



# The Blue Foundations to Sustainable Development – Climate Change Adaptation and Mitigation Actions

*The new 2030 Agenda for Sustainable Development (2030 Agenda) sets the roadmap for integrated management approaches of natural systems, including oceans and coasts (Goal 14), as means to overcome poverty and foster social and economic development.<sup>1</sup> Nature-based solutions to climate change adaptation and mitigation in coastal and marine environments are win-wins to tackle climate change (Goal 13) while supporting sustainable development.<sup>i</sup>*

Marine and coastal ecosystems are valuable capital assets and represent critical infrastructure for social and economic development.<sup>2</sup> These ecosystems provide a wide range of goods and services to people, including *provisioning services* (e.g. breeding, nursery and living grounds for many fish, crustaceans and other fauna), *regulating services* (e.g. nutrient regulation, waste disposal, carbon sequestration, and shoreline stabilization), *supporting services* (e.g. soil formation, photosynthesis and nutrient cycling), and *cultural services* (e.g. providing value to tourism, recreation and education). Regulating services such as carbon sequestration, shoreline stabilization and natural hazard protection support climate change mitigation and adaptation respectively. Managing human interactions with marine and coastal ecosystems and their resources is therefore an important cross-cutting component for achieving the goals and targets of Agenda 2030. Despite considerable progress, efforts to maximise the social and economic contributions of these ecosystems, while ensuring their conservation and restoration, currently fall far short of the level of change required to achieve the 2030 Agenda's vision of sustainable development and combatting of climate change.

## Oceans and coasts in the 2030 Agenda

The UN General Assembly adopted the 2030 Agenda on 25 September 2015.<sup>1</sup> The 35-page document is the result of more than five years of negotiations between UN member states,<sup>3</sup> and two-plus years of consultations involving civil society, appointed experts, and other stakeholders from around the world.<sup>3</sup> Consultations and surveys, designed to incorporate perspectives of the poorest and most vulnerable people, were a distinctive feature of the Agenda's preparation process.<sup>1,4</sup>

Environmental sustainability in general is a central theme of the Agenda, whose preamble recognises that 'social and economic development depends on the sustainable management of our planet's natural resources.'<sup>5</sup> Oceans and coasts are recognised by Agenda 2030 in two key ways: *First*, Goal 14 expresses a commitment to 'Conserve and sustainably use the oceans, seas and marine resources for sustainable development'. This commitment is accompanied by specific targets to 'By 2020, sustainably manage and protect marine and coastal ecosystems to avoid significant adverse impacts, including by strengthening their resilience, and take action for their restoration in order to achieve healthy and productive oceans' (14.2), and also to 'By 2020, conserve at least 10 per cent of coastal and marine areas, consistent with national and international law and based on the best available scientific information' (14.5). *Second*, commitments relevant to marine and coastal ecosystems are integrated into several other goals and targets in Agenda 2030, as shown in Figure 1.

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No Poverty	Zero Hunger	Good Health and Wellbeing	Quality Education	Gender Equality	Clean Water and Sanitation	Affordable and Clean Energy	Decent Work and Economic Growth	Industry, Innovation and Infrastructure	Reduced Inequalities	Sustainable Cities and Communities	Sust. Consumption and Production	Climate Action	Life Below Water	Life on Land	Peace, Justice and Strong Institutions	Partnership for the Goals
					6.1							13.1	14.1	15.1		
												12.2	13.2	14.2	15.2	
	2.3	3.3			6.3							13.3	14.3	15.3		
1.4	2.4				6.4		8.4	9.4		11.4	12.4	13.a	14.4	15.4		
1.5	2.5				6.5					11.5		13.b	14.5	15.5		
					6.6					11.6			14.6	15.6		
				5.a	6.a					11.7			14.7	15.7		17.7
					6.b						12.8		14.a	15.8		
		3.9								11.b			14.b	15.9		
													14.c	15.a		
														15.b		
														15.c		

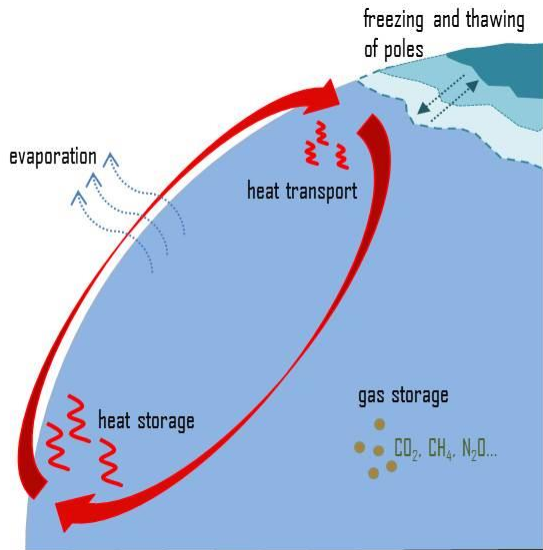
**Figure 1** Table listing the sustainable development goals with those targets highlighted, which both relate to the natural environment of oceans and coasts and express commitments to take certain actions concerning oceans and coasts (Source: Milligan & Mohammed, 2016).<sup>6</sup>

### Oceans and coasts in the climate system

The oceans and coasts comprise important ecosystems which provide a complex array of invaluable biophysical goods and services which are essential for the survival, health, well-being and the development of people. These ecosystems present a significant source of food provisioning through fisheries and aquaculture, host a yet uncounted plenitude of biodiversity and provide many medicines. Furthermore, the oceans have the overall function of acting as a global oxygen source/carbon sinks as well as global climate regulators. The oceans store vast amounts of heat as well as various greenhouse gases acting as a buffer against a warming

atmosphere. Warm water currents flowing from the equator to the poles allow for global heat exchange. The land gets its water supply from evaporated sea water (Fig.2).

Thus oceans and coasts provide vital services to people and the environment which are, in their entirety, simply irreplaceable. This makes healthy oceans and coasts an extremely valuable capital asset and of prime concern for conservation. Due to their prominent role in the global climate system oceans and coasts can play key roles for finding nature-based solutions for climate mitigation and adaptation.



**Figure 2** Ocean interactions with the global climate system. The oceans store significant amounts of heat and can act as a buffer against a warming atmosphere; Heat is transferred through warm water currents from the equator to the poles; Significant quantities of different potential greenhouse gases are stored in the oceans; Evaporated water from the oceans supplies the land with rain water; At the poles sea water undergoes cyclical freezing and thawing.

If sustainably restored and sufficiently protected, marine and coastal ecosystems will be able to play a prominent role in achieving the sustainability goals for coastal nations around the globe. Many countries have already started to include coastal and marine solutions into their climate change adaptation and mitigation plans<sup>7</sup>, and are making sure that sectoral plans on fisheries or Marine Protected Areas include climate “proofing” efforts.

### Nature-based solutions to support sustainable development

#### Coastal mitigation

Coastal ecosystems sequester and store huge amounts of carbon from our atmosphere, and are often referred to as blue carbon ecosystems. Coastal wetlands draw in carbon as they grow and transfer much of this into the rich organic soils held by their roots.<sup>8</sup> Unlike terrestrial soils, the soils of blue carbon ecosystems are largely anaerobic (without oxygen). This means that the carbon incorporated into the soils decomposes very slowly and can be stored for hundreds or even thousands of years.<sup>9</sup> Additionally, high salinity in many blue carbon systems reduces methane production, a potent greenhouse gas.<sup>10</sup>

Unlike their terrestrial and freshwater counterparts, blue carbon systems do not become saturated with carbon because sediments accrete vertically in response to the rising sea level, if ecosystem health is maintained.<sup>11</sup> Therefore, the rate of carbon sequestration and the size of the carbon sink may continue to increase over time.

#### Ocean mitigation

Marine ecosystems and species in other near shore, open ocean or deep sea environments (i.e., corals, kelp, plankton and marine fauna) play a substantial role in the carbon cycle, although they only store carbon temporarily. Only a healthy and sustainably managed ocean can continue to maintain its capacity to support the carbon cycle and to act broadly as a carbon sink.<sup>12</sup>

#### Coastal and marine adaptation

Climate change can strongly impact the flora and fauna of marine and coastal environments as well as the people relying on their services. Well-functioning coastal and marine ecosystems provide resources for subsistence and commercial fishing, purify water and air, attract tourists, and provide cultural inspiration. Coastal and ocean related economic activities are therefore highly vulnerable to changing seas. Furthermore, coastal ecosystems play a unique role in protecting coastlines from the increasing impacts of climate change by absorbing incoming wave energy and providing storm

surge protection, as well as preventing erosion. Hence, the conservation of healthy coastal and marine ecosystems and the restoration of degraded systems are not only key to supporting the adaptation of its flora and fauna but the local people and big businesses which rely on them.

### **The blue foundations of sustainable development – climate actions**

The 2030 Agenda places primary responsibility for taking such action on national governments, who have committed to working in partnership with other stakeholders, and with other governments in the many contexts where management of marine and coastal environments transcends national boundaries.<sup>13</sup> Evidence suggests that such efforts are proliferating around the world, on two main fronts:

**(1) Management measures for climate benefits of blue natural assets** – these include better planning of economic and infrastructure development,<sup>13</sup> protection and spatial management of marine and coastal environments to enhance adaptation benefits (shoreline protection) as well as support climate mitigation efforts (carbon sequestration),<sup>14,15</sup> and use of carbon and climate finance and incentives to encourage more sustainable marine and coastal management.<sup>16</sup>

The revision of existing national coastal and marine conservation strategies provides an opportunity to enhance policies and management activities which recognise the value of these ecosystems for adaptation and mitigation to climate change. MPAs can spearhead holistic responses to the management challenges of achieving sustainable development and biodiversity conservation alongside climate change adaptation and mitigation.

**(2) Enabling conditions for good management** – including capacity building and efforts to reform laws, policies and institutions, relating to: marine and coastal rights, responsibilities and decision-making,<sup>17</sup> measurement, assessment and accounting for blue natural assets (especially for adaptation and mitigation),<sup>18</sup> frameworks that connect and leverage diverse sources of carbon and climate finance across public, private and third sectors,<sup>16,19</sup> and more equitable allocations of socio-economic benefits flowing from the role of marine and coastal environments for climate change mitigation (carbon credits) and adaptation (cost-savings).<sup>20,21,22</sup>

### **Challenges, opportunities and next steps**

Marine and coastal ecosystems and the valuable goods and services they provide are being continuously and rapidly degraded as a result of pollution, overfishing, climate change, habitat destruction, and other factors.<sup>23</sup> Many of the benefits and opportunities provided by oceans and coasts are being missed or lost.<sup>24</sup> Despite considerable progress, the efforts for recognising and conserving the ecosystems currently fall far short of the level of change required to achieve the 2030 Agenda's vision of sustainable development. This challenge prevails in most countries and globally.

How can national governments work with other actors to accelerate progress towards sustainable development of oceans and coasts? Two key domains of action that can be pursued immediately and in the long term are

**(1) Connect knowledge and develop national strategies concerning the use of blue natural assets for climate action** – In many countries there are opportunities to connect diverse clusters of knowledge and to establish coordinated national strategies concerning

oceans and coasts, in a coherent manner oriented to supporting national climate adaptation and mitigation goals.

**2) Develop national strategies for blue climate change action** – Many coastal countries are working to establish coordinated national strategies for ocean-based economic development.

Countries can also benefit from outlining coastal adaptation and mitigation in the broader national blue sustainable development policy – as well as ensuring the blue sustainable development aspects are considered in relevant climate efforts. Existing guidance, ongoing knowledge exchange and learning can help find the adequate mechanisms and means for each country.<sup>25</sup> The value of, for example, mangroves can be recognized, managed, protected or restored through a variety of legal, policy or other financial mechanisms.<sup>26 27 28</sup>

Adaptation strategies, including National Adaptation Plans and Programmes of Action, as well as mitigation efforts such as REDD+<sup>ii</sup> and NAMAs<sup>iii</sup>, provide opportunities to use multi-use conservation efforts (including protection) as an implementation tool for ecosystem-based adaptation and mitigation. National climate change plans and strategies for coastal states are well positioned to recognize the use of MPAs or other area-based management for ecosystem-based adaptation and mitigation as a “no-regret” climate change strategy. Processes like Integrated Coastal Zone Management (ICZM) and Marine Spatial Planning (MSP)<sup>iv</sup> can be

<sup>ii</sup> Reducing emissions from deforestation and forest degradation and the role of conservation, sustainable management of forests and enhancement of forest carbon stocks in developing countries

<sup>iii</sup> National Appropriate Mitigation Actions

<sup>iv</sup> MSP is a process that brings together multiple users of the ocean – including energy, industry,

used to meet the wider management challenges of achieving sustainable development and biodiversity conservation while contributing to sustainable development.

If sustainably restored and managed, as well as sufficiently protected, marine and coastal ecosystems will be able to play a prominent role in achieving the sustainability goals beyond Goal 14. The synergies and linkages with the overall climate agenda and Goal 13 are evident. The progress on including coastal and marine solutions into national climate change adaptation and mitigation plans<sup>29</sup> linked to a broader social and economic development agenda need to continue in a programmatic, holistic and inclusive manner.



government, conservation and recreation – to make informed and coordinated decisions about how to use marine resources sustainably.

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<sup>1</sup> See Transforming our world: the 2030 Agenda for Sustainable Development, UN General Assembly (UNGA) Resolution A/RES/70/1, 25 September 2015, [www.un.org/en/documents/](http://www.un.org/en/documents/).

<sup>2</sup> See Millennium Ecosystem Assessment, 2005, Ecosystems and Human Well-being: Synthesis, [www.millenniumassessment.org](http://www.millenniumassessment.org); S Díaz et al, The IPBES Conceptual Framework – connecting nature and people (2015) doi:10.1016/j.cosust.2014.11.002; K Brown et al, Ecosystem Services for Poverty Alleviation: Marine & Coastal Situational Analysis, Synthesis Report (2008), Ecosystem Services for Poverty Alleviation Initiative, [www.espa.ac.uk](http://www.espa.ac.uk).

<sup>3</sup> See the personal accounts on 'SDGs History' compiled by the Overseas Development Institute, [www.deliver2030.org](http://www.deliver2030.org); Sustainable Development Knowledge Platform (SDKP) Documents Library, [ustainabledevelopment.un.org/resources/documents](http://ustainabledevelopment.un.org/resources/documents).

<sup>4</sup> See UN Foundation, Process feeding into the Post-2015 Development Agenda, [www.unfoundation.org/assets/pdf/post-2015-process-slide-1114.pdf](http://www.unfoundation.org/assets/pdf/post-2015-process-slide-1114.pdf).

<sup>5</sup> Quoted from paragraph 32 of the 2030 Agenda.

<sup>6</sup> [https://www.researchgate.net/publication/307205479\\_The\\_Blue\\_Foundations\\_of\\_Sustainable\\_Development](https://www.researchgate.net/publication/307205479_The_Blue_Foundations_of_Sustainable_Development)

<sup>7</sup> Herr, D. and Landis, E. (2016). *Coastal blue carbon ecosystems. Opportunities for Nationally Determined Contributions. Policy Brief*. Gland, Switzerland: IUCN and Washington, DC, USA: TNC.

<sup>8</sup> US Environmental Protection Agency. Greenhouse Gas Equivalencies Calculator. Last updated on September 15, 2016. Accessed on October 14, 2016 <https://www.epa.gov/energy/greenhouse-gas-equivalencies-calculator>

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<sup>14</sup> See International Union for Conservation of Nature (IUCN) Guidelines for Applying the IUCN Protected Area Management Categories to Marine Protected Areas, 2012, [www.iucn.org](http://www.iucn.org); P Jones, Governing Marine Protected Areas: Resilience through diversity, 2014, ISBN 9781844076635; JS Collie et al, Marine Spatial Planning in Practice, *Estuarine* (2013) doi:10.1016/j.ecss.2012.11.010; GJ Edgar et al, Global conservation outcomes depend on marine protected areas with five key features (2014) doi:10.1038/nature13022.

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