Blue Economy

Case Study Compendium

ARUP

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Cover image:Auckland (credit: Sulthan Auliya, Unsplash)

Contents

Acronyms

BE	Blue economy
CPTED	Crime Prevention through Environmental Design
EEZ	Exclusive Economic Zones
EMFAF	European Maritime, Aquaculture and Fisheries Fund
FDI	Foreign Direct Investment
ICZM	Integrated Coastal Zone Management
LMMA	Locally Managed Marine Areas
MPA	Marine Protected Areas
MSP	Marine Spatial Planning
NGO	Non Governmental Organisation
R&D	Research and Development
RCS	Regional Coastal Scheme
SMEs	Small and Medium-sized Enterprises
UNCLOS	United Nations Convention on the Law of the Sea
UNESCO	The United Nations Educational, Scientific and Cultural Organization

Introduction

Oceans are spaces of complex socio-economic and environmental interactions, processes, challenges and opportunities. They are key to the economic development of coastal countries, the direct provision of livelihoods for coastal populations and indirect livelihoods of many others. Oceans are in fact key to all life on earth, absorbing approximately 25 percent of all CO2 emissions. [1] However, insufficient consideration for environmental and social sustainability are putting the ocean's resources at risk, hampering the socio-economic benefits that the ocean might deliver for future generations. The blue economy - a concept concerning sustainable use of ocean resources – is of upmost importance.

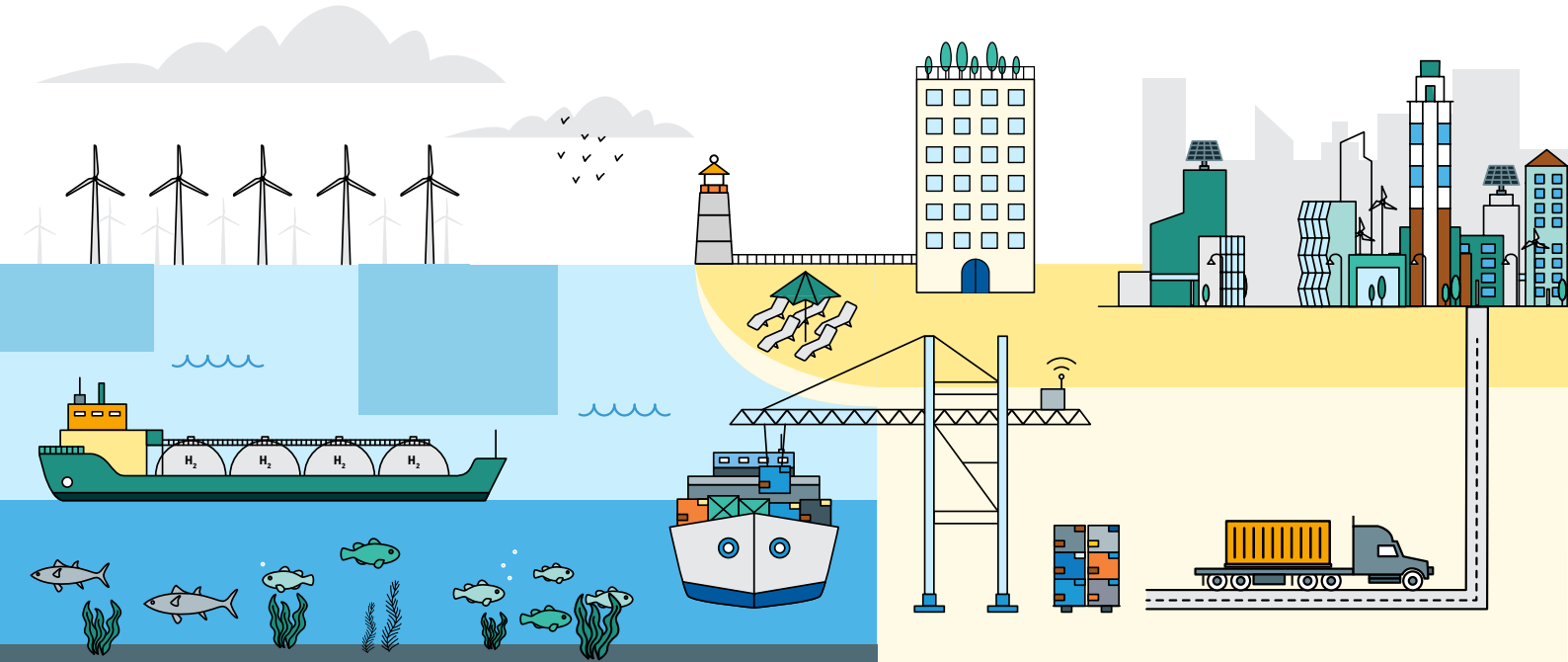
Blue economy sectors include port & maritime trade, coastal tourism, fishing, waterfront development, renewable marine energy, carbon sequestration, and marine biotechnology. Other ocean activities such as oil and gas extraction and deep-sea mining are often included in blue economy definitions but do not necessarily align with key principles of marine protection and sustainability.

The blue economy means:

"Reframing the oceans as development spaces; Decoupling socio-economic development from environmental degradation; Improved relevant international law and governance mechanisms; Prioritising the use of coastal and marine environment to benefit people, alleviate poverty, generate employment and promote equity"

- (Attri and Bohler-Mulleris, 2018).

In decoupling socio-economic development from environmental degradation, blue economy should seek to benefit both current and future generations, through activities that protect and restore marine ecosystems, while promoting sustainable and equitable use of ocean resources for inclusive livelihoods, food security and poverty reduction.



Hong Kong Waterfront (credit Manson Yim: Unsplash)

This case study compendium of successful blue economy projects and planning initiatives is intended to be a valuable resource in planning efforts globally. The blue economy is a concept gaining growing attention and awareness in both academic and policy circles. Strategic and operational planning activities are at various levels of completion across countries and cities. This publication is therefore timely, and these case studies are intended to inform and inspire blue economy stakeholders globally, who play a role in local and national blue economy planning and implementation.

1. World Economic Forum (2020) 'The oceans are absorbing more carbon than previously thought'. Available at: https://www.weforum.org/agenda/2020/10/oceans-absorb-carbon-seas-climate-change-environment-water-co2/

The Case Studies

Image: Penang Island, Penang, Malaysia
(credit: Mahmud Ahsan, Unsplash)

The following pages set out 35 key blue economy case studies across seven sectors:

1. Governance and Planning

5. Waterfront Development

2. Ports and Maritime Trade

6. Operational Environment

3. Coastal Tourism

7. Climate Change Mitigation and Adaptation

4. Fishing

Sector 1 - Governance and Planning is an overarching area that concerns how ocean resources are planned for, coordinated and managed and examines underlying laws and key actors across different scales. Sectors 2-6 are some of the key areas in which the sustainable blue economy principles can be realised if projects are carefully implemented and managed. Sector 6 concerns the wider operational environment, including infrastructure on land such as transport and waste management, that can either support, or undermine ocean health and resultantly blue economy performance. Sector 7 considers how blue economy projects must be combined with wider efforts to tackle the effects of climate change. This section considers both efforts to mitigate carbon emissions and efforts to adapt to climate hazards such as sea-level rise and coastal storms.

Report case studies have been shortlisted from a longer list of more than 100 case studies identified through desktop research that explored academic and grey literature, including journal papers, practitioner reports, websites, and news articles. Wider blue economy principles and guidelines also outlined throughout the report come from a combination of this desktop research, as well as from existing blue economy research conducted by Arup.[2] A full list of references is included throughout.

Case study criteria

The long list of case studies has been assessed against the following evaluation criteria:

a) The case study's economic contribution

b) The case study's social contribution

c) The case study's environmental contribution

d) The case study's feasibility

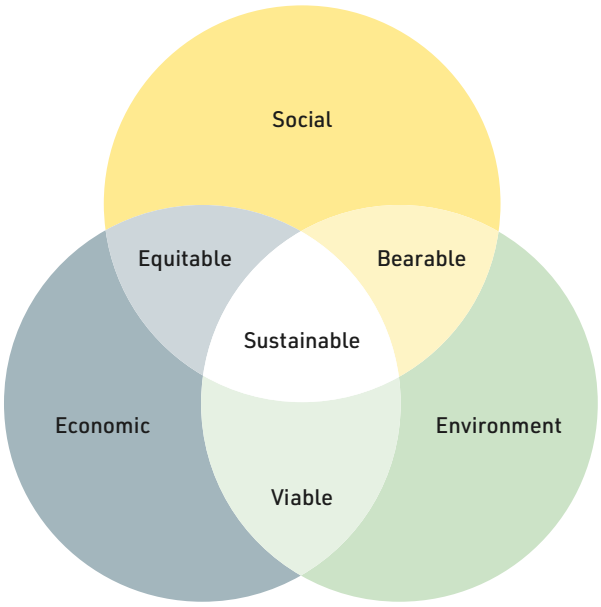
e) The intrigue and/or innovation of the case study

f) Geographic diversity of case studies

g) Demonstration of blue economy principles and guidelines

2. WIOMSA, UN-Habitat, 2021. Coastal Cities of the Western Indian Ocean Region and the Blue Economy: Status Report. WIOMSA and UN-Habitat, Zanzibar, Tanzania

Case study evaluation criteria a-c concern the three pillars of sustainability. Projects must find a balance between these three pillars in order to truly align with a sustainable definition of the blue economy.

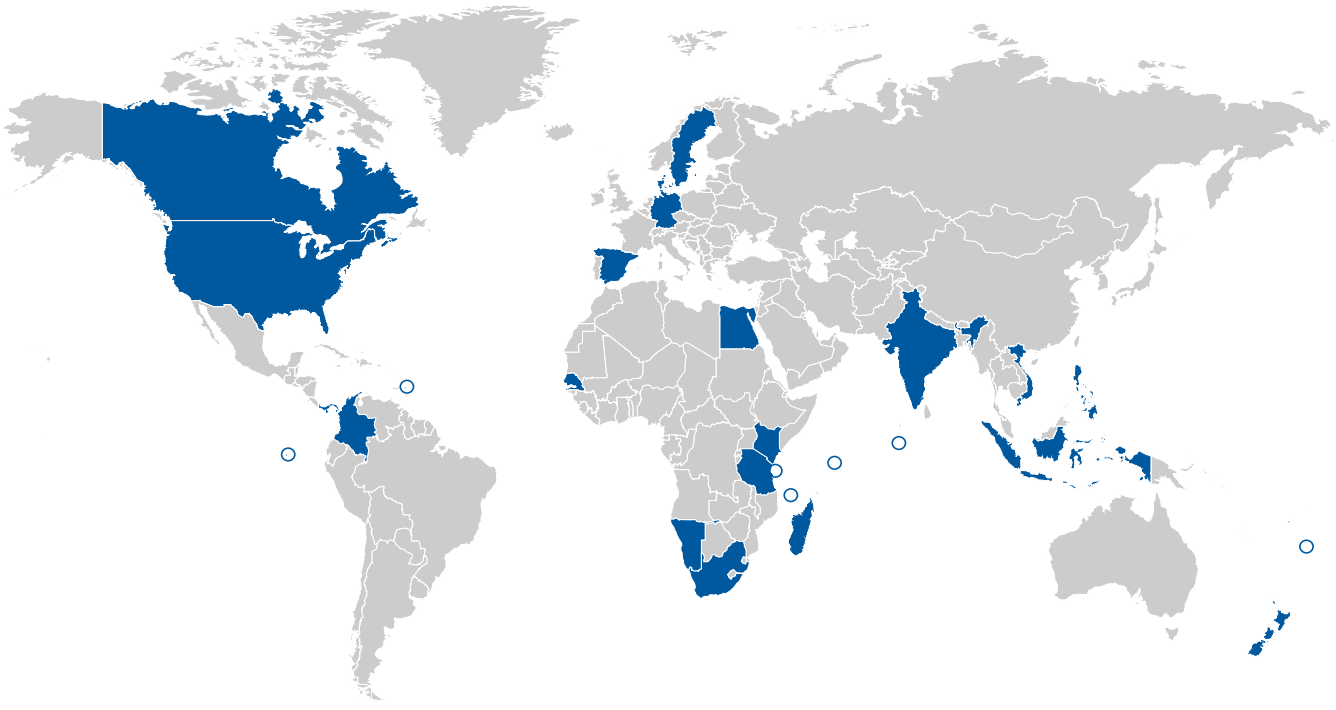


3 Pillars of Sustainability [3]

Criteria d) feasibility considers whether the case study is something that is likely to be replicable in several other locations. This aspect of evaluation filtered out less abstract or conceptual examples but also sought to ensure that the chosen case studies were diverse with respect to scale of delivery and implementation costs, so that the compendium is of value to a range of blue economy actors.

While the evaluation process sought to select case studies that were replicable, it was also important that the compendium is not presenting examples which are too obvious. Criteria e) therefore considers the intrigue and/or innovation of each case study.

Criteria f) sought to ensure that case studies came from a diverse range of locations. Most case studies will be replicable in different geographies but this contextual variety is still considered an important factor. Case studies are from the following countries: Vietnam, Tonga, USA, Morocco, Kenya, Spain, Germany, Sweden, Egypt, Barbados, Galapagos, Panama, South Africa, Seychelles, Comoros, Madagascar, Senegal, Indonesia, Philippines, Tanzania, Maldives, Canada, New Zealand, Zanzibar, India, Namibia, Colombia and Denmark.



Case Study Locations

Case studies are globally and thematically diverse, but stakeholders are encouraged to consider the applicability of each one to their own context.

Lastly, evaluation criteria g) considers whether the case study under evaluation demonstrates key blue economy principles and/or guidelines. These guidelines are not mandated in policy, rather best practice considerations as identified through wider desktop research.

Shortlist case studies have then been further reviewed and interrogated by experts from across Arup, specialising in key sustainability areas. These include marine biologists, economists, human geographers, and climate change specialists (See page X).

Each of the following sections have a similar structure:

- The section starts by presenting overarching blue economy guidelines/recommendations that research has identified that projects (within that section) should embody.
- The section then provides five case studies which illustrate these guidelines.
- These case studies are accompanied by descriptive information and icons that show the project location, year, scale, cost*, and stakeholders involved. That is followed by a narrative which provides a description of the case study, key benefits, challenges and innovative and interesting aspects.

* Project costs have been included where available. However, in cases this was not possible and the value was either committed, or estimated on the following scale: low (<$50,000), medium ($50-$500k), high ($500,000-$1m) and very high ($1m+). When viewing costs, the reader should consider this alongside year of implementation with respect to inflation. It should also be understood that costs noted are primarily intended to give the reader a sense of project scale and replicability rather than a precise reference.

Image: Barcelona City Beach. (credit: Enes Unsplash)

1. Governance and Planning

Previous page image: Hong Kong (credit: Arthur Guiot, Unsplash)

Blue economy governance and planning concerns the structures in place and decisions made, with respect to the management of ocean and coastal resources at local, regional, national or supranational scales.

At highest level, ocean management is governed by international laws and agreements including the 1982 United Nations Convention on the Law of the Sea (UNCLOS)[3]. UNCLOS divides the ocean into: Territorial zones – 12miles from a state coastline – in which that state retains full control; Contiguous zone – up to 24 miles – in which the coastal state can prevent and punish 'infringement of its customs, fiscal, immigration or sanitary laws and regulations'; and Exclusive Economic Zones (EEZ) – 200 miles from the coastline - in which the state has sovereign rights of exploration, exploitation and management of ocean and seabed. Beyond EEZ, is the 'high seas' where all states have rights over fishing and ocean resources.[4] UNCLOS contains conditions regarding the protection and preservation of the marine environment in each zone and a requirement for states to 'prevent, reduce and control marine pollution but various challenges exist, including the ability of states to monitor and regulate the actions of ships bearing their flag.

In February 2022, 40 Heads of State and Government met at the One Ocean summit in France. This session addressed the protection of marine ecosystems, pollution, climate change, and ocean governance. Following the conference, there are now 84 countries that committed to protecting 30% of land and marine areas under national jurisdiction by 2030, as well as commitments to end plastic pollution and preserve marine ecosystems for climate mitigation and adaptation. At the time of writing, UN member states are also meeting in New York to discuss an international legally binding instrument under UNCLOS, on the conservation and sustainable use of marine biological diversity of areas beyond national jurisdiction.[5] These meetings precede the second United Nations Conference on the Ocean, in June in Lisbon 2022, which will examine success in meeting targets of Sustainable Development Goal 14 (SDG14) – Conserve and sustainably use the oceans, seas and marine resources for sustainable development.[6]

Supranational stakeholders like the EU play a notable role in blue economy development and EU funds and investments unlock blue growth. European support measures for the blue economy include a European Maritime, Aquaculture and Fisheries Fund (EMFAF), a policy framework to develop offshore renewable energy, decarbonise maritime transport and green port operations, and new measures to prevent litter from finding its way into the sea. Elsewhere, a blue economy strategy for the African Union was developed in 2019.[7]

At national or local scales, blue economy strategies can provide a high-level roadmap for coastal and ocean areas. Defining a long-term vision/strategy for sustainable blue growth at a national level can provide a signal of state priorities to private sector actors, who can pursue coordinated projects aligned with policy objectives in blue economy. Many investments in green and blue infrastructure require large upfront investments, and proactive budgeting, investment pipelines and multstakeholder partnerships are needed for ambitions to be realised.

It is important that blue economy activities are properly regulated to ensure that environmental, social and economic considerations can be properly balanced. Regulation might discourage private investment into specific sectors and monitoring and enforcement can be costly to public sector entities, especially if small local authorities. It's therefore important to balance heavy regulatory constraints with incentives (e.g. financial, behavioural) to ensure businesses find it attractive and profitable to invest in blue economy sectors (e.g. tax exemptions for R&D investments in blue economy, for energy-efficiency savings or the use of cleaner energy sources, etc.)

Marine Spatial Plans (MSP) can create zoning of marine waters for different ocean activities; and Integrated Coastal Zone Management Plans (ICZM) provide coordinated planning between land and sea.

3. Blue economy governance and planning concerns the structures in place and decisions made, with respect to the management of ocean and coastal resources at local, regional, national or supranational scales.

4. UCL, (ND) United Nations Convention on the Law of the Sea, 1982 (UNCLOS). Available at: https://www.ucl.ac.uk/cclp/ccsunclos.php#:~:text=The%20Exclusive%20Economic%20Zone%20(EEZ,themselves%20and%20the%20seabed%20below.

5. United Nations. (2022) Intergovernmental Conference on an international legally binding instrument under the United Nations Convention on the Law of the Sea on the conservation and sustainable use of marine biological diversity of areas beyond national jurisdiction (General Assembly resolution 72/249). https://www.un.org/bbnj/

6. Ocean and Climate Platform (2022). Looking back at the One Ocean Summit: What commitments for the ocean? Available at: https://ocean-climate.org/en/looking-back-at-the-one-ocean-summit-what-commitments-for-the-ocean/

7. AU-IBAR, 2019. Africa Blue Economy Strategy. Nairobi, Kenya. Available at: https://www.au-ibar.org/sites/default/files/2020-10/sd_20200313_africa_blue_economy_strategy_en.pdf

Governments can designate areas as Marine Protected Areas (MPA) in which certain activities are restricted. The robustness of an MPA can vary, with some MPAs being fairly limited in what protection they offer, while others are designated 'no take zones' where fishing is prohibited (alongside various other activities), allowing stocks in the area, and in surrounding areas to recover and grow. In recent years there has been examples of 'debt-for-nature swaps', in which debt from developing nations is cancelled (by creditor nation), or purchased (by NGOs), in exchange for an increase in local MPAs. At the local level, Locally Managed Marine Areas (LMMA) are areas of protected ocean space that tend to be smaller than MPAs and often in more rural settings. Local communities typically work together to balance local blue economy activities within LMMAs. LMMAs can help fill conservation gaps between MPAs.

Not unlike terrestrial planning, the role of local governments in blue economy planning and governance varies country to country. Significant blue economy projects are often instigated by national government with private sector partnership and foreign direct investment (FDI). While in some countries regional and city governments have increased control over local coastal planning, in many cases, national governments retain primary control over planning in ocean waters. Recent Arup research in East Africa has highlighted the benefits of allowing local governments to be able to plan 5km from the coast, the zone in which local artisanal fishing and coastal tourism activities largely take place.[8] Funding is also an issue for many local authorities, with financial decentralisation an important factor. Public-private partnerships and pooling of resources amongst neighbouring authorities[9] can support local blue economy ambitions if well structured, but national coordination and support is a key factor. Blue economy strategies need to be coordinated across governance scales and with new and existing marine and coastal planning tools. The decisions around how ocean resources will be managed, should be reached through coordinated, inclusive multi-stakeholder mechanisms.

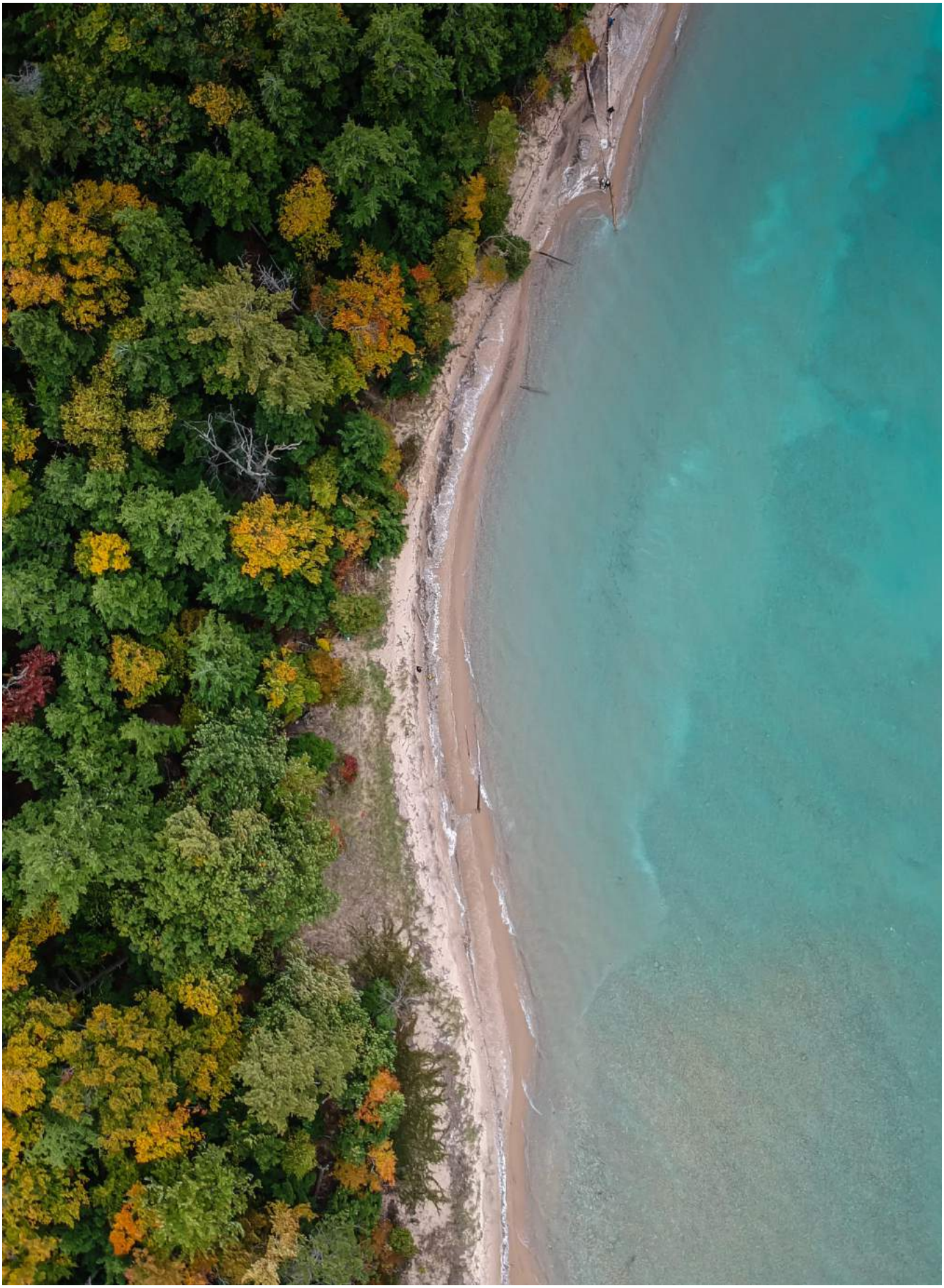
Lastly, blue economy research and development and the generation, collection and analysis of data are essential for policy and investment decision making. Without data, it will be impossible to assess the adequacy of proposed initiatives and the impacts of implemented projects. This must consist of good quality data, disaggregated at the right levels (local, regional, national), sectors, and demographies (socioeconomic groups, vulnerable groups, gender, etc). This also includes a proper understanding of how much ocean resources are worth (and how much ocean-related activities contribute to economic growth) is required to incorporate ocean resources degradation (or protection) into a cost-benefit analysis to inform policy and investment decision-making; and to adopt methodologies that incorporate blue economy considerations that are not easily monetized into project prioritization and appraisal mechanisms.

Key Guidelines for Blue Economy Governance and Planning

- A long-term blue economy vision, of appropriate timescale and realistic ambition, with coordinated planning and investment that is fully aligned with sustainability principles.
- Capacity building of blue economy stakeholders including local government.
- Inclusive, multi-stakeholder planning structures and approach.
- Coordinated planning tools and processes including horizontal (different sectors) and vertical (different scales – international, national, regional, and local) integration.
- Planning that incorporates systems-thinking which understands and effectively manages interdependencies between different ocean sectors, stakeholders, and environments and that thinks holistically about the wider operational environment.
- Robust environmental regulation, balanced with investment incentives.
- Forward-thinking and climate-focused planning and investment.
- Planning and pipeline projects supported by robust research and monitoring.

8. WIOMSA, UN-Habitat, 2021. Coastal Cities of the Western Indian Ocean Region and the Blue Economy: Status Report. WIOMSA and UN-Habitat, Zanzibar, Tanzania. Available at: https://unhabitat.org/coastal-cities-of-the-western-indian-ocean-region-and-the-blue-economy-status-report

9. For Example the partnership of Kenyan coastal counties - JKP - Jumuiya ya Kaunti za Pwani - https://jumuiya.org/



1.1

Integrated Coastal Governance in Morocco

Image: Rabat, Morocco (credit: Carolyn Albritton, Flickr)

Description

The Rabat-Sale-Kenitra region has been supported by the World Bank in designing its first Regional Coastal Scheme (RCS), building upon the Integrated Coastal Zone Management (ICZM) previously put in place. A partnership was formed between the World Bank (supported by the government of Italy, the government of Morocco, and regional authorities, to design the RCS. The Scheme is intended to promote sustainable development of the coast, and to reconcile environmental protection with economic development.[10, 11]

A diagnosis phase was initiated in 2020, in which it was recognised that two thirds of the region's population is concentrated on the coastline, putting great strain on the local coastal ecosystem. The need to mitigate the impacts of population concentration, and to strengthen the resilience of the coastline was evident. Furthermore, the untapped economic potential of the coastline space was analysed, with the green tourism highlighted as a key area for investment. Strategies were therefore outlined to develop an integrated coastline governance model which promotes green and sustainable economic activities within the coastline area, and which seeks rehabilitation and protection of the local ecosystem.[12]

Investments have been delegated to coastal regeneration, construction of wastewater treatment plants in selected localities, biological stabilization of dunes, and the recycling of plastic waste. Other priorities outlined include natural resource management, port development, integrated city planning and fishing. The roadmap of the RCS, building on the ICZM foundations, is designed around a 2040 horizon with both short-term and long-term objectives.[13]

The RCS depends upon institutional strengthening through legislative tools, in conjunction with capacity building and inclusive development. From the outset, the initiative has employed a participatory approach, centred upon consultations with communities and stakeholders, and strategies to raise awareness of coastal management issues. The development of sustainable livelihoods, in conjunction with ecosystem protection, is at the centre of the RCS as the coastline remains a central economic hub. Inclusive consultation of civilians, fishermen, farmers, businesses, civil society organizations and scientists, is centralised in the RCS. A key component in ensuring that ecosystem protection and economic development is enduring and raises stakeholder awareness of environmental threats, coastal degradation, sustainable urban development practice, resource awareness,

10. MSPglobal. (2020). Morocco. Available at: https://www.mspglobal2030.org/msp-roadmap/msp-around-the-world/africa/morocco/. (Accessed: 02/03/2022).

12, 12, 13, 14. The World Bank. (2021). Preserving Morocco's Coastline. Available at: https://www.worldbank.org/en/news/feature/2021/01/13/preserving-moroccos-coastline. (Accessed: 02/03/2022).

15. World Bank (2020) Guide méthodologique pour l'élaboration du Schéma Régional du Littoral (SRL). Available at: https://siredd.environnement.gov.ma/Rabat-Sale-Kenitra/Content/images/documents/Liens/9-Guide%20Methodologique%20SRL.pdf

Location
Morocco

Cost
Very High (Estimate)

Delivered by
Multistakeholder

Scale of Impact
Regional

Year
2020

and sustainable fishing practices amongst other aspects. Local ownership and capacity building were written into the RCS, with extensive stakeholder consultation across scales. This is an important approach to promote both short and long term sustainability, and consideration of local development needs.[14]

The World Bank has praised the RCS in Morocco and noted the potential for this innovative integrated coastal management model to be scaled up and applied as a methodological guide for other cases. Methodology guidance was subsequently developed for other local governments and decision makers in the region.[15]

Key Fact or Innovation

With two thirds of the region's population concentrated on the coastline and putting significant pressure on coastal ecosystems, integrated coastal planning and management is key to the sustainable development of the region.

Environmental

Rehabilitation of the coastal ecosystem is written into the ICZM and the RCS. The impacts of the population density and coterminous resource strain are tackled through RCS strategy.

Social

A participatory approach was employed from the outset. Consultations included not only the World Bank, national and local government, but also key local coastal development stakeholders.

Economic

Sustainable livelihood development has been centralised in the RCS, encouraging developments in the green tourism industry, improved fishing practices, improved resource management, and the development of untapped opportunities within this economic hub.

1.2

Transforming Tonga's Ocean Management

Image: Tonga (credit: Brent De Vries, Flickr)

Location
Tonga

Cost
High (Estimate)

Delivered by
Multistakeholder

Scale of Impact
National+

Year
2015

Description

The territory of Tonga comprises 98 percent ocean and its seas cover an area of approximately 700,000 km2. However, Tonga's marine resources are threatened by competing uses and overuse, in conflict with the natural ecosystem. In July 2015, the Cabinet of Tonga, in response to the first-ever multi-Ministerial Cabinet Paper, made the decision to implement the Pacific's first Marine Spatial Plan (MSP).[16] The intended outcome is ecologically sustainable social and economic development of Tonga's ocean, benefitting all Tongans both today and in future generations. A commitment has been made to implement a 30 percent network of Marine Protected Areas (MPAs) within the MSP.[17]

This initiative was enabled through a multistakeholder partnership between Oceans 5, in cooperation with the Waitt Foundation & Institute, and the Government of Tonga, which supported the International Union for the Conservation of Nature's Oceania Regional Office (IUCN-ORO) and the Vava'u Environment Protection Association.[18]

The initiative comprised of a national ocean awareness program, national consultations and drafting of the MSP, implementing the MSP in law, and subsequent consultations and awareness initiatives to inform people of the new MSP.[18] The MSP designates community special management areas, general use management areas, sustainable use management areas, limited use areas, habitat protection areas, no-take marine reserves, and special and unique marine reserves.[20]

The implementation of the MSP has generated positive outcomes in fish stocks and the number of Special Management Areas has increased over time.[21] Community engagement and multi-stakeholder partnerships have been essential for the success of the MSP.

Environmental

Key aspects include protected limited use areas, habitat protection areas, no-take marine reserves, and special and unique marine reserves.[22]

Social

The process involved national consultations to gain input to, and build ownership of, the MSP.

Economic

Tonga's marine resources are very important for food security, coastal protection, commercial fisheries, livelihoods, tourism, and carbon sequestration. The minimum estimate of the annual value of Tonga's inshore subsistence and domestic commercial fisheries is T$10 million (US$4.3 million).[23]

Key Fact or Innovation

A long-term ocean vision enabled through a diverse multistakeholder partnership.

16 18, 19. Oceans 5. (2019). Transforming Tonga's Ocean Management. Available at: https://www.oceans5.org/project/transforming-tongas-ocean-management/. (Accessed: 02/03/2022).

17. 20, 22 MEIDECC. (2017). Tonga develops a marine spatial plan. Available at: https://oceanconference.un.org/commitments/?id=21256#:~:text=The%20marine%20spatial%20plan%20will,and%20preservation%20of%20traditional%20uses. (Accessed: 02/03/2022).

21. SPREP. (2019). Tonga State of Environment Report 2018. Samoa: SPREP. Available at: https://tonga-data.sprep.org/system/files/Tonga%20SOE%20high-res.pdf (Accessed: 02/03/2022).

23 Salcone J, Tupou-Taufa S, Brander L, Fernandes L, Fonua E, Matoto L, Leport G, Pascal N, Seidl A, Tu'ivai L, Wendt H (2015) National marine ecosystem service valuation: Tonga. MACBIO (GIZ/IUCN/SPREP): Suva, Fiji

1.3

Waterfront Partnership of Baltimore

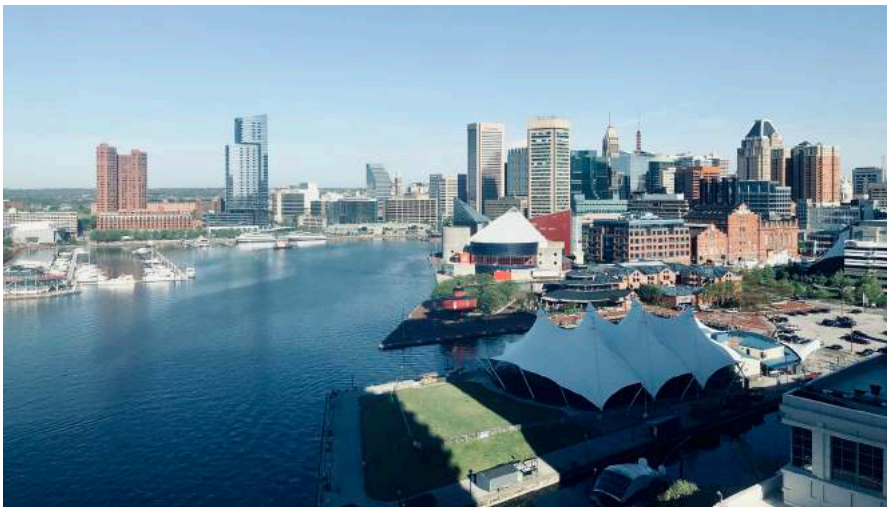


Image: Inner Harbour, Baltimore (credit: Chris6d)

Location
USA

Cost
Very High (Estimate)

Delivered by
Multistakeholder

Scale of Impact
City

Year
2005 onwards

Description

The Waterfront Partnership of Baltimore is a not-for-profit collaboration of local business, community partners and local government.[24] It was initiated in 2005 to improve the condition of the promenade and harbor and make the waterfront a more attractive environment for all to enjoy.[25] The partnership uses local 'Special Benefits' taxation for funding which comes from a surcharge on properties within a certain boundary. Private events on the waterfront, corporate sponsorship, and finance from the City of Baltimore provide further funding.[26]

In 2010, the Waterfront Partnership released the Healthy Harbor Plan, an ambitious initiative to make the Harbor safe for swimming and fishing by 2020. The plan identified 3 main issues that needed tackling: trash, sewage, and stormwater. Also included in the plan was the commitment to issue an annual "Healthy Harbor Report Card" to monitor progress alongside community river health awareness and education.[27]

The area includes Pierce's Park - a one-acre public green space privately funded by the partnership, Rash Field Park - a newly developed site led by the Partnership, and the National Aquarium. The space is intended to connect people to the waterfront in innovative ways, while modeling best practices in urban waterfront development in the face of sea level rise.

Environmental

Improvement of local waters through clean-up activity, education and greening.

Social

Public green space with an educational element and an inclusive overall planning process.

Economic

The Partnership plays an important role in maintaining this space and making the case for increased capital investment.

Key Fact or Innovation

Environmental progress through low-effort and low-cost mechanisms. Environmental data collection forms a key part of the Partnership's activities

24, 26. Waterfront Partnership of Baltimore. (2022). About Waterfront Partnership. Available at: https://www.waterfrontpartnership.org/about/. (Accessed: 02/03/2022).

25. Profiles PR (2020) Waterfront partnership. Available at: https://profilespr.com/portfolio/waterfront-partnership/

27. Waterfront Partnership of Baltimore. (2022b). Healthy Harbour Plan. Available at: https://www.waterfrontpartnership.org/healthy-harbor/healthy-harbor-plan/. (Accessed: 07/03/2022).

1.4

Mida Creek Locally Managed Marine Area

Image: Mida Creek, Kilifi

Location
Kenya

Cost
Medium (Estimate)

Delivered by
Civil Society

Scale of Impact
Community

Year
1995 onwards

Description

Locally Managed Marine Areas (LMMA) are coastal areas that are largely, or wholly, managed by local communities, aiming for sustainable management of the local environment. The Mida Creek Conservation Community in Kilifi, Kenya is a good example of a LMMA. As part of the wider Watamu Marine Association, community groups have been undertaking conservation efforts in the creek area for several decades in response to mangrove exploitation.

LMMAs in Kenya typically go through 5 stages: 1. Conceptualization of the main idea - which typically involves a champion/s and community endorsement; 2. Inception – this involves wider consultation of the idea and benefits in the local community, establishment of funding, and a draft management plan; 3. Implementation – involving demarcation of the area, resolution of any land issues and agreement among stakeholders; 4. Monitoring and management – in which management structures, roles and responsibilities are refined; 5. Ongoing management – in which the process is refined for continued sustainability.[28]

The Mida Creek initiative received initial financial and technical input from the Portuguese NGO 'A Rocha' with Kenya Forestry Research Institute another partner. It has subsequently received funding from other donors, as well as from its own income-generating activities. It is protected under the Kenyan Forest Act.[29]

Community involvement and ownership has been essential to conservation efforts, which in cases may appear to conflict with traditional livelihoods, such as fishing. The socio-economic benefits of conservation are demonstrated, and the community are active participants in conservation efforts. Local people are involved in beach clean ups, mangrove planting, and ecotourism initiatives, thus contributing to, and witnessing, both the protection of the ecosystem, and the socio-economic benefits of this protection. Through ecotourism, young men are provided an alternative to fishing, and local women's groups manage mangrove nurseries.[30]

Over time, the creek area has become recognized as a key site of mangrove protection and planting, an area of high marine biodiversity, a recognized International Bird Area and along with Arabuko-Sokoke Forest, forms a UNESCO Biosphere Reserve.[31]

Environmental

Protection and restoration of mangrove habitat for biodiversity and carbon capture.

Social

Community-led initiative with opportunities provided for many residents in ecotourism and conservation.

Economic

Demonstration of the local socio-economic benefits of ecotourism. Project funds are now providing additional funds to support local education.

Key Fact or Innovation

Successful and sustainable eco-tourism with a well-functioning community management structure.

28, 29. Kawaka, J., Samoilys, M. A., Church, J., Murunga, M., Abunge, C., & Maina, G. W. (2015). Locally Managed Marine Areas (LMMAs) in Kenya: a detailed history of their development and establishment. CORDIO East Africa. Available at: https://cordioea.net/wp-content/uploads/2015/07/LMMA-Review-Kawaka-et-al.-2015-Final-10Jul.pdf

30. WIOMSA and UN-Habitat, 2021. Coastal Cities of the Western Indian Ocean Region and the Blue Economy: Case Study - Kilifi. WIOMSA and UN-Habitat, Zanzibar, Tanzania. (Accessed: 02/03/2022).

31. Watamu Marine Association. (2009). Mida Creek, Watamu. Available at: http://www.watamu.biz/watamu-attractions.php?cid=42. (Accessed: 02/03/2022).

1.5

Co-Management of Natural Coastal Resources in Vietnam

Image: Mekong Delta (Credit: LisArt, Flickr, CC BY-NC-ND 2.0)

Location
Vietnam

Cost
Medium (Estimate)

Delivered by
Multistakeholder

Scale of Impact
City

Year
2007-2010

Description

Stakeholders in the coastal zone of Soc Trang Province, Mekong Delta, have come together to create a better governance (shared governance) of natural resources locally, to protect the area's first line of coastal defence (mangroves) and to improve the livelihood of local communities through resource conservation.

The co-management approach in Soc Trang was established by local people, supported by the German development agency GIZ (Deutsche Gesellschaft für Internationale Zusammenarbeit) and local authorities in the region. The co-management group is one in which local communities take part in the resource management decision-making process together with local authorities. This shared power approach differs from past attempts by authorities to incentivize resource conservation, but without local ownership in the process.[32]

Activities under the shared management approach are discussed and communally agreed, before being formally recorded within the agreement. Issues include agreement of roles and responsibilities of forest rangers and local people when managing illegal activities, agreed regulations on sustainable management of mangrove seedlings for local social and environmental benefit and regulations on sustainable fishing practices.[33]

Governance of natural resources has been improving steadily. Local authorities and people are becoming partners working together and making joint decisions for natural resource conservation. Further initiatives have been suggested to deal with local issues. Education, dialogue and shared ownership are key to the sustainability of this approach.

Environmental

Co-management helps to conserve mangroves in Soc Trang. The mangrove area in front of Au Tho B village has increased from 70 ha in 2008 to 118 ha in 2014.[34]

Social

Local people involved in shared governance of natural resources have developed stronger resource ownership and have become more aware of the needs for, and benefits of, mangrove conservation.

Economic

Community agreement and ownership is likely to improve the long-term economic sustainability of local projects.

Key Fact or Innovation

Shared governance for ecosystem conservation and improved livelihoods.

32. Schmitt, K. (2012) Mangrove planting, community participation and integrated management in Soc Trang Province, Viet Nam. pp. 205

33, 34. Schmitt. K (2015) Co-management (shared governance) of natural resources in the coastal area. Panorma. Available at: https://panorama.solutions/en/solution/co-management-shared-governance-natural-resources-coastal-area

2. Ports and Maritime Trade

Ports provide vital connections for inland countries and form key parts of national economies. Globally, over 80% of international goods traded are transported by sea.[35] Port cities are of significant national importance, supporting direct and indirect local and national economic activity, employment and food security amongst other factors.[36]

In many countries, governments are undertaking strategic investments in both direct port infrastructure, and ensuring that ports have sufficient supporting infrastructure such as road and rail connectivity. Ports are often national assets, with significant private investment and municipal authorities in some cases have limited input. Effective coordination amongst stakeholders across different scales is important to ensure that the economic opportunities that port investment creates fully trickles down to local communities, and that port operations can be balanced with other local ocean activities and environmental concerns.

Ports can pose environmental challenges to local waters through shipping processes such as fuel and ballast water pollution and issues associated with land reclamation. Furthermore, while maritime freight is considered much more environmentally friendly than aviation, it still comes with significant carbon emission which need to be managed. Port investment must be robustly regulated and connected to Environmental Key Performance Indicators (EKPI), to minimise environmental impact, and cascading impact on other blue economy sectors such as fishing and tourism. EKPIs include port control of water quality, soil contamination, port waste, dredging, air quality, noise, energy consumption and emissions and land development.[37] Meeting such challenges requires effective coordination between port authorities, national and local government, private sector and civil society stakeholders, capacity building of port authorities and other key stakeholders and associated regulation for sustainable port management.

Key Guidelines for Ports and Maritime Trade

- Coordinated planning, engagement and capacity building, which balances the needs of different stakeholders directly and indirectly affected by port activity.
- A focus on inclusive job creation particularly for citizens in which the port is based.
- Decarbonization of shipping.
- Investment in creation and renewal of energy efficient port infrastructure and processes.
- Meeting other Environmental Key Performance Indicators, supported by robust Environmental and Social Impact Assessment mechanisms and ongoing monitoring and regulation.
- Climate smart port investments to improve climate change resilience.

35. UNCTAD. (2018). Review of Maritime Transport 2018. United Nations Conference on Trade and Development. p. 23. Retrieved from: https://unctad.org/en/PublicationsLibrary/rmt2018_en.pdf

36. New ranking compares food security in cities. (2019). Wageningen University and Research. Retrieved from: https://www.wur.nl/en/Research-Results/Research-Institutes/Economic-Research/showwecr/New-ranking-compares-food-security-in-cities.htm

37. Jung. E and Berger. T (2018). Green Port Policy Guidelines. Interreg, European Union. Available at: https://www.interreg-danube.eu/uploads/media/approved_project_output/0001/27/7266177c8bcbaa62dc9b01b5ecdfd0ffd162bd3b.pdf

2.1

Port of Seattle Duwamish Valley

Image: Port of Seattle (credit: Shunya Koide, Unsplash))

Description

In 2013, the Cumulative Health Impacts Analysis found that the Duwamish Valley near-Port community were subject to environmental injustices and health and economic inequalities in accordance with their proximity to the Port of Seattle and Duwamish River.[38] People in the Duwamish Valley were found to be disproportionately affected by the health impacts of contaminated waste, poor urban design, and severe air pollution in comparison with the rest of Seattle.[39] Life expectancy in the neighbourhoods of Georgetown and South Park was found to be up to 13 years less than wealthier parts of Seattle.[40] The Duwamish Valley community were also found to lack equitable access to the economic benefits that the Port brought to the region. Action was deemed necessary to address these health and economic inequalities.

A partnership between the Port of Seattle, the Duwamish Valley community, EPA, and Just Health Action was formed to address this inequality and promote more sustainable and equitable development of the near-Port communities. The Near-Port Community Capacity Building Project was therefore launched, followed by the Duwamish Valley Community Equity Program. The programs work towards three shared goals: community-port capacity building, healthy environments and communities, and economic prosperity in place.[41]

The programs have resulted in strong community engagement and capacity building around Port-related livelihoods, and environmental protection. Results have included a solar energy green jobs project to introduce local youth to careers in renewable energy; careers events held around Port-related careers; and the launch of the Duwamish River Green Jobs Program in 2021 to develop green career pathways in shoreline habitat restoration and Port-related environmental sectors.[42] Equitable and sustainable

38. Gould L, Cummings BJ. Duwamish Valley Cumulative Health Impacts Analysis. Seattle, WA: Just Health Action and Duwamish River Cleanup Coalition/Technical Advisory Group. March 2013. Available at: http://justhealthaction.org/wp-content/uploads/2013/03/Duwamish-Valley-Cumulative-Health-Impacts-Analysis-Seattle-WA.pdf. (Accessed: 09/03/2022).

39, 41, 42. Port of Seattle (2022) Duwamish Valley Community Equity Program. Available at: https://www.portseattle.org/duwamishvalley

40. Just Health Action. (2013). Duwamish Valley Cumulative Health Impacts Analysis. Washington: Just Health Action. Available at: http://justhealthaction.org/wp-content/uploads/2013/03/Duwamish-Valley-Cumulative-Health-Impacts-Analysis-Seattle-WA.pdf. (Accessed: 09/03/2022).

43. EPA. (2021). Case Study of the San Pedro Bay Ports' Clean Air Action Plan 2006-2018, Best Practices and Lessons Learned. Washington, D.C.: United States Environmental Protection Agency. Available at: https://www.epa.gov/sites/default/files/2021-03/documents/420r21011.pdf. (Accessed: 03/03/2022).

Location
USA

Cost
Unknown

Delivered by
Multistakeholder

Scale of Impact
Community

Year
2017

development, in addition to social responsibility, have been prioritised while addressing the environmental and economic inequalities experienced by this near-Port community.[43]

Key Fact or Innovation

Efforts by civil society actors to monitor health and economic inequalities has been a key driver for the project, supported by national 'environmental justice' funding and engagement by the Port of Seattle.

Environmental

Environmental justice concerns have been addressed in conjunction with green development in renewable energy and ecosystem restoration and protection.

Social

Community involvement and participatory development have been key to the success of this initiative. Health and economic inequalities have been addressed sustainably and inclusively.

Economic

Sustainable future livelihoods have been secured through job creation and skills training in green and blue sectors.

2.2

Port of Valencia Climate Strategy

Image: Port of Valencia, Spain (credit: NASA Johnson, Flickr)

Location
Spain

Cost
Unknown

Delivered by
Public Body - National/local government

Scale of Impact
City

Year
2021

Description

The Port of Valencia's Strategy outlines an ambitious commitment towards net zero emissions by 2030, and the decarbonization of the Spanish port system. Targets include; centering the circular economy in port construction projects and operations ; renewable energy generation; sustainable hydrogen generation, storage, and distribution; traffic management systems; decarbonising port machinery; more effective rail usage within the port; and the development of technologies towards carbon neutrality.[46]

This strategy is in alignment with the European Green Deal towards cleaner transport, and an urgent need to reduce greenhouse gas emissions produced by the maritime transport sector. This strategy recognizes the immediate and sizeable potential of ports to contribute to the transition to low carbon operations and eco-efficiency within the transport and freight sector.[47]

Key Fact or Innovation

This case study provides a progressive and climate smart strategy that includes renewable energies, new technologies and a holistic systems approach that recognizes direct and indirect port interactions.

Environmental

The strategy will contribute to the decarbonization and digital transformation of the Port of Valencia, alongside circular economy processes.

Social

The strategy addresses industrial and occupational safety and security within the port.

Economic

The strategy notes the significant savings in substituting the import of fossil fuels for cleaner energies, as well as the positive impact of smart technology in port operations with respect to economic competitiveness.

44, 46. ValenciaPort. (2021). Project Port Authority of Valencia Strategy towards Zero Emissions by 2030. Valencia: ValenciaPort. Available at: https://sustainableworldports.org/wp-content/uploads/Supporting-info-PAV-Strategy-towards-zero-emissions-by-2030-.pdf. (Accessed: 03/03/2022).

45. World Ports Sustainability Program. (2020b). Port of Valencia – Strategy towards zero emissions by 2030. Available at: https://sustainableworldports.org/project/port-of-valencia-strategy-towards-zero-emissions-by-2030/. (Accessed: 03/03/2022).

47. World Ports Sustainability Program. (2020b). Port of Valencia – Strategy towards zero emissions by 2030. Available at: https://sustainableworldports.org/project/port-of-valencia-strategy-towards-zero-emissions-by-2030/. (Accessed: 03/03/2022).

2.3

Port of Los Angeles – Zero Emissions

Image: Port of Los Angeles, Los Angeles, CA, USA (credit: Barrett Ward, Unsplash)

Location
USA

Cost
Very High (Over $2billion)

Delivered by
Local government

Scale of Impact
City

Year
2005-present

Description

In 2006, the Ports of Los Angeles and Long Beach (Ports) adopted a Clean Air Action Plan (CAAP), later updated in 2010 and 2017.[48] The CAAP outlines a commitment to reducing pollution from ships, trucks, trains, harbor craft, and cargo handling equipment. This commitment has resulted in an 85% emission reduction for particulate matter, a 50% reduction in nitrogen oxides, and a 95% reduction in sulfur oxides.[49] The 2017 CAAP Update reaffirmed this commitment and provided further guidance on progressing towards a zero-emission future, while simultaneously protecting and strengthening the economic position of the port.[50] Targets were specifically set for zero tailpipe emissions from cargo handling equipment and trucks by 2030 and 2035 respectively, and developments in technologies to reduce CO2 emissions from other sources, including ships, trains, and harbor craft were also outlined.[51] These developments will help to accelerate the availability of clean technologies necessary to move toward a carbon free port.[52]

Key Fact or Innovation

This case study demonstrates innovative piloting of technology, combined with a whole-system approach to decarbonization, supported by robust data collection and monitoring of key performance indicators.

Environmental

Recognition of the influence that ports have on emissions outside of their boundaries as well as in areas of direct control.

Social

Local residents played a key role in highlighting air pollution issues associated with the port that needed to be addressed. They were engaged throughout the planning process.[53]

Economic

Port leaders noted the longer-term cost savings of getting ahead of future environmental regulations and increasing resource efficiency at the same time.[54]

48. World Ports Sustainability Program. (2022). Port of Los Angeles – Zero Emissions Pathway Technology Demonstrations. Available at: https://sustainableworldports.org/project/port-of-los-angeles-zero-emissions-pathway/. (Accessed: 03/03/2022).

49, 50, 51. Clean Air Action Plan. (2021). Strategies. Available at: https://cleanairactionplan.org/strategies/ (Accessed: 03/03/2022).

52, 53, 54. EPA. (2021). Case Study of the San Pedro Bay Ports' Clean Air Action Plan 2006-2018, Best Practices and Lessons Learned. Washington, D.C.: United States Environmental Protection Agency. Available at: https://www.epa.gov/sites/default/files/2021-03/documents/420r21011.pdf. (Accessed: 03/03/2022).

2.4

Port of Hamburg homePort

Image: Port Hamburg, Germany (credit: Moritz Kindler, Unsplash)

Location
Germany

Cost
Unknown

Delivered by
Local government

Scale of Impact
Community

Year
2020

Description

homePort is an innovative space created in the Port of Hamburg which acts as a "laboratory" for collaboration and innovation towards common goals, including zero emissions targets and increased economic competitiveness. The area is described as an 'independent innovation campus' and a range of actors are included within the space, including citizens, research institutions, established companies and start-ups.[55] The port facilities collaboration, in addition to providing access to cutting edge technologies, space to test hardware-heavy products, and water testing areas for experimentation in real port conditions.[56]

AIRCOAT is an example of an initiative developed at homePort towards a reduction in greenhouse gas emissions. Using passive air lubrication technology, a film is produced by plants and applied to ship hull surfaces, reducing frictional resistances and therefore limiting fuel consumption and associated exhaust emissions.[57]

Key Fact or Innovation

Using technology to foster engagement and collaboration.

Environmental

Technological innovations are supported at homePort which aim to reduce greenhouse gas emissions.

Social

HomePort is an important space for collaboration and sustainable networking. It is also a space for community engagement in port operations and associated issues.

Economic

Collaboration and technological innovation within the homePort space are incentivised by both a reduction in greenhouse gas emissions at the port, in addition to market competition and economic growth.

55. homePort. (2022). homePort. Available at: https://www.homeport.hamburg/en. (Accessed: 03/03/2022).

56. World Ports Sustainability Program. (2020). Hamburg Port Authority – homePort. Available at: https://sustainableworldports.org/project/hamburg-port-authority-homeport/. (Accessed: 03/03/2022).

57. homePort. (2022b). AIRCOAT. Available at: https://www.homeport.hamburg/en/portfolio/aircoat-air-induced-friction-reducing-ship-coating. (Accessed: 08/03/2022).

2.5

Port of Gothenburg – CinfraCap Project

Image: Gothenburg (credit: Maria Eklind, Flickr. CC BY-SA 2.0)

Location
Sweden

Cost
Very High (reported as $150 million - $200 million)[58]

Delivered by
Multistakeholder

Scale of Impact
Regional/National

Year
2020-present

Description

Carbon capture and storage is a key component of global efforts to reduce global emissions and climate change. The CinfraCap (CarbonInfrastructureCapture) Project at the Port of Gothenburg focuses on transportation and deposition of captured carbon in an efficient and climate smart manner.[59] It is aiming to develop a full system/logistics chain approach for carbon capture, with liquid carbon transported by pipelines, rail and road to the port, to be loaded onto ships and transported to receiving terminals where liquid CO2 is unloaded and pumped into rock 3000 metres beneath the seabed.[60] The project is focused on Western Sweden but the knowledge and research can have benefits to other locations globally.

The CinfraCap project began late 2020. Preliminary studies to find the optimal design and business model for the initiative are expected to be completed late 2022.[61]

Key Fact or Innovation

The project is a diverse and collaborative effort between companies Göteborg Energi, Nordion Energi, Preem, St1, Renova, and Gothenburg Port Authority.

Environmental

It is stated that 2 million tonnes of liquid carbon dioxide can be transported.[62]

Social

The project is advancing research and innovation into a defining problem for current and future generations.

Economic

Swedish energy companies are pooling resources for increased efficiency in carbon transport. By working together fewer pipelines and port berths are required.[63]

58, 60, 61, 62, 63. Port of Gothenburg (2022). Cinfracap - Liquefied carbon dioxide finds its way to the harbour. Available at: https://www.portofgothenburg.com/the-project-of-the-port/cinfracap/

59. World Ports Sustainability Program. (2020). Port of Gothenburg – CinfraCap Carbon Infrastructure Capture. Available at: https://sustainableworldports.org/project/port-of-gothenburg-cinfracap-carbon-infrastructure-capture/

3. Coastal Tourism

Image: Maldives (credit: Upgraded Points, Unsplash)

Tourism is a key blue economy sector, and its economic contribution is particularly significant for certain countries such as small island nations. An estimated 80% of global tourism takes place in coastal locations.[64]

Tourism can be less environmentally resource-intensive than some other key blue economy sectors especially eco-tourism initiatives which can be a useful educational tool for marine conservation efforts. However, economic opportunities and the need for infrastructure development in this sector must be balanced against the need to protect coastlines ecosystems and communities from negative impacts from unsustainable development strategies, marine habitat pollution and degradation brought by tourism, as well as wider emissions impact of tourist-driven aviation. From a social perspective, efforts need to ensure that income from tourist-related activities, job creation, and regeneration plans leveraged by tourism filter down to local communities, rather than solely benefiting international operators.

Economically, the global tourism industry has been somewhat paralysed over the past few years due to the COVID-19 pandemic. Some resorts have shown resilience, shifting to a more domestically orientated offering, but the impact has regardless been profound.

To balance these environmental, social and economic challenges requires coordinated, holistic sustainable tourism planning. This is ideally linked to a sustainable national tourism strategy, as well as to relevant local plans should as ICZM. Strategies and plans should consider with foresight, natural capital value and vulnerability, tourism carrying capacity[65], low carbon opportunities, wider infrastructure pressures and needs, and the possibility of coordinated tourism strategies amongst regional resorts. Resilience should be a key component of tourism strategy, with preparatory recovery plans in order to help businesses recover from industry shocks such as COVID-19, as well as diverse strategies to limit the impact of future shocks including increasing climate risks. Strategies and plans also need to be accompanied by the capacity and structures to manage and monitor tourism impact and resolve conflicts between different coastal and marine stakeholders.

Key Guidelines for Coastal Tourism

- Coordinated, holistic, inclusive and sustainable tourism planning and management.
- Promotion of highly sustainable eco-tourism initiatives like marine sanctuaries and mangrove habitats. Supported by frameworks, legislation, incentives, capacity building etc.
- Create local prosperity including support for Small and Medium Enterprises to benefit from the local tourism industry, and well-paid quality training and employment for local communities.
- Monitoring and regulation of unsustainable practices connected to coastal tourism e.g. ensuring endangered species are protected from harmful activities, environmental regulation and risk assessment of new development proposals and regulation of existing developments (e.g. polluting hotels), and advocacy against actions such as littering.
- Inclusive processes including full consultation of local communities and other affected stakeholders in new tourism projects.
- Build industry resilience to manage from shocks and stresses, including diversity of assets, offering and customer markets.
- Climate smart tourism investments which enable resorts to respond and adapt to climate shocks and stresses and not contribute to increased emissions.

64. Obura. D et al. (2017). Reviving the Western Indian Ocean Economy: Actions for a Sustainable Future. WWF International. Gland, Switzerland. pp. 13-14. Available at: https://www.greengrowthknowledge.org/resource/reviving-western-indian-ocean-economy-actions-sustainable-future

65. UNEP (2013) Sustainable Coastal Tourism: An integrated planning and management approach. Available at: http://www.greentrek.org/files/2013/09/SustainableCoastalTourism-PlanningUNEP.pdf p80

3.1

Accommodation Eco-tax on the Balearic Islands

Mallorca, Balearic Islands (credit: Austin Farrington, Unsplash)

Description

In 2016, the Government of the Balearics introduced a new eco-tax on tourist accommodations, despite years conflicts with tourist companies.

Tax rates vary depending on accommodation type ranging from 1 to 4€ per person/per night, with a reduction of 50% from the 9th day of stay. Moreover, rentals via the sites Airbnb and HomeAway had to be licensed and registered with the Balearic Government and failure to comply could result in a fine of up to €400.000 for big businesses. Individuals who rent out their personal properties have a cap of 60 days per year to do so.

Funds collected from the tourist tax have been channelled into distinct environmental projects throughout the Balearic Islands (Mallorca, Menorca Ibiza and Formentera). This has been done via a Commission for Sustainable Tourism (formed by Balearic officials, economic stakeholders and other organizations with a vested interest in the island's sustainability journey) who decide together with existing organizations how the money should be spent every year. The main issues addressed include environmental restoration, improving the quality of tourism offering, improving infrastructures for future tourism, promotional projects, cultural heritage projects and sustainability research including a planned app to educate tourists about the local marine ecosystem. How the taxes are used is a key issue, with research suggesting a preference amongst locals for environmental projects, rather than further tourist promotion for example.

Despite opposition from tourism companies, the tax has

66, 69, 72. López Del Pino, F., Grisolía Santos, J. M., & Ortúzar, J. D. D. (2021). Is there room for a room-tax in the Canary Islands?. International Journal of Tourism Research. Available at: https://accedacris.ulpgc.es/bitstream/10553/77818/1/jtr.2438.pdf

67, 70. Tonazzini, D., Fosse, J., Morales, E., González, A., Klarwein, S., Moukaddem, K., Louveau, O. (2019) Blue Tourism. Towards a sustainable coastal and maritime tourism in world marine regions. Edited by eco-union. Barcelona. Available at: https://www.iddri.org/sites/default/files/PDF/Publications/Hors%20catalogue%20Iddri/20190620_BLUE%20TOURISM%20STUDY_EN.pdf

68, 71, 73. Melville. S. Euronews (June 2021) Taxing tourists is helping the Balearic Islands give back to sustainable initiatives. Available at: https://www.euronews.com/travel/2021/06/28/taxing-tourists-is-helping-the-balearic-islands-to-give-back-to-sustainable-initiatives

Location
Balearic Islands, Spain

Cost
Medium (US$50k-US$500k)

Delivered by
Local government

Scale of Impact
City

Year
2004

been viewed positively by many concerned about the growing pressure of tourism on the islands. Overall, it seems that such an initiative is an effective way to reduce tourist impact on the local environment. Similar taxes are in place in Catalonia, and a cap on the number of beds available to tourists on the islands of Mallorca and Ibiza has also been introduced.

Key Fact or Innovation

This scheme demonstrates economic regulation of the mass tourism, with proceeds used for environmental and socio-cultural projects.

Environmental

Funds have been raised for environmental projects and for wider mitigation of the impacts of mass tourism on natural landscapes.

Social

The project will appeal to those residents who feel negative effects of the islands' mass tourism. There has been involvement of different stakeholders in the decisions around what to do with the tourism tax funds (although potential room for further improvement).

Economic

The Balearic eco-tax has demonstrated great capacity to raise funds with more than €40 million collected in 2016 and €64 million in 2017. From May 2018, the Balearic Islands government doubled the rate (to €1 to €4) collecting over €120 million in 2018. €270 million has been raised since the tax began.

3.2

Galapagos Island: Balancing Growth

Image: Galapagos (credit: Simon Berger, Unsplash)

Location
Galapagos

Cost
Unknown

Delivered by
National Government

Scale of Impact
National +

Year
Ongoing

Description

Tourism is crucial to the economy of the Galapagos Islands – many people on the Islands have jobs in the tourism industry (nearly half the population), and it provides more than half of the Islands' income, generating approximately $143USD million a year.[74] However, it is important that tourism is also sustainable for the environment. Especially as Galapagos is one of the most important sites of biodiversity globally. Negative impacts from tourism locally have included marine pollution from cruise ships, litter and high-rise development.[75] Several initiatives have therefore been developed to mitigate the effects of tourism.[76]

• The Galapagos National Park has now made it compulsory for all vessels to recycle their oil on the Galapagos rather than dump it;

• A carrying capacity has been imposed to limit the number of visitors allowed in certain areas at one time, and the National Park Authority can further reduce the number of tourists if they perceive that areas are suffering damage;

• Boat routes are planned by the National Park to ensure that any given area is not overwhelmed by visitors at any one time;

• Entrance fees have been introduced for visitors to the National Park which then fund conservation projects within the Park;

• Tourists are not able to explore the islands independently – a guide must be present for exploration of sensitive areas both for education and for site protection;

• Educational opportunities have been developed for both tourists and locals concerning the island's biodiversity and cultural history;

• Boat licenses are required for both tour operators and fishing boats so that the Marine Reserve can police the waters more carefully;

While tourism will always place pressure on biodiverse assets, these and other steps can help protect the Galapagos for current and future generations.

Environmental

Entrance fees fund conservation projects alongside mitigation measures addressing negative impacts from tourism.

Social

The need for guides and other ecotourism livelihoods provides local jobs, while the impact of tourism on local society is somewhat mitigated through the above measures.

Economic

Tourism generates approximately $143USD million a year for the Islands. These and other measures help contribute to the long-term sustainability of this operation.

Key Fact or Innovation

Through clever planning of boat trips and guided excursions authorities can actively manage local environmental pressure.

74, 75, 76. Galapagos Conservation Trust and Royal Geographical Society (Nd) Sustainable Tourism. The impacts of tourism. Available at: https://www.discoveringgalapagos.org.uk/discover/sustainable-development/sustainable-tourism/impacts-of-tourism/

3·3

Creating Sustainable Tourism at the Samadai Dolphin House in Egypt

Image: Dolphins near Shaab Marsa Alam (Egypt), a reef in front of Marsa Alam's pier (credit: Alfonso González, Flickr)

Location
Egypt

Cost
Medium

Delivered by
Local Government

Scale of Impact
City

Year
2004

Description

This initiative consists of a local government action enforcing the establishment of a management plan for sustainable tourism. There was a need to ensure that tourist visits, and therefore income, were maintained while balancing the need for marine conservation, in particular the preservation of the spinner dolphin resting habitat. The structure of tourism in Samadai was therefore reorganized in order to achieve this balance. Zoning and structuring of previously uncontrolled visits were adopted, and a modest entry fee was implemented which had minimal impact on the tourist's cost, but significantly contributed to the budget of the region's Red Sea Protectorates.[77]

Authorities collaborated with international experts and stakeholders were engaged in the process throughout, through consultations and meetings. A management plan was then drafted, adopted and implemented. The establishment of the Samadai Dolphin House has demonstrated to locals, and acts as an exemplar, that protected areas and tourism can coexist and even enhance one another.

Key Fact or Innovation

The project displays local government leadership and a science-based approach to inform decision making.

Environmental

Protection of an important dolphin resting habitat.

Social

Multi-stakeholder engagement was reported throughout the process.

Economic

The project demonstrates that protected areas can not only coexist, but even enhance local economies through tourism.

77. PANORAMA. (2016). Creating sustainable tourism at the Samadai Dolphin House in Egypt. Available at: https://panorama.solutions/en/solution/creating-sustainable-tourism-samadai-dolphin-house-egypt. (Accessed: 03/03/2022).

3·4

Social Enterprise Approach to Eco-Tourism

Image: Barbados (credit: Anthony Ingham, Unsplash)

Location
Barbados

Cost
Low (Estimated)

Delivered by
Civil Society/Multistakeholder

Scale of Impact
National +

Year
2020

Description

NGO Pinelands Creative Workshop - supported by United Nations Development Program (UNDP) and the Government of Barbados, delivered training to eight non-governmental organisations in tourism-related social enterprise. The hope is that through the blue economy, these organisations can positively and sustainably impact livelihoods, with a focus on most vulnerable groups.

The initiative included a Continuing and Professional Education (CPE) course of study in 'Social Entrepreneurship (SE) for Caribbean Transformation', developed with the University of the West Indies – Open Campus. This course was delivered during the COVID-19 pandemic and therefore transitioned to online format. The training raised awareness of the Sustainable Development Goals (SDG's), specifically to Goal 14 (Life Below Water). This initiative provided a way of considering alternative funding modalities while also promoting an inclusive, or whole of society approach to the growth and development of eco-tourism.[78]

Key Fact or Innovation

Capacity building and training for socially responsive approaches to ecotourism.

Environmental

Opportunity to build awareness of the SDG's especially SDG 14 – Life Below Water.

Social

Promotion of socially responsible enterprise and business concept to support the Blue Economy.

Economic

Two businesses legally registered, knowledge on new form of income generation, and shift to circular economic model with a more regenerative and restorative design and thinking.

78. Greaves.S (2021) Social Enterprise Approach to Ecotourism. Panorama. Available at https://panorama.solutions/en/solution/social-enterprise-approach-eco-tourism

3·5

Caribe Panama's Guna Yala Territory

Image: Guna Yala (credit: Banco Mundial America, Flickr, CC BY-NC-ND 2.0)

Location
Panama

Cost
Medium

Delivered by
Multistakeholder

Scale of Impact
Community

Year
2008

Description

The Guna tribe are the most visible of Panama's indigenous communities, with approximately 62,000 living along the Caribbean coast and islands off the north coast of Panama.[79] The Guna have semi-autonomous status in Panama. Along the coast in Guna Yala territory, the Guna General Congress (Secretariat of Tourism Affairs) have developed a tourism model designed to benefit the Guna, protecting its identity, and collaborating in the financing of its autonomy through community management. Regulations ensure the total prohibition on the transfer of possession rights over islands and land to non-Guna, and local control of tourism projects, investment plans and licenses for tourist activities. Other measures also include the promotion of a totality of workforce by the Guna, with limitation of the number of sailboats and foreign ships in the territory and taxes to the entrance of tourists.[80]

This case exemplifies tourism as an opportunity for the empowerment and development of communities. It provides a good example of tourism that has been constructed by the community rather than a community that has been constructed (or deconstructed) by tourism. From this point of view, the Guna Yala case demonstrates the value of local organization and community structures in the empowerment of those developing tourist initiatives.[81]

Key Fact or Innovation

Regulation that provides local ownership and control of tourism activity.

Environmental

Guna have expressed the correction of negative environmental impacts, in particular the problem of waste, as a key aim.

Social

Community-based and collective regulation, tourism education at the community level, community focus in the distribution of tourism's benefits, and valuing Guna culture and ethnicity.

Economic

Improved coordination of the tourist offering, political control of tourism resources and products, and improved dialogue with the Panamanian state, aimed at increasing Guna welfare.

79. Visit Panama (2022) GUNA. Available at: https://www.iddri.org/sites/default/files/PDF/Publications/Hors%20catalogue%20Iddri/20190620_BLUE%20TOURISM%20STUDY_EN.pdf

80. Tonazzini, D., Fosse, J., Morales, E., González, A., Klarwein, S., Moukaddem, K., Louveau, O. (2019) Blue Tourism. Towards a sustainable coastal and maritime tourism in world marine regions. Edited by eco-union. Barcelona. Available at: https://www.iddri.org/sites/default/files/PDF/Publications/Hors%20catalogue%20Iddri/20190620_BLUE%20TOURISM%20STUDY_EN.pdf

81. Pereiro, X. (2016). A review of Indigenous tourism in Latin America: Reflections on an anthropological study of Guna tourism (Panama). Journal of Sustainable Tourism, 24(8-9), 1121-1138. Available at: https://www.researchgate.net/publication/303710328_A_review_of_Indigenous_tourism_in_Latin_America_reflections_on_an_anthropological_study_of_Guna_tourism_Panama

4. Fishing

Fishing provides an important source of livelihood to fishermen and women and to those engaged in processing and value addition. Fishing is also a crucial source of protein for citizens. In some countries local workers involved in the industry often compete with international trawlers fishing in local waters and/or compete with imported produce. In many cases, both large and small operators resort to unsustainable practices. Through careful management, fish stocks can be sustained. The use of legal instruments such as quotas and Marine Protected Areas (MPAs), for example, can provide space for fish stocks to recover, with overspill then benefitting adjacent areas where fishing is permitted.

While international, national and local efforts have made progress in addressing unsustainable practices, issues remain such as improper catching techniques and discarding of nets and equipment at sea (Ghost Gear).

Internationally, the Global Sustainable Seafood Initiative (GSSI) promotes standards food sustainably caught fish, and they, as well as the Food and Agriculture Organization (FAO) recognize the Marine Stewardship Council (MSC) certification as an important tool,[82] although required improvements for MSC have been identified elsewhere.[83, 84]

In 2020, leaders of 14 countries[85] responsible for 40% of global coastline pledged to end overfishing, restore dwindling fish populations and stop flow of plastic into the seas in the next 10 years.[86]

Locally, communities often need support through improved catch equipment, and infrastructure on land e.g. processing sites, cold storage and markets where catches can be sold at fair prices. In many countries, women play a key role in the fish value chain and support efforts can have significant positive impact on family life. More broadly, efforts to support local fishermen and women can have important socioeconomic impacts locally and lead to improved environmental impacts. Well-considered technological innovations can play a role in supporting improved local value chains and socio-economic conditions.

Key Guidelines for Fishing

- Mechanisms for connectivity and knowledge-sharing between scientific research organisations, and local actors, including monitoring of stocks and guidance-sharing.[87]
- Use of Marine Protected Areas to restore fish stocks, balanced with wider consideration of other ocean users.
- Exploration and promotion of investments that can ideally enhance, protect, or at least not harm biodiversity such as low impact aquaculture and mariculture.
- Robust monitoring, advice and regulation of fishing for improved environmental outcomes e.g. tackling of ghost gear, use of high impact gear, illegal fishing and unsustainable techniques, and reduction in value chain wastage.
- Supporting local communities, including less advantaged groups, including investment in fishing equipment and in on-land infrastructure and equitable processes (e.g. linking fishing to ecotourism practices to diversify livelihoods and increase sustainability).

Previous page image: Fishing in Bay of Bengal, India (credit: Well-Bred Kannan, Flickr)

4.1

Abalobi - Connecting Small-Scale Fishers and Businesses

Image: Fishing of the Western Cape, South Africa (credit: Gerrard Nel, Flickr)

Description

Abalobi, Xhosa for 'small-scale fisher', is a social enterprise behind an app of the same name currently active in several parts of South Africa as well as parts of Seychelles and Comoros, and with recent expressions of interest from Kenya, Mauritius, Madagascar and Tanzania. The app connects chefs and restaurants to local fishers and produce. It enables buyers and consumers, to select produce that comes from socially and environmentally sustainable fishing practices.

The not-for-profit organisation originated from brainstorming sessions between researchers at the University of Cape Town, the South Africa National Department of Agriculture, Forestry and Fisheries, and several small-scale fisher community representatives. The app allows fishers to log and legitimise their catches, connect fishers to co-ops and processing, and ultimately to restaurants. It also includes financial management tools and optional at-sea satellite traceability. Beyond the app, Abalobi activities include surveying and monitoring, community engagement and training to both fishers and front-of-house restaurant staff.[88]

Abalobi measure annual progress against key performance indicators, publishing the data on their website. In 2021 Abalobi registered 1130 Fishers registered on their system (with approximately 3000 the previous year. In 2021 the Abalobi marketplace processed almost 13,000 seafood orders. There has also been a steady increase in ecologically sustainable species on the marketplace, and a general increase in revenue to fishers on the marketplace.[89] In an independent study 90% of fisherfolk surveyed reported improvements in their quality of life because of Abalobi (45% 'very much improved', 45% 'slightly improved') .

88. Abalobi. (2021). Abalobi. Available at: http://abalobi.org/. (Accessed: 03/03/2022).

89. Abalobi (2022) Abalobi Impact Analysis. Available at: http://abalobi.org/impact/#ourworkinnumbers

90, 91. 60 Decibels (2021) Abalobi Impact Performance Report. Available at: http://abalobi.org/wp-content/uploads/2021/12/60-Decibels-@-Abalobi-_Results_Final.pdf

92. Abalobi impact report 2018-2019. Available at https://drive.google.com/file/d/1wbioPPDOr80ZS_boLMJs5PFy37tOAiv5/view

Location
South Africa, Seychelles, Comoros

Cost
Medium (US$50k-US$500k)

Delivered by
Multistakeholder

Scale of Impact
National+

Year
2015

Key Fact or Innovation

Multi-stakeholder collaboration, that is socially minded and technologically innovative and unique. Robust data collection and monitoring - 91% of fisherfolk say their income has increased because of Abalobi.[90]

Environmental

There has also been a steady increase in ecologically sustainable species on the Abalobi marketplace and continued education around sustainable practices.

Social

97% of surveyed women using Abalobi agree that their role in fisheries is being recognised by community members.[91]

Economic

In 2018/19 Abalobu paid ZAR 4.05 million ($253,000) to small scale fishers.[92]

4.2

Participatory Seagrass Mapping for Biodiversity Conservation and Sustainable Fisheries

Image: Fishing in Senegal (credit: Carsten ten Brink, Flickr)

Location
Senegal

Cost
Low (Estimate)

Delivered by
Multistakeholder

Scale of Impact
Community

Year
2012

Description

In the Joal-Fadiouth MPA in Senegal, community-based approaches such as participatory seagrass mapping enhance the legitimacy of conservation actions by drawing upon local fisherfolk knowledge. This mapping helps to raise awareness about ecosystem interrelations that are important to commercial fisheries and to the communities that depend on them.

This initiative was developed jointly between the FIBA Foundation (now MAVA Foundation) and the Management Committee of the Joal-Fadiouth MPA. The creation of the community based MPA provided the basis for the participation and empowerment of fishermen, which in turn helped to raise awareness as well as generating a sense of ownership among the fishermen that were not involved in the participatory mapping activities. This strengthened the adaptive management of the MPA, and increased the legitimacy of some of the regulations that are being implemented.[93]

Key Fact or Innovation

Citizen science and environmental awareness on the importance of ecosystem services for livelihoods and climate change.

Environmental

Participatory seagrass mapping increasing the level of their protection in the Joal-Fadiouth MPA.

Social

Direct positive impact on the fishermen. The fishermen empowered by the participatory mapping activities.

Economic

Impact on the wider fishermen community, which participated in the different awareness raising activities and now have a better understanding of the importance of healthy seagrass beds for thriving fisheries activities.

93. PANORAMA. (2020). Participatory seagrass mapping for biodiversity conservation and sustainable fisheries. Available at: https://panorama.solutions/en/solution/participatory-seagrass-mapping-biodiversity-conservation-and-sustainable-fisheries. (Accessed: 03/03/2022).

4.3

The Meloy Fund – Financing the Transition to Sustainable Fisheries

Image: Kids helping out with the fishing net in Gentuma Raya, Gorontalo, Indonesia. (credit: Asian Development Bank, Flickr)

Location
Indonesia, Philippines

Cost
Very High (Estimated)

Delivered by
Multistakeholder

Scale of Impact
National+

Year
2011

Description

The Meloy Fund for Sustainable Community Fisheries is an impact investment fund that incentivizes the development and adoption of sustainable fisheries by investing in small and medium-sized enterprises (SMEs) that support the recovery of coastal fisheries in Indonesia and the Philippines. In doing so, the Fund and its investees pursue a triple bottom line strategy which includes ensuring positive financial, social, and environmental outcomes.[94] Types of funding support provided include investments in supply chain and production efficiencies, waste-reduction, aggregation, and value-added processing to reduce costs and improve revenue for local fishermen. They Fund is also investing in fishing related activities to reduce fishing pressure and allow recovery of stocks.[95]

The Meloy Fund provides a partnership that supports SMEs to transform their business models for sustainability and financial success, sustaining the natural resources on which they depend and ensuring that a portion of business returns benefit local fishers.

Key Fact or Innovation

Impact investment fund making debt and equity investments in fishing-related enterprises that support the recovery of coastal fisheries.

Environmental

Meloy Fund's portfolio companies source from 328,132 ha of critical coastal habitat in the Coral Triangle, in which they implement new responsible sourcing practices and catalyze or participate in improved management through new or existing Fishery Improvement Projects (FIPs) or similar fishery sustainability standards.

Social

Meloy Fund's portfolio companies are currently positively impacting 40,243 coastal community members, 50% of current portfolio companies are women-led.

Economic

The Fund is increasing incomes, contributing to stable and predictable earnings, and improving equitable distribution of profits.

94, 95. The Meloy Fund. (2019). About the Fund. Available at: https://www.meloyfund.com/about. (Accessed: 03/03/2022).

4.4

Mafia Island Marine Park: A Success Story of Inclusive Governance

Image: Mafia Island, Tanzania (credit: David Bacon, Flickr)

Location
Tanzania

Cost
Low (US$<50k)

Delivered by
Multistakeholder

Scale of Impact
Community

Year
1995

Description

The Mafia Island Marine Park (MIMP), established in 1995, was the first of its kind in mainland Tanzania. The park remains home to the local community, and the marine resources within the park are the primary source of income. Prior to the creation and designation of the Park, fisheries were under increasing pressure due to the presence of migrant fishers who used illegal blast and pull net fishing methods. The Park is the result of community and government collaboration and action to mitigate the decline. Since the outset, socio-economic benefits for local inhabitants have been prioritized, and a collaborative management and inclusive governance system has been put in place.

Despite initial negative attitudes towards the Park designation, communities have gained ownership and greater understanding of their coastal and marine resources. They actively participate in monitoring, law enforcement patrols, and education programmes. The strategy has resulted in a 98% decrease in illegal fishing practices, mangrove restoration, and replenishment for fisheries.[96]

Key Fact or Innovation

Collaborative governance and participatory management to address illegal fishing.

Environmental

Mangroves have been restored in depleted areas and there has been a 98% decrease in illegal fishing practices;

Social

670 boys and girls from poor families have been assisted with payment of school/college fees; Village level infrastructure has been provided; Communities have gained ownership on coastal and marine resources; Gender is mainstreamed in conservation activities through equal distribution of marine resources and social benefits among the communities.

Economic

Cost-effective initiative since most of labor and effort employed in preserving the ecosystem and keeping illegal activity away has been provided by the community itself. There have been additional benefits into the community such as resources for education.

96. PANORAMA. (2021). Mafia Island Marine Park: a success story of inclusive governance. Available at: https://panorama.solutions/en/solution/mafia-island-marine-park-success-story-inclusive-governance. (Accessed: 03/03/2022).

4·5

Ghost Gear Clearance and the Circular Economy in Gemanafushi

Image: Freedom from Marine Debris (credit: NOAA's National Ocean Service, Flickr)

Location
Maldives

Cost
Unknown

Delivered by
Multistakeholder

Scale of Impact
National

Year
2020

Description

Globally, an estimated 90% of species caught in lost gear are commercially valuable, and some fish stocks experience up to a 30% decline due to ghost gear.[97] The International Pole and Line Foundation (IPNLF) through funding from the Joanna Toole Ghost Gear Solutions Award are tackling the accumulation of ghost gear off the island of Gemanafushi in the Maldives.[98] Commercial net fishing is banned in the Maldives, but ghost gear is washing up from elsewhere in the Indian Ocean – threatening the local island ecosystem – particularly the Olive Ridley turtles. The initiative builds on cross collaboration between stakeholders – on February 2020, IPNLF met with the local island council in Gemanafushi, fishing industry members, and the local Women's Development Committee (WDC) to collaborate to remove dangerous ghost gear from the waters.

IPNLF has helped to establish new protocols for retrieving and storing the gear by local fishers – removing the gear and promoting safe disentanglement of marine life. The state fish purchasing company MIFO lends the storage space to house recovered gear, and the WDC helps to process the materials into items that can be resold and recycled. The initiative therefore creates value from otherwise waste material and promotes the circular economy, in addition to protecting the ecosystem.

Key Fact or Innovation

Cross collaboration and circular economy approach to a major environmental challenge.

Environmental

Reducing impact on marine life such as Olive Ridley turtles that are frequently caught and trapped in fishing nets.

Social

Cross collaboration between stakeholders.

Economic

Promotion a circular economy approach around waste material.

97. Ocean Conservancy (2022) The Problem of Ghost Gear. Available at: https://oceanconservancy.org/trash-free-seas/plastics-in-the-ocean/global-ghost-gear-initiative/

98. Global Ghost Gear Initiative (2020) IPNLF tackles ghost gear in the Maldives. Available at: https://www.ghostgear.org/projects/2020/8/18/ipnlf-tackles-ghost-gear-in-the-maldives

5. Waterfront Development

Sydney, Australia (credit: Ashley, Flickr)

Waterfront Development projects, if delivered effectively through well-designed mixed-use development, can provide valuable public space for community activity, exercise, interaction and trade, generating sustainable economic benefits from natural coastal assets, while being respectful and protective of natural coastal and marine habitats. However, not all waterfront developments balance these factors. Robust development control, inclusive consultation, rigorous environmental impact assessments are key to ensuring that development is done responsibly.

In some cases, it can be a challenge to establish the necessary capital to get projects off the ground. Public administrations often face limitations in terms of financial and institutional capacity, human resource constraints, competing priorities, and spatial availability (leading to practices such as dredging for land reclamation). Private sector support may therefore enable the transformation of lower-value waterfront space into developments of high economic and social value. However, there needs to be balance between outsourcing of responsibility and harnessing of revenue from the private sector to pay for public sector opportunities, versus necessary establishment of sustainable public funding initiatives. Importantly, in any Public-Private Partnership (PPP), there also needs to be a shared long-term vision for blue economy development, which balances environmental considerations with socio-economic factors.[99]

Key Guidelines for Waterfront Development

- Environmentally sensitive waterfront design and delivery that adds value to the environment rather than detracts from it (including rehabilitation of degraded spaces and habitats, treatment of water, green infrastructure to replicate coastal habitat, etc.). Promotes water as a central characteristic not an afterthought; connects people to natural processes.[100]
- Climate smart waterfront development that is based on science and considers sea-level rise, storm surge risk and other climate shocks and stresses.
- Intelligent, holistic and responsible use of mixed-use developments, which balances economic, social and environmental considerations and the needs of different stakeholders, particularly local communities (who are engaged throughout).
- Sustainable funding mechanisms that have a shared vision and do not comprise on environmental considerations.
- Promotion of existing historic, cultural and architectural value of waterfronts.
- Inclusive, safe (e.g. CPTED) and welcoming sites that contribute to social cohesion. Full public access.
- Promotion of active transport and sustainable connectivity through waterfront development connected to wider urban area.

99. WIOMSA and UN-Habitat, 2021. Coastal Cities of the Western Indian Ocean Region and the Blue Economy: Strategic Roadmap. WIOMSA and UN-Habitat, Zanzibar, Tanzania

100. Biohabitats (2021) Restoring Ecology Along The Urban Waterfront Summer solstice 2017 Vol XV edition 2. Available at: https://www.biohabitats.com/newsletter/restoring-ecology-along-the-urban-waterfront/thoughts-on-restoring-ecology-along-the-urban-waterfront/

5.1

Auckland Waterfront Development

Image: Auckland Waterfront (credit: Dan Freeman, Unsplash)

Description

The development of Auckland's waterfront has centred around a preservation of its heritage, while securing important climate resilience, sustainability, and socio-economic targets. The waterfront in Auckland has facilitated a diverse range of uses since the 1880s, ranging from industrial use, a harbor, dockyards, and railway tracks, to today's residential, commercial and public space uses.[101]

The development has centred around an 18-hectare waterfront brownfield site – Wynyard District. Here, the industrial land was contaminated, and water quality and land remediation had to be addressed to restore biodiversity. The industrial past of the land has been maintained in its architectural design and land management, ranging from the use of shipping containers for tourism agendas, to the development of Tīramarama Way.[102] The Wynyard District is founded on Tāmaki Makaurau/Auckland's maritime heritage, and this is reflected in the design of Tīramarama Way. This is a connecting street located on the original shoreline of the Waitematā Harbour and a mahinga kai (a food gathering place) prior to the site's redevelopment. The design reflects the site's heritage, incorporating purposeful puddles which rise and fall with the tides for play, a hanging light arrangement which celebrates the constellations specific to Maori astronomy, and dots sandblasted into the ground to represent the waterfront in 1841.[103]

Ecological and climate resilience has also been written into the design of the waterfront development. Sensors have been implemented to gather data and monitor the area's energy efficiency, sustainable transport, and climate adaptation.[104] Sustainable design features also include stormwater infrastructure, rainwater harvesting, improvements to public transport, and sea wall strengthening to protect the city for

101. Niemann, B. and Werner, T. (2016) 'Strategies for the sustainable urban waterfront'. WIT Transactions on Ecology and The Environment, vol. 204, pp. 431-439.

102. Eke Panuku Development Auckland. (2022). Wynyard Quarter. Available at: https://www.panuku.co.nz/projects/wynyard-quarter/chapter/park-hyatt-auckland. (Accessed: 14/03/2022).

103. Auckland's Future in Progress. (2022). Tīramarama Way. Available at: https://progressakl.co.nz/projects/tiramarama-way/. (Accessed: 14/03/2022).

104. C40 Cities. (2022) Cities100: Auckland - Smart Green Waterfront Development. Available at: https://www.c40.org/case-studies/cities100-auckland-smart-green-waterfront-development/. (Accessed: 14/03/2022).

105. PWC (2013) Building the Waterfront economy - Waterfront Auckland. Available at: http://www.wynyard-quarter.co.nz/wqsmart/www/pdfs/economic/pwc-report-economic-value-of-of-the-auckland-waterfront.pdf

Location
New Zealand

Cost
Very High ($350 million)

Delivered by
Multistakeholder

Scale of Impact
City

Year
2011

the next 100 years from rising sea levels and earthquakes.

The waterfront development is forecasted to contribute $4.29 billion to Auckland's economy by 2040 and will support 20,000 new jobs in the city.[105]

Key Fact or Innovation

Redevelopment of a brownfield site for social, economic and environmental benefits, connected to local culture.

Environmental

Climate change mitigation and resilience are written into the development designs with features such as sensors to monitor sustainability targets, and infrastructure to facilitate rainwater harvesting and sea wall strengthening. Developments will both contribute to climate change mitigation, in addition to ensuring that developments are sustainable.

Social

The heritage of the site has been preserved, complementing socio-economic developments rather than being in conflict.

Economic

The waterfront development is forecasted to contribute $4.29 billion to Auckland's economy by 2040 and will support 20,000 new jobs in the city.

5.2

Toronto Waterfront Development

Image: Toronto (credit: Touann Gatouillat Vergos, Unsplash)

Location
Canada

Cost
Very High (Capital spending 2020/2021 was $286.4 million)[106]

Delivered by
Multistakeholder

Scale of Impact
City

Year
2001-2028

Description

The government of Canada, province of Ontario, and city of Toronto have formed a partnership for the development of Toronto's waterfront. This partnership has been named Waterfront Toronto, formerly known as the Toronto Waterfront Revitalization Corporation, and is unique in its establishment and funding through three levels of government.

Socio-economic and ecological priorities have been combined through this waterfront development project, as a strong economy is sought through sustainable development. The land surrounding the Harbour encompasses 2,000 acres of largely unused brownfield land. This is being progressively transformed into a thriving waterfront with businesses, attractions, 750 acres of parks and public spaces, and leading innovations in sustainable living. Economic and ecological priorities are both considered, with objectives including improved water quality, cleaning contaminated soil, addressing flooding risk, and facilitating business areas, recreation areas, and affordable housing. Public interest appears to be at the forefront of this development.

Villiers Island is notable as part of the Port Lands Flood Protection Project, which is the largest public investment in the project portfolio and will add an estimated $5.1 billion to the Canadian economy overall. This is a new 240-hectare island being formed through the redirection of the Don River, upon which Toronto's first climate-positive neighbourhood is being built. Climate-positive targets involve going beyond carbon neutrality and making further efforts to offset climate impacts of other neighbourhoods. In addition to these environmental priorities, affordable housing and the creation of public space are both at the forefront of the project's objectives.

Economic and ecological objectives are embedded in future plans. Waterfront Toronto's latest Green Building requirements were released in 2021 and dictate the need for zero-carbon development, mass timber buildings, on-site energy generation, and embodied carbon analysis.[107]

Environmental

Short term objectives include improved water quality and cleaning contaminated soil. Long term objectives include climate-positive building and meeting Green Building requirements.

Social

Includes sustainable development of business areas, affordable housing, and climate-positive neighbourhoods. Public interest is placed at the forefront of initiatives.

Economic

The Port Lands Flood Protection Project, for example, is expected to generate $5.1 billion for the Canadian economy.

Key Fact or Innovation

2,000 acres of largely unused brownfield land is being transformed into a thriving waterfront with businesses, attractions, 750 acres of parks and public spaces, and leading innovations in sustainable living.

106. Waterfront Toronto (2021) Integrated Annual Report. Available at: https://www.waterfrontoronto.ca/sites/default/files/documents/waterfront-toronto-integrated-annual-report-2020-2021--for-online-.pdf

107. Vitello. C (ReNew Canada) (2021) Waterfront Toronto releases new requirements for resilient communities. Available at: https://www.renewcanada.net/waterfront-toronto-releases-new-vision-for-resilient-communities/

5.3

Portland Waterfront Development

Image: Greenway, Portland (C) TM Images PDX, Flickr

Location
USA

Cost
Very High ($1m+)

Delivered by
Multistakeholder

Scale of Impact
National+

Year
2003 onwards

Description

'Prosper Portland', formerly known as the Portland Development Commission, was established as a community development corporation by the City of Portland, and a public-private partnership was formed with major developers in the area. The objective was to redevelop the underused riverside land in the South Waterfront area of the city - a project named 'The Downtown Waterfront Urban Renewal Area', coordinated by the 'South Waterfront Development Plan'. The project involved three incremental phases covering transport, housing, sanitation and public recreation, therefore creating thriving mixed-use waterfront space.[108]

Socio-economic objectives complemented environmental objectives: for example, the South Waterfront Greenway was outlined in the development plan which encompasses 1.2 miles of park and urban walkways. This not only encourages green transport alternatives such as walking or cycling, but also provides a critical connection between downtown areas and the city centre which is important for economic development.

Other environmental plans include riverbank restoration to create a better habitat for salmon and other wildlife, and the installation of bioswales which cleanse rainwater from contaminants before it is released into the Willamette River.

Stakeholder cooperation across diverse sectors is evident in this case study. Many developers already owned land within the development area, including Oregon University, who agreed to dedicate this land to the project at no cost to the city. Furthermore, extensive environmental consultations were carried out to ensure that the plans had no adverse environmental impacts and were instead beneficial to the ecology of the waterfront.

Environmental

The project involves ecosystem restoration, such as the riverbanks, important for species such as salmon in the area. Green transport alternatives are being actively encouraged.

Social

Connectivity and access are improved through developments such as the South Waterfront Greenway. Public space is prioritised.

Economic

Connecting downtown areas to the city centre is imperative for economic development. The project as a whole has not only been considered one of Portland's most successful examples of urban renewal and tax increment financing, but is also a catalyst for other development projects.[109]

Key Fact or Innovation

The development includes 1.2 miles of park and urban walkways.

108. The World Bank. (2019) Municipal Public-Private Partnership Framework. The World Bank: Washington. Available at: https://ppp.worldbank.org/public-private-partnership/sites/ppp.worldbank.org/files/2020-02/World%20Bank_Municipal%20PPP_Project%20Summaries%20Part%202%20%287Sept%29_Content.pdf. (Accessed: 14/03/2022).

109. Prosper Portland. (2018). Downtown Waterfront. Available at: https://prosperportland.us/portfolio-items/downtown-waterfront/. (Accessed: 14/03/2022).

5.4

Stone Town Zanzibar Waterfront

Image: Stone Town (credit: Javi Lobarda, Unsplash)

Location
Zanzibar

Cost
Very High (Estimated)

Delivered by
Multistakeholder

Scale of Impact
City

Year
1980s

Description

Stone Town, Zanzibar, offers a prime example of investment in heritage tourism and waterfront conservation. This has increasingly been used as a catalyst for development and is often, as is the case in Zanzibar, complemented by wider urban planning and conservation efforts in the area.[110] Zanzibar's waterfront has a significant colonial history as an economic hub for Arab and European maritime trade. The architecture and urban fabric of the waterfront is therefore a unique synthesis of African, Arab, Indian, and European influences. [111]

The Stone Town Waterfront was developed during the British administration with the intention of creating luxurious facilities but this was never fully realised after the country gained independence in 1963, followed the revolution in 1964. The spice market collapse, in particular the clove market, led to a withdrawal of the main income source, and the waterfront began a period of urban decline. This was characterised by emerging slums, environmental problems and decline of the built environment.

However, from the 1980s onwards, Zanzibar began to gain international attention and investment began to filter in towards heritage conservation. Prominent actors in the preservation and development of the Stone Town Waterfront include the Zanzibar government, Aga Khan Trust for Culture, UNESCO, the EU, and the Zanzibar Stone Town Conservation and Development Authority. Plans were drawn up towards the restoration and enhancement of heritage structures, such as the transformation of the cable and wireless station into an upmarket hotel. Furthermore, the waterfront space was restructured through an EU project, involving the relocation of the port industry, preservation of ferry and passenger facilities, the opening of public spaces and retail facilities, and the removal of warehouses. After being deemed a World Heritage Site, the Waterfront attracted more tourism and funding.[112]

Stone Town Waterfront is exemplary of sensitive restoration and conservation of waterfront areas in postcolonial developing countries to encourage international funding, and income through the promotion of heritage tourism.

Environmental

By restoring and repurposing existing buildings and saving them from dilapidation, environmental impacts of new construction projects is limited.

Social

Sensitive heritage conservation can strike a balance between the preservation of a site's history, and the economic benefits that redevelopment can bring.

Economic

Employment is generated through the restoration and repurposing of heritage buildings. Heritage tourism is an important source of income, and international investment is encouraged through the conservation of historical sites.

Key Fact or Innovation

Heritage conservation and promotion of a historical site through multistakeholder partnerships.

110. Pramesti, R. E. (2017). 'Sustainable Urban Waterfront Redevelopment: Challenge and Key Issues'. Media Matrasain, vol. 14(2), pp. 41-54.

111, 112. Aga Khan. (2020) Aga Khan Historic Cities Programme – Zanzibar Stone Town Projects. Available at: https://www.akdn.org/publication/aga-khan-historic-cities-programme-zanzibar-stone-town-projects. (Accessed: 14/03/2022).

5.5

Detroit Waterfront

Image: Detroit RiverWalk (credit: Kevin Chang, Flickr. CC BY-NC-ND 2.0)

Location
USA

Cost
Very High (Estimated)

Delivered by
Multistakeholder

Scale of Impact
National+

Year
2003

Description

Detroit's Riverfront has been the subject of socio-economic development by the Detroit River Conservancy, and of ecological restoration by the Friends of the Detroit River (FDR) citizen advocacy group. The Riverfront was an industrial site heavily used in the 1950's, during which time the river lost between 95-97% if its historical coastal wetlands and became one of the most polluted rivers in North America. The aforementioned initiatives address the need to restore the ecological health of the Riverfront, while also harnessing the untapped socio-economic potential of these largely unused former industrial sites.

The Detroit River Conservancy is a non-profit organization formed with the intention of redeveloping the Detroit Riverfront. A central objective has been a continuous, 5.5 mile RiverWalk formed of plazas, green spaces, residential property, walkway, trails, pavilions and businesses. The RiverWalk will connect people to, and engage them with, the Detroit International Riverfront. Former industrial sites are being redeveloped into new retail or residential sites, or transformed into green spaces. For example, in 2012, work began to transform the Uniroyal tire factory located west of the Belle Isle Bridge into green space, with the potential for future residential or commercial use. The site was largely contaminated, and soil reclamation and excavation were needed to for a full ecological recovery. Similarly, in 2013, redevelopment of 1801 West Jefferson, the site of the former Free Press printing operation, began. This will form a 20-acre green space site on the RiverWalk.[113]

The Friends of the Detroit River group addresses issues of air and water pollution, shoreline stabilisation, habitat loss and degradation, and littering in the Detroit River. In partnership with the Michigan Department of Natural Resources, FDR has led a great deal of ecological restoration work on Belle Isle.[114]

Environmental

Numerous environmental benefits with riparian restoration, green corridors and numerous aquatic species once again thriving. Largely restoring degraded brownfield land and polluted water.

Social

The waterfront is now quality place for social interaction and recreation, with kilometers of active transport infrastructure and a place for city events.

Economic

Connecting to the downtown area and long-term plans for plazas and pavilions.

Key Fact or Innovation

Transboundary initiative (US and Canada) with the citizens advocacy group Friends of the Detroit River (FDR) playing an important role in the ecological revitalization of Detroit's riverfront which had previously become one of the most polluted rivers in North America.

113. Detroit Riverfront Conservancy. (2022). Detroit Riverfront Conservancy. Available at: https://detroitriverfront.org/. (Accessed: 11/03/2022).

114. Friends of the Detroit River. (2022). About Us. Available at: https://www.detroitriver.org/about. (Accessed: 14/03/2022).

6. Operational Environment

Previous page image: Rio de Janeiro, Brazil (credit: Agustin Diaz Gargiulo, Unsplash)

Beyond the five key blue economy sectors examined thus far, there exists a host of wider challenges which impact the marine environment. Failings in the operational environment in coastal cities, towns and further afield can impact performance across blue economy sectors. For example, deficiencies in sewage and solid waste management systems and poor practices by water companies (in cases enabled by poor regulation) means that in many places sewage often goes into the ocean untreated. This is not only a problem for developing nations. The resultant pollution inevitably has a negative impact on ocean processes and marine life, and as a consequence impacts blue economy sectors such as fishing and tourism which rely on clean waters. Furthermore, plastic waste makes up 80% of all marine debris further impacting these, and other blue economy sectors.[115] Improvements in liquid and solid waste management infrastructure and processes, and a transition to the circular economy can be key, leading to cleaner beaches and oceans, healthier marine life, and higher-functioning blue economy sectors.

Other supporting sectors like transport and education are also key to a sustainable blue economy, in particular the latter. Without skilled labour force, there is not a chance that blue economy sectors will thrive, and this is often the challenge in small local communities. This requires a complete intervention to promote more "blue careers" in tertiary education to overcome generational renewal obstacles in certain sectors (e.g., fisheries). But also, a lot of investment is needed to upskill active labour force to adapt to new/changing technologies today. Blue economy projects should aim to include technical training and skills development of local populations, to help ensure that national blue economy aspirations translate down to benefits for local communities.

Blue economy projects significant in size, can themselves stimulate further population growth locally, as people move in search of employment opportunities. With this comes increased infrastructure demand, and environmental and social issues can develop if this growing demand is not met. Major blue economy projects therefore should be approached and planned holistically, aware of the opportunities they hold, and the demands they may create.

Key Guidelines for the Operational Environment of the Blue Economy

- Circular economy embedded in national and local planning and behaviours.
- Blue economy opportunities always linked to local education and training opportunities.
- Robust regulation of pollution into marine environment from city/national level and throughout related supply chains.
- Transboundary approaches and cooperation where necessary to tackle marine pollution.
- Climate smart infrastructure.
- A holistic approach to blue economy planning and projects, that well-considers the relationship between ocean sectors and urban sectors and systems.

115. Reddy. S. (2018). Plastic Pollution Affects Sea Life Throughout the Ocean. Pew Research. Retrieved from: https://www.pewtrusts.org/en/research-and-analysis/articles/

6.1

Mississippi River Basin Healthy Watersheds Initiative (MRBI)

Image: Upper Mississippi River Basin (credit: Osten, Unsplash)

Description

80% of pollution to the marine environment comes from the land. One of the biggest sources is called nonpoint source pollution, that occurs as a result of runoff. This can come from cumulative smaller sources, like septic tanks, cars, trucks, and boats, in addition to larger sources, such as farms, ranches, and forests.[116] With respect to farming, improved practices can limit pollution into waterbodies. Actions include establishing protection zones along surface watercourses, within farms and in buffer zones around farms; crop management; manure management - and other related management of livestock - especially Intensive livestock operations; regulation of feed additives, hormones and medicines; and limiting overgrazing to reduce land degradation.[117]

In the USA, through the Mississippi River Basin Healthy Watersheds Initiative (MRBI), the Natural Resources Conservation Service (NCRS) - an agency of the United States Department of Agriculture - and partners work with producers and landowners to implement voluntary conservation practices that improve water quality, restore wetlands, enhance wildlife habitat and sustain agricultural profitability in the Mississippi River Basin.[118]

NRCS has identified the Mississippi River Basin as a top priority due to water quality concerns, primarily related to the effects of nutrient loading on the health of local water bodies and, eventually, the Gulf of Mexico.[119]

The 13-state initiative (Arkansas, Kentucky, Illinois, Indiana, Iowa, Louisiana, Minnesota, Mississippi, Missouri, Ohio, South Dakota, Tennessee and Wisconsin) offers technical and financial assistance to farmers in priority watersheds.[120]

MBRI uses a “conservation systems approach” to help producers address water quality and soil health by avoiding, controlling and trapping nutrients and sediment. Actions include efficient use of fertilizer, nutrient management, minimizing nutrient and water runoff, crop rotation, cover

116. NOAA (2021) What is the biggest source of pollution in the ocean? Available at: https://oceanservice.noaa.gov/facts/pollution.html

117. Mateo-Sagasta, J., Zadeh, S. M., Turral, H., & Burke, J. (2017). Water pollution from agriculture: a global review. Executive summary. Available at: http://www.fao.org/3/a-i7754e.pdf

118, 119. USDA (Nd) NRCS Announces Additional Funding for Point Remove - Mississippi River Basin Initiative Project. Available at: https://www.nrcs.usda.gov/wps/portal/nrcs/detail//?cid=nrcs142p2_035234

120 121, 123. USDA (Nd) Mississippi River Basin Initiative (MRBI). Available at: https://www.nrcs.usda.gov/wps/portal/nrcs/detail/null/?cid=stelprdb1119363

122. USDA (2022) Mississippi River Basin Healthy Watersheds Initiative. Available at: https://www.nrcs.usda.gov/wps/portal/nrcs/detailfull/national/home/?cid=stelprdb1048200

Location
Mississippi Basin, USA

Cost
Very High (>$100 million)

Delivered by
Multistakeholder

Scale of Impact
Regional

Year
2010-present

crops, and residue and tillage management. Some farmers may also receive monitoring equipment to assess water quality.

The program is also supported by existing US Farm Bill conservation programs including technical and financial assistance through the Agricultural Conservation Easement Program (ACEP).[121]

Key Fact or Innovation

Systematic approach to marine pollution by addressing issues in upstream water bodies.

Environmental

Reduction in pollution from agriculture into water bodies and reduction in the related negative impacts this brings. To date, segments of the Cache River and St. Francis River in Arkansas, and Flowers Creek in Indiana, have been scheduled for de-listing from the state impaired waters lists due to improved water quality.[122]

Social

More than 50 cities and 18 million people rely on the Mississippi for their daily water supply. MRBI provides healthier water bodies for eating, drinking and recreation.[123]

Economic

Healthier water-bodies and oceans means better outcomes for those that rely on the ecological functioning of these waters for their livelihoods (e.g. fishing and tourism).

6.2

EcoAct Tanzania Green Life

Image: Mangrove Forest, Tanzania (credit: Richard Mortel, CC BY 2.0)

Location
Tanzania

Cost
Low-Medium (Estimate)

Delivered by
Civil Society

Scale of Impact
City

Year
2018

Description

EcoAct Tanzania is a social enterprise focused on reducing plastic pollution in coastal ecosystems. EcoAct uses a chemical-free plastic extrusion technology called "Waxy ıı Technology" to recycle and transform used plastics, packaging materials, and agricultural waste into lumbers. These materials offer an alternative to wood timbers and is being used for construction and furniture making amongst other uses. By reducing timber demand, the process helps to preserve coastal mangrove as well as providing local, sustainable jobs in manufacturing and selling the lumbers.

The company is already creating hundreds of jobs and has collected and reused 20 tons of plastic through the initiative. Its three-year strategic plan aims to collect and remove 2500 tonnes of waste plastic from the environment.[124]

Key Fact or Innovation

Materials from plastic waste which helps clean the environment and provide livelihoods.

Environmental

Reduction of plastic waste and reduction of mangrove deforestation.

Social

Medical insurance provided to 100 households collecting waste in informal settlements.

Economic

Created a reported 300 direct jobs and sold materials to hotels in Arusha and Zanzibar.

124. Gaspare. L (2021) EcoAct Tanzania Green Life. Available at: https://panorama.solutions/en/solution/ecoact-tanzania-green-life

6.3

Regulations on the Use of Plastic Bags in Quezon City

Image: Plastic bag in ocean (credit: Oleksandr Sushko, Unsplash)

Location
Quezon, Philippines

Cost
Low-Medium (Estimate)

Delivered by
Local Government

Scale of Impact
City

Year
2012 onwards

Description

After China and Indonesia, the Philippines is the 3rd largest contributor to ocean plastics in the world.[125] Plastic bags can block watercourses, presenting a flood risk issue; they pose a risk to marine life that can get trapped; and they can pose a microplastics issue as they disintegrate. The Government of the Philippines is therefore working to address this issue, with the Quezon City Government's policy offering a pioneering example in the country.

In Quezon City, plastic bags have been found to amount to 12% of the total waste composition.[126] The authorities therefore decided to implement a series of regulations. Since 2020, retailers are no longer allowed to distribute plastic bags to customers. Before the total ban, a 'recovery system' was implemented in 2012, in which customers had to pay a tariff if they needed a plastic bag. The fees funded various environmental initiatives.[127] The local government allowed a three-month grace period from the date of enactment of the 2012 Ordinance and an additional grace period of three months in which warnings were given but no penalties or other charges. This was combined with a widespread information campaign to raise local awareness. Thereafter, financial penalties have been applied, and retailers risk losing permits if they repeatedly break the Ordinance.[128]

Key Fact or Innovation

Comprehensive, integrated approach to reducing plastic bag waste.

Environmental

Plastic bags are a significant component of ocean waste. This initiative helps mitigate the issue.

Social

This policy intervention is contributing to a shift in consumers behaviour towards a more reuse-oriented attitude.

Economic

From 2012-2018 a total amount of at least PHP 285 million (€4.8 million) was reported by 68 Type 1 Relevant Retailers (shopping malls, supermarkets, fast food chains, etc.) throughout the City as a result of the plastic bag tariff.[129]

125, 126, 129. C40 (2018) Municipality led Circular economy Case Studies. Available at: https://circulareconomy.europa.eu/platform/en/knowledge/municipality-led-circular-economy-case-studies

127 Gaia (2020) Regulating single-use plastics in the Philippines: Opportunities to move forward. Available at: https://www.no-burn.org/wp-content/uploads/Philippine-Policy-Brief-on-SUPs-Ban-1.pdf

128 Government of Quezon City (February 2021) QC to resume ban on plastic bags, single use plastics. Available at: https://quezoncity.gov.ph/qc-to-resume-ban-on-plastic-bags-single-use-plastics/

6.4

Aditya Solar-Powered Ferry, Kerala

Image: Aditya solar-powered ferry (credit: Samarjitbharat, Creative Commons 4.0 International license)

Location
India

Cost
Low-Medium

Delivered by
Multistakeholder

Scale of Impact
City/Regional

Year
2017

Description

Aditya is India's first solar-powered ferry and the largest solar-powered boat in India. The 20-metre-long and 7-metre-wide vessel has a capacity of 75 passengers in addition to 3 crew staff. Aditya was designed and built by NavAlt Solar and Electric Boats in Kochi, India. NavAlt is a joint venture firm between an Indian company Navgathi Marine Design and Constructions and two French companies Alternative Energies and EVE Systems. The development received support funding from the Kerala government.[130]

The ferry currently operates between Vaikkom and Thavanakkadavu in the Indian state of Kerala, beginning service in 2017. In its first three years of operation, the Aditya saved more than 100,000 litres of diesel. In 2020, the state government unveiled plans to replace 3 diesel ferries operating the same route with solar ones, mentioning that Aditya costs about 79 USD per month compared to 2867 USD for diesel-powered ones. The State Water Transport Department of the Government of Kerala has also reportedly decided to replace all of its 48 diesel ferries with solar ones by 2025.[131]

Key Fact or Innovation

After a trip on the solar boat, the director general of the International Solar Alliance said the Aditya could serve as a model for other countries where limited resources make solar-powered projects a hard sell.

Environmental

The ferry generates close to zero polluting emissions.

Social

Affordable ferry transport - each day, the Aditya carries about 1,700 passengers across the lake.

Economic

The ferry is at least 30 times cheaper to run than its diesel counterparts.

130. Jumde. A (The Better India News) (2016) Kerala Govt. Commissions India's First Solar-Powered Boat, Paves the Way for a Greener Tomorrow. Available at: https://www.thebetterindia.com/55045/india-s-first-solar-powered-ferry-kerala/

131. Rajendran. K (2020) Indian Solar Ferry Flies Flag for Cleaner, Cheaper Water Transport. Marine link. Available at: https://www.marinelink.com/news/indian-solar-ferry-flies-flag-cleaner-480911

6.5

Blue Economy Training, Kwale

Image:Women on beach, Kwale (credit: Victor Matara)

Location
Kwale, Kenya

Cost
Unknown

Delivered by
Multistakeholder

Scale of Impact
Regional/National

Year
2022

Description

With a youth unemployment rate of 11.4%,[132] the blue economy offers an important opportunity for new entrants into the Kenyan workforce. However, for Kenyans to benefit from national blue economy ambitions, there must be corresponding education and technical training that provides the skills and knowledge for youth to access blue economy livelihood opportunities.

The GoBlue Technical Training Program is one initiative in Kwale county aiming to equip Kenyan youth for blue economy opportunities. Funded by the European Union and German development agency 'Deutsche Gesellschaft für Internationale Zusammenarbeit' (GIZ), the program is implemented by Jumuiya Ya Kaunti za Pwani – a economic bloc of Kenyan coastal county governments. 136 students have recently graduated from the program, hosted at Ukunda Vocational Training Center in Kwale, in courses including maritime security, tourism and hospitality and boat repair and maintenance.[133]

The GoBlue Training Program has been taking place at a time of local blue economy development, with a new fishing port planned at Shimoni. Longer-term, a new US$10 million World Bank funded blue economy college is planned in Kwale, which will serve East and Central Africa.[134]

Key Fact or Innovation

The blue economy college planned in Kwale will be the second dedicated blue economy learning institute on the Kenyan coast alongside Bandari Maritime Academy in Mombasa.

Environmental

Blue economy and environmental awareness/education.

Social

Youth empowerment and education, to benefit from local blue growth.

Economic

Building technical capacity in maritime careers for national social and economic development.

132. Ng'ethe. V (2020) Kenya's youth unemployment at 39%? Why this headline-grabbing number is wrong? Africa Check. Available at: https://africacheck.org/fact-checks/reports/kenyas-youth-unemployment-39-why-headline-grabbing-number-wrong

133. Kenya News (February 2022) 136 Students Receive Training in The Blue Economy Sector. Available at: https://www.kenyanews.go.ke/136-students-receive-training-in-the-blue-economy-sector/

134. Kenya News (March 2020) Sh1.1 Billion To Harness The Blue Economy. Available at: https://www.kenyanews.go.ke/sh1-1-billion-to-harness-the-blue-economy/

7. Climate Change Mitigation and Adaptation

Rampion Offshore Wind Farm, United Kingdom (credit: Nicholas Doherty, Unsplash)

The consideration of climate change aspects is a key cross-cutting topic that is gaining increased urgency and relevance for a whole host of projects worldwide, and the same can be said for blue economy initiatives. Understanding the impacts of climate change on the blue economy, while also acknowledging the role that the ocean has in mitigating and adapting to these is an important step in order to achieve sustainable futures environmentally, socially, and economically. Climate considerations have been noted in various places with respect to the preceding six blue economy sectors, but this final section considers climate change issues in further detail, with respect to both climate mitigation and adaptation.

The world's ocean is a major natural carbon sink, currently absorbing just under one-third of anthropogenic CO2 emissions[135, 136] and therefore has a key role and great potential in tackling climate change challenges. However, this process is contributing to an increase in ocean acidification and impacting biodiversity, and ocean-based carbon removal approaches should take this into account. Other important measures include offshore clean energy production, coastal ecosystem conservation and protection, and the implementation of nature-based solutions and other green and blue infrastructure in coastal areas for resilience-based and eco-disaster risk reduction (eco-DRR).

Key Guidelines for the Climate Change Mitigation and Adaptation and the Blue Economy

- Consideration of combined strategies for both mitigation and adaptation to conserve, protect, restore ecosystems, and promote climate-smart growth.
- Implementation of ecosystem-based approaches such as nature-based solutions for carbon sequestration and resilience building, eco-DRR, prioritization of green and blue infrastructure when possible or in association with hybrid green and grey structures.
- Use of renewable energy and sustainable long-term approaches assessing how can ocean resources can be used to generate renewable energy (e.g. off-shore wind, energy harvesting from ocean waves and tides, etc.).
- Promotion of circular economy and development principles, such as zero waste.
- Integration of green and blue infrastructure and nature-based solutions for ecosystem restoration.
- Application of green financing mechanisms such as green and blue bonds.

135. Northrop. E and Lebling. K (2020) Leveraging the Ocean's Carbon Removal Potential. WRI. Available at: https://www.wri.org/insights/leveraging-oceans-carbon-removal-potential

136. Rosane. O (2019) As oceans absorb CO2 at a faster rate, bigger challenges emerge. WEForum. Available at: https://www.weforum.org/agenda/2019/03/oceans-absorb-co2-challenges-emerge/

7.1

Circular Economy for the Whole Island, Samsø

Image: Windfarm Offshore Samsø. (credit m.prinke, Flickr)

Description

In 1997, Samsø, an island off the coast of central Denmark, set the ambitious goal to become entirely energy self-sufficient through renewable sources within a decade. Remarkably, the island actually managed to reach this goal ahead of time, becoming self-sufficient in 2004.[137] This was achieved in part through investment in 11 off-shore wind turbines, alongside biomass, solar and electric vehicle investment.[138] This process has been led by civil society and the elected municipal board with strong engagement and involvement from local businesses and the wider community.[139]

The island keeps pursuing other sustainable goals such as promoting a more circular economy (e.g. new recycling collection system to reduce the volume of waste incinerated for energy), be free of fossil fuels by 2030, and be in balance for parameters wider than just energy. A longer-term vision to 2030 includes for example the decision to nationalize the main ferry and start the island's own shipping company, with all ferries ordered to be fuelled by liquefied natural gas (LNG), with the ultimate intention of replacing this with liquid biogas produced locally. Other considerations of how the loop can be closed on other value chains include biogas being produced from organic material flows and by-products on the island (e.g. sewage, biowaste, slurry, etc.), and connected with water and nutrient flows in the island.[140]

Samsø presents an example of blue economy activities as part of a larger system, highlighting the different interdependencies across energy efficiency, waste management, renewable energies, supply chains, etc. It also demonstrates the creation of the demand for renewable energy, namely raising awareness and harnessing planning regulation to promote energy-efficiency efforts.

137, 139, 140. C40 (2018) Municipality led Circular economy Case Studies. Available at: https://circulareconomy.europa.eu/platform/en/knowledge/municipality-led-circular-economy-case-studies

138. UNFCC (2022) Samsø: An Island Community Pointing to the Future | Denmark. Available at: https://unfccc.int/climate-action/un-global-climate-action-awards/climate-leaders/samso

Location
Denmark

Cost
Very High

Delivered by
Multistakeholder

Scale of Impact
Regional

Year
1997 onwards

Key Fact or Innovation

This case study provides an example of how an island can achieve self-sufficiency and no reliance on external energy generation, having not just circular energy flows but being a 'bio-circular' island including other natural material flows.

Environmental

Samsø's carbon emissions are now completely offset by renewable energy produced, with longer term ambitions going far beyond this.

Social

There is a unique bottom-up approach evident which uses public outreach and local ownership to increase acceptance and involvement, as stipulated in municipal plans and strategies.

Economic

Heating plants are either privately or cooperatively owned, and The Danish Energy Authority allocated a grant fund that enabled half of the financing required to be provided by government grants; Subsidies were provided to the public for investing in energy conservation; Grants were given to energy consultants for their free advice to homeowners.

7.2

Giant Kelp Forest, Lüderitz

Image: Kelp (credit: J Cruikshank, Unsplash)

Location
Namibia

Cost
Medium

Delivered by
Private Sector

Scale of Impact
National+

Year
2020-present

Description

Kelp forests play and important role in carbon capture - transforming CO2 into seaweed biomass through photosynthesis. They also provide an important source of biodiversity, with many species found in Kelp habitat.[141] Kelp Blue, is an organization that grows Giant Kelp forests at scale, to restore ocean health and address climate change challenges. Their activities remove barriers to scale seaweed farming such as designing a structure to enable cultivation of giant kelp offshore (to not compete with coastal ecosystems), selecting species that do not require annual re-planting, and only harvesting the canopy of the macroalgae.[142, 143]

The products made from the harvest kelp include sustainable agri-foods, fertiliser, pharmaceuticals, and textiles.[143] Since only the canopy is harvested this consists of a less environmentally damaging alternative with a reduced need for chemical fertilizers, pesticides, antibiotics, and fossil-based plastics. These structures can also support additional high-value aquaculture (e.g. scallops, oysters, mussels) and targeted high-value line-fishing.

This case study demonstrates how an innovative green-blue infrastructure and the promotion of nature-based solutions can generate multiple benefits while also being an effective measure for tackling climate change impacts.

Key Fact or Innovation

Green-Blue infrastructure solution (kelp forest cultivation) for tackling climate change impacts.

Environmental

Kelp forest cultivation increases biodiversity and sequesters carbon. Products made from the harvest kelp provide a less environmentally damaging option to many alternative practices.

Social

The initiative has provided local skills development and training in this new practice.

Economic

Job creation, employment diversification, and local fish stocks could increase between 10% and 20% benefitting local fishermen. Other associated indirect economic diversification such as the potential for offshore Kelp Forest tourism.

141. Clifton-Ross. J (2021) THE MAGIC OF SEAWEED: How kelp forests enhance biodiversity and fight climate change. Available at: https://www.oursafetynet.org/2021/02/19/how-kelp-forests-enhance-biodiversity-and-fight-climate-change/

142, 144. Kelp Blue (2022) Re-wilding the oceans. Available at: https://kelp.blue/

143. Deane. S. Panorama (2021) Kelp Blue. Available at: https://panorama.solutions/en/solution/kelp-blue

7·3

Tidal Energy for Biorock™ Coral Reef Restoration

Image: Biorock (credit: Marionpinta. Creative Commons 3.0)

Location
Indonesia

Cost
Very High

Delivered by
Multistakeholder

Scale of Impact
National+

Year
1976-present

Description

Biorock™ - invented in 1976 - is a technology producing natural building materials from the sea. These strengthen with time and are self-repairing.[145] It was named Biorock™, because beyond growing hard limestone rock for structural purposes, it also increased the growth of corals and all marine organisms. The Biorock™ system applies a low-voltage current to an undersea metal frame, causing mineral ions to deposit on the structure, forming a substrate that encourages and accelerates coral reef growth, leading to faster restoration of reefs. Biorock technology can be used for the regrowth of coral reefs and protection of corals, other marine ecosystems and islands from rising sea levels and coastal erosion.[146]

Biorock™ can be powered by solar, wind, waves, and ocean current energy, generated directly at the site. Use of renewal tidal energy to run an electrical turbine to power a Biorock™ is an attractively sustainable approach. Arup in collaboration with the Gili Eco Trust, based near Lombok in Indonesia, developed a prototype tidal turbine to generate electricity for coral reef restoration in the Gili Islands. The team designed the tidal turbine (a Gorlov helical type) so that it could be constructed and tested locally. Suitably robust construction materials and methods that can be repaired and maintained by locally-based operatives were selected, including: glass fibre reinforced plastic turbine blades, surface coatings to minimise biofouling, low-friction bearings, and a fully user-serviceable dynamo generator.[147]

Key Fact or Innovation

Innovative technology for promoting coral reef growth and restoration using renewable energy.

Environmental

Promotion of coral reef growth and restoration using renewable energy.

Social

Methods that can be repaired and maintained by locally based operatives were selected in the Arup-Gili Eco Trust collaboration.

Economic

Biorock™ has reduced costs by local repair and low maintenance, and long-term sustainable energy generation.

145, 146, 147. Global Coral Reef Alliance (2009) Biorock™,Mineral Accretion Technology™, Seament. Available at: https://www.globalcoral.org/biorock-coral-reef-marine-habitat-restoration/

7·4

Protection of Earth's Carbon-Trapping Coastal Trees

Image: Mangrove, Cispata Bay (credit: Nicolás Díez Cruz, Creative Commons Attribution-Share Alike 4.0 International)

Location
Colombia

Cost
Very High

Delivered by
Multistakeholder

Scale of Impact
Community

Year
2018

Description

Challenges and pressures arising from illegal farming, fishing, and logging combined with climate change are threatening the existence of mangroves in Cispatá Bay, Colombia. This is an important ecosystem for coastal communities, providing protection from storm surges, as well as food and wood supplies. Moreover, mangroves have a key environmental role storing up carbon from the atmosphere.

An investment in carbon-trapping coastal trees made by Apple in partnership with Conservation International for Apple's Earth Day 2018 Give Back campaign aims to protect and restore the 27,000-acre mangrove forest. This is forest is expected to sequester 1 million metric tons of CO2 over its lifetime.[148]

This initiative quantifies blue carbon credits, which is a key element to inform future multi-level decision-making, such as whether to invest in mangroves protection and restoration as opposed to other risk prevention and/or carbon sequestration initiatives. It also encourages other companies to invest in these conservation efforts as they are measurable and quantifiable, therefore tradeable in carbon markets.

Key Fact or Innovation

Private sector investment on climate change benefits using coastal NbS.

Environmental

Carbon sequestration through coastal ecosystem – mangroves.

Social

Example of nature-based solutions to address environmental hazards in coastal regions, protecting communities from environmental hazards.

Economic

Food and wood provision; reduced costs associated to post-disaster recovery.

148. Apples (2019) Conserving mangroves, a lifeline for the world. Available at: https://www.apple.com/newsroom/2019/04/conserving-mangroves-a-lifeline-for-the-world/

7·5

Ørsted (Gode Wind 1) Project Bond

Image: Orsted Windfarm (credit: Joel Arbaje, Unsplash)

Location
Germany

Cost
Very High

Delivered by
Private Sector

Scale of Impact
National+

Year
2015

Description

In 2015 Danish multinational power company Ørsted issued the world's first project bond[149] for the Gode 1 offshore wind farm construction and operation, located in Germany's part of the North Sea. Gode 1 consists of 55 turbines and is part of the wider 900MW Gode wind cluster, with an expected capacity to provide electricity for 340,000 homes.[150]

The use of a project bond in the financing of the project partly represented a shift in risk perception from investors in offshore wind energy projects, alongside a steady mainstreaming of renewable energy investments in the European energy market.

Ørsted agreed to develop a 50/50 joint venture to help capitalise the wind farm between itself and financial investors (Global Infrastructure Partners - GIP), which gave the project a higher credit rating and allowed it to attract more institutional investors.

Some key aspects to the success of the restructuring include technical and contractual protections provided against project risk. Moreover, the partnership between Ørsted and GIP permitted the bond to be rated as investment-grade, and therefore eligible for investment by institutional investors. This partnership between institutions approach has set the precedent for the capitalisation of offshore wind, being already replicated in other cases (e.g. in the Borkum Riffgrund 2 offshore windfarm).[151]

Key Fact or Innovation

Ocean-based renewable energy via project bond provided by pension funds, banks, sovereign wealth funds.

Environmental

Sustainable energy generation.

Social

Provision of electricity needs for 340,000 homes.

Economic

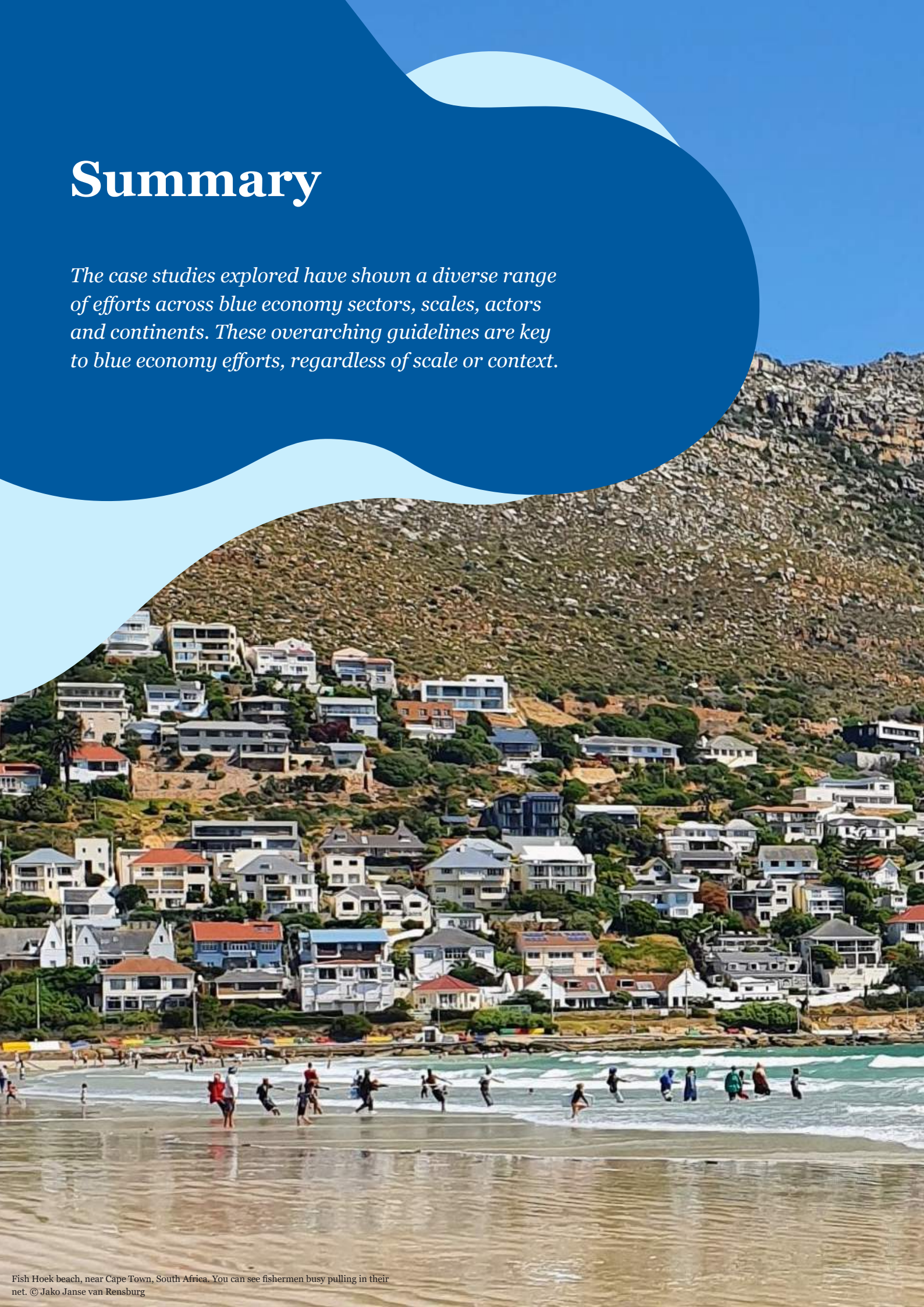
Mainstreaming of renewable energy investments in the European energy market.

149. bonds in that they are issued to finance a specific project with proceeds paid exclusively from money generated by that project as opposed to the overall revenue of the issuing entity

150, 151. Friends of the Ocean (2020) The Ocean Finance Handbook. Available at: https://www3.weforum.org/docs/WEF_FOA_The_Ocean_Finance_Handbook_April_2020.pdf

Summary

The case studies explored have shown a diverse range of efforts across blue economy sectors, scales, actors and continents. These overarching guidelines are key to blue economy efforts, regardless of scale or context.



Fish Hoek beach, near Cape Town, South Africa. You can see fishermen busy pulling in their net. © Jako Janse van Rensburg

While case studies are unique for their different reasons, the following key points and principles are evident and important across the report, its case studies, and its blue economy sectors. These points should be considered in future blue economy planning efforts.

Key Guidelines for the Blue Economy

1. Blue economy activities should align with truly sustainable definitions (chapter 1) and go beyond the avoidance of harm, to provide social, environmental, and economic benefits from our ocean for current and future generations.[152] Blue economy planning and investment need sustainability objectives at heart.

2. A robust legislative and governance framework, aligned with international laws and standards for ocean and coastal sustainability, is important for national blue economy efforts. This can support the creation of MSPs, MPAs, LMMAs, and wider blue economy planning efforts.

3. Inclusivity and equality must be promoted and developed through blue economy planning and implementation. Nationally and locally this includes full involvement of stakeholders in blue economy planning; ensuring local jobs/training from blue economy investments; and using taxes from blue economy for environmental and social prosperity. Internationally this includes fair arrangements between developed and less developed nations like 'debt for nature' swaps.

4. Blue economy plans should blend innovation with traditional tried and trusted approaches to sustainable coastal and ocean management that have existed amongst coastal communities for decades.

5. Plans and projects should be holistic in their design, demonstrating understanding of interdependent sectors, stakeholders, spaces, and social, economic and environmental impacts.[153, 154] This includes direct links between blue economy sectors wider economic sectors, and diverse stakeholders, as well as indirect linkages between land and ocean processes. Coordinated planning, tools and approaches are needed that work towards multi-sector benefits and virtuous impacts.

6. A significant amount of blue economy activity takes place in cities. Blue economy sectors such as ports and tourism can be significant contributors to urban growth. Blue economy plans should align with wider urban plans, and coordination between national and local government and other urban stakeholders is important.

7. Blue economy sector projects need to be supported by a robust operational environment. This includes transport that supports blue economy sectors, education and capacity building that helps local communities to benefit, and liquid and solid waste management that help ensure healthy waters and marine life. Circular economy approaches have an important role in this respect.

8. Blue economy planning and investment should be climate-ready - to adapt to changing climate and not add to (and in cases reduce) carbon emissions. Effectively planned and designed physical and natural infrastructure, renewable marine energy and carbon sequestration are some important considerations.

9. Blue economy planning and projects should be based on robust scientific evidence and assessment of environmental, social and economic issues. The precautionary principle should prevail when scientific data is not available.[155] Projects should be accompanied by effective monitoring of impact (positive and negative), communication of this to stakeholders, and lessons learned addressed in current and future projects.

10. Cooperation and partnership is key for current and future ocean sustainability. Partnerships between communities, cities, regions and nations, involving public, private and civil society stakeholders is needed, to share best practices, create sustainable financing mechanisms, and find inclusive and sustainable solutions to both local and transboundary issues.[156]

152, 155. UNEP (2018) The Principles. Available at: https://www.unepfi.org/blue-finance/the-principles/

153, 156. Atkisson, A., Arnbom, T., Tesar, C., Christensen, A. (2018). Getting it right in a new ocean: Bringing Sustainable Blue Economy Principles to the Arctic.

154. WIOMSA and UN-Habitat, 2021. Coastal Cities of the Western Indian Ocean Region and the Blue Economy: Strategic Roadmap. WIOMSA and UN-Habitat, Zanzibar, Tanzania

The report has discussed a large variety of initiatives, ranging from technologically sophisticated methods for carbon capture, storage and financing, through to relatively simple initiatives that demonstrate coordinated and inclusive efforts to manage marine resources and social, environmental and economic conditions. While case studies have been examined sector by sector, in many cases they demonstrate different blue economy sectors operating in the same space, and balancing the needs and actions of different stakeholders across different sectors.

Summary blue economy principles and guidelines have demonstrated the importance of sustainable, integrated approaches, grounded in robust data and an inclusive and coordinated approach.

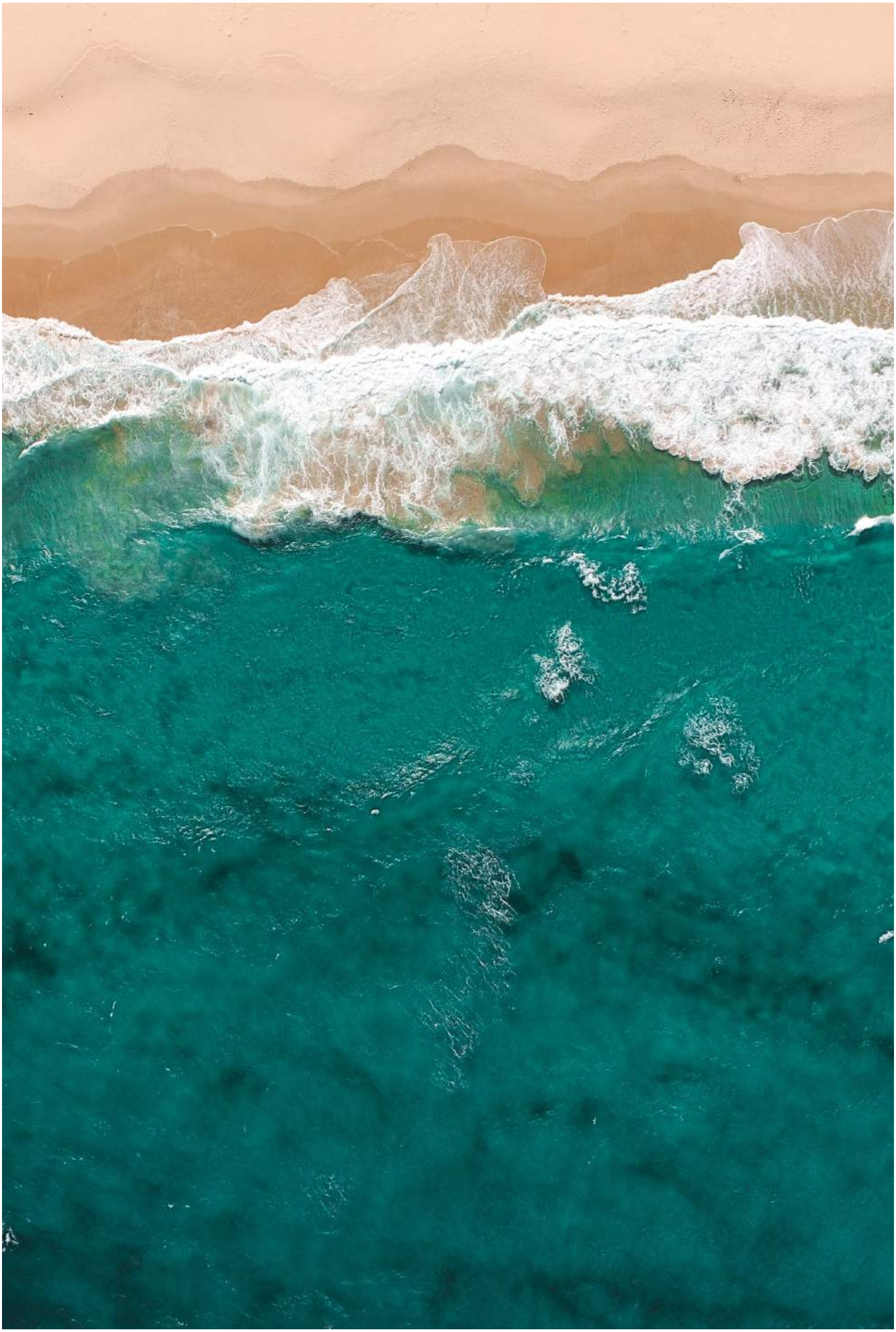
We hope that national governments, whether advanced, or early in blue economy planning will take inspiration from some of the planning and project examples presented in this report.

We hope that city stakeholders including municipal authorities, will take inspiration from the sustainable blue economy activity taking place across other global cities, including the key role of private sector and civil society in many of these initiatives.

We hope that community level stakeholders take inspiration from the success of LMMAs and other local approaches to the blue economy demonstrated across the report.

Lastly, we hope that all these and other stakeholders take collective inspiration from the many multistakeholder initiatives and approaches outlined in this report. Collaboration is key, and we encourage stakeholders leading national and local blue economy planning and implementation, to collectively examine these case studies with other local stakeholders including private sector and civil society, and consider how such initiatives might be applied to their local context, and how the projects and principles presented can help to meet local blue economy ambitions.

We welcome further engagement and conversation on this subject and can be reached on the following address - BlueEconomy@arup.com



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