

The Blue Economy: From Concept to Reality in the Caribbean Region¹

Discussion paper for the Caribbean Regional Dialogue with the G20 Development Working Group

Summary

The “blue economy” is of significant value to all Caribbean countries - the potential that a better and more effective use of marine resources presents is significant in terms of economic growth, community development and environmental protection. The opportunity to create more value from existing and new resource streams, in the widest sense, is of high interest to policy makers in the region, as well as to the regions’ development partners. While opportunities do exist however, the full potential of the ocean is not being realized in many countries. Barriers to realising greater opportunities and benefits need to be addressed, and industry working in the ocean needs to be greened, so the ocean can play a fuller more central role in economies at national, regional and global scales.

The blue economy is also of potentially significant interest to the G20, particularly the G20 Development Working Group (DWG). Since 2010 the DWG has supported developing countries providing support inter alia to help the world’s poorest, smallest and most vulnerable developing countries. Developing the blue economy in these countries requires active support in many of the DWG’s priority areas, including: support for countries’ tax capacity; for developing economic and other forms of infrastructure; promoting food security, reducing poverty; and strengthening human resource development. All of these are central policy requirements in building an effective blue economy, offering significant opportunity for sharing knowledge and information, strengthening collaboration, within the DWG’s priority policy areas, for Caribbean countries and the region as a whole.

This paper provides an overview of the opportunities presented by the blue economy, providing the basis for discussion of some practical measures that Caribbean countries and the region as a whole can take to realise those opportunities; and offering some suggestions for DWG engagement in promoting these national and regional efforts to build an effective and sustainable Caribbean blue economy.

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1 INTRODUCTION

Caribbean countries face a variety of economic challenges which act as major impediments to their growth and development. The continued reliance on a limited number of major export products with the associated vulnerability to economic shocks, as well as natural disasters, places many countries in the region in a precarious position.

Two Caribbean countries carry debt to GDP ratios in excess of 100% of GDP,² while a further seven countries³ have debt in excess of 75%. Overseas development assistance has been on the decline and is no longer an option for the large majority of Caribbean countries. Graduation to middle income status has also meant that concessional financing is no longer available, notwithstanding the vulnerabilities of the economies in the region.

Given all these factors, one may ask what options are available to move the region from a “survivability to sustainability” frame of reference. One obvious answer is the “blue economy”, offering as it does opportunities for economic diversification, new sources of revenue, economic growth and employment creation for the Caribbean region.

1.1 Economic Importance of Oceans

All coastal nations, and in particular Small Island Developing States (SIDS), depend on the wealth of resources provided by the oceans and the many essential aspects of the global economy they support. The global ocean market is estimated to be valued at approximately US\$1,345 billion per annum, contributing approximately 2% to the world’s GDP. Marine services, such as tourism and shipping, provide the largest proportion (US\$880bn), followed by sectors categorised under marine resources (US\$377bn) and marine manufacturing (US\$107bn).⁴ Globally, approximately 350 million jobs are linked to the oceans through fishing, aquaculture, coastal and marine tourism and research activities. Moreover, in excess of one billion people depend on fish as their primary source of protein.⁵

As technology improves our knowledge of the deeper offshore waters and our capacity to access them, a number of new opportunities have also emerged and are gradually being realised. These include the current interest in deep seabed minerals, ocean energy production and marine genetic resources with medical, pharmaceutical and industrial benefits.

² The two countries are Jamaica and Grenada.

³ Antigua and Barbuda, Barbados, Belize, Dominica, St. Kitts and Nevis, St. Lucia, and St. Vincent and the Grenadines. The Commonwealth Secretariat has a long standing programme providing assistance to member countries on issues relating to Debt management including supporting the strengthening and reforming of debt management strategies, frameworks, policies and operations.

⁴ Figures from *Harnessing our ocean wealth: An integrated marine plan for Ireland*. (Government of Ireland: July 2012). p. 8. Available at: <http://www.ouroceanwealth.ie/SiteCollectionDocuments/Harnessing%20Our%20Ocean%20Wealth%20Report.pdf>.

⁵ OECD, *The future of the ocean economy: Exploring the prospects for emerging ocean industries to 2030*. OECD project proposal, 14 December 2012. p. 5.

1.2 Development Demands Facing the Planet

This dependence on the oceans as a major source of resources and services will continue to grow as human populations increase, which by 2050 is projected to grow to nine billion. Sustained population growth, aggressive economic competition and increased consumption will result in intensive exploitation and pressure on resources, including those from the ocean. The availability and flow of energy, food and water will be critical: Oil demand is projected to grow nearly 40 percent by 2030, much of which will be extracted from offshore waters; fish from both wild and aquaculture sources contributed 16 percent of global animal-based protein in 2009 and are the primary source of animal-based protein for 1.3 billion people.

The potential of the oceans to help meet those requirements is huge, but they are under increasing pressure from many uses and threats resulting from overexploitation and poor management. If Caribbean countries are to effectively develop their ocean space to meet these needs in a sustainable way, an approach is needed that integrates environmental management directly with economic development, fiscal policy and social goals; and which involves international development partners, including G20 members and the DWG, to help Caribbean countries build the enabling environment for a Caribbean blue economy.

1.3 The Blue Economy and Blue Growth

The concept of an ocean-based, or 'Blue' economy has its origins in the "green economy" concept endorsed at the United Nations Conference on Sustainable Development and has been embraced by many island and coastal nations as a mechanism to realise sustainable growth. The concept stems from the realisation that, with the extensive marine areas many SIDS are endowed, the future resource base for such countries is predominantly marine. This significant *per capita* marine resource base means that the blue economy offers the prospect of sustained, environmentally-sound, socially inclusive economic [blue] growth. The Blue economy concept also embodies economic and trade activities that integrate the conservation and sustainable use and management of biodiversity. In this regard, the Blue economy also supports sustainable livelihoods and food security for island and coastal communities.

A recent UNEP study into the benefits of transitioning to a Green Economy highlighted three broad conclusions that are highly relevant to the blue economy: (i) in a transition to a Green Economy, new jobs are created, which over time exceed the losses in 'brown economy' jobs; (ii) transitioning to a Green [Blue] Economy not only increases wealth over the long term, but also produces a higher rate of GDP growth; (iii) there is a clear link between poverty eradication and better protection and restoration of habitats, marine fisheries resources and biodiversity.

Building on this approach, international organisations are developing a range of specific strategies and approaches to develop the blue economy. The Commonwealth, for example, is supporting developing countries pursue four inter-related goals: (i) diversifying the existing economic base and increasing the proportion of GDP derived from ocean sectors; (ii) focusing on strategies to create higher value jobs; (iii) addressing the achievement of food security through marine sources of protein; and (iv) supporting developing countries in managing ocean development in a sustainable way.

2 CARIBBEAN CONTEXT OF MARINE SPACE AND RESOURCES

Caribbean countries have jurisdiction over significant ocean areas that, in many cases, far exceed the land area of the countries themselves. The Bahamas exclusive economic zone, for example, is estimated to be 242,970 square miles compared to its land area of 5,383 square miles, whereas St Vincent and the Grenadines' is estimated to be about 13,900 square miles, over 90 times its land area. In the case of St. Kitts and Nevis, the ocean space is almost 7,900 square miles, with its land area being only 100 square miles.

2.1 Marine Resources and Activities in the Caribbean

Uses of the marine environment contribute significantly to the overall economy of Caribbean countries. Of these, tourism and fishing play a dominant role. There are also strong cultural attachments to coastal resources and their uses.

Fishing

The fisheries sector of Caribbean countries is an important subset of the blue economy and represents a significant source of nutrition, employment and foreign exchange, as well as contributing to social and economic stability. In 2010, 62,217 people were directly employed in marine capture fisheries, with a total fleet of just under 25,000 fishing vessels operating in the commercial capture fisheries. During the period 2006-2010 total capture fish production averaged 136,148 tonnes across Caribbean Regional Fisheries Mechanism (CRFM) member States. The value of the marine capture fishery production for the region from domestic fleets was approximately US\$543 million for the period 2008-2009.⁶

There are few large surplus stocks in the Caribbean region, with the exception of Guyana, Suriname and, to a lesser extent, Belize.⁷ Coastal fisheries in particular have declined sharply in some countries in recent years. Anecdotal evidence suggests that catches of conch, lobster, and some demersal fishes are all declining, particularly in the Eastern Caribbean region, where future development of the offshore fishery resources and larger pelagics are considered to offer possible opportunity for technical and economic diversification in this sector.

Tourism

Tourism is a key part of the economy of most, if not all, Caribbean countries, particularly island nations. For some, it accounts for almost the whole economy. The sector is a substantial source of employment. It is also a major source of foreign exchange and has, since the 1990's, helped to offset a decline in agriculture and in agricultural exports. For example, tourism accounts for 75% of the collective GDP of the member countries of the Organisation of Eastern Caribbean States (OECS).

⁶ J. Masters, *CRFM Statistics and Information Report for 2010* (2012), 65 pp. Available at: http://www.crfm.net/images/Rev_CRFM_Statistics_and_Inormation_Report_2010_revised_June_2014_for_website.pdf.

⁷ ITLOS, *Written Statement of the Caribbean Regional Fisheries Mechanism*, 27 November 2013. p. 2. Available at: <https://www.itlos.org/index.php?id=252>.

Tourism is heavily reliant on the marine environment in terms of cruise ship tourism, beach side hotels and beaches, scuba diving, recreational and sport fishing and recreational yachting. The quality and status of the marine environment could therefore have a significant impact on the value of this sector, depending on how tourists perceive the quality of the marine environment and the experience it offers.

In some countries the tourist market for fish products is strong, with tourists consuming a large amount of fish compared to the domestic market. This support to the increasingly important tourism industry needs to be considered when determining the extent to which the fisheries sector contributes to the economies of the region.

Maritime Transport

It is estimated that more than 90% of global trade is seaborne with most, if not all agriculture products being exported by sea. Caribbean island nations in particular are almost entirely reliant on shipping to support their economies. Thus, shipping and the supporting infrastructure such as ports and harbours are vital to the economic growth of the islands. The Caribbean Sea is also a major global shipping hub due to the large number of vessels converging on and departing from the Panama Canal.

2.2 The Value of Marine Ecosystems

In addition to the specific activities listed above, the oceans also provide a broader range of essential goods and services that support economic well-being and human health. Such services include: provision of food and raw materials; provision of regulating and supporting functions such as flood control and coastline protection, waste management, water balance, climate regulation, and other processes; and benefits arising from cultural and amenity values.⁸ If appropriately governed and managed the marine environment can therefore contribute at a significant scale to society as a whole through:

Food security -adequate scales and levels of marine resource protection, management and enforcement will provide long-term sustainable and renewable supplies of food;

Sustainable economic growth - the sustained supply of goods and services provides the basis for a range of economic activities. Primary amongst these is marine tourism that can be a major contributor to GDP for islands and coastal areas.

Energy security - ocean currents and wave energy can be captured to provide a sustained source of energy; the ocean supplies a place to site wind farms relieving pressures on land. In remote small island states solar energy can reduce a near-total dependency on imports of diesel and other fuels.

Poverty reduction - healthy marine ecosystems are associated with healthier local communities on the basis of more and better quality sustained supplies of food in the form of fish protein. This is coupled with the fact that healthier more intact ecosystems generally harbour less pathogens of consequence to humans.

⁸ The Economics of Ecosystems and Biodiversity (TEEB). *The economics of ecosystems and biodiversity: Mainstreaming the economics of nature: A synthesis of the approach, conclusions and recommendations of TEEB*. (UNEP, FAO, UNDP, IUCN, World Fish Centre, GRID Arendal, 2011).

Climate change mitigation - shallow coastal water ecosystems, such as mangroves, tidal marshes and even sea grass meadows, some often considered to consist of unattractive mud, are now seen as a critical part of our approach to managing essential natural carbon sinks.

Disaster risk reduction and mitigation - coastal habitats such as coral reefs, mangroves and coastal marshes provide significant protection from episodic events such as cyclones and hurricanes. Through appropriate management the presence of such ecosystems also act as day-to-day natural solutions to coastal erosion and flooding from storms and increasing sea levels.

2.3 Threats Facing the Caribbean Sea

At a global level, the overexploitation and poor management of the oceans has resulted in lost opportunities, heightened food insecurity and diminished economic opportunities for some of the world's poorest people.⁹ At a regional level the Caribbean Sea faces numerous environmental threats. Of particular concern are the unsustainable exploitation of fish and other living resources, pollution from marine and land based sources and habitat damage.¹⁰

For example, it is estimated that 35% of fish stocks in the wider Caribbean region are overexploited, which has implications not only for the economic sustainability of these resources but also for coastal communities that rely on fisheries as a livelihood and source of food. The pollutants constituting the greatest threat to coastal and marine ecosystems and to public health in the wider Caribbean region include, oil hydrocarbons, sediments, nutrients, pesticides, litter and marine debris, and toxic wastes. Sewage, however, is one of the most significant pollutants affecting the region.

Other major threats to the marine ecology of the Caribbean Sea include increases in exotic invasive species; poorly planned and regulated coastal development; unsustainable extraction of natural resources such as sand harvesting for construction; and the increasing intensity of hurricanes and other storm events. Climate change has added to these pressures and may also lead to an increase in the cumulative impacts of these factors.

The consequences of these impacts includes loss of livelihoods and economic opportunities to fishers, hoteliers and related business, loss of natural protection of the coastline, loss of natural habitats for flora and fauna, as well as loss in recreational opportunities.

2.4 Status of the Blue Economy in the Caribbean Region

While the blue economy clearly offers great potential for the Caribbean region, the full potential of the ocean is not being realized in many Caribbean countries. The wider

⁹ UNCTAD, *The oceans economy: Opportunities and challenges for small island developing states*. UNCTAD/DIT/TED/2014/5 (New York & Geneva: United Nations, 2014). p. 2.

¹⁰ A preliminary Transboundary Diagnostic Analysis, undertaken as part of the Caribbean Large Marine Ecosystem (CLME) Project, identified three priority transboundary problems that affect the wider Caribbean Sea: (i) unsustainable exploitation of fish and other living resources; (ii) habitat degradation and community modification; and (iii) pollution. Available at: <http://caricom-fisheries.com/Projects/MajorProjects/tabid/58/Default.aspx#579>

Caribbean ocean governance framework is characterised by a collection of multilateral environmental agreements, political agreements, non-binding agreements, programmes, projects and national laws, which exist at various levels.

Over 30 different regional and sub-regional organisations with some level of engagement in governance of the ocean and its resources operate in the region and support these arrangements. They include UN organisations and regional intergovernmental organisations, oriented towards all aspects of ocean governance and marine resource management. However, integration across them is poor resulting in both gaps in implementation and duplication of effort. The absence of a regional body to provide an overarching coordination function is increasingly being recognized as a significant gap by Caribbean countries and development partners.¹¹

Notwithstanding this, there are currently a number of initiatives underway in the Caribbean that give effect to the blue economy concept at some level.

At a sub-regional level, the marine environment is recognized as a burgeoning sector within the Growth and Development strategies of the Organisation of Eastern Caribbean States (OECS) and presents tremendous potential for the transformation into a vibrant blue economy. To this end, in 2013 OECS Heads of Government adopted the Eastern Caribbean Regional Oceans Policy and Action Plan. This regional policy provides a framework that guides the planning and development of marine activities in the Eastern Caribbean region in a rational and sustainable manner.¹²

In 2013 nine Caribbean Governments and territories¹³ also signed the Caribbean Challenge Initiative (CCI) Leaders Declaration committing them to accelerate and expand efforts to safeguard the Caribbean region's marine and coastal environment, further promote the sustainable use of natural resources through new commitments to conservation, engage the private sector and partners of the CCI and expand the CCI to include additional governments.

At the heart of this Initiative are two overarching goals:

1. Effectively conserve and manage at least 20 percent of the marine and coastal environment by 2020; and
2. To support goal 1, to have in place fully functioning sustainable finance mechanisms that will provide long-term and reliable funding to conserve and sustainably manage the marine and coastal resources and the environment in each participating country and territory. A growing number of partners - such as funders and non-governmental organizations - are rallying around this effort, providing financial, technical, and other support.¹⁴

¹¹ http://cermes.cavehill.uwi.edu/PolicyPerspectives/CERMES_Policy_Perspectives_2011_11_01.pdf.

¹² <http://www.caribbeanleadership.org/en/newsletter-content/june-2014/the-organisation-of-eastern-caribbean-states-thirty-three-years-later#sthash.teAhDyQI.dpuf>.

¹³ The Bahamas, British Virgin Islands, Dominican Republic, Grenada, Jamaica, Puerto Rico, St Lucia, St Kitts and Nevis and St Vincent and the Grenadines.

¹⁴ See <http://www.caribbeanchallengeinitiative.org/welcome>.

A further initiative being developed by the Carbon War Room (a global not-for-profit organisation founded by Sir Richard Branson) aims to accelerate the transition of Caribbean island economies from a heavy dependence on fossil fuels to renewable resources. To date, ten Caribbean countries are participating in the project.¹⁵ The project will help scale renewable projects and support the capacity of islands to achieve their sustainable energy goals by delivering technical expertise, engaging with governments and island stakeholders, and providing communications support.

There are also a number of country-specific initiatives currently underway. For example, in May 2014 the Government of Grenada announced its intention to undertake a number of initiatives aimed at protecting its marine space and growing the island's blue economy.¹⁶ To this end, the Ministry of Fisheries has established a National Ocean Governance Committee to oversee the development of these initiatives across government. One key proposal is for the establishment of a Blue Growth and Oceans Governance Institute, to be hosted by the Government of Grenada in partnership with the Government of the Netherlands.¹⁷

In The Bahamas, an integrated policy framework is being implemented to manage the ocean space and marine resources with the objective to give greater clarity to roles, functions and actions of approximately 34 governmental bodies. Similar initiatives are at various stages of development in St Kitts and Nevis, St Vincent and the Grenadines and Antigua and Barbuda.

In Antigua and Barbuda, the Barbuda Blue Halo Initiative is being implemented by the Waitt Institute, a U.S.-based marine conservation NGO. The project aims to develop a comprehensive, community-driven, science-based plan for the island of Barbuda to use its coastal waters sustainably, profitably, and enjoyably. The project has already established new fisheries management regulations, created a zoning plan for the coastal waters, and will augment local enforcement and scientific monitoring capabilities, and develop a long-term financing strategy. Further similar initiatives are now planned for Montserrat and Curaçao.

2.5 Future Opportunities for Caribbean Blue Growth

By applying a blue economy approach many new opportunities arise for the region, which can create new jobs, achieve a higher rate of growth, reduce poverty, and secure international biodiversity and sustainability obligations. Among emerging opportunities identified as having potential in the blue economy with particularly strong potential in the Caribbean context are fish farming (aquaculture), marine renewable energy, ocean-related tourism and marine biotechnology.

¹⁵ Aruba, the Bahamas, the British Virgin Islands, the Colombian islands of San Andrés and Providence, Dominica, Grenada, Saint Kitts and Nevis, Saint Lucia, and Turks and Caicos

¹⁶ <http://nowgrenada.com/2014/05/pm-grenadas-blue-economy-poised-rapid-growth/>.

¹⁷ On 11-13 March, the Government of Grenada in conjunction with the Governments of the Netherlands and Indonesia recently convened a strategy meeting for action on blue growth and food security. Representatives from several development agencies, including the World Bank and FAO participated.

Aquaculture

Worldwide demand for fish and fishery products is expected to surge in the coming years across all continents. However, capture fisheries production is set to remain rather static, so that aquaculture has expanded rapidly to produce nearly half of all the fish people consume. To maintain the role of fish in diets, aquaculture production will have to more than double from current levels by 2050. Most of the future expansion in aquaculture production capacity will probably occur in the ocean, with some of it moving increasingly off-shore to escape the constraints of coastal waters.

Globally, aquaculture is already a multi-billion-dollar industry, but the Caribbean has yet to tap into its true potential to expand marine and fresh water aquaculture. This is because the aquaculture sector is not well developed in the region. Significant development has been limited to countries such as Jamaica and Belize, but other countries including Guyana, Haiti, Suriname and Trinidad and Tobago are putting greater emphasis on aquaculture as an area for development.¹⁸

The CRFM has identified the promotion and development of aquaculture as one of its priority programme areas, with the formulation of aquaculture development policy and legislation as key areas for attention. The objective is to increase food production and security, improve rural income and employment, diversify farm production, and increase foreign exchange earnings and reduce the high food import bill.

Marine renewable energy

The ocean is a rich source of potential energy resources, and with growing concern over climate change and increasing global interest in renewable energy, investment in ocean based energy is poised to grow over the next few decades.

The development of marine renewable energy (MRE) in the Caribbean can support achievement of renewable energy objectives and provide energy security through greater independence from imported hydrocarbons. MRE technology options include offshore wind, wave, tidal stream, thermal energy conversion (OTEC) and salinity gradient, and the feasibility varies according to each technology as they range in development status globally. Considering the multiple benefits of MRE, in terms of energy security, environmental protection and socio-economic benefits, it is a win-win solution in terms of sustainable development and the blue economy.

However, there are also significant challenges facing the sector globally, as it is an emerging sector and demonstrated commercial success is not yet evidenced. As such, there are challenges to be overcome in establishing successful MRE in the Caribbean. These include policy, planning and legislative frameworks, institutional requirements, financing and markets, technological viability and local infrastructure.¹⁹

¹⁸ <http://aquaculturedirectory.co.uk/aquaculture-gateway-blue-economy-caribbean/#sthash.sp4EVIImX.dpuf>

¹⁹ Adapted from Greenhill, L. *Early briefing report on the feasibility of marine renewable energy in the Seychelles*. Briefing paper prepared for the Commonwealth Secretariat by the Scottish Association for Marine Sciences, November 2014.

Biotechnology

While the development of marine-based biotechnology is at a very early stage of development worldwide, the biotechnological potential of marine organisms is huge with macro-algae, microalgae, bacteria etc. having the capacity to deliver solutions to most if not all the global-scale major socioeconomic and political drivers including:

Climate change - Carbon dioxide sequestration using microalgae is being explored as a stand-alone technology and in the context of an integrated biorefinery approach to produce commercial products.

Energy security - Both micro and macro algae are currently being extensively explored for their capacity to produce oil and other fuels for transport and energy production.

Food security - Algae, both micro and macro, have historically been used as food and remain a major component of the diet in Japan and elsewhere. Algae, via both mariculture of macroalgae and microalgae are currently being extensively exploited as both niche foods and to provide food constituents.

Aging population - There is an exponentially expanding literature and investment into exploring the potential of marine organisms, microbes in particular, to generate products in the pharmaceutical, nutraceutical, functional food, cosmeceutical and wellness market sectors.

Marine biotechnology has also displayed widespread commercial potential in industrial products and processes, and in the life sciences industry as a novel source of enzymes and polymers.

These opportunities remain to be explored and fully developed in the Caribbean region, building on good practices and utilising the support of development partners, including regional organisations and international development partners.²⁰

Ocean related tourism and leisure

Against a global background of rising incomes, ageing populations, growing leisure time, and the declining image of cruises as the preserve of the wealthy, the long-term prospects for ocean cruise tourism appear healthy. According to the Caribbean Tourism Organization nearly 24 million cruise passenger arrivals were recorded for the region in 2014, an increase of some 8 percent from 2010 levels.²¹ There is however, abundant opportunity for further expansion of this well-established cruise industry, offering a significant opportunity to strengthen this component of blue economic development.

Looking a couple of decades ahead, there is the question not only of new destinations but also of new forms of ocean-related tourism. Underwater hotels and sea-floor/floating resorts already exist in such places as Florida, China, and Fiji, with more in the planning stage. Deep sea tourist expeditions are another such activity with significant potential.

²⁰ Adapted from Day, J. and M. Stanley. *Early briefing report on the feasibility of marine/blue biotechnology in the Seychelles*. Briefing paper prepared for the Commonwealth Secretariat by the Scottish Association for Marine Sciences, November 2014.

²¹ Caribbean Tourism Organization, Caribbean Tourism Review, (2014). Available at: <http://www.onecaribbean.org/wp-content/uploads/2014TourismReviewDocumentAmendedFEB11.pdf>

Several companies around the world already offer mid-range dives of between 500 and 1000 metres.²²

Questions and Issues for Discussion

- What other national and regional steps are being taken by Caribbean countries and regional institutions to develop the Caribbean blue economy?
- What best practices and opportunities to share knowledge and experience are being identified through this process?
- What are the key challenges for Caribbean countries and the region as a whole as this process develops?
- What role can development partners play in supporting these efforts?

3 THE BLUE ECONOMY AND G20 DEVELOPMENT PRIORITIES

With the establishment of the Seoul Development Consensus, the DWG focused on nine priority development pillars, with emphasis placed in each year since the Consensus, on specific elements of the nine pillar framework. The Saint Petersburg Development Outlook, identified the following five priority areas: infrastructure; food security; financial inclusion and remittances; domestic resource mobilization; and human resource development. Of these five, three are directly relevant to the blue economy, namely: infrastructure, food security, and human resource development.

Furthermore, in 2015 the Turkish Presidency has placed development at the centre of its G20 agenda, the three pillars of the Presidency agenda being:

- (i) Strengthening the Global Recovery and Lifting the Potential;
- (ii) Enhancing Resilience; and
- (iii) Buttressing Sustainability.

In this regard, the Turkish Presidency has identified several priority areas for its focus:

The primary focus will be on further enhancing the integration of developing and low-income countries into the world economy through concrete and growth-oriented actions.

Creating better quality jobs remains at the heart of G20's shared objective of achieving strong, sustainable and balanced growth. It will also give special importance to the better integration of SMEs, especially in the developing countries, to global value chains as there is a strong correlation between participation in the global value chains and GDP per capita.

Supporting food security in the developing world will be given particular attention, focusing on sustainable food systems. G20-led projects and pilots aimed at human

²² OECD (note 5 above), p. 21.

resource development will continue. Turkey will also look for innovative ways to enhance the role and contributions of the private sector in development.

A final priority area relates to energy sustainability and the reasons behind the high costs of renewable energy investment.²³

Questions and Issues for Discussion

The blue economy has not been a core area of policy focus for the DWG to date. Yet there may be opportunities for engagement with the DWG work. Exploring possibilities for engagement in a manner consistent with the DWG's mandate and priorities will be central to the success of this approach.

- What specific opportunities are there for the DWG to support Caribbean country and regional efforts to build the Caribbean blue economy?
- Are the pathways and channels best addressed sectorally, for example through supporting tourism development; or thematically, for example through support for human resource development needs in building the blue economy?

4 REALISING THE BLUE ECONOMY IN THE CARIBBEAN

Having briefly examined the context in which the blue economy is developing in the Caribbean region, the challenges facing the region and the emerging opportunities to build a blue economy, as well as the potential for development partner support, focusing particularly on the potential support which the DWG may offer, the remainder of the paper considers the priority factors and conditions, which will enable the development of the Caribbean blue economy; and some of the specific steps which will be needed, with DWG and other support, to shift from concept to reality.

4.1 Barriers to Realising the Blue Economy

For many Caribbean countries, the challenges to exploiting ocean resources and services for sustainable development lie in the inherent structure of their economies. The small size of many countries limits their capability to fully exploit the economies of scale and price bargaining power that larger countries may have. Sovereignty necessitates certain fixed costs of providing public services, including data collection, policy formulation, regulatory activities and security. The provision of these public goods comes at a high cost per person, limiting the institutions and skills available for policy response. These challenges are inherent and any effective practical approaches to the development of the blue economy must take these factors full on board and be relevant to the Caribbean context.

²³ Turkish G20 Presidency Priorities for 2015 statement. Available at: <https://g20.org/wp-content/uploads/2014/12/2015-TURKEY-G-20-PRESIDENCY-FINAL.pdf>.

Several international organisations are now working to consider the gaps and hurdles which developing countries need to address in building the blue economy. Based on empirical work conducted in the region the Commonwealth for example has identified the following six key barriers to fully realising the blue economy, although this is by no means an exhaustive list.

Climate change

The greatest systemic threat to achieving the blue economy is climate change. Among the many challenges arising from climate change, four appear to be particularly relevant constraints to building the Caribbean blue economy.

Firstly, sea level rise, which presents the biggest challenge for small island states leading to island abandonment, exposure to storm surges, damage to coastal economies and infrastructure. The sea level rise anticipated from climate change is the biggest long-term threat facing the tourism industry in many Caribbean countries, where most tourism infrastructure lies just above sea level. Port infrastructure is also vulnerable, although to a lesser extent.

Secondly, meeting the demand for water in small island states will be strongly compromised under most of the climate change scenarios. Thirdly, changes in the ocean and coastal marine environment, such as elevated sea surface temperatures and ocean acidification, will disrupt critical ecosystem services, for example coral reefs and fisheries, on which small islands depend upon for food and economic development.

Finally, a further significant impact of climate change in the region is physical damage from hurricanes and other severe weather events. Significant reef damage and alteration has occurred as a result of hurricanes in the Caribbean, along with associated damage to coastal infrastructure which has not been constructed to hurricane-proof standards.

Ocean governance

The existing ocean governance framework in most, if not all, Caribbean countries emphasises a traditional sector-specific approach to management and planning and thus shows symptoms of the problem facing a large number of countries seeking to implement a blue economy approach - ocean governance remains highly 'balkanized'. As a generalisation, governmental attempts to mitigate or adapt to particular resource uses on a sector-by-sector basis normally prove ineffective and are unable to respond to the cumulative and synergistic impacts and pressures from human activities. The existing arrangements in most countries are likely to give rise to a number of institutional challenges, such as:

- Lack of connection between the various authorities responsible for individual activities resulting in poor or absent coordination and national oversight for the management and utilisation of marine space;
- A spatial and temporal overlap of human activities and their objectives, causing conflicts;
- Impacts from one (or more) activities adversely affecting other users of the marine environment;

- Lack of consideration of the cumulative effects of multiple activities on the marine environment and other users;
- A lack of connection between marine activities and the resource use and onshore communities that are dependent on them;
- Lack of protection of biologically and ecologically sensitive marine areas.

As Caribbean governments encourage economic development of marine areas in the future value-based conflict between competing interests can also be expected to increase. It will be difficult to resolve such conflicts without a more comprehensive and integrated approach to marine planning and decision-making, which recognizes the interactions and the interdependent nature of the various systems on islands.

Sustainable marine resource management

Many fisheries in the Caribbean Sea are also under considerable pressure as a result of numerous factors including over harvesting, a lack of enforcement, particularly of recreational catches, and a lack of other employment resulting in more people fishing as a livelihood. The health of coral reefs and associated biodiversity are of critical importance both from an environmental perspective and as an economic one due to the strong reliance on the tourism and fisheries sectors.

Regulation and enforcement

Although legal frameworks exist in most countries for many marine activities, there are often a number of regulatory gaps compared to the range of activities undertaken, as well as duplication between pieces of legislation addressing the same issue. Of critical importance to future economic development is the fact that such frameworks often do not anticipate or provide an enabling environment for future uses of the marine environment.

A further pressing concern is that the current regulations are not enforced robustly in many countries. The Commonwealth's experience of undertaking stakeholder engagement in several Caribbean countries, for example, highlights the difficulties associated with the enforcement of existing rules and regulations, particularly with regard to fisheries. Improving the procedures for monitoring and enforcement and clearly defining the institutional and organizational responsibilities for the management of marine activities and resources between the various ministries and departments is a crucial issue that must be addressed.

Aside from national and regional initiatives, there is also scope in the existing DWG agenda to support Caribbean countries in these efforts, *inter alia* through capacity building and human resource development support, as well as support to countries in their efforts to promote regulatory reform.

Education and capacity building

The lack of education and training in the wider Caribbean region leads to chronic gaps in the technical capacity for marine research, planning and decision making. Identifying future skills needs and labour market supply and demand trends and adapting and developing existing education, vocational and professional training programmes to meet them will be essential if the blue economy is to become a reality in the Caribbean. A more

coordinated focus between the existing research and educational facilities may well prove beneficial in terms of addressing key gaps in research skills and capacity building but ultimately a more comprehensive research strategy is likely to be required if the Caribbean is to fully realise the opportunities presented by a blue economy.

Marine research and information

Knowledge of the marine environment is a critical need for effective decision making. The marine environment, both globally and within the Caribbean, is far from completely understood. There is a paucity of data relating to the offshore waters in the Caribbean Sea. Furthermore, indigenous marine research is not well developed in most Caribbean countries due to a lack of funding and research institutions.

Research and development and other knowledge-generating activities support sustainable economic growth and job creation through the development of new products and services, facilitate better management and protection of marine ecosystems, and inform policy, governance and regulation of the marine sector. Identifying and defining ongoing strategic research needs, in an inclusive and adaptive manner, together with the appropriate funding resources and mechanisms, is essential for achieving economic development and informing policy. As noted above, a more coordinated focus between the existing research and educational facilities can be crucial to support the development of new research clusters aimed at supporting and furthering key marine sectors.

Lack of data and research capacity hampers the potential development of new sectors and is a major impediment to effective planning of marine space. A focused programme of development partner support to these countries can help build the research, spatial and other data foundations upon which a Caribbean blue economy strategy can be developed.

Questions and Issues for Discussion

Empirical evidence suggests the presence of at least six significant barriers to the more effective development of the Caribbean blue economy: climate change, institutional challenges in regard to ocean governance, promoting the sustainable management of marine resources, strengthening regulation and enforcement, gaps in technical education and capacity building, as well as the need for more and better marine research and information. The primary responsibility for addressing these lies with Caribbean member countries and regional institutions. However there are significant opportunities for development partners to support these efforts.

- Which among the six significant barriers can the DWG most effectively support through its ongoing agenda?
- What approach can be used for the DWG to mobilise other forms of international support?

4.2 Enabling Conditions

Blue growth requires a range of framework conditions to be fulfilled, most obviously: adequate infrastructure and highly skilled staff with access to low skilled workers. Other essential conditions include: public acceptance, a solid international legal framework regarding the international waters and good governance at local and regional levels. At the same time, it should be recognised that trade-offs will need to be made where space is limited and the combination of all activities is not feasible. Clear coordinated institutional mechanisms for integrated coastal and ocean management established and implemented across relevant sectors such as fisheries, tourism, transport, energy, health and environment, will be essential to accommodate and resolve conflicts between the vast range of marine-related interests and values.

The successful and sustainable development of a blue economy will also require governance and policies that integrate environmental and economic considerations. The mix of marine resource development will be determined by existing governance structures and will likely require new legislation, rules, strengthening institutions and in potentially the establishment of entirely new institutions. More importantly, translating new opportunities into productive sectors will require investment in research and development, building technical capacity and creating the right environment to attract and retain outside investment. These have to be fundamental principles of the blue economy.

In order to fully realize the transition to a blue economy, the Commonwealth has identified seven key thematic areas (**enablers**) that are vital for creating the conditions for growth and investment. These enablers are not prioritized in order of importance and there are strong inter-relationships and synergies between them. These include, *inter alia*: (i) a healthy, resilient and productive marine environment; (ii) Infrastructure; (iii) Technology, research and development; (iv) Business development, investment and finance; (v) Maritime surveillance and enforcement; (vi) Education and capacity building; and (vii) Ocean governance.

4.3 Priorities for Blue Growth

Whilst there is not a universally agreed definition of what the blue economy may look like, a number of features would be prominent if such an approach were being implemented in the Caribbean Sea:

- Protection and recovery of ocean ecosystems and biodiversity would be achieved;
- Integrated cross-sectoral spatial planning, including coastal zone management, would be in place for all sea uses at both the national level and at the level of the Caribbean Sea basin;
- Fisheries and aquaculture management would achieve equitable, non-subsidised, and sustainable practices;
- Surveillance of offshore waters would be strengthened through enhanced maritime domain awareness and existing laws would be robustly enforced;
- Greater utilisation of renewable energy from the ocean would occur;

- Adaptation planning would be in place for rising sea levels and foreseeable climate change impacts;
- Existing ocean industries (e.g. shipping and offshore petroleum) would have ‘greened’ their activities and be ensuring that their operations cause least environmental damage and meet the highest levels of sustainable practice;
- Increasing sustainable use of bioresources, including biotechnology, to find innovative solutions to many of the regions problems would be occurring; and
- Market mechanism would achieve dramatically enhanced recycling of major ocean pollutants such as nutrients.

The challenge is where to start in order to alter course to achieve a blue economy and in so doing to develop or strengthen social, economic and environmental linkages and reform current governance arrangements. This will require some fundamental changes in the way the ocean is managed at national, regional and global scales to create a more harmonised and integrated approach.

5 WHAT IS NEEDED TO GROW THE CARIBBEAN BLUE ECONOMY?

While there currently exist a number of models describing the blue economy, a critical gap is a mechanism for their implementation. There is a need to deliver practical solutions to countries that are pragmatic, realistic and achievable while at the same time delivering tangible benefits to countries in terms of economic diversification, food and energy security. Such solutions can only be developed in conjunction with the very countries that they are intended to assist, with the support of development partners.

5.1 Implementing the Blue Economy

Attaining the full potential of the blue economy may seem a daunting, task. Many of the elements required to transition to a Caribbean blue economy already exist however, and the evolution of current approaches is both possible and realistic. Identifying and addressing a few priority issues could significantly drive and enable progress in this direction.

In this section, five thematic and four sectoral issues are highlighted, which, if pursued by national and regional authorities with the support of development partners can help transform the promising concept of a Caribbean blue economy into a sustainable process of implementation.

Issue 1: Create integrated approaches to ocean governance

Enhancing cooperation and communications will be needed to create more political will to strengthen governance and cooperation at all scales to remove and reduce barriers to implementation and to make growing the blue economy easier to achieve and more politically desirable to do. The importance of making this shift is because change only happens through strong leadership. Never more is this the case than the ocean, where resources are seen to be everyone’s rights and no one’s responsibility.

Issue 2: Apply marine spatial planning

The application of marine spatial planning approaches should be a key tool for future marine planning and decision making to support a shift towards a blue economy. This will be important to ensure that activities are managed at the appropriate spatial scale to maximise benefits across social, economic and ecological perspectives.

Addressing two important practical issues can help advance this process.

Firstly, *providing greater leadership to create better marine spatial plans*. Governments could work at the national scale to provide a single lead agency for marine spatial planning and harmonise associated legislation and policies to deliver better and sustainable planning at the coast and in the sea. There may be scope for development partners to help support this process.

Secondly, *delivering a more appropriate scale for marine spatial planning*. Governments at the national and regional scale should ensure that the scope of spatial plans is sufficiently broad to manage the full range of threats and impacts. Bringing into spatial plans activities that happen in the coastal zone or inland and which have an impact on coastal and ocean resources and communities will be important.

Issue 3: Growing the institutional and human capacity to act

The institutional capacity gap is a common theme across all blue economy sectors and requires strong public leadership, backed up with a coherent top to bottom planning and management regime. Caribbean countries, the region as a whole and development partners supporting this process can work collectively to devise new ways of working that lever greater capacity from current systems to make change happen through for example increased regional cooperation, sharing of costs and public/private partnerships.

Addressing three practical issues can help support the development of institutional and human capacity to act.

Firstly, through *sharing and creating joint capacity*. Many governments, including a large number of Commonwealth Caribbean member governments have made commitments to sustainable growth and resource protection and management, not just at national and global scales, but often at the regional level. A key 'short cut' to implementing the blue economy is to identify like-minded Governments and share capacity on issues of critical concern in a creative, effective and politically appropriate manner.

Secondly, through *increasing cooperation and coordination on ocean issues of common concern*. Increased cooperation on issues that are common across the region, coupled with greater coordination across Governments can help reduce costs and speed up the transition to more sustainable governance and management arrangements. Governments can analyse current actions and commitments and identify and implement new opportunities at regional and global scales for closer cooperative and coordinated working in making the transition to a blue economy.

Thirdly, a specific measure that could help catalyse the institutional capacity to act, comprises the conduct of a *Caribbean cross-sectoral skills gap analysis for the blue economy*, which can be followed by a strategy to address the revealed skills gaps. This

initiative could be supported through partnership with all Caribbean countries, other coastal and developing country SIDS and regions, other developing countries, development partners, academic partners and others. A pilot study could catalyse the overall process.

Issue 4: Enhancing knowledge of the Caribbean Sea

Knowledge of the marine environment is a critical need for effective decision making. The more that is known about the marine environment, the better people's interaction with it can be managed.

One practical step to address this is to *identify and access available data relevant to the region*. Numerous international research cruises are undertaken in the Caribbean Sea each year, often by G20 member countries. The purpose and application of the research varies on a case-by-case basis but in most cases the data acquired may be used for a number of different purposes. Under international law, such researchers are obliged to provide copies of their data to the host country. However this is rarely proactively shared and in most cases requires a formal request from the host country. As a result data that are key to enabling responsible use of marine waters are not being made available to the appropriate responsible agencies.

A programme of identifying marine data, in particular bathymetry, via a number of academic and other sources would help address this shortcoming.

Issue 5: Maritime domain awareness for the Caribbean Sea

Enforcement of legislation, especially in offshore areas, assumes a knowledge of illegal activity. This is often impossible due to a lack of awareness of activities undertaken in the maritime domain. Taking a regional approach to Maritime Domain Awareness in the Caribbean Sea will reduce duplication of effort and allow limited resources to be shared and more effectively deployed. The emergence and rapid development of satellite-based remote sensing platforms now means that the ability to monitor activities across large areas of ocean space in near real time is becoming affordable for many countries.

One practical step to address this is to *deploy the latest satellite technology to enhance maritime domain awareness in the region*. By combining satellite technology with innovative tracking and analysis tools, Caribbean countries could create a system that will help governments and inter-governmental organisations across the region close the gap on illegal fishing and related criminal activity. These facilities already exist, for example within the Commonwealth, and can be shared with Caribbean countries if development partner funding can be secured at an early stage.

In addition to the above five thematic priority issues required to progress the Caribbean blue economy from concept to implementation, the following four areas of sectoral focus will also directly support implementation.

Issue 6: Capture fisheries

Sustainable fishing and mariculture represent the main approaches to reducing overfishing and restore marine ecosystems. Adopting sustainable fishing requires addressing the underlying causes of resource depletion including subsidies that contribute to overfishing

and over capacity, illegal, unreported and unregulated fishing and marine pollution, among others.²⁴

Practical steps to advance this include *applying an ecosystem approach*. The existing approach of maximising economic returns through managing individual species of economic interest to the exclusion of broader ecosystem effects leads to resource degradation and invariably decline of the target species. Understanding ecosystem linkages and interdependences is critical to ensuring a sustained flow of marine goods and services. Governments should shift the focus from single species management to one where single species issues are viewed within the context of values, challenges and issues of the broader ecosystems involved.

Secondly, *shifting away from financial regimes that reward unsustainable practices*. Fisheries management is hampered by incentives and investments that lead to resource degradation and social decline. Fisheries incentives that support unsustainable fishing operations and agricultural policies that provide investment into land-based operations that increase erosion into the coastal waters and increased flows of pollutants and nutrient-enriching chemicals are but two examples. The problem is often one of lack of recognition of the values, or visibility of values, for other marine goods and services, coupled with breaking the current arrangements in funding to transform investments. Governments can take decisive action at the national and regional levels to remove such perverse incentives that lead to environmental degradation.

Issue 7: Aquaculture

To allow the open water mariculture development within the Caribbean, there are four main principles that could be applied:

- Use of indigenous species
- Co-location of different aquaculture activities
- Use of seaweeds, detritivores and herbivores
- Use of by-products of existing industries as feed products for mariculture

Two practical steps can help address this set of challenges.

Firstly, *developing a critical mass for the regional knowledge base*. For mariculture to be successfully developed in the Caribbean region it needs to be considered at a regional rather than a national scale. In this way the critical mass for a regional knowledge base will be more achievable. Moreover, all aquaculture relies on the production of good quality seed, which requires expensive and technologically advanced hatcheries. Establishing such facilities at the regional level, but holding national brood stock (to ensure genetic fidelity to local populations), will be a significant benefit to any emerging industry.²⁵

In addition, toxin testing and food safety laboratory facilities are necessary but expensive to run and require a highly trained workforce. Again, this could be established at a

²⁴ UNCTAD (note 9 above), p. 8.

²⁵ Dr Adam Hughes (Scottish Association for Marine Sciences) personal communication.

regional level to not only reduce the costs but also increase international acceptance and confidence in products from the region.

Secondly, *strengthened international cooperation will need to be enhanced in issues that cross Caribbean national boundaries*. Regional monitoring and warning systems of harmful algal blooms, regional disease management programmes, regional control of biosecurity (standards for importing seed or broodstock) and genetic resources, can all significantly benefit from a stronger system of international cooperation. Such approaches can also help Caribbean countries and the region develop a harmonized approach to regulatory implementation monitoring, enforcement and policy development in marine environmental management that recognizes the conflicting needs of industrial development, population and economic growth, as well as ecological sustainability.

Issue 8: Blue biotechnology

As for mariculture, developing the critical mass for a regional knowledge base for marine biotechnology will be crucial. Pulling together and funding public/private commercial/academic partners across national boundaries could make the Caribbean a significant global driver and contributor to blue biotechnology development, with significant economic benefits for the region. Indeed there is already some interest in this sector in the Caribbean.

Three practical steps can help catalyse this process.

Firstly, the *establishment and greater promotion of centralised facilities*. The importance of Biological Resource Centres and the added economies/values that could be accrued by having these as trans-national facilities should be considered for the Caribbean as a whole.

Secondly the *development of a bioprospecting legal framework*. The international instruments including the Convention on Biodiversity and the Nagoya Protocol, to ensure equitable benefit sharing from genetic resources are in place and this provides opportunities for Caribbean countries to realise strategic, scientific and economic gain from their largely unexplored resources. Opportunities exist to add real value and to develop strategic partnerships with academia, SMEs and international pharmaceutical companies. These could result in additional high-value jobs as well as an income stream from royalties on income generated from any products derived from exploited materials.

Thirdly there is the potential to *develop a new local blue biotechnology industrial sector* based on the capacity of locally-derived microbes. The management of waste materials, particularly from existing fisheries activities as well as current and future mariculture could form an initial focus of interest. Depending on the feed-stock there will be a range of options with respect to exploitation ideally employing a biorefinery approach where the highest value components are extracted first and then sequentially lower value materials isolated and utilised.²⁶

Issue 9: Marine renewable energy

The strong drivers suggest that MRE is a realistic consideration for the Caribbean region, recognising that there are significant challenges facing the sector globally. Considering the

²⁶ Dr John Day (Scottish Association for Marine Sciences) personal communication.

multiple benefits of MRE, in terms of energy security, environmental protection and socio-economic benefits, it is a win-win solution in terms of sustainable development and the blue economy.

Addressing three practical Issues can help shift from concept to implementation of this element of the Caribbean blue economy.

Firstly, *leveraging the existing global investment in MRE*. A strategic initial action would be to proactively engage with the applied initiatives that are addressing MRE feasibility internationally, to take advantage of the significant global investment in MRE and apply the learning to the unique context of the Caribbean.

Secondly, *establishing proof of concept*. It would be of significant benefit to the region to identify a real and feasible collaborative project (public and private partnership) of appropriate scale, to develop as a flagship project, with close community involvement and to secure international funding and develop a specific and tangible project which provides an opportunity to work through the issues and to learn and adapt.

Thirdly, *addressing the funding constraint*. Cost is a critical issue as it is capital intensive and risky, and achieving the most for the least is paramount. This requires identifying sources of funding, collaborating across the region to share knowledge and to lobby internationally; and collaborating globally to ensure up to date access to research outputs on MRE technologies, and experiences with community-driven projects.

Questions and Issues for Discussion

An outcome of this dialogue could be a process to better understand the needs of capacity constrained countries in the Caribbean and to provide practical ways forward to assist them to diversify their existing economic base through sustainable utilization of ocean resources within the context of limited institutional and investment capacities. One option is to identify a number of discrete pilot projects to build up a framework of experience and lessons learned which will form the basis for a more substantial, scale-up of projects with development partners.

- Which among the five thematic and four sectoral issues are consistent with the DWG development priorities and which can it most effectively support?
- What opportunities exist for DWG engagement?

6 CONCLUSIONS

This paper has briefly examined the opportunities, challenges, barriers, gaps and opportunities in building a Caribbean blue economy. It is clear that the development of a blue economy in the region will face significant national and regional challenges and constraints. It is equally clear that the prospects for developing a blue economy and transforming the nascent conceptual framework, which has developed over an extended period in the region, are real and capable of achievement. Doing so will require addressing a number of significant gaps and barriers; and addressing a number of both thematic and sectoral enablers.

There is very significant scope for development partner initiative, including through DWG engagement to help the Caribbean region, as well as other developing country regions, both to help transform concept into implementation and to help support the development of sustainable blue economies.