludes marine biomass for example. Additional cultural values from on-the-water experiences and broader cultural appreciation of the UK's maritime heritage are also excluded. Recommendations made within the report to further improve the UK's marine natural capital accounts include the following:

- Further regular scientific surveys, starting with the extent of the UK's broad-scale habitats (over a third of UK marine and coastal habitats fall in the category of "seabed" or "known unknown");
- Better understanding of the interactions and trade-offs between living and non-living natural capital resources (e.g. seabed minerals) so that resources are developed with minimal detrimental effect to each other and the wider environment;
- Better understanding of the ecological processes associated with the delivery of key ecosystem services, such as those relating to heavy metal movement in the marine environment, nutrient remediation in the deep sea, effectiveness of natural hazards and the boundaries relevant for carbon processing, to enable more appropriate condition indicators to be developed; and
- Greater understanding of society's appreciation and valuation of marine and coastal habitats, which can also pave the way for opportunities for joint working and civil society involvement.



6.4 Collect and synthesise socio-economic information on existing ocean sectors and users

Natural capital, while critical, is only one element that needs to be considered by and reflected within a holistic Blue Economy strategy. Comprehensive ocean accounts should set out to bring into view the full contribution of the ocean to all sectors of society and vice versa, including for example the values of small-scale fisheries to a national economy, such as food security, responsible stewardship of the marine environment, sustainable methods in terms of fuel use and bycatch, and higher employment ratios relative to industrial fishing activity (UNEP 2012).

As with other national economic information ocean accounts include environmental, social and economic data drawn from various sources such as national statistics, scientific literature and databases, civil society and industry and organised within a clear conceptual framework. Missing data, in particular for the extent and condition of natural assets and for sectors and workers where the economic contribution of their efforts is not captured in the traditional market economy or national statistics should be gathered and included.

6.4.1 Other data platforms

As with the natural capital data portals highlighted in the opening section, a growing number of socio-economic data platforms are emerging, which can provide developers of Blue Economy strategies with useful information about human and commercial activities at sea.

These services are provided by charities or corporate entities such as [Global Fishing Watch](#), [Windward](#), [OceanMind](#) and [Marine Traffic](#). Lloyds List Intelligence's [Seasearcher](#) focuses on the commercial aspects of the maritime industries, for example.

6.5 Create a holistic dashboard of ocean wealth including historic information

With natural assets mapped, natural capital quantified and socio-economic information collected and synthesised, the next stage is to draw together these information sources into a comprehensive set of ocean accounts, comprising a dashboard of ocean wealth, so the data becomes accessible and can be interrogated in order to inform decision-making.

6.5.1 “National Accounting for the Ocean and Ocean Economy”

A report commissioned by the High Level Panel for a Sustainable Ocean Economy titled “National Accounting for the Ocean and Ocean Economy” (Fenichel 2020) proposes that a set of ocean accounts should include three areas which are consistently tracked over time:

1. **Ocean product:** measures the flow of goods and services from the ocean including those arising from human efforts in the Blue Economy, in both physical and monetary terms. This includes ocean-derived materials (e.g. fish, seaweed), energy and ecosystem services such as coastal protection and climate regulation.
2. **Ocean balance sheet:** includes the stocks in physical and monetary terms of both natural capital or environmental assets such as fish populations, biodiversity and genetic resources, coastal wetlands and seabed minerals (“non-produced assets”) and produced assets such as port infrastructure or offshore energy installations. A stable or increasing ocean balance sheet is central to sustainability. Any reduction in natural capital values indicates that ocean resources are being depleted, leading to reduced flows of goods and services from them in the future.
3. **Ocean income:** measures the benefits to people from the ocean, broken down by different constituencies and expressed in monetary terms.



This should be complemented by:

4. **Ocean impacts:** information on the flows to coastal and marine ecosystems from socio-economic activities, such as air and water emissions and waste flows, which influence the condition and hence value of natural assets over time.
5. **Ocean governance:** contextual information on ocean governance developments and indicators such as relevant taxes and subsidies; policies and regulations; health, poverty and social inclusion; protected areas implementation; research and technology.

It is not sufficient or meaningful to simply view the aggregate ocean asset value indicated by an ocean balance sheet. What is helpful is for policy-makers to firstly be very clear on what is and is not included in ocean accounts as they develop (no country is yet producing a complete set); and secondly to regularly request and review information on each of the areas above, which should be presented consistently over time. Identifying gaps in data can inform research priorities. The ability to view monetary accounts, physical accounts (e.g. stocks of fish), environmental indicators such as ocean acidification and human indicators for employment and wellbeing separately is important for characterising the overall state of the ocean economy.

The key thing is that ocean accounts are used to guide decision-making, however imperfect or incomplete they may be. Lack of data cannot be an excuse for failing to consider natural assets in decision-making. As the authors of the High Level Panel report make clear, the most useful question a policymaker should ask is how ocean wealth, a key indicator of sustainability, has changed over time.

6.5.2 The Global Ocean Accounts Partnership

In 2019 the [Global Ocean Accounts Partnership](#) (GOAP) was created to coordinate efforts by governments to create Ocean Accounts, develop a shared technical framework for ocean accounting and support collaborative capacity-building activities. The GOAP maintains guidance documents on ocean accounting for technical specialists and decision-makers and coordinates regional communities of practice and training programmes.

The GOAP's technical guidance for Ocean Accounts, a framework devised by a coalition of experts led by The United Nations Economic and Social Commission for Asia and the Pacific, aligns with the UN System of Environmental Economic Accounting (SEEA), which is the accepted international standard for environmental-economic accounting and is in use by 89 countries, according to the UN's 2020 Global Assessment. Several countries are engaging with the Global Ocean Accounts Partnership to produce pilot Ocean Accounts and share lessons. Three of these countries are considered in the examples on the next page.

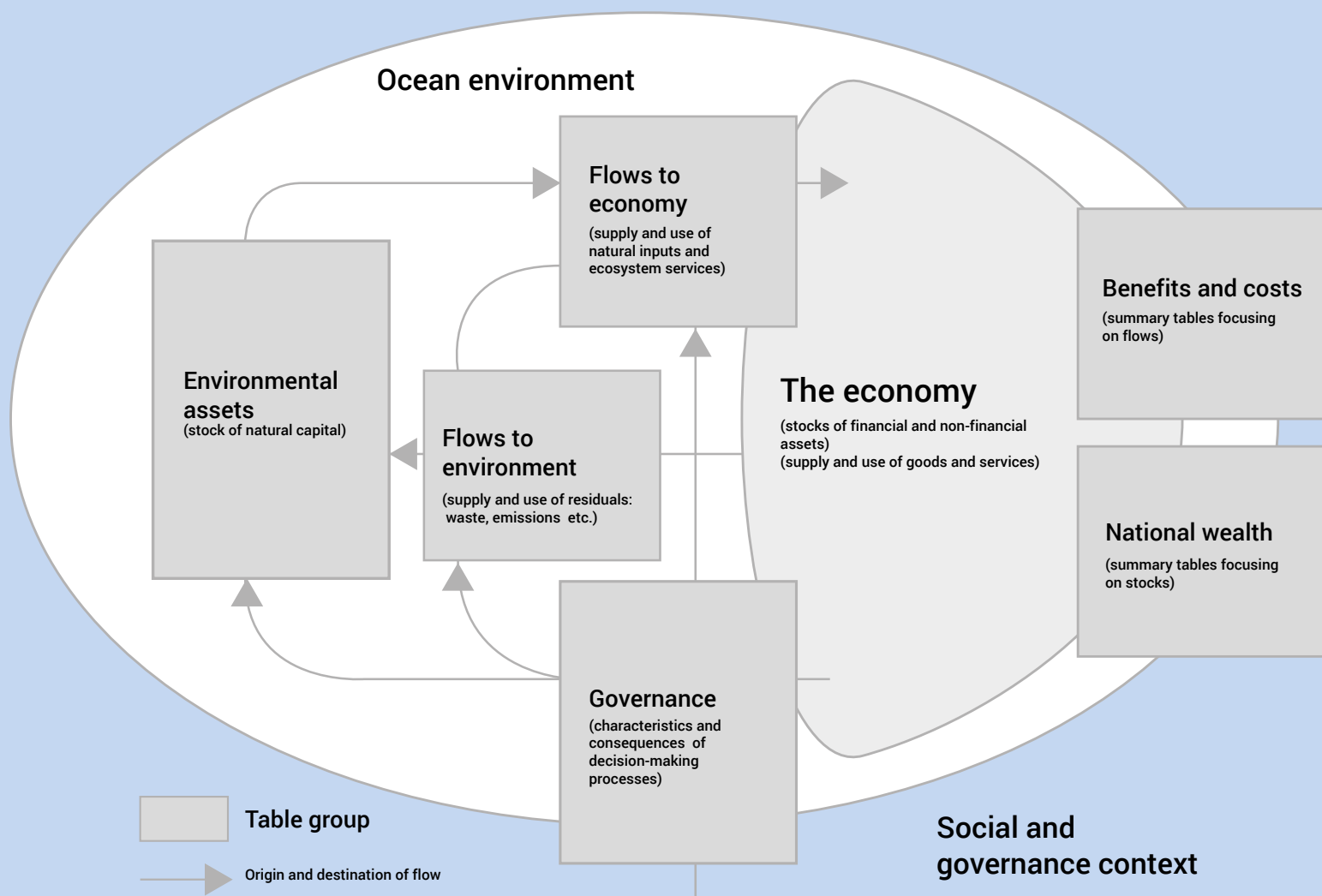


Figure 7: The Ocean Accounts Framework: an integrated structure for ocean data and statistics. From draft Technical Guidance on Ocean Accounting compiled by the Global Ocean Accounts Partnership

In this schematic the economy is reflected as a user of ocean services. In turn the economy produces residual flows to the ocean environment (pollutants)



6.5.3 Canada's Ocean Accounts pilot – including key ecosystems

Canada anticipates its ocean accounts “will help us better understand the total value that oceans bring to our society. Ocean accounts will contain ocean-related environmental, social, and economic data in a comprehensive way so we can determine whether investments in our oceans are building ocean wealth for future generations” (Blue Economy Strategy Engagement Paper 2021).

Currently Canada's ocean economy accounts for \$31.7 billion annually in gross domestic product and almost 300,000 jobs in fisheries, aquaculture, energy, shipping, tourism and recreation. Canada is co-chair of the Global Ocean Accounts Partnership and one of several countries piloting a new Ocean Accounts framework.

As part of its national pilot, Statistics Canada is focused on creating initial national accounts of ocean and coastal ecosystem extent and condition for several key ecosystems: seagrass meadows, kelp forests, cold-water corals, sponge reefs, and saltmarshes, in addition to collecting data on sea surface temperature, salinity and sea ice. Fisheries and Oceans Canada (DFO) is also collaborating with University of British Columbia to generate an initial assessment of blue carbon stocks in eelgrass beds along the Canadian coastline, as a step towards estimating carbon stocks for seagrass in general.

6.5.4 Australia's Ocean Accounts Pilot – at a Marine Park scale

Australia conducted an ocean accounts pilot project in 2020 for the Geopraphe Marine Park in Commonwealth waters off Western Australia to provide structured environmental, social and economic information to inform ongoing management of the marine park and to improve its understanding of how ocean accounts can help the government sustainably manage marine resources.

The pilot project reviewed four main ecosystem asset types across the 96,477 hectares of the marine park including seagrass meadows (57%), sandy bottoms (42%) and areas of rocky reef and kelp forest.

Results from the pilot are summarised in the graphic below, showing significant market contributions from recreational fishers (A\$2.2m

surplus) and whale watching (A\$254k surplus) along with other values such as seagrass carbon stores worth an estimated A\$444k. Acknowledging uncertainty in the confidence of the findings because of data limitations and noting that the measurement and accounting for cultural services was beyond the scope of the project, the authors note that the project has increased awareness of the contribution of Geopraphe Marine Park to human wellbeing in addition to the park already playing an important role in biodiversity conservation.

Recommendations to the government from the study authors include the following:

- Be led by user needs and their methods of access to ocean accounts, to prioritise what is produced, its frequency and its granularity;
- Appoint a central body to coordinate production of national ocean accounts and the setting of data standards;
- Include confidence estimates where data gaps exist and risk profiles, to inform priorities for investing further in data collection;
- Map the extent and condition of ecosystems and monitor species regularly and consistently. This is critical in the development of policy; and
- Foster standardisation, coherence and sharing of data across diverse and ongoing data collection efforts of government, the private sector, academia and community organisations.

These early examples of pilot ocean accounts demonstrate some substantial and hitherto hidden values by way of social and economic services that ocean spaces provide. They cast traditional ocean economies and industries in a new light and introduce additional sectors and services into the Blue Economy mix. This in turn allows for more nuanced and evidence-based decision-making which takes a longer view.

It is encouraging to note that efforts are underway to develop ocean accounts in several other countries, including Fiji, Indonesia, Malaysia, Norway, Portugal, Samoa, Thailand, Vanuatu and Vietnam. Learnings from these countries will provide invaluable lessons for other countries to follow.

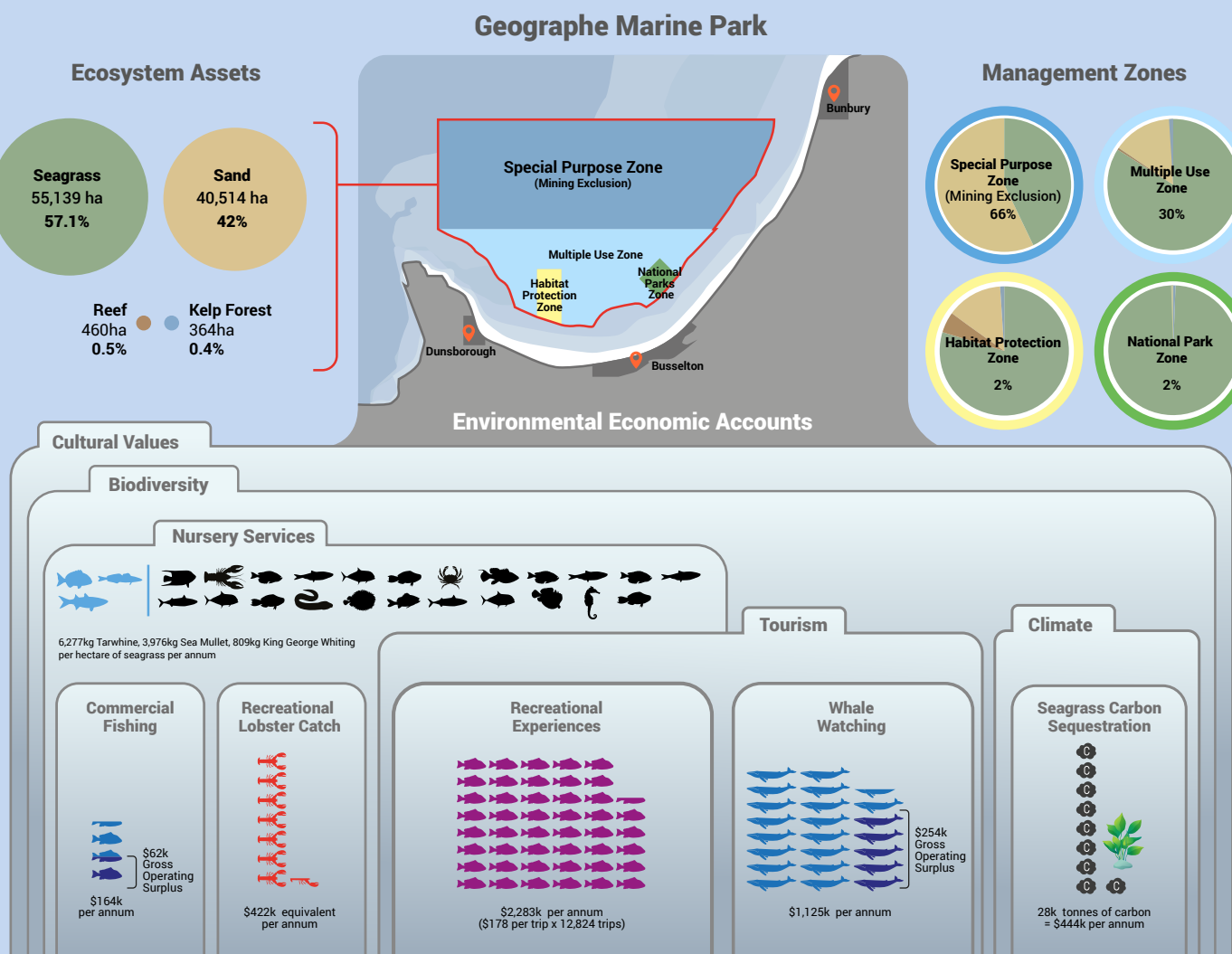


Figure 8: IDEEA Group (2020) Synthesis report, Ocean accounting pilot for Geographe Marine Park. Institute for the Development of Environmental-Economic Accounting, Victoria, Australia



6.6 Monitor ocean wealth over time and adapt marine spatial planning and policy as necessary

The systems and processes set out above are not only essential for the formulation of Blue Economy strategies, but require constant attention and revisions in order to identify changes over time and design responses to new intelligence.

6.6.1 Morocco's natural capital accounts for its fisheries

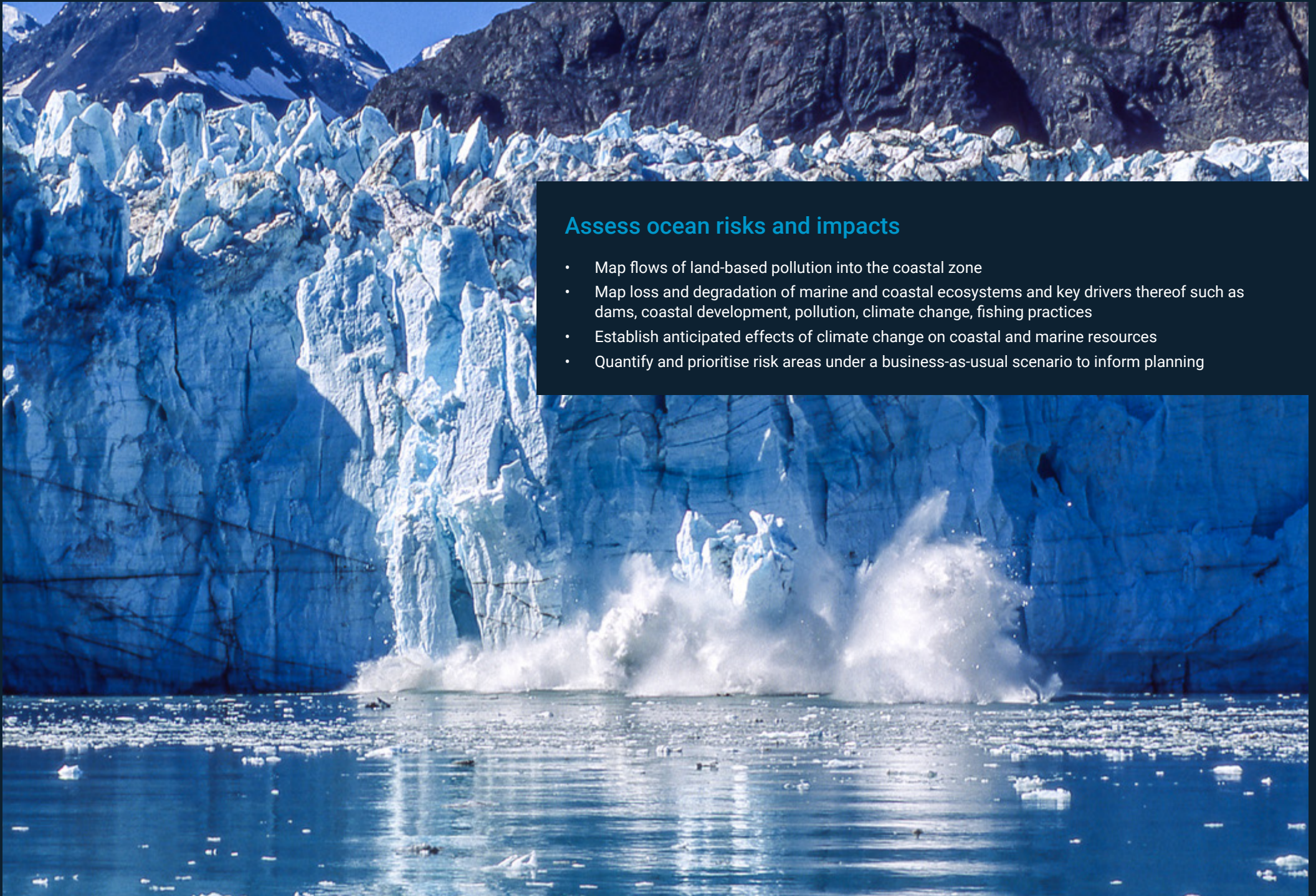
Developing a complete and integrated dashboard of ocean wealth is a significant endeavour that will not take place overnight, so many governments are staggering their approach to comprehensive development by prioritising the focus on key elements of their Blue Economy. Morocco, for example, has started its journey to quantify and regularly review its natural capital by focusing on its fisheries. The North African country has been working with the World Bank's [WAVES](#) (Wealth Accounting and the Valuation of Ecosystem Services) partnership to develop [accounts](#) that cover the supply and use of fisheries, both in primary and processed form. The focus ranges from catch and harvest volume to household consumption of fish products and import and export value.

By analysing the data in these accounts, decision-makers can gain a more informed sense of progress and potential areas for further exploration and investment. For example, analysis of Morocco's fisheries data revealed that more than 5,500 jobs were created in the fishing and aquaculture sectors between 2010 and 2018, with an increase of over 30,000 in the fish processing industry over the same period.

Such insights are powerful inputs to inform further decisions and activity, for example, to drive new phases of targeted marine spatial planning to prepare for likely future states, or to encourage new environmental protection policies.



A stable or increasing ocean balance sheet is central to sustainability



Assess ocean risks and impacts

- Map flows of land-based pollution into the coastal zone
- Map loss and degradation of marine and coastal ecosystems and key drivers thereof such as dams, coastal development, pollution, climate change, fishing practices
- Establish anticipated effects of climate change on coastal and marine resources
- Quantify and prioritise risk areas under a business-as-usual scenario to inform planning



7 THE BLUE ECONOMY IN PRACTICE: ASSESSING OCEAN RISKS AND IMPACTS

7.1 Rationale for assessing ocean risks and impacts

Understanding risks and their compounding impacts on the ocean is important to shaping policy priorities for protecting and enhancing both natural and built Blue Economy resources. When assessing ocean risks and impacts, there are many factors to consider, including climate change, overfishing, pollution (both from land and sea sources) and coastal development. A risk-based approach should also be adopted in assessing the impacts of introducing new Blue Economy sectors, as noted in section 9.5.

Value at risk: Policy-makers need to be clear on the potential values at risk from ocean change. Climate change results in rising average ocean temperature, which is disrupting food webs and whole ecosystems, with knock-on implications for fisheries and tourism revenues. Climate change also results in an increase of dissolved carbon dioxide in the oceans, lowering pH. These conditions, known as acidification, are not only disrupting the calcium carbonate structures of shellfish species in some geographic locations but also have the potential to alter the carbonate budgets of coral reefs, moving them from a state of accretion or stability to one of destruction. Coral reefs are significant economic assets, not only because of their tourism benefits, but also due to their natural coastal defenses to extreme ocean weather and fishery habitat provision. Further pollution sources such as mis-managed plastic waste add further pressure on the marine environment.

Adaptation planning: Climate-change induced sea level rise is already apparent and featuring in national infrastructure planning considerations. Ports need to both mitigate their climate change impacts through adopting green technologies and adapt to rising sea levels in delivering their maritime services. Coastal development plans should incorporate the latest available science on sea-level rise and deploy grey-green or natural solutions which are adaptive to sea-level rise. The use of hard coastal structures can prevent the natural landward migration of important blue carbon ecosystems, such as mangrove forests and saltmarshes which is a natural adaptation to sea level rise.

Human and aquatic health: Water-borne pollution is a significant factor in coastal water quality and riverine and marine ecosystem health. Sewage pollution and excess nutrient run-off from agriculture create eutrophication causing dead zones and harmful algal blooms (HABs), leading to outbreaks of seafood poisoning. Addressing inland water quality and solid waste management will play dividends downstream for the ocean. This emphasises the need for holistic “scape-based” approaches (e.g. [Ridge to Reefs](#)) when considering risks to the marine environment.



7.2 Map flows of pollution into the coastal zone

Water-borne pollution is a significant factor in coastal water quality and riverine and marine ecosystem health. Sewage pollution and excess nutrient run-off from agriculture create eutrophication and dead zones, leading to outbreaks of seafood poisoning. Addressing inland water quality and solid waste management will play dividends downstream for the ocean.

7.2.1 Understanding ocean sewage pollution in Hawaii

More than [80% of the world's sewage](#) is discharged into the ocean environment untreated. In some cases such as in the Caribbean it is believed to be more. There are many elements in household waste that are harmful to marine ecosystems, such as pharmaceuticals and heavy metals, that can impact coral reproduction, growth and vulnerability to disease.

[Reef managers in Hawaii](#) working with The Nature Conservancy have led community-scale research to understand wastewater impacts and which areas should be prioritised for management action. They also used citizen science techniques to assess water quality to better inform management decisions.

7.2.2 Mapping plastic debris in the Arctic

The issue of ocean plastic pollution has been high in the public consciousness since the final episode of the BBC's Blue Planet II series aired in December 2017. Scientists, however, have long been investing resources to understand the problem. In 2017, scientists from seven countries created a [map of floating plastic pollution in the Arctic](#). Arguably, the more concerning statistic is that floating plastic only accounts for about 1% of all plastic dumped in the sea. The project's scientists [estimated](#) that the Greenland and Barents seas have accumulated approximately 300 billion pieces of plastic amounting to many hundreds of tons of harmful debris, mainly originating from the US and Europe (Cozar 2017). The team used a computer model to identify where the plastic is likely to be, and such origin and drift models are increasingly available to scientists in all parts of the Blue Economy.

7.2.3 Mapping plastic emissions in Japan

To take effective action, a computer model is used to identify where and how the plastic enters the marine environment. This is exactly what [scientists in Japan showcased in 2020](#), when they published a high-resolution map of 1km grids of plastic emissions identifying where the plastic first entered a water body across Japan. Such reverse modelling can help to identify where policy interventions and public awareness campaigns may have the greatest impact.

7.3 Map loss and degradation of marine and coastal ecosystems

Marine science has and continues to provide increasing evidence of ocean degradation as a result of the past economic paradigm of overexploitation of marine resources at the cost of the natural capital represented by coastal and open ocean ecosystems (UNEP 2012), (EIU 2015), (UNEP 2016), (World Bank 2017), (FAO 2020), (Smith H. 2019).

7.3.1 The Allen Coral Atlas

As with the mapping of natural capital explored in the previous section, many sectors are developing data sets that will be of use to governments assessing marine degradation.

The increasingly commercialised space sector is reducing the cost of space data and opening the door to earth observation datasets that were, in relatively recent history, only accessible by the most powerful of governments. Such earth observation techniques hold great promise for evidence-based Blue Economy development, as demonstrated by the launch in May 2021 of the [Allen Coral Atlas](#). This is the world's first satellite-based global coral reef monitoring system, complementing its reef extent and composition maps, to provide a comprehensive picture of coral reef change over time. In particular, researchers, conservationists, and Blue Economy policy-makers using the monitoring system can observe where corals are bleaching throughout the world.



7.4 Establish anticipated effects of climate change on coastal and marine resources

Policy-makers need to be clear on the potential values at risk from ocean change. Climate change results in rising average ocean temperatures, which is pushing many marine species beyond the boundaries of their thermal niche forcing them to undergo range shifts, disrupting food webs and whole ecosystems, with knock-on implications for fisheries. Many of the species that are being affected by climate change are charismatic, such as marine turtles or humpback whales, and are key drivers of tourism revenues. Climate change also results in an increase of dissolved carbon dioxide in the oceans, lowering pH.

In 2019, the UN reported that while sea level has risen globally by around 15 cm during the 20th century, it is currently rising more than 3.6mm per year, which is twice as fast, and still accelerating (IPCC 2019). Coastal development plans should incorporate the latest available science on sea-level rise and deploy grey-green or natural solutions which are adaptive to sea-level rise.

7.4.1 UNCTAD – climate change impacts in Caribbean coastal transport infrastructure

In 2018, the United Nations Conference on Trade and Development (UNCTAD) published [two case studies](#) focusing on climate change impacts and adaptation for coastal transport infrastructure in the Caribbean. The case studies focused on Jamaica and Saint Lucia and analysed infrastructure scenarios in a range of potential future states. Dynamic modelling suggested that most of the seaports and some international airport runways were increasingly likely to suffer from coastal inundation. Less immediately obvious impacts were also analysed, such as the fact that higher temperatures would reduce aircraft lift, requiring either reduced payloads, longer runways than currently exist, or both. Assuming current technology standards, warming of 1°C warming was also predicted to result in a 5% increase in energy requirements, related to increased demand for cooling and ventilation systems.

This work was further supported by a [Climate Risk and Vulnerability Assessment Framework](#) for Caribbean Coastal Transport Infrastructure.

7.5 Quantify and prioritise risk areas

Based on available data on known risks, it is possible to identify which areas to prioritise for more data collection, further analysis and action. These can be targeted at a strategic level, or take root in individual Blue Economy sectors.

7.5.1 The World Bank's natural capital risk assessment in the Caribbean

As part of its 2016 report “Toward a Blue Economy: A Promise for Sustainable Growth in the Caribbean”, the World Bank undertook a natural capital risk assessment in the Caribbean, to provide a realistic backdrop for further Blue Economy thinking and development. The report focused on four distinct risk areas: overfishing; coastal development (such as filling wetlands or hardening coastlines for construction); pollution (largely focused on plastic pollution and excess nutrients from agricultural run-off and untreated sewage); and climate change and ocean acidification. It highlighted that in some cases the decline of ocean assets caused by these threats may prevent Blue Economy sectors and industries from reaching their full potential in the region. These trends featured heavily throughout the rest of the document influencing the report's recommendations.

7.5.2 Port of Los Angeles' Sustainability plan

Climate-change induced sea level rise is already apparent and featuring in national infrastructure planning considerations. Ports need to both mitigate their climate change impacts through adopting green technologies and adapt to rising sea levels in delivering their maritime services. The Port of Los Angeles (POLA), the busiest container port in North America, has been showing leadership here in recent years, placing climate change mitigation at the heart of its environmental policy. This manifested in a commitment to become [a zero-emissions port](#), planning



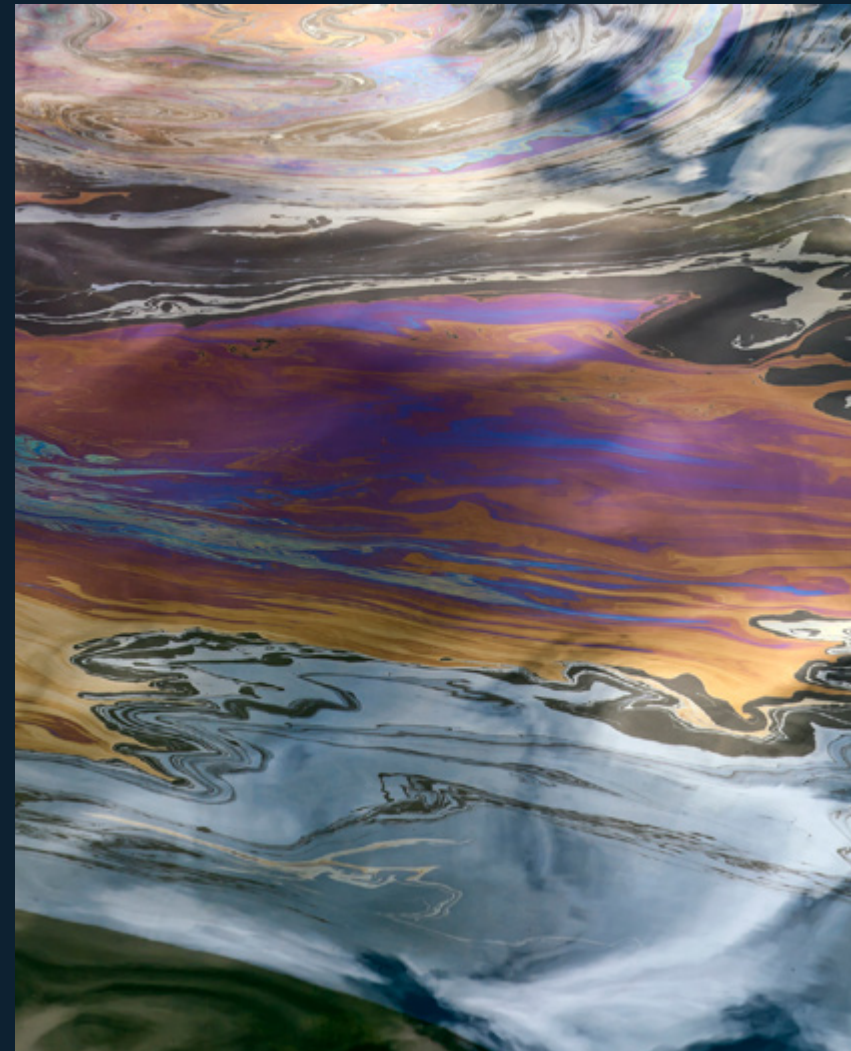
to ensure all cargo-handling equipment on the docks will be zero-emission vehicles by 2030, and the same for trucks servicing the terminals by 2035. The port aims to reduce greenhouse gas emissions to 40% below 1990 levels by 2030 and 80% below 1990 levels by 2050. In October 2020, POLA reported that it had reduced emissions by 7% year on year, already putting it ahead of its interim 2023 target.

7.5.3 China's marine pollution action plan

In 2018 China proposed an action plan comprising four main actions: land-based pollution control, marine pollution control, ecological protection and restoration, and environmental risk prevention. Launched by the Ministry of Ecology and Environment, the National Development and Reform Commission and the Ministry of Natural Resources, the Action Plan addressed Comprehensive Governance of the Bohai Sea, 78,000km² of seaspace off the east coast of China. A comprehensive and systematic approach is evident in actions to address, for example, "pollution control of rivers entering the sea; strict control of industrial pollution source discharge; clean-up of sewage outlets; promotion of agricultural, rural and urban pollution prevention and control; and reduction of land-based pollutants into the sea" (Wenhai 2019).

7.5.4 Oil pollution

In addition to sewage and plastic, a further source of anthropogenic pollution that occurs in marine spaces is oil pollution. In late 2019, the northeast coastline of Brazil was seriously threatened by an ['unprecedented' marine oil spill](#), the origins of which are, to this day, still unknown. What is known is that a third of the country's northeastern coastline was affected by the incident, and key marine habitats including at least 14 marine reserves and parks were sullied by thousands of tonnes of crude oil. While local coastal communities [rallied to the clean-up cause](#), it would obviously have been far less damaging if the spill had been detected before it had hit land.





Establish a holistic and integrated Blue Economy governance framework

- Create gender-balanced, responsive and trans-disciplinary ocean governance structures including Finance and Education Ministries, representing all key ocean stakeholders
- Establish accessible ocean data repositories and portals and data governance protocols
- Mobilise financial resources for implementation of Blue Economy plan
- Participate in international collaborations for peer-learning, innovation and cooperation

Pictured in 2019, left to right, are Tapaeru Herrmann, Secretary, Ministry of Foreign Affairs & Immigration; Dr Manu Tupou-Roosen, FFA Director-General; and Pamela Maru, Secretary, Ministry of Marine Resources. Credit: Ministry of Foreign Affairs and Immigration, Cook Islands.



8 THE BLUE ECONOMY IN PRACTICE: ESTABLISHING A HOLISTIC AND INTEGRATED BLUE ECONOMY GOVERNANCE FRAMEWORK

8.1 Rationale for a holistic and integrated approach to Blue Economy governance

A national Blue Economy is likely to involve a wide range of marine and maritime themes, potentially including sectors as diverse as offshore energy generation, defence, port services, small-scale and commercial fishing, travel and tourism, education, inward investment and foreign affairs (see Appendix 1). Importantly the ocean is a global commons and all citizens will have a view on how their nation's EEZ should be managed for the benefit of current and future generations. Blue Economy considerations sit within the ocean environment.

Social equity and buy-in: To ensure all interests are reflected and to prevent the possibility of potential disparities and inequalities (real or perceived) between stakeholders, novel ways of structuring government strategy, engagement and support are required. Inclusive approaches should seek to redress existing inequities and conflicts in accessing and gaining value from ocean resources, and to foster co-management of coastal ecosystems and local empowerment. Transparency of action and communication invite public trust.

New insights: Climate change, biodiversity loss and marine pollution are systemic challenges which require systemic solutions. Inviting and incentivising wider sectors of society including entrepreneurs, commerce, academia, NGOs and impact investors to engage in ocean and Blue Economy planning and governance provides fresh insights, evidence and innovation to inform policy measures.

Adaptive: Governance approaches which are more flexible and open than traditional top-down methods are likely to be more adaptive to change and fit-for-purpose in an effective Blue Economy.

Two examples of existing ocean governance structures are examined in detail in section 9. Such structures should reflect the nation's vision for its ocean space and uses and be proportionate to the scale and complexity of its Blue Economy activities.



8.2 Create inclusive ocean governance structures representing all key stakeholders

When developing holistic governance frameworks, all relevant stakeholders need to be considered and consulted to ensure that the decision-making process is inclusive, transparent and enables capacity and resilience building (Weiland 2021). A stakeholder is a person or a group of people that have a stake in the resource, the process, the development, or the outcome of the process (Mackenzie 2019). Stakeholders include a diverse set of people such as decision-makers and managers, local communities representing socio-economic and civil societies, and ocean users within sectors and interest groups, among others (Malone 2014).

For any holistic Blue Economy strategy to be considered truly inclusive, all relevant stakeholders need to be able to see themselves in it: where they fit; what they can contribute; where they are touched by linkages and cross-sectoral interdependencies; and how they will benefit from more strategic, joined up thinking. Each nation's Blue Economy will involve a myriad of stakeholders and strategic themes across individual marine and maritime sectors; cross-cutting governmental priorities (e.g. employment, education, exports and inward investment) and any number of community representatives (e.g. related to industry labour groups, gender and indigenous people's equality).

Where a diverse group of stakeholders is involved, such as in ocean governance, an inclusive approach to reaching all stakeholders needs to be targeted. There is no one-size-fits-all solution to stakeholder engagement because geographic and cultural differences exist in opportunities to manage and develop the marine space and in the way that communities engage with the marine space. Hence, several different approaches to stakeholder engagement should be considered to ensure that the needs and demands of a wide variety of stakeholders are captured.

8.2.1 Engaging stakeholders: The Bermuda Ocean Prosperity Programme

An example of a transparent stakeholder engagement plan is one led by the Government of Bermuda. The [Bermuda Ocean Prosperity Programme](#) (BOPP) is a partnership between the Government, the Waitt Institute and the Bermuda Institute of Ocean Sciences (BIOS). It has the stated aim of protecting Bermuda's marine resources whilst maximising potential for sustainable economic growth. BOPP's Blue Economy Draft Strategy encompassed three sectors (fisheries, ocean renewable energy and blue tourism) and developed economic analyses and recommendations over a ten-year period, to inform policy and investment decisions.



OUR PROCESS

2019-2020



BOPP Steering Committee Selection of Three Industries for Focus

Industries were chosen based on importance to Bermuda and potential growth.



Global Market Assessment and Local Economic Assessment

Industry-wide global trends and understanding of performance of the industry in Bermuda.



Stakeholder Interviews

Interviews to collect expert input and views of the Bermudian stakeholders.



Expert Review and Recommendations

Industry experts evaluate research and draft specific recommendations for each industry.



Steering Committee and Bermudian Expert Review

Experts in Bermuda and the BOPP Steering Committee provides inputs to the Draft recommendations.

2021 ONWARD



Preliminary Report Recommendations released for Public Comment

BOPP will conduct stakeholder outreach to receive input on the recommendations of each report. Stay tuned!



Quantitative Analysis

An analysis will be performed to model the economic impact of each recommendation, such as projected revenue gains and jobs created.



Development of Draft Strategy

Using the results of the reports and the inputs of stakeholders, a Draft Blue Economy Strategy for the next 10 years will be produced.



Public Release

The Draft Blue Economy Strategy will be shared with Bermudian stakeholders and the public.



Government Review

The Bermudian Cabinet will review the Draft Strategy and develop next steps. The strategy is not legally binding and is meant to guide policy decisions.

Figure 9: The Bermuda Ocean Prosperity Programme's process for establishing its Blue Economy Draft Strategy



As depicted above, BOPP set out a concise and clear ten-step process for involving stakeholder communities in the development of the Draft Strategy, with steering committees, stakeholder interviews, expert input and public reviews all built in and clearly signposted. Such clarity and visibility can only help various stakeholders to appreciate process and to understand where they can benefit and contribute.

8.2.2 Engaging stakeholders: Canada's Blue Economy strategy

Canada has invested similar amounts of thought and energy into the stakeholder engagement elements of its Blue Economy strategy. In December 2020, the Canadian Fisheries and Oceans Minister [announced](#) that an online consultation process would take place in the following months to allow “provinces, territories, Indigenous peoples and others” to contribute ideas to its emerging Blue Economy strategy. The Minister also used the announcement to ensure communities understood the breadth of the initiative, asserting that the Blue Economy was “not only the fishing industry”, outlining that it also included “aquaculture, energy, ocean technology, shipping, tourism and other industries.”

The full consultation process commenced in February 2021 with a series of [‘marathon’ roundtables](#) involving the Minister and stakeholders from groups representing fisheries and aquaculture, academia and women leaders in ocean sectors. A month later all Canadians were [invited to contribute](#) to the strategy, via an [online engagement portal](#) that allowed for direct input as well as featuring a [Blue Economy Strategy Engagement Paper](#) and providing a [Blue Economy Strategy Engagement Toolkit](#) to encourage interested groups and citizens to lead broader community consultations in their area. The toolkit featured background information, promotional materials, a discussion guide, and templates to collate and submit the results of any consultation sessions.



Figure 10: Canada's Blue Economy Strategy promotional material in Inuktitut (Inuit language)

While these headline outreach activities are commendable, it is important to recognise that one size may not fit all. Stakeholders groups are diverse and as in any sector or in any walk of life some may need specialist approaches in order to facilitate meaningful input. For example, the Canadian Fisheries and Oceans Minister highlighted indigenous communities as being of critical importance to the development of their Blue Economy strategy, as they possess vast knowledge and centuries of experience working with and protecting the oceans.

It is also important to underline that stakeholder engagement is not a one-off endeavour; it is an ongoing and ever-evolving process. Effective ocean governance includes a long-term vision of capacity building and resilience building which is regionally specific. An adaptive stakeholder engagement process can also help assess and continuously reassess the state of the marine resource and the state of human development aspects, particularly focusing on human health and wellbeing (Britton 2021).



8.3 Establish accessible ocean data repositories and portals and data governance protocols

As illustrated in sections 6 and 7, accurate and up-to-date information is essential to provide an evidence-based approach to the development of a holistic Blue Economy strategy. As new Blue Economy approaches reach beyond traditional ocean governance structures, new approaches to data management and accessibility are also required.

8.3.1 India's Draft Blue Economy Policy Framework

The Indian government has recognised this and is taking appropriate steps to develop new data policies that are fit for the future. In its [Draft Blue Economy Policy Framework](#), published in September 2020, the Economic Advisory Council to the Prime Minister acknowledged the significant progress that the country has made in mapping its coastal regions and EEZ. At the same time, it recognised the need to further streamline all existing data and mapping policies, and that they should be dovetailed with Coastal Marine Spatial Planning requirements. A new National Map and Data Policy is accordingly being developed, in line with data security and transparency requirements.

India already has proof of the success of investing in ocean-related data portals. In 2018, the country reaped the rewards of investment in the digitalisation of its maritime industry. Its centralised web-based Port Community System (PCS) was developed to provide global visibility and access to the central database for all its port community stakeholders through internet-based interfaces. This data-driven modernisation agenda was cited as one of the major reasons why India surged 23 places (from 100 to 77) in the World Bank's Ease of Doing Business report. Such returns on investment prove to all stakeholders the value of opening up data, lessons that can be incorporated into the wider Blue Economy agenda.



To me, the Blue Chakra or wheel in India's national flag represents the potential of blue revolution or the Ocean Economy. That is how central the Ocean Economy is to us.

Shri Narendra Modi, Prime Minister of India



8.4 Mobilise financial resources

Financial resources to support Blue Economy implementation can be found both from existing programmes and new sources (Sumaila 2021).

8.4.1 Repurpose subsidies

SDG Target 14.6:

By 2020, prohibit certain forms of fisheries subsidies which contribute to overcapacity and overfishing, and eliminate subsidies that contribute to IUU fishing, and refrain from introducing new such subsidies, recognizing that appropriate and effective special and differential treatment for developing and least developed countries should be an integral part of the WTO fisheries subsidies negotiation.

A key area for consideration is the responsible use of government subsidies to stimulate sustainable rather than unsustainable activities. Overfishing has been the greatest contributor to the steep decline in the ocean's biodiversity (Rogers 2020) and "very often state funding keeps unprofitable fishing fleets at sea whilst fish stocks are at risk of collapsing in many parts of the world due to overexploitation" (World Trade Organisation 2021). Prolonging "harmful" subsidies which support overcapacity in fishing, and which were estimated to be in the range of \$22bn globally in 2018 (Sumaila 2019), will simply fuel the downward spiral of natural resources and dilute or negate the effectiveness of any conservation investments.

8.4.1.1 New Zealand's subsidy lobbying

New Zealand has lobbied the WTO for many years to eliminate subsidies and level the playing field in international fisheries. In 1986 the country eliminated its fisheries subsidies and simultaneously introduced rights-based management of fisheries with a system of individual transferable quotas. Compensation was awarded to fishers willing to exit the industry. New Zealand is also among the 11 member countries of the Comprehensive

and Progressive Agreement for Trans-Pacific Partnership (CPTPP), along with Australia, Brunei, Canada, Chile, Japan, Malaysia, Mexico, Peru, Singapore and Vietnam. The UK is currently applying to join. Representing countries with economies that comprise 13.4% of global GDP this is one of the world's largest free trade areas by GDP. It is also the first international trade agreement which prohibits subsidies that negatively affect already over exploited fish stocks, containing a requirement for member countries to phase out subsidies to overfished stocks within three years after implementation of the Agreement. Given that its member countries account for 14% of world fisheries and aquaculture production (FAO 2019), this is a powerful driver for subsidy reform.

8.4.2 Repurpose infrastructure finance

There is a growing recognition among multilateral development banks that infrastructure finance needs to be ocean-positive. Investing in maintaining and restoring coastal ecosystems such as mangroves, coral and oyster reefs is a cheaper and more adaptive response to sea-level rise (since these ecosystems grow as sea level rises) than built infrastructure alternatives for reducing flood risk. Natural or grey-green approaches also provide associated biodiversity, carbon capture and livelihood co-benefits. Maintaining mangroves is estimated to save more than \$65 billion annually in flood damages across 100 countries (Menendez 2020) and the ecological restoration economy provides significant employment and economic contributions (BenDor 2015), contrary to perceptions that environmental regulation is bad for business.





8.4.2.1 US Department of Defense's investment in Reefense

One example is the US Government Department of Defense's new investment in [Reefense](#), which integrates structural engineering, reef health, and adaptive biology to create reef-like ecological systems which can mitigate the wave damage associated with sea-level rise and more challenging storm events, reduce the ecological impact of current coastal protection measures and reduce infrastructure maintenance costs. Recognising and classifying coral reefs, mangroves and other coastal ecosystems as the first line of defence in national coastal infrastructure can help direct and make best use of public funds to protect against natural events whilst contributing to climate change mitigation and providing employment.

8.4.3 Stimulate natural capital and ecosystem services markets

Requiring the financial sector to disclose its impacts on natural capital is a potent policy measure. It provides the essential signal to financial markets to internalise nature in decision-making and stimulate nature-positive investment opportunities. Restoring biodiversity builds in redundancy and resilience to future shocks, by providing alternative resources. It mitigates economic risks, which are compounding because of the risk of reaching tipping points from having exceeded four of the nine planetary boundaries already (Rockström 2009). These compounding systemic risks also need to be fully recognised by the financial community and central banks.

Developing governance and regulatory frameworks which are coherent in addressing climate change, biodiversity loss and societal needs alongside economic opportunities can encourage inward investment. This could include ambitious efforts in establishing Nationally Determined Contributions to the Paris Agreement on Climate Change (2015) which transparently complement the development of voluntary carbon market opportunities.

8.4.3.1 The Dutch Central Bank highlights biodiversity as a material financial risk

In 2020, the Dutch Central Bank and financial supervisor, De Nederlandsche Bank (DNB), was the first central bank to highlight [biodiversity as a material financial risk](#), finding that assets at risk represent more than a third of the assets managed and owned by Dutch banks, pension funds and insurers.

8.4.3.2 China's blue carbon economic development action plan

Supporting the development of carbon markets can accelerate access to significant new sources of funds, as institutions implement their net zero plans. Weihai city announced China's first blue carbon economic development action plan in 2021, which proposes that blue carbon will comprise 30% of Weihai's Blue Economy by 2025. Planned activities include research on ocean ecosystem carbon capture; development of carbon measurement and evaluation standards; coastal wetland restoration; ecotourism development and a new "marine eco-economic innovation and development demonstration zone and a blue carbon valley" to attract new enterprises.

8.4.4 Encourage financial innovation

In addition to the traditional sources of finance, new opportunities exist to fund Blue Economy activities, such as debt-for-nature swaps and blue bonds which tie funding flows to environmental outcomes, both of which have been transacted by the Government of Seychelles. Novel products for insuring natural assets such as coral reefs have also been developed and this approach could be extended to other protective coastal ecosystems such as mangroves. Evidence of strong governance mechanisms and prudent fiscal management will be required by funders.

Lack of access to capital can be a key constraint for local actors and opportunities should be explored to redress this. In a full value-chain analysis of the perspectives of fishers, small-scale processors, middlemen and company agents in Kenya, access to financial capital emerged as the top constraint across all sites and actor groups (Kimani 2020). Small-scale



fisheries actors cited their inability to access loans, usually through not owning assets such as land or equipment that might be used as collateral. Mobile apps to transparently record fishing information from catch source to plate, combined with mobile money mechanisms, can provide financial security to unbanked small-scale fishers whilst supporting sustainable fishing.



8.5 Seek international support and alliances

One signal of the rapid rise in importance of the Blue Economy is how much it is now being referenced within official diplomatic circles. International alliances provide important bridges and opportunities for peer learning, cooperation and innovation.

8.5.1 Commonwealth Blue Charter

The [Commonwealth Blue Charter](#) is a commitment by the 54 Commonwealth countries (which collectively comprise 35% of national waters) to actively cooperate in solving ocean-related problems and

meeting commitments for sustainable ocean development. Launched in 2018 the Charter is powered by 10 action groups led by 15 governments tackling areas as diverse as ocean acidification, sustainable aquaculture and coral reef protection and restoration. The Charter plays a catalytic role in enabling governments to learn from each other and from expert partners through action group meetings, [toolkits and case studies](#).

8.5.2 Other alliances

A snapshot of activities between March and May 2021 illustrates the breadth of international Blue Economy engagement taking place. [Kenya and Morocco](#) discussed Blue Economy investment, technology and skills transfer; and [Kenya and Norway](#) explored collaboration, training and investment in the fishing industry. In parallel, the Acting African Union Commissioner for Agriculture, Rural Development, Blue Economy and Sustainable Environment and the European Union Commissioner for the Environment, Oceans and Fisheries led 140 policy, community and business leaders from across Africa and Europe in discussions on [sustainable Blue Economy investment best practices](#).

In the Caribbean [Belize and the UK](#) discussed how the UK's Commonwealth Marine Economies Programme can contribute to Belize's Blue Economy strategy; and the Prime Minister of Antigua and Barbuda discussed with the UK and other Commonwealth leaders [accessing the necessary technical expertise](#) to allow his nation to transition to a sustainable Blue Economy. Barbados' Minister of Maritime Affairs and the Blue Economy issued a rallying call across the region, emphasising that the "tremendous" opportunity provided by the Blue Economy could only be achieved if Caribbean countries "[come together to work as one](#)".

While some of these engagements were early stage explorations of potential engagement value, it is clear that the Blue Economy is now embedded in the language of international diplomacy; we can expect much more of the same in the coming months and years, as the respective strengths and needs of partner nations align more effectively to regional and global Blue Economy approaches.



Develop a Blue Economy plan

- Determine an overall vision for a national Blue Economy
- Establish SMART objectives (specific, measurable, achievable, realistic and timebound)
- Undertake consultative Marine Spatial Planning (MSP) including ambitious conservation targets, including all ocean stakeholders
- Determine policies and regulations with an ecosystem and natural capital approach including activities on the high seas
- Assess land-based measures required to stem ocean pollution
- Plan and secure resources to implement and enforce associated regulations, including capacity development



9 THE BLUE ECONOMY IN PRACTICE: DEVELOPING A BLUE ECONOMY PLAN

9.1 Rationale for developing a Blue Economy plan

Developing a Blue Economy plan guided by a clear national vision provides a strategic focus for government policy and actions. Supporting this with consultative marine spatial planning which incorporates ambitious marine protection and conservation areas provides a clear mandate for action and begins to define the resources and measures required for implementation.

Optimise use of resources: Marine spatial planning (MSP) is a public process of analysing and allocating the spatial and temporal distribution of human activities in marine areas to achieve ecological, economic and social objectives that have been specified through a political process ([IOC UNESCO](#)). Different sectors may be combined to synergistic effect (such as whale-watching activities within a marine protected area) or can be segregated (such as shipping lanes and protected areas). Spatial and temporal planning guide where overlaps can safely be made, allowing best sustainable use of ocean space.

Development roadmap: Articulating a Blue Economy plan backed up by evidence-led and consultative MSP identifies economic development opportunities and supports the business case for investment in new areas. Analysing the current and potential financial benefits of different Blue Economy activities provides a holistic view of the shared costs of enabling activities such as monitoring, control and enforcement and how to resource them.

9.2 Determine a Blue Economy Vision

Creating a Blue Economy plan starts with defining the overall vision for a national Blue Economy. This provides the high-level aspiration of government and guides the setting of SMART (specific, measurable, achievable, realistic and timebound) objectives which comprise the strategic framework for subsequent policy and planning.

For many countries Blue Economy planning and formulation of ocean policies is only recently getting underway. For example, the only ocean policies that are cabinet-mandated for “large ocean nations” (or Small Island Developing States) currently appear to be in Vanuatu, Seychelles, Solomon Islands and St Vincent and the Grenadines. This is a new area of policy development where the lessons are still emerging but these countries have the opportunity to provide global leadership.

Two examples of setting out a Blue Economy vision with associated governance structures and ocean policy responsibilities are considered below.



9.2.1 The United Kingdom's integrated ocean policy framework

The United Kingdom was one of the earliest adopters of an integrated approach to marine policy in the world. In 2009 it developed a cross-party, cross-government and cross-departmental white paper entitled “Our Seas – A Shared Resource”, setting out a shared vision for sustainable development of the UK’s seas and the high-level marine objectives which have shaped marine policy in the UK ever since. “Our Seas” was put on a statutory footing with the Marine and Coastal Access Act 2009, the Marine Scotland Act 2010 and the development of the UK Marine Policy Statement in 2011, another first within Europe and one of the first in the world.

This integrated policy and legislative framework provided the foundations for developing integrated management of the ocean and marine spatial planning across the UK and domestic implementation of international commitments. The UK is made up of four devolved administrations (England, Scotland, Wales and Northern Ireland) which have competencies that are devolved (e.g., environment, culture) and competencies that are reserved by central UK government (e.g., energy, defense). As a result, when the UK approached the creation of an integrated approach to marine policy in what can now be seen as a Blue Economy approach, there were issues on how to integrate not only between government departments and policy areas, but also between administrations.

The government’s solution to integrated policy and delivery is set out in Figures 11, 12 and 13 below. It consists of five key components: its overarching Marine Policy Statement, a UK Marine Strategy, a UK Marine Science Strategy, a Joint Fisheries Statement and Marine Spatial Plans (MSPs) for each region.

The UK’s Marine Policy Statement, which applies to all administrations and all relevant policy and decision-making bodies within those administrations, comprises its vision and objectives for the marine environment. It was prepared in 2010 to contribute to the achievement of sustainable development in the UK marine area. Jointly adopted by the Secretary of State, Scottish Ministers, Welsh Ministers and the Department of the Environment in Northern Ireland, the UK Marine Policy Statement was seen as a key step towards achieving the vision shared by the UK Administrations of having “clean, healthy, safe, productive and biologically diverse oceans and seas”.

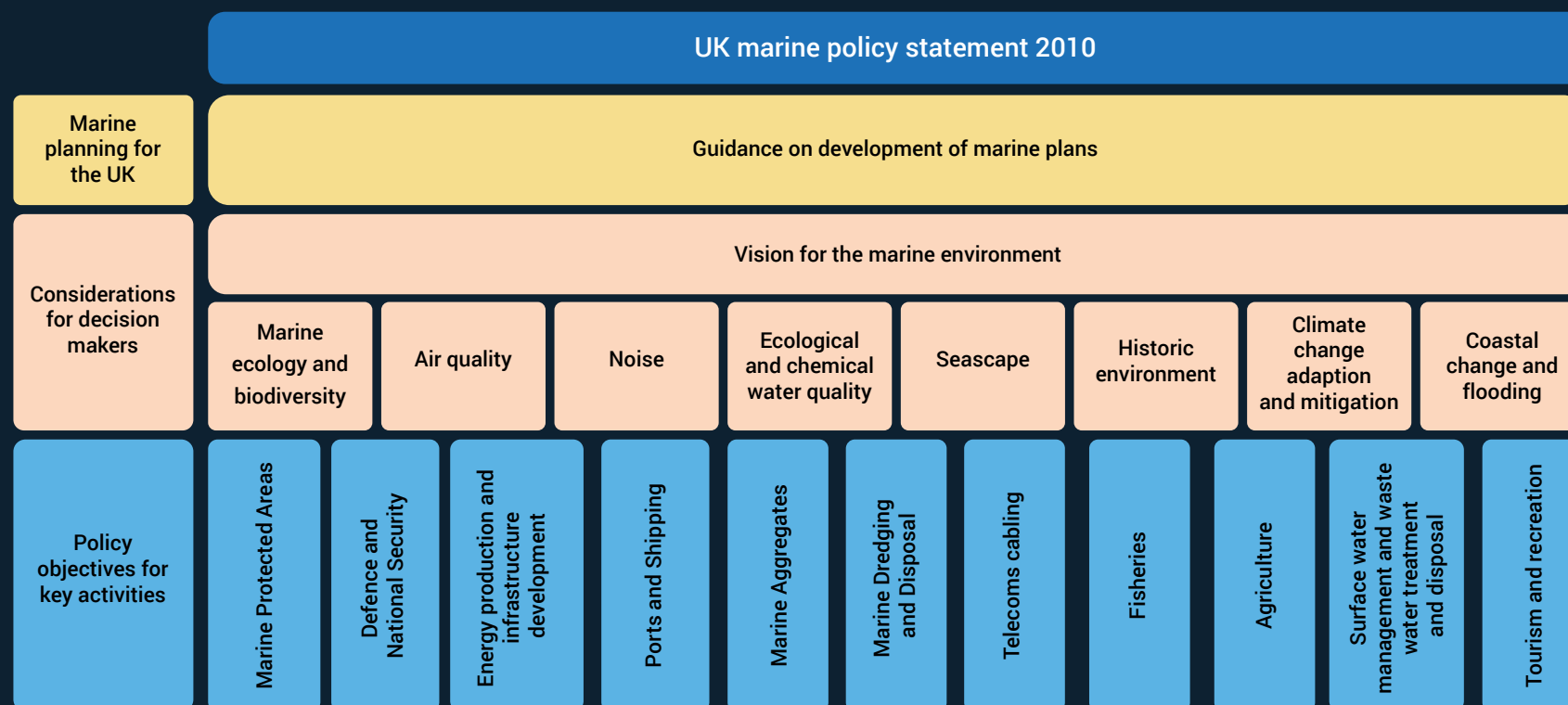


Figure 11: UK Marine Policy Statement



In 2010, this was a ground-breaking policy document, involving collaboration both across administrations and across departments within those administrations, one of the first in the world to do so. The policy objectives for activities include key social, economic and environmental considerations that marine planning authorities and decision makers should take into account across 11 key sectors. These considerations distilled policy objectives across multiple, complex areas that themselves often have sector specific national policy statements or policy strategies for each administration. As such, the text of the Marine Policy Statement was often based on compromise and the identification of common goals across different administrations.

The UK's Marine Strategy provides the framework for delivering the UK vision for the marine environment and the Marine Science Strategy sets the general direction for future marine science across the UK for the period to 2025 by identifying high level priority areas for marine science and tackling cross-cutting barriers, to help deliver the science. The Joint Fisheries Statement will set out a shared vision for UK fisheries post EU exit and is currently in development.

Marine Spatial Plans across each region cover all relevant policy areas setting priorities and directions for future development within the plan area, informing sustainable use of marine resources and helping marine users understand the best locations for their activities.



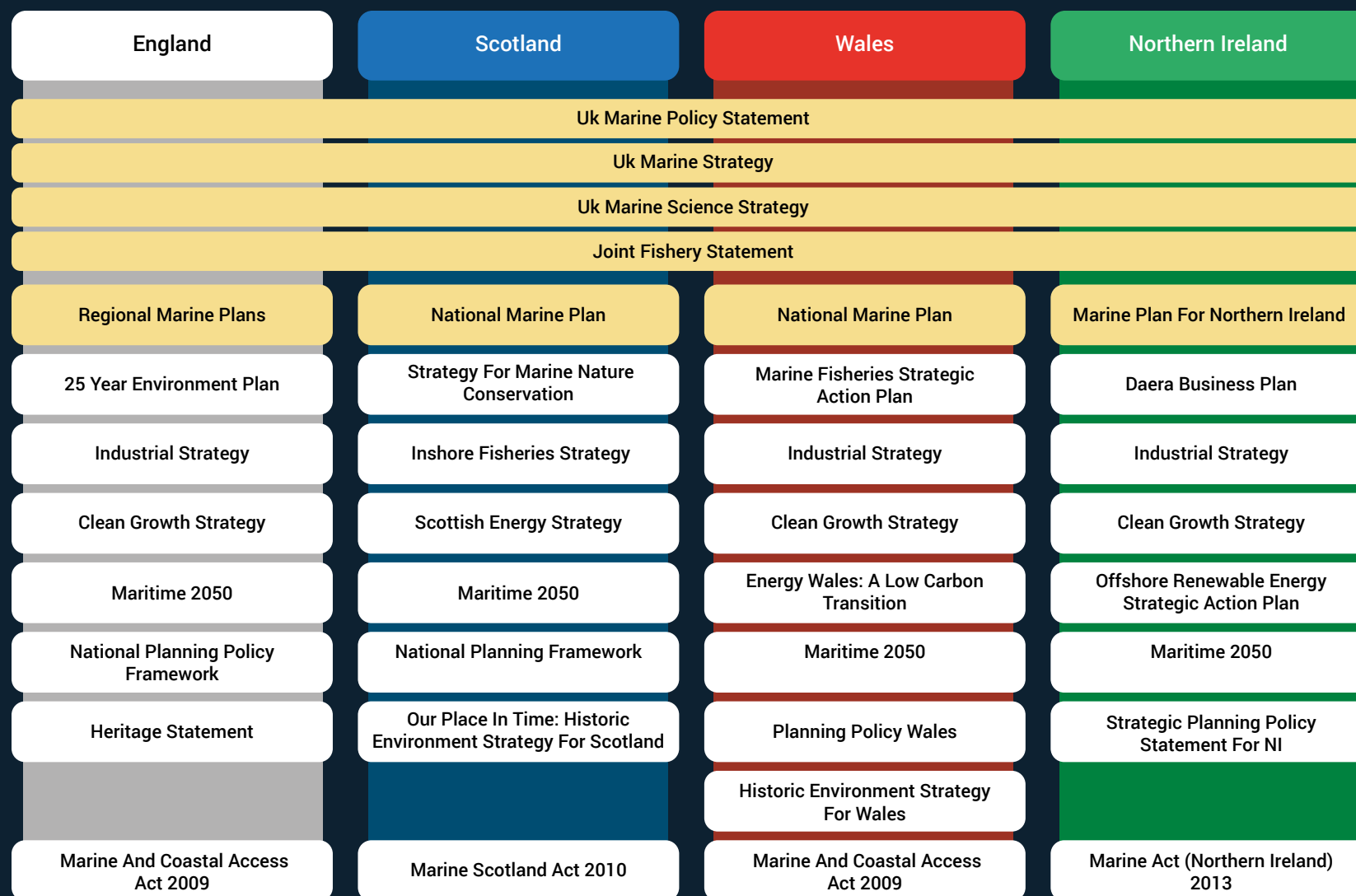


Figure 12: UK Blue Economy Policy Framework

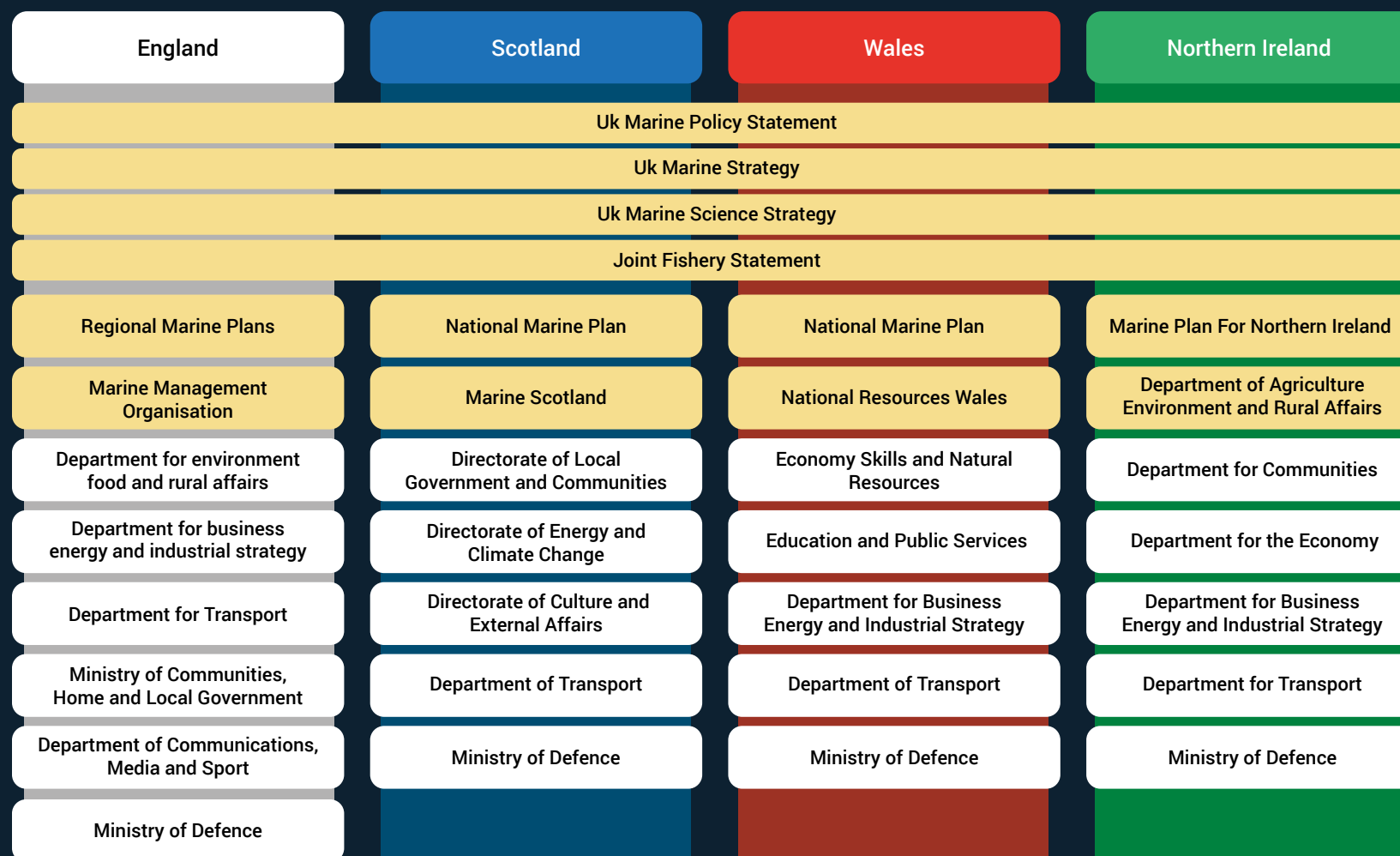


Figure 13: UK Blue Economy Institutional Framework



From a delivery perspective, each devolved administration has chosen a different approach which is best suited to their own administrative, political and geographical needs.

England created an independent non-departmental public body, the Marine Management Organisation (MMO), which reports to five government departments (Environment, Food and Rural Affairs; Transport; Energy and Industrial Strategy; Communities, Housing and Local Government; and Defense). The MMO is responsible for managing fisheries, marine protected areas, marine infrastructure licensing and marine spatial planning. Some delivery functions are outside this agency (e.g., oil and gas, maritime affairs, nationally significant infrastructure licensing), but they all operate within the framework set down by the MMO as Marine Plan Authority.

Scotland combined all devolved functions associated with the marine environment (fisheries, marine protected areas, marine infrastructure licensing, marine spatial planning) into one government department, Marine Scotland, which has responsibility for policy making, operational decision making and science across these functions. This has created a centre of excellence within the Scottish Government for marine matters that has both policy and operational control, in addition to responsibility for delivering the science to inform decision making.

Wales has a small marine policy team with most of the operational decision-making being located within Natural Resources Wales, a non-departmental public body, whose remit is the sustainable management of Wales' natural resources, both on land and at sea. In Northern Ireland all policy and operational decision making for the marine environment falls within a small team in the Department for Agriculture, Environment and Rural Affairs.

In addition, national coordinating mechanisms exist for assessing environmental status via the UK Marine Strategy; coordinating science needs via the UK Marine Science Strategy; and monitoring and surveillance of human activity at sea across all functions, including fishing, navigation, safety at sea, customs, defense and security services through the work of the National Maritime Information Centre and Joint Maritime Operations Command.

Of these models, the cross-departmental models of England and Scotland are good examples of integrated Blue Economy implementation. The Scottish model relies on centralising control as much as possible, which is achievable because of the smaller size of its Blue Economy. The English model by contrast has a delegated model that possesses a strong coordinating function across government departments, which reflects both the size of government as well as the complexity of the English sea space, which is one of the most congested (in terms of use) and busiest (in terms of marine transport) in the world.

9.2.2 Seychelles' Blue Economy approach

Seychelles was one of the first of the "large ocean nations" in the world to take a proactive Blue Economy approach to managing its marine space. Key components are its Blue Economy Roadmap approved by the Government of Seychelles in 2018 setting out an integrated approach to ocean-based sustainable development which brings together economy, environment and society, consistent with the Sustainable Development Goals, Aichi Target 11 of the Convention on Biological Diversity and the Paris Agreement. The Roadmap articulates the Seychelles "Blue Economy Brand" as a unique comparative advantage based on its sustainability credentials, building on Seychelles' national and international legal and policy frameworks, successful flagship initiatives such as marine spatial planning and innovative financing through blue bonds, whilst advancing a prioritised agenda for action and investment to 2030.

The Seychelles Marine Spatial Plan (MSP) is a government-led process aimed at supporting the sustainable and long-term use and health of the waters throughout Seychelles' 200 nautical mile Exclusive Economic Zone (EEZ) of 1.3m sq. km. The Seychelles MSP is the largest MSP in the Western Indian Ocean and the first MSP in the world to explicitly address climate change. It is an integrated, multi-sector approach to addressing climate change adaptation, marine protection, and supporting the Blue Economy and other national strategies. Although the MSP authority is the Ministry of Environment Energy and Climate Change, whose mandate (defined within the MSP) is to designate 30% of Seychelles' EEZ as a marine protected area, the government clearly recognises the need for integration and coordination



across government departments. Two cross-governmental bodies have been or are in the process of being established.

The first of these is the Department of the Blue Economy, an independent department with a mandate to provide strategic direction and coordination of Blue Economy implementation, as part of the continued sustainable development of Seychelles. The Department is responsible for delivering the “Blue Economy Strategic Policy Framework and Roadmap: Charting the Future (2018-2030)”. This focuses on four key priorities for action and investment proposing objectives and strategic actions to inform sector-based planning and development out to 2030. The Department’s role focuses on the development of the Blue Economy from the perspective of creating the right socio-economic enablers for sustainable economic growth, skills, innovation, resilience, and partnerships rather than ocean management, which is carried out by relevant agencies with oversight from the Seychelles Ocean Authority (SOA).

The SOA, once it is formally established, will be empowered to coordinate and adaptively manage the implementation of Seychelles’ MSP. It will fall under the President’s or Vice-President’s Office to ensure it can fulfil its cross-portfolio role but will otherwise be fully independent with no existing mandates to ensure that it is not biased towards any one policy portfolio or set of interests. It will function as a governance agency and will not perform operational functions that are already assigned to existing relevant authorities. Direct implementation will be undertaken by line agencies that manage protected areas or management areas under the MSP as set out in specifically produced policy maps.

The mandate of the SOA is still under consideration; however, it is likely to embrace the following:

- Governance, monitoring and evaluation of marine spatial planning and its implementation by line agencies.
- Provide information and expertise to support in matters of marine governance.
- MSP scientific practices including data requirements and a MSP research agenda
- Development of funding options to support the sustainable implementation of the MSP.
- Public education, stakeholder communication and outreach.

The Blue Economy arrangements for Seychelles are designed to keep operational functions within individual government departments whilst in tandem creating two oversight bodies to help with roadmap delivery, namely one for economic development and one for MSP implementation. It remains to be seen how these arrangements will work in practice, in particular in relation to accountability, governance and operational delivery. Whilst there is currently no coordinated mechanism for marine science, there is a well-established means of monitoring human activity at sea, with a focus on illegal, unreported and unregulated (IUU) fishing. This is coordinated with neighbouring states through the Regional Centre for Operational Coordination and the Regional Maritime Information Fusion Centre.

Funding for marine science and conservation and Blue Economy enterprises is provided in part by SeyCCAT, the Seychelles Conservation and Climate Adaptation Trust, which was created through the Debt for Nature Swap to restructure the country’s national debt in exchange for ambitious marine conservation as part of a national marine spatial plan.

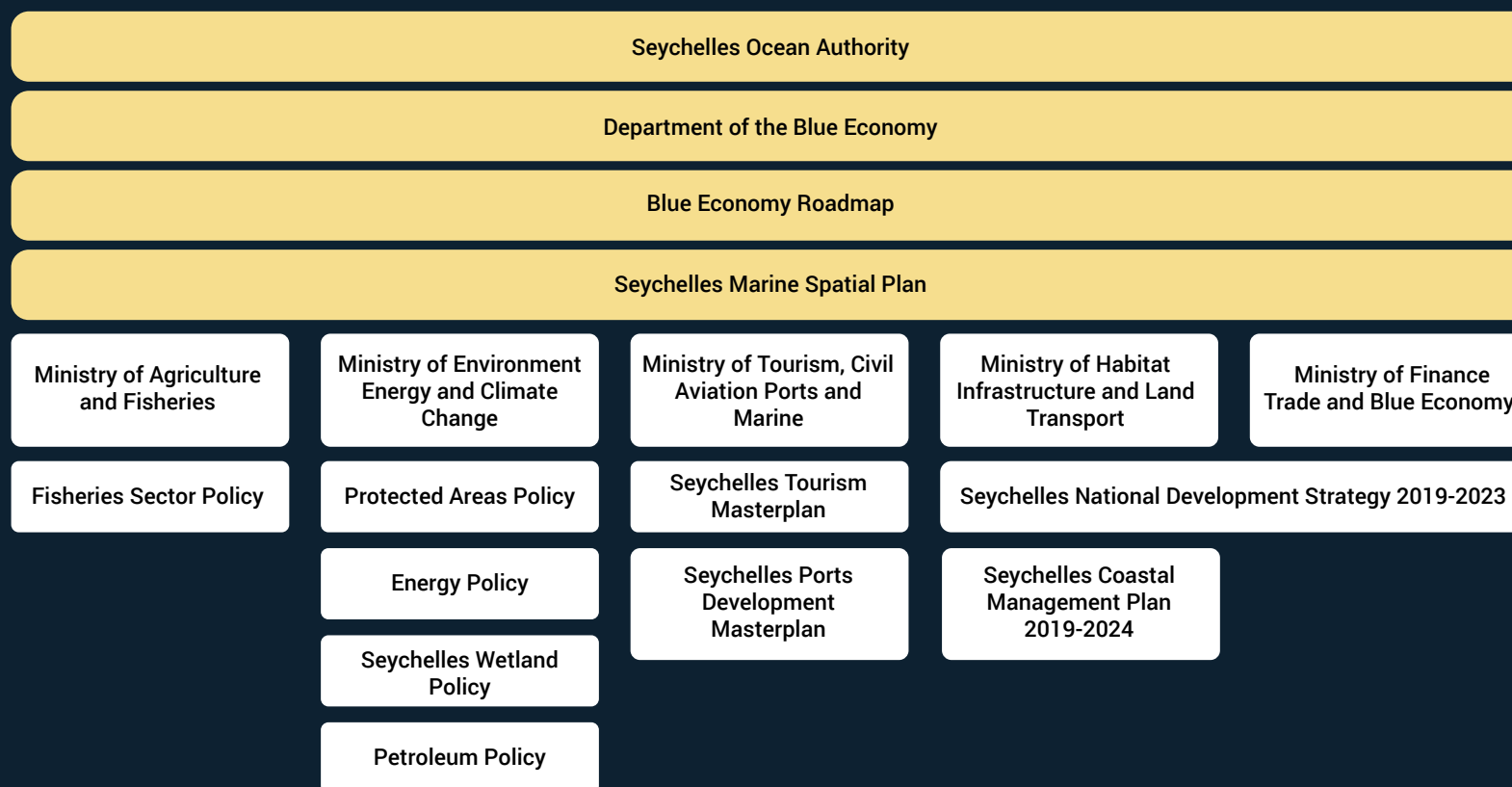


Figure 14: Seychelles Blue Economy Policy and Institutional Framework



These two examples illustrate some of the complex considerations that go into formulating appropriate structures and mechanisms for integrated Blue Economy planning and marine management. The degree of complexity correlates to the levels of marine activity; however common to both is a unifying vision for the national seaspace to guide planning and policy priorities, comprehensive and stakeholder-inclusive marine spatial planning to help optimise sustainable use of ocean resources and the delegation of operational responsibilities to competent authorities.

9.3 Establish SMART objectives

Once a guiding Blue Economy framework has been established, objectives and activities need to be planned, ideally following the SMART (specific, measurable, achievable, realistic and timebound) planning model. This is where broad aspirations are distilled into actionable plans, with targeted objectives, owners and deadlines.

9.3.1 The Virgin Islands' Strategic Blue Economy Roadmap

Following the destructive hurricane season of 2017, the Virgin Islands has been collaborating with the United Nations Development Programme (UNDP) to explore and develop its Blue Economy as “an integral part of its way forward in terms of building resilience through structural transformation and innovation.”

It developed its [Strategic Blue Economy Roadmap](#) as the comprehensive and overarching framework within which to manage its 84,000 square kilometres of ocean space, and associated activities and resources. The roadmap very clearly articulates that space's key marine features, the threats its marine environment faces and the broad policy context within which it operates, before setting out its vision, and five overarching Blue Economy goals (1: promote sustainable growth; 2: ensure food security; 3: improve environmental governance; 4: transition to a more climate-resilient territory; and 5: to achieve these goals while sustaining the ecological integrity of the marine environment).

The roadmap then progresses to articulate Specific Development Objectives focusing on sectoral objectives (e.g. promoting aquaculture) and enabling activities (such as promoting innovation and attracting inward investment) along with 'Results Areas' aligned to them. Associated activities are then each assigned a priority level, identifying whether each discrete activity is expected to be achieved in the short term (0-24 months), medium term (2-5 years) or long term (over 5 years).



Roadmap Element	Specific Development Objectives (SDOs) and Results Areas
1. Enabling environment	<p>SDO 1: Establish robust governance arrangements that both improve the management of the Virgin Islands' marine environment and attract private sector investment.</p> <hr/> <p>Results Areas:</p> <ul style="list-style-type: none"> 1.1 A healthy resilient and productive marine environment 1.2 Integrated approaches to ocean governance 1.3 Sustainable finance and investment 1.4 Human capacity development 1.5 Public awareness and engagement 1.6 Maritime surveillance, monitoring and enforcement <hr/>
2. Maritime tourism	<p>SDO 2: Initiatives that deliver capacity building, innovation, and other changes that attract investment and improve the long term sustainability of the maritime tourism sector.</p> <hr/> <p>Results Areas:</p> <ul style="list-style-type: none"> 2.1 Manage the cumulative impacts of the charter yacht sector on the marine environment 2.2 Increase the number of young people pursuing careers in the maritime sectors 2.3 Effectively manage the impacts associated with cruise ship tourism on the marine environment and other marine users <hr/>
3. Fisheries	<p>SDO 3: Initiatives that ensure that marine fishing activities are environmentally sustainable and managed in a way that will achieve equitable economic and social benefits, including women and youth.</p> <hr/> <p>Results Areas:</p> <ul style="list-style-type: none"> 3.1 Improve the health of the nearshore demersal and reef fisheries 3.2 Diversify the existing fisheries to include new or underutilised fish species 3.3 Restructure the existing Virgin Islands Fishing Complex business model to increase both participation of and benefits to local fishes 3.4 Reduced post-harvest losses in the fishery sector

Figure 15: An excerpt from the Virgin Islands' Strategic Blue Economy Roadmap



9.4 Determine policies and regulations with an ecosystem and natural capital approach

9.4.1 Grenada's Sustainable Blue Growth agenda

Grenada has been working with the World Bank to scope and embed a range of [Blue Economy-themed policies](#) that have ecosystem and natural capital perspectives at their heart, at the same time as supporting fiscal reform measures to promote stability. The project supported the government's measures for better environment and natural resource management, and drove the inclusion of environmental sustainability requirements in public procurement processes. Marine protected areas also increased from 3 in 2016 to 20 in 2019, and in the same year there were zero imports of Styrofoam food containers, single-use plastic bags or disposable plastic plates, forks, and spoons.

9.4.2 Belize's Integrated Coastal Management Plan

Belize is ranked 9th on the Climate Change Vulnerability Index for the Latin America and Caribbean region. Its geographic location and low-lying coastal areas leave it susceptible to the impacts of climate change: rising sea level, increased sea temperature, and increased frequency of damaging hurricanes. Reflecting this situation, the Inter-American Development Bank and the World Resources Institute worked with the government of Belize to develop a set of [climate-resilient Integrated Coastal Zone Management performance indicators](#). There are 15 indicators in four categories – from legal and institutional frameworks to the availability of sustainable financing.

The pilot assessment in 2019 identified where Belize was performing well against the indicators (e.g. collecting environmental data), and areas for further development (e.g. the monitoring and evaluation of coastal investments).

9.5 Undertake consultative Marine Spatial Planning

Marine Spatial Planning (MSP) is one of the cornerstones of an effective, evidence-led Blue Economy strategy and has been most effective where it has been developed with the involvement of all relevant authorities and stakeholders (The Second World Ocean Assessment 2021). As cross-sectoral interest in the preservation and use of marine spaces looks set to grow in the coming decades, there is a risk that competition for use of various parts of the ocean estate becomes acute. As the name suggests, good MSP brings insight and transparency to this issue. By collecting and analysing useful marine data, MSP has the potential to bring together different stakeholders (e.g. government, industry, NGOs and private citizens), empowering them to jointly make considered decisions for the allocation of space among potentially competing economic, governmental and environmental activities.



Marine Spatial Planning is an important component of India's Blue Economy... The assessment will help understand the scope of industries and activities which can be proposed here alongside protecting marine life and biodiversity in the region.

M Rajeevan, Secretary, Ministry of Earth Sciences



Assessing trade-offs between existing and proposed new sectors to mitigate antagonistic, as opposed to synergistic effects, is a key part of MSP. A detailed study of interactions between Blue Economy sectors finds that while some sectors coexist synergistically (such as renewable energy and tourism), other sectors such as shipping, drilling and fishing are involved in many antagonistic interactions.

To navigate the complexity of weighing up the benefits and trade-offs of introducing new sectors, a set of questions to help decision-makers assess whether new combinations contribute to prosperity, sustainability and equity has been suggested (Crona 2021):

1. How does the sector contribute to the cumulative Blue Economy?
2. Does it enhance or erode ecosystem health?
3. Does it enhance or reduce future potential?
4. Does it equitably distribute opportunities with different sized sectors?
5. Does it equitably distribute opportunities with different historical claims?
6. Does it equitably distribute the gains from public resources?

The majority of international governments which have a well-developed Blue Economy or ocean policy framework have established stand-alone MSP delivery functions within government, charged with understanding and representing the policy interests of all government departments when developing a national MSP. Furthermore, some interesting joint MSP activities are now underway.

As noted in section 8, Blue Economy activity is now strongly represented within international relations, and MSP is certainly a beneficiary of that development.

9.5.1 Bangladesh and China's collaborative Marine Spatial Planning

In May 2021, for example, Bangladesh and China shared that they were [continuing to engage on joint MSP activities](#) in the Bangladeshi coastal zone, despite the challenges presented by COVID-19. In particular, researchers from the two nations have been focusing on the interpretation of remote sensing images provided by satellites in order to build a more complete picture of human activities at sea, the distribution of natural resources and the geographical layout of existing coastal infrastructure. The aim of this work is to provide a tool that incorporates suggested dos and don'ts for marine resource management in each specific coastal area.



9.5.2 India and Norway's collaborative Marine Spatial Planning

Adjacent to Bangladesh, India and Norway are also collaborating fruitfully on MSP activities. In March 2021, the two nations announced the launch of a five-year programme to perform [high-resolution mapping of coastal locations and territorial waters](#). The first phase of the pilot project will focus on Puducherry and Lakshadweep; data collection is anticipated to take approximately three years. Assessment and analysis will lead to evidence-based plans and policies will be developed to help sustainable activities supporting industry, fisheries, tourism and similar ocean-centric activities within the two locations. As well as enabling proactive, integrated planning, the Minister of Earth Sciences also highlighted that such MSP activities guarded against the negative use and exploitation of ocean resources that were poorly planned and unscientific.

9.5.3 Seychelles and Mauritius' collaborative Marine Spatial Planning

Finally, Seychelles and Mauritius are undertaking MSP for the world's first Joint Management Area in the Indian Ocean, covering a large area of the ecologically significant Mascarene Plateau. How well this important area is managed will have far-reaching implications, since it has been found to have a very significant beneficial downstream impact on the fisheries of East Africa (Popova 2019). However, it is important to note that management of resources in the Joint Management Area (JMA) only extends to seafloor resources and not those in the water column (i.e. fisheries). This is because the JMA is extended continental shelf and the water column is effectively high seas (areas beyond national jurisdiction). Fisheries are under management of regional fisheries management organisations (RFMOs; Indian Ocean Tuna Commission and the Southern Indian Ocean Fisheries Association). Therefore collaboration is required between the coastal states (Seychelles and Mauritius) and the RFMOs.

9.6 Assess measures required to stem ocean pollution

As section 7 on assessing ocean risks makes clear, any Blue Economy strategy is vulnerable to the pressures placed on it by ocean pollution, so assessments of such threats and exploring potential measures to counter them is essential as part of a sensible risk management approach. Many approaches to ocean pollution are emerging, but not all will be applicable in every region, so a broad assessment of available options on land and at sea is required before investment is made.



9.6.1 UNEP's roadmap to tackle plastic pollution

As eight million tonnes of plastic end up in our oceans every year, it is no wonder that this issue is prevalent. The UN Environment Programme (UNEP) has created a [10-step roadmap for governments to tackle plastic pollution](#), starting with a baseline assessment and combining awareness-raising activities with economic incentives to encourage the uptake of eco-friendly and fit-for-purpose alternatives (UNEP 2018). The UNEP report identifies government levies and bans (where properly planned and enforced) as among the most effective strategies to limit overuse of



disposable plastic products. Its recommendations include specific actions that policy-makers can take to inter alia improve waste management, promote eco-friendly alternatives and successfully implement bans or levies on the use and sale of single-use plastics.

9.6.2 Vietnam's National Action Plan for Management of Marine Plastic Litter

Co-ordinated policy interventions and related activities are being developed the world over. In January 2020, Vietnam launched its [National Action Plan](#) on the issue, in partnership with the UNDP. Following the SMART model, the plan sets out a range of objectives that the government intends to achieve, by 2025 and 2030. Those objectives include to: reduce marine plastic litter by 50% by 2025 (75% by 2030); collect 50% of abandoned, lost, or discarded fishing gear by 2025 (75% by 2030); prevent the use of single-use plastics and non-biodegradable plastic bags in 80% of coastal tourism areas by 2025 (100% by 2030); and to strive for 80% of marine protected areas to be free of plastic litter by 2025 (100% by 2030). These objectives were complemented by commitments to annual monitoring of progress and reviews of the plan.

The range of activities that will enable Vietnam to achieve these goals include education and awareness-raising programmes; collection and classification of plastic waste from coastal and ocean activities; control of plastic litter at source by establishing a plastics classification programme aligned to intensive management processes; and investing in scientific research and international collaborations.

9.7 Plan and secure resources to implement and enforce regulations, including capacity development

With policies and regulations in place, appropriate resources must be allocated to ensure policy implementation and regulation enforcement. This could involve the creative reallocation or evidence-led targeting of existing resources, combined with training and capacity development drives, or raising new levels of investment for new assets or capabilities.

9.7.1 Regional MCS centre in Ghana

One of the global hotspots of IUU fishing is the coastal zone off West Africa, where the practice is estimated to cost West African nations USD 300m in lost landed catch values. Ghana and neighbouring countries have responded to this challenge robustly by jointly resourcing a state-of-the-art regional Monitoring, Control and Surveillance Centre, which was [launched in May 2021](#). The €16.5m facility, funded by the European Union, will enable coastal nations in the central and western Gulf of Guinea to enhance vessel monitoring and analysis across the region, and coordinate collaborative activities to address maritime crime.

9.7.2 Involving citizens in marine regulations enforcement

Resources to implement and enforce regulations should not be viewed as solely involving the allocation of government money, assets and staff. Citizens can also play an important role in coastal and marine monitoring and the protection of natural resource. This is exactly what the National President of the Association of Nigerian Licensed Customs Agents had in mind when in May 2021 he called for governments at all levels [to engage youths in coastal communities](#) to support enforcement agents in the fight against marine crime. A more mature model along these lines is featured in section 10.



Implement and monitor the Blue Economy plan

- Implement land-based measures required to stem ocean pollution
- Implement and enforce policies and regulations with an ecosystem approach including activities on the high seas
- Implement monitoring, control and surveillance activities across EEZ
- Provide resources for capacity development and promote entrepreneurship
- Monitor progress on activities alongside monitoring ocean wealth and adapt activities in all areas according to evidence of what works well



10 THE BLUE ECONOMY IN PRACTICE: IMPLEMENTING AND MONITORING THE BLUE ECONOMY PLAN

10.1 Rationale for implementing and monitoring a Blue Economy plan

Learning what works and adopting: Monitoring the implementation of Blue Economy activities and assessing their effectiveness are critical to learning what works in practice. As alluded to earlier, enabling activities such as monitoring, control and surveillance, capacity development and implementation of international treaties and obligations are the fundamental building blocks towards realising a Blue Economy approach that raises quality of life and regenerates marine ecosystems in addition to contributing to national prosperity and resilience. Successful approaches can be shared to coordinate and scale international responses to achieve a global healthy ocean.

10.2 Implement measures to stem ocean pollution

The world's ocean is an integral component of the biosphere and its health is intricately connected to that of the land and atmosphere. A focus on improving river water quality will pay downstream dividends in terms of coastal ecosystem and human health. Improved land practices to mitigate nutrient run-off, solid waste management infrastructure and waste-water treatment systems all require attention. Support for circular economy approaches to reduce plastic and other waste streams is also key.

10.2.1 Antigua and Barbuda's plastic litter policies

In 2016 Antigua and Barbuda prohibited the import, manufacturing and trade of plastic shopping bags which accounted for 90% of the plastic litter in the environment. In the first year, the ban contributed to a 15.1% decrease in the amount of plastic discarded in landfills and paved the way to introduce further policies to reduce plastics. In 2017 the import of plastic food service containers and cups was prohibited and in 2018 single-use plastic utensils were banned, along with food trays and egg cartons. Styrofoam packaging is also expected to be banned.

The success of the measures in Antigua and Barbuda is attributed to extensive stakeholder engagement with the private sector, retailers, supermarkets, public authorities and relevant ministries, together with incorporating the ban in existing legislation for expedience. A national media campaign featuring ministry officials was launched to sensitise the public, and the manufacture and use of alternatives to plastic bags with tax-free materials such as sugar cane, bamboo, and paper and potato starch was promoted. Reusable bags were provided to shoppers outside supermarkets, which were also required to offer paper bags from recycled material in addition to reusable ones. Local seamstresses and tailors were taught how to manufacture reusable bags to meet increasing demand.



SDG target 14.1:

requires countries to “prevent and significantly reduce marine pollution of all kinds, in particular from land-based activities, including marine debris and nutrient pollution” by 2025



10.2.2 The Earth and Sea Observation System – Marine Watch

Sea-based measures also need to be considered. Illegal oil discharge from commercial shipping in and around the Malacca Strait and wider Malaysian EEZ is a major problem for authorities, causing environmental and economic damage through loss of habitat, coastal erosion and depletion of marine species. While shipping operators are required under the International Convention for the Prevention of Pollution from Ships to dispose of pollutants safely, there are many instances of illegal disposal. The Earth and Sea Observation System (EASOS) is a project led by the UK's Satellite Applications Catapult. Its [Marine Watch](#) component aims to deliver decision support to the Malaysian maritime law enforcement authorities by providing timely information of oil pollution events, while supporting pollution control measures and potentially identification of offenders.

EASOS draws together satellite-based remote sensing data capable of identifying potential oil slicks and runs a dispersion modelling system to predict the spread and movement of slicks and to locate likely sources. In order to differentiate between true oil slicks and false detections, the system's algorithms compare each potential slick with data proven to be oil (termed training data) providing a confidence level that a given detection is oil. This information is shared with local authorities, who can mobilise interventions if the threat is considered urgent.

In one tangible example in 2019, the Marine Watch system [enabled the Malaysian authorities to avert a potentially major environmental disaster](#) from a 5 km² oil slick off the coast of Johor, southern Malaysia. Information on the oil slick was passed directly to the Johor Marine Department who deployed two vessels to search, locate, contain and disperse the oil before the 40-tonne slick reached the Malaysian coastline.

10.3 Implement and enforce policies and regulations with an ecosystem approach

10.3.1 Chile's Rapa Nui Marine Protected Area

Chile (a member of the High Level Panel for a Sustainable Ocean Economy) has now designated over 40% of its EEZ as Marine Protected Areas; the challenge, as with every MPA, is to implement that policy and provide real and adequate protection, enforcement and management. According to the Marine Conservation Institute's [Marine Protection Atlas](#), 30% of the MPAs designated by Chile are fully or highly protected; 4% are less protected or their status is unknown; and implementation is not in place for the remaining 66%. While there is still progress to be made, much good practice has been developed and is worthy of emulation.

A theme weaved throughout this report is the importance of meaningful stakeholder engagement within Blue Economy development, and that is especially important in coastal and marine management. Chile's 278,000 square mile Rapa Nui Marine Protected Area is a case in point. It was [designated as an MPA](#) in 2018; industrial fishing and mining were banned, but traditional fishing was still allowed. This last point was in large part due to [the engagement and buy-in of the indigenous people](#), who played a strong role in establishing the boundaries of the MPA and the levels of protection to be introduced.



10.3.2 Argentina's Marine Protected Areas

Chile's neighbour Argentina is also making great strides in implementing its designated MPAs. In 2016, the Argentinian Senate passed a bill [tripling the amount of safeguarded marine territories](#), again following detailed stakeholder engagement. This leap forward has been followed by further designations, but it is the detail of the implementation plans that is worth considering. In particular, the 2016 law placed the management of the MPAs under the authority of the National Parks Administration, whereas no responsible body had been nominated previously. It was also indicated that enforcement activities would be carried out by the Argentine Navy.

10.3.3 Colombia's National Carbon Tax

Not all Blue Economy policies have to focus directly on the marine and maritime environment. As illustrated in section 7 climate change represents a grave threat to the success of Blue Economies, so any policies introduced to mitigate climate change impacts will undoubtedly have a positive effect on the marine environment.

For example, as highlighted in the Inter-American Development Bank's [2020 report](#) on the mainstreaming of natural capital approaches into decision-making, Colombia created a National Carbon Tax as part of its climate commitments to reduce its emissions. Some of this collected revenue is assigned to conservation activities such as conserving key ecosystems and strengthening the system of protected areas.

10.4 Implement Monitoring, Control and Surveillance activities across the EEZ

"[The Potential of the Blue Economy](#)", a 2017 report by the United Nations and World Bank, highlights the importance of effective monitoring, control and surveillance (MCS) systems for fisheries at both national and regional levels in large ocean nations (or SIDS) and Coastal Least Developed Countries. The FAO defines MCS thus:

- Monitoring - the continuous requirement for the measurement of fishing effort characteristics and resource yields.
- Control - the regulatory conditions under which the exploitation of the resource may be conducted.
- Surveillance - the degree and types of observations required to maintain compliance with the regulatory controls imposed on fishing activities.

10.4.1 Palau's MCS plan

The Republic of Palau was singled out for praise in the UN and World Bank report, as its early work on developing a comprehensive plan for MCS was deemed to have a potentially positive impact on countering illegal, unreported and unregulated fishing (IUU fishing), improved pollution detection and response capacity to oil spill detection; better disaster preparation and response; and climate change adaptation.

[Palau's plan](#), now due for a review, coherently assessed current capacity and responsibilities; surveyed potential technology enhancements and set out a five-year working plan for each key area. Large ocean nations potentially have the most to gain from investments in effective MCS, but are often limited by financial resources, so Palau's investment is all the more impressive.



10.4.2 The Indonesia Maritime Information Centre

An appetite to share relevant marine and maritime data among a range of agencies was also the driving force behind the launch in July 2020 of the [Indonesia Maritime Information Centre](#) (IMIC), a multi-agency data-sharing centre that will help the Indonesian coastguard to better protect the country's interests in its complex maritime space. Recent months have seen a number of incidents that have demonstrated the challenges facing the world's largest archipelagic state in monitoring its 6.1 million km² EEZ. Authorities have seized many foreign vessels illegally fishing in their waters whilst intensifying diplomatic efforts to cooperate with surrounding states. This spirit of transparency also extends to the general public, as IMIC publishes bi-monthly reviews of MCS incidents and interventions that separately cover maritime security, maritime safety, contraband smuggling, natural disaster and IUU fishing activities.

The fight to secure natural capital and human safety at sea depends upon effective data sharing within and between states; IMIC stands as a model for this kind of work in the Asia-Pacific region.

10.4.3 The Bantay Dagat / Sea Guardian programme in the Philippines

As referenced in the example from Nigeria in section 9.7.2 wider civil society should not be overlooked when considering MCS activities. Citizens within coastal communities rely on the ocean for their livelihoods and therefore have more reason than most to see it protected effectively.

The Bantay Dagat or “sea guardian” programme is a community-based law enforcement institution in the Philippines that engages fisherfolk in coastal villages (or barangays) on a volunteer basis to support the detection and enforcement of illegal fishing in coastal waters. The Bantay Dagat volunteer force is overseen and managed by the Bureau of Fisheries and Aquatic Resources within the Philippine Government Department of Agriculture (DA-BFAR).

This civilian volunteer fisheries patrol force attempts to keep a 24-hour watch on Philippine coastal waters up to 15 kilometres from shore. They have high visibility as a law enforcement agency and are seen where they operate as an effective deterrent. Their scale (100,000 volunteers

nationwide) marks them out as a key asset for the protection of the Philippines' natural resource.

10.5 Provide resources for capacity development and promote entrepreneurship

Throughout this report, we have highlighted the broad and potentially complex nature of strategies and implementation plans required to bring Blue Economies to life. With that as a backdrop, the authors of holistic Blue Economy capacity building strategies have a lot of work to do, to understand and rank the importance of individual sectoral and enabling activity development needs, and to identify broader capacity building needs that may not be so immediately apparent.

10.5.1 Blue Economy capacity building in the Philippines

On the former, the Philippines is a fine example of a multi-layered approach to capacity building within Blue Economy sectors. Taking fisheries as one example, the range of recent capacity development initiatives is impressive, with the government investing in both infrastructure and education and training.

Infrastructure support has included delivering [a floating fish cage project](#) to support the livelihoods of marginalised fisherfolk; providing [a new community fish landing centre and jetty port](#), to “help facilitate science-based monitoring of the local fish production”; and [repopulating freshwater bodies](#) with non-invasive and indigenous fish species.

Education and training support includes providing [scholarships](#) for young people to access fisheries-related training; providing [financial literacy training programmes](#) for fisherfolk communities; and leading a technical workshop on marine fish health and disease prevention management within the offshore fish cage aquaculture industry.

These initiatives sit within headline strategic priorities of the Philippine Government's Department of Agriculture, such as the ambition to invest in and attract [a new generation of future Filipino leaders in the agri-fishery sector](#).



10.5.2 Potentially 'hidden' capacity needs for Blue Economy enablers

While extremely laudable, sector-specific strategies and investments will only be able to go so far; more concerted thinking is also required to consider the additional capacity development that may be required across the broader canvas of the Blue Economy. NLAI's own collaboration projects in the Philippines have highlighted a potentially hidden Blue Economy need. As more space-enabled opportunities open up within the ocean realm; as more earth observation satellites enter orbit; as more marine and maritime use cases for satellite data emerge; and as more nations such as the Philippines launch their own space agencies and related initiatives, capacity development plans need to reflect this new paradigm. In this case, we suggest there is a need to ensure that there are enough local operatives trained in the use of satellite data, earth observation techniques and Geographic Information Systems to make best use of new tools for cost-effective MCS activities.

10.5.3 Emerging Blue Economy training programmes – from Lebanon to Barbados

Across the world we are encouraged to witness the emergence of a raft of Blue Economy-specific training programmes. Recent examples include:

- In Lebanon, [academia and the Beirut port community](#) came together to promote training programmes that provide more opportunities for young people within the Blue Economy;
- The Copenhagen Business School is supporting [a three-year post-doctorate](#) in Environmental, Social and Corporate Governance (ESG) and The Blue Economy;
- The European University for Smart Urban Coastal Sustainability (EU-CONEXUS) provides for [a Minor in Blue Economy and Growth](#). This course allows students to study from a long list of aquaculture and fisheries; marine biotechnology; ocean energy; marine transport and shipbuilding; and coastal and maritime tourism;
- South Africa held its inaugural [Ocean Economy Skills Summit](#), touted as the first of its kind, in Johannesburg in February 2021;

- In Kenya, institutions of higher learning in the coastal region, such as the Technical University of Mombasa, are structuring more academic programmes to provide [more courses with Blue Economy themes](#) such as fisheries, marine renewable energy, shipping and maritime commerce; and
- A [secondary school environmental awareness project in Barbados](#) drew a direct link to the country's new Blue Economy strategy.

10.5.4 The rise of marine technology innovation hubs in the USA

Governments the world over are investing in the potential of novel practices, approaches and technologies to transform the Blue Economy landscape by creating new, innovation-enabled opportunities in the ocean realm.

A report [first released in 2019](#) identifies that the number of marine technology innovation hubs in the USA alone has grown exponentially. These hubs act as marine technology ecosystems which represent a community of stakeholders and innovators in the maritime sector, encouraging collaboration and access to further investment.

Founding of Marine Tech Innovation Hubs

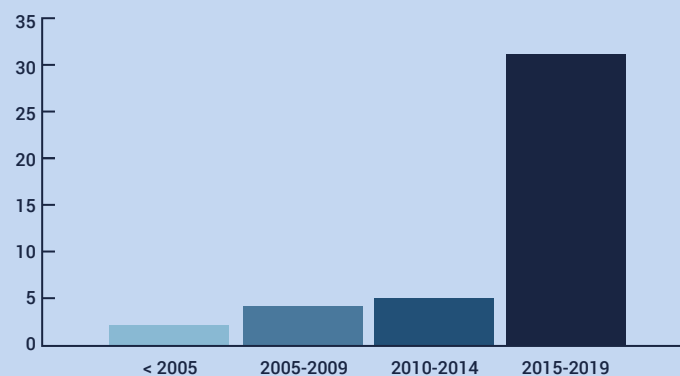


Figure 16: Source: David Hume / The Economist Group World Ocean Initiative



10.5.5 Government support – Innovate UK's SMART programme

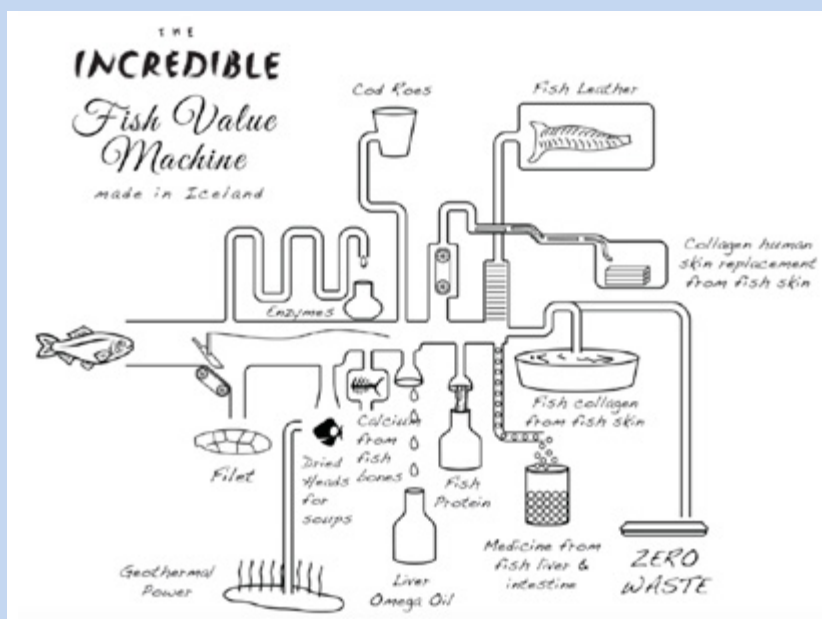
Many programmes are supported directly by states or government agencies. Some of these can be mainly commercial in nature, providing government funding and related support to develop new technologies or services that target specific market sectors of the ocean economy. [SMART](#), from Innovate UK, the UK Government's national innovation agency, is one such scheme. Developers of innovative products and services have to show how they are developing services that have a defined market, meet a user / customer need and have a sound business plan in place. While such funds may be open to all industries, one example of a relevant product is London-based company FrontM's [Blue Economy Messenger](#). Targeted at the fishing sector, it aims to bring new edge computing capabilities to bear in a smartphone app and / or a bespoke ruggedised handset that enables the fishing community to be more effective in its operations.

10.5.6 Blue Economy impact funds, incubators and accelerators

Impact funds and incubator and accelerator programmes with a particular ocean or Blue Economy focus are led by energetic entrepreneurs and are more aligned to traditional investment models, in that they provide start-up or scale-up funds together with well-rounded support, mentorship and advice. Examples include Singapore-based [Hatch](#), France-based [Blue Oceans Partners](#), Australia's [Ocean Impact Organisation](#), Norway's [Katapult Ocean](#) and South Africa based [Ocean Hub Africa](#). Academic and industry partners frequently provide expert input and advice, technology transfer or impact assessments. Governments can aim to encourage the growth of national incubators and accelerators via tax incentives for research and development and planning centred around hubs of national Blue Economy or technology excellence.

10.5.7 Iceland's 100% Fish Project – a zero waste approach

Over the last ten years the Iceland Ocean Cluster (IOC) has incubated Blue Economy start-ups which now have a combined value of \$600m. According to the IOC director these organisations were formed with an ethos for treating the country's limited natural resources with the greatest respect. The "[100% fish project](#)" sits at the core of the IOC's mission to eliminate waste and extract maximum value from its fish harvest, with the result that Icelandic companies now use 80% of their cod, including for high-value products such as supplements, cosmetics and pharmaceuticals, compared with an average 50% use of cod harvests in the US and Europe. The benefits here of a circular no-waste approach are clear.



Iceland Ocean Cluster



10.5.8 UNDP's Ocean Innovation Challenge

While the two models above weave social and environmental concerns into their aspirations, their critical success factors are business growth, and quite often (when aligned to government programmes) the creation of export value. Not all innovation support programmes have commercial interest front and centre, however. There is a growing number of NGOs and philanthropic organisations supporting ocean-themed innovation schemes, that support environmental sustainability and livelihoods.

One such live project is the United Nations Development Programme's [Ocean Innovation Challenge](#) (OIC), now in its second round. This programme provides up to USD 250,000 for innovations that help to achieve Sustainable Development Goal 14 (Life Below Water). The first challenge in 2020 focused on countering ocean plastic pollution and the 2021 programme focuses on fisheries, with applicants specifically challenged to articulate how their innovation will help address SDG targets 14.4 (over-fishing, illegal fishing and destructive fishing), 14.7 (sustainable management of fisheries, aquaculture and tourism in SIDS) and 14.b (providing access for small-scale artisanal fishers to marine resources and markets).

Whereas some funds can limit the type of applying organisation, the OIC is open to all – public or private entities including government, private companies including start-ups, NGOs, UN bodies, academia, and intergovernmental organisations. Proving future financial sustainability is part of the application process and as programmes progress, is a core test of overall sustainability.

The variety and impetus of all Blue Economy innovation and support programmes are truly to be welcomed, and much more investment will be required if the Blue Economy is to reach its potential.

10.6 Monitor progress on activities, monitor ocean wealth and adapt activities accordingly

There is no finite endpoint to the development and implementation of a Blue Economy strategy. Progress requires constant monitoring and evaluation, and iterative approaches to plans and activities. Many nations

are in the early stages of establishing their Blue Economies, with many lessons still to be learned, but it is important to attempt to build stability and longevity into any Blue Economy strategy and infrastructure from the outset.

10.6.1 India's Blue Economy Coordination Committee

India is attempting to do so through the establishment of [a new Blue Economy Coordination Committee](#) (BECC), which aspires to unite and oversee many ministries' efforts, and activity supported by states, union territories and other agencies. The BECC will involve representatives from national security agencies, the navy and the ministries of external affairs, defence, home affairs, commerce, fisheries, earth sciences and department of expenditure.

Interestingly, the whole endeavour will be driven by NITI Aayog (NITI being the National Institution for Transforming India; Aayog is Hindi for Policy Commission), a public policy think-tank focused on delivery of the United Nations SDGs which was established by and is chaired by Prime Minister Narendra Modi.

The newly-formed BECC will focus energies on six targeted 'functional clusters', which include a National Accounting Framework (overseen by the Ministry of Statistics and Programme Implementation); Marine Fisheries (under the Department of Fisheries); Logistics, Infrastructure and Shipping (under the Ministry of Ports, Shipping and Waterways); Coastal and Deep Sea Mining, New and Renewable Offshore Energy and R&D (under the Ministry of Earth Science); National Coastal Marine Spatial Planning Framework (under the Ministry of Environment, Forest and Climate Change and Security); and International Engagement (under the National Security Council Secretariat).

Aligned to India's emerging Blue Economy policy framework, and its commitment to investing in and streamlining the collation and sharing of ocean data, the building blocks are in place for India to achieve its goal of a Blue Economy valued at USD 10 trillion. Constant, thoughtful monitoring of progress, within inclusive local governance frameworks, specific activity sets and within ocean wealth developments, will be critical to success.



11 CONCLUSION

11.1 Blue Economy activities

It is important to note that we have only provided a snapshot of Blue Economy activities in this paper, and that many more approaches and areas of focus are possible.

As a key component of the biosphere, the ocean realm extends from the coastal zone and its associated ecosystems, from deltas and estuaries to salt marsh, mangroves, seagrass and coral reefs, throughout a nation's Exclusive Economic Zone (EEZ) and on to areas beyond national jurisdiction. The latter alone encompass two thirds of the surface of the planet and more than 90% of the volume of the ocean. An effective Blue Economy approach considers all influences and interactions across this interconnected ocean system and recognises the need to move away from sectoral management to holistic management of the ocean ecosystem.

Each country's Blue Economy is a unique reflection of its economic development needs and its natural and human wealth. Developing countries may seek to grow their national Blue Economies to meet essential human needs whilst developed countries should seek to foster Blue Economies which rebalance resources in favour of local communities and more sustainable ocean activities. Large ocean nations (or SIDS) have a unique perspective to offer. Many have a limited terrestrial resource base, a high level of dependency on imports, tourism and fisheries and are already adversely affected by sea-level rise. The ocean is part of their lifeblood and SIDS such as Palau, Republic of the Marshall Islands and Seychelles have been in the vanguard of driving international cooperation on the Blue Economy agenda.

A country's Blue Economy may encompass traditional areas of activity and new or emerging industries. The successful realisation of a Blue Economy approach depends upon adequately addressing the many enabling factors which underpin activity on and off the water and combining social and economic activities in ways that minimise negative impacts and that preferably have a positive, regenerative impact on the marine environment

and local livelihoods.

Table 1 in Appendix 1 illustrates the significant potential scope of these sectors, demonstrating the need for systemic and collaborative approaches which transcend sectors, disciplines and sectors of society. Care is needed in assessing synergies and antagonistic combinations, as we discuss in section 9.5. The ocean is everyone's business.

11.2 Blue Economy enablers

The scope of sectors open to each country ultimately depends upon natural resource availability, which in turn is influenced by climate change. The capacity for countries to successfully implement a Blue Economy approach also depends upon social conditions and governance capacity (Cisneros-Montemayor A.M. 2021). Whilst sectoral activities are optional in any Blue Economy approach, enabling activities are not. Evidence shows that some Blue Economy approaches have failed to deliver the anticipated triple wins for society, nature and climate, and economy, when enabling activities such as considering the needs of communities and identifying appropriate governance structures are missing (Okafor-Yarwood I. 2020). Ensuring that the food security and nutrition needs of local communities are met requires going beyond simply increasing sustainable seafood production, to addressing the wider food system, including seafood distribution and market access, affordability and consumption (Farmery A.K. 2021). Investments in the domestic seafood value chain, in opening up market access for fishers and measures to minimise waste can create more local value from existing seafood production whilst supporting national food security. Shorter supply chains are likely to have a lower carbon footprint and, as the Covid-19 pandemic has demonstrated, are also less vulnerable to trade disruptions.

We provide a detailed breakdown of Blue Economy enablers and why they are needed in Table 2 in Appendix 2.

11.3 A vibrant forward-looking sector

The examples highlighted in this report illustrate the huge breadth of scope in Blue Economy activities and how rapidly developments are coming on stream. Government actions and collaborations are continuously growing and developing, as are private sector initiatives and civil society interest in matters of ocean and wider planetary health and social justice. Everyone has a personal stake in the ocean and Blue Economy developments are hence of interest to people from all walks of life.

From a growing interest in preparing more holistic ocean accounts (which go far beyond traditional measures of built wealth to include values of natural ocean resources), to comprehensive marine spatial plans incorporating ambitious marine conservation measures, through nationally inclusive stakeholder engagement programmes, to the rise of ocean innovation challenges centred around SDG14, much excellent work is going into building Blue Economies nested within more healthy marine environments which serve the needs of people.

From these examples we see clear evidence of our RAISE principles being adopted in practice, guiding the design and implementation of ocean governance and Blue Economy planning processes which embrace the wider Blue Economy goals of regeneration and inclusivity. We hope that by highlighting just a few examples of work-in-progress by governments, lessons may be learned and inspiration provided for further dynamic progress on the Blue Economy internationally.



12 RESOURCES

Doughnut Economics Action Lab	https://doughnuteconomics.org/
High Level Panel for a Sustainable Ocean Economy – blue papers and special reports	https://www.oceanpanel.org/ocean-science
Reviving the Ocean Economy: the case for action	https://www.worldwildlife.org/publications/reviving-the-oceans-economy-the-case-for-action-2015
The Ocean Economy in 2030	https://www.oecd.org/environment/the-ocean-economy-in-2030-9789264251724-en.htm
Ocean Accounts Diagnostic Tool	https://www.oceanaccounts.org/ocean-accounts-diagnostic-tool/
Ocean Accounts Technical Guidance	https://www.oceanaccounts.org/technical-guidance-on-ocean-accounting-2/
UK Marine Natural Capital Accounts 2021	https://www.ons.gov.uk/releases/uknaturalcapitalaccountsmarine2021
Government of Canada's Blue Economy Strategy Engagement Paper	https://www.dfo-mpo.gc.ca/campaign-campagne/bes-seb/index-eng.html
Financing Nature: Closing the Global Biodiversity Financing Gap – Paulson Institute	https://www.paulsoninstitute.org/key-initiatives/financing-nature-report/
Commonwealth Blue Charter case studies and resources	https://bluecharter.thecommonwealth.org/
IOC UNESCO Marine Spatial Planning tools and resources	http://msp.ioc-unesco.org/
Second World Ocean Assessment – including Marine Spatial Plan case studies	https://sdgs.un.org/publications/launch-second-world-ocean-assessment-woa-ii-volume-ii-32885
UK Marine Policy Statement	https://www.gov.uk/government/publications/uk-marine-policy-statement
Single-use Plastics – A Roadmap for Sustainability	https://www.unep.org/resources/report/single-use-plastics-roadmap-sustainability
Food Systems Dashboard	https://foodsystemsdashboard.org/

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14 APPENDICES

14.1 Appendix One – Blue Economy sectors

Type of activity	Blue Economy component	Sector	Sub-sector
Traditional	Harvesting and trade in living marine resources	Fisheries	Small-scale fisheries Industrial fisheries Fish processing Trade of seafood products Trade of non-edible seafood products (e.g. pet food, aquaculture feed, biotechnology products) Secondary fisheries activities (e.g. building fishing vessels, making fishing gear, maintenance of vessels).
Traditional and emerging		Aquaculture	Coastal aquaculture Offshore aquaculture Onshore / closed system aquaculture Fish processing Trade of seafood products Trade of non-edible seafood products (e.g. pet food, aquaculture feed, biotechnology products) Secondary aquaculture activities (e.g. building fish farms, building boats, maintaining facilities, veterinary services).
Emerging		Marine Genetic Resources	Pharmaceuticals Cosmeceuticals Nutraceuticals Industrial enzymes and other biomolecules Inspiration for commercial products

Type of activity	Blue Economy component	Sector	Sub-sector
Traditional	Extraction and use of non-living marine resources	Hydrocarbons	Oil and gas exploration Oil and gas production Supporting services for the oil and gas industry (e.g. survey, rig and vessel construction, diving, vessel / rig maintenance, insurance)
Traditional		Marine aggregates	Dredging of shallow-water marine aggregates Supporting services for the dredging industry (e.g. survey, vessel construction and maintenance)
Traditional and emerging		Precious materials extraction	Precious coral dredging Diamond dredging Supporting services (e.g. vessel and equipment construction and maintenance) Material processing Trade of precious materials
Emerging		Deep-sea mining (deep shelf or deep sea)	Manganese nodule mining Seabed massive sulphides Cobalt crusts Phosphate deposits Iron sands Supporting services (e.g. survey, vessel / rig construction and maintenance, construction and maintenance of subsurface infrastructure) Refining of minerals Trade in minerals
Emerging	Use of renewable non-exhaustible natural forces	Renewable energy including for production of new fuels (e.g. hydrogen)	Wind energy Tidal energy Wave energy Ocean thermal energy conversion Supporting services (e.g. survey, plant construction, installation and maintenance, vessel construction and maintenance; cable construction, laying and maintenance)

Type of activity	Blue Economy component	Sector	Sub-sector
Traditional	Commerce, trade and security in and around the ocean	Shipping and ship building	Vessel construction Vessel outfitting Vessel containers Vessel maintenance Vessel fuelling Vessel decommissioning / recycling Navigation and safety
Traditional		Maritime transport	Cargo vessel industry Transport of oil, gas and other bulk fuels Cruise liner industry Ferry industry
Traditional		Military	Construction, operation and maintenance of military vessels Naval equipment (e.g. navigation, surveillance, weapons, aircraft) Training facilities
Traditional and emerging		Ports and related services	Port infrastructure Port services Digital infrastructure
Traditional		Coastal development	Construction and maintenance of coastal infrastructure (e.g. buildings, roads, coastal protection) Coastal tourism
Traditional		Tourism and recreation	Cruise industry Yachting / sailing / boating / kayaking Diving Wildlife tourism Museums, galleries and other attractions Airline and other transport industries Service industries

Type of activity	Blue Economy component	Sector	Sub-sector
Traditional and emerging	Subsea cable laying	Communications and power cables	Building and maintenance of cable laying and cable maintenance vessels Cable manufacturing Technology development Science (cabled observatories and sensors).
N/A	Indirect contributions to economic activities	Ecosystem service provision	Generation of food Biodiversity Habitat provision Carbon sequestration Nutrient cycling Coastal protection Waste disposal Cultural services including inspiration and education
Traditional and emerging	Supporting activities to the Blue Economy	Ocean monitoring and surveillance	Environmental monitoring Monitoring control and surveillance for enforcement or security purposes
		Science and technology development	Physical sciences including weather forecasting and hazard prediction / warning Environmental sciences related to ocean health Development of clean / renewable technologies, sensors and other applied technologies
		Ecosystem-based management	Public and privately-funded environmental services; policy and management infrastructure and human capacity
		Financial services including the insurance sector	Financing blue economic development Insuring blue economic infrastructure
		Governance, policy and law	Financed institutions Public and privately-funded maritime and environmental law industry

Table 1: Blue Economy sectors (drawn from UNEP, 2012; EIU, 2015; World Bank, 2017)



14.2 Appendix Two – Blue Economy enablers

Enabling activities	Why the activity is important	Role in the Blue Economy	Actions
Valuation of natural oceanic capital	Primary step in understanding the monetary and non-monetary values of marine ecosystems.	Underpins the sustainable management of all sectors	Requires expertise in valuation of natural capital and assessment of current sectors such as small-scale fisheries
Ocean science	Provision of the best scientific data to underpin governance and shape management decisions.	Underpins the sustainable management of all sectors.	Marine science, observational infrastructure, technology, data infrastructure and science.
Strategic Environmental Assessment	Ensures that one sector or group of developmental activities does not undermine another. Allows multisectoral approaches and facilitates environmental and social impact assessments.	Underpins a multisectoral holistic approach to developing the Blue Economy.	High-level participatory decision making tools.
Effective inclusion and active participation of all societal groups	Ensure that all stakeholders are fully engaged in development of the Blue Economy.	Especially important in coastal Blue Economy sectors including port and other coastal infrastructure development and tourism.	Investment in social sciences and networking of local communities and other stakeholders.
Development of marine spatial plans	Important step to decision making and in the early resolution of conflicts in use of ocean space.	Underpins sustainable management of all sectors.	Geospatial analysts, data from Government Ministries regulating different sectors.
Prioritisation of Blue Economy sectors	Allows each country to tailor blue economic development to its particular circumstances.	Underpins sustainable management of all sectors.	Requires valuation of natural capital and existing / potential maritime industries. Requires development of a Blue Economy plan and clear setting of targets.
Development of new financing mechanisms	Blue economic development requires new approaches in financing such as debt-for-nature swaps, blended financing, underwriting of natural capital assets.	Probably more appropriate for sectors where external investment is not through traditional channels or where traditional investment pathways lead to unsustainable development.	New financial institutions, investors, analysts. Reforming of harmful subsidies. Development of financial incentives for better ocean stewardship.
Capacity development	The Blue Economy needs both human capacity and also requires infrastructure such as science laboratories, governance and enforcement institutions.	Underpins sustainable management of all sectors.	Investment in infrastructure and training.

Enabling activities	Why the activity is important	Role in the Blue Economy	Actions
Institutional reform	The Blue Economy requires a robust framework for governance, institutions, investment and business innovation	Underpins sustainable the sustainable development and ongoing management of a Blue Economy.	Requires good laws and regulations; compliance to international law (e.g. UNCLOS), treaties, guidelines; strong institutions; strong interministerial co-operation; inclusive decision making; evidence-based decision making; credible arbitration mechanisms.
Surveillance and monitoring.	Needed for monitoring achievement of Blue Economy targets; for enforcement of regulations; to identify changes in the marine environment arising from blue economic activities or other local, regional or global drivers.	Required for adaptive integrated management of the Blue Economy and protection of the marine environment. Also required for enforcement of regulations relating to the sustainable use of marine resources and prevention of pollution.	Can be achieved through reforming national institutions charged with surveillance and monitoring; investing in surveillance and monitoring capacity; entering into public-private partnerships or international cooperation to enhance surveillance capacities.
Anticipate and adapt to the impacts of climate change.	Climate change is already disrupting the marine environment globally and can potentially alter the distribution of marine living resources and the effectiveness of plans for management and conservation of the marine environment.	Required to ensure that Blue Economy plans are met through adaptive management.	Expertise in climate change impacts on all sectors of the Blue Economy are required. Climate impacts must be accounted for in Blue Economy planning. Monitoring ensures that unanticipated effects of climate change are detected at an early stage.
Adoption of clean technologies, renewable energy and circular material flows where feasible.	Aimed to reduce degradation of the ocean, emissions of CO ₂ and depletion of natural resources.	Will ensure that the new Blue Economy contributes to reducing ocean degradation and to targets to meet emissions reductions.	Requires investment in clean technologies, renewable energy infrastructure and adoption of circular economy approaches.
Development of relevant partnerships.	Many countries lack the resources to enable the Blue Economy by themselves. Some issues related to blue economic development require regional or even global approaches (e.g. sustainable management of fisheries, tackling IUU fishing, dealing with harmful subsidies).	Enables many Blue Economy sectors where resources or capacity is limited within a country. Allows regional or global progress towards a Blue Economy.	Clear communication of needs to potential partners. Willingness to cooperate with regional or global partners to advance the Blue Economy. Capacity development in relevant ministries (e.g. Foreign Ministry, Treasury, Trade Ministry).

Table 2: Enablers of blue economic development (drawn from UNEP, 2012; EIU, 2015; World Bank, 2017)

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