



An inter-agency paper towards the preparation of the  
**UN Conference on Sustainable Development (Rio+20)**

a  
**blueprint**

FOR **ocean** AND **coastal** SUSTAINABILITY

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**RIO+20**  
United Nations  
Conference on  
Sustainable  
Development



# A **blueprint** FOR **ocean** AND **coastal** SUSTAINABILITY

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**UN Conference on Sustainable Development (Rio+20)**



About the UN agencies and programmes that contributed to this report:



### **Intergovernmental Oceanographic Commission of UNESCO (IOC/UNESCO)**

UNESCO's Intergovernmental Oceanographic Commission (IOC), established in 1960, promotes international cooperation and coordinates programmes in marine research, services, observation systems, hazard mitigation, and capacity development in order to understand and effectively manage the resources of the ocean and coastal areas.

By applying this knowledge, the Commission aims to improve the governance, management, institutional capacity, and decision-making processes of its 142 Member States with respect to marine resources and climate variability and to foster sustainable development of the marine environment, in particular in developing countries. The Commission responds, as a competent international organisation, to the requirements deriving from the United Nations Convention on the Law of the Sea (UNCLOS), the United Nations Conference on Environment and Development (UNCED), and other international instruments relevant to marine scientific research, related services and capacity-building



### **International Maritime Organisation (IMO)**

IMO is the United Nations (UN) specialised agency with responsibility for the safety and security of shipping and the prevention of marine pollution by ships. International shipping is the carrier of world trade, transporting around 90% of global commerce.

Being an international industry shipping needs a global regulatory framework in which to operate. IMO, with its 170 Member States, provides this framework and has adopted 52 treaties regulating virtually every technical aspect of ship design and operation, the most important of which – concerning the safety of life at sea and the protection of the environment – today apply on 99% of the world's merchant fleet.

IMO adopts international shipping regulations but it is the responsibility of Governments to implement those regulations. IMO has developed an Integrated Technical Co-operation Programme (ITCP) designed to assist Governments which lack the technical knowledge and resources needed to operate a shipping industry safely and efficiently.



### **Food and Agriculture Organization of United Nations (FAO)**

Achieving food security for all - to make sure people have regular access to enough high-quality food to lead active, healthy lives – is at the core of all FAO activities, including for fisheries and aquaculture. FAO's mandate is to raise levels of nutrition, improve agricultural productivity, better the lives of rural populations and contribute to the growth of the world economy.

Fisheries and aquaculture have the capacity – if supported and developed responsibly – to contribute significantly to improving the wellbeing of poor and disadvantaged communities. The vision of FAO for these sectors is a world in which responsible and sustainable use of fisheries and aquaculture resources makes an appreciable contribution to human well-being, food security and poverty alleviation. The FAO Fisheries and Aquaculture Department, in particular, aims to strengthen global governance and the managerial and technical capacities of members and to lead consensus-building towards improved conservation and utilisation of aquatic resources.



### **United Nations Development Programme (UNDP)**

UNDP is the United Nations' global development network, an organisation advocating for change and connecting countries to knowledge, experience and resources to help people build a better life. UNDP is on the ground in 177 countries, working with them on their own solutions to global and national development challenges. As they develop local capacity, they draw on the people of UNDP and its wide range of partners.

Through its Ocean and Coastal Governance Programme, UNDP is working in cooperation with many other UN agencies, the Global Environment Facility, international financial institutions, regional fisheries organisations and others to improve oceans management and sustain livelihoods at the local, national, regional and global scales through effective oceans governance. Through its Large Marine Ecosystems Programme, UNDP-GEF is supporting ecosystem-based approaches to marine resource management in over ten of the world's Large Marine Ecosystems.

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# 1

# introduction

**Sha Zukang, Under-Secretary-General for Economic and Social Affairs and UNCSD Secretary-General, recently stated that the ocean is Earth's most threatened ecosystem, and noted that a 'Blue Economy' approach was emphasised during the second session of the UNCSD Preparatory Committee in March 2011 – this will fit with the twin focus of Rio+20. The objectives of the UN Conference on Sustainable Development will be to:**

- **Secure renewed political commitment for sustainable development**
- **Assess the progress to date and the remaining gaps in the implementation of the outcomes of the major summits on sustainable development**
- **Address new and emerging challenges**

## INTRODUCTION

The ocean is an integral part of our planet, and is an absolutely essential component of human lives, livelihoods and the environment that sustains us. Use of ocean space and resources has been an essential component of global economic growth and prosperity.

The concepts and objectives of 'sustainable development' and 'Green Economy' make sense only if the ocean is fully incorporated. Sustainable development is defined as "development that meets the needs of the present without compromising the ability of future generations to meet their own needs." Sustainable development is the approach recognised by the international community to deal with environmental, social and economic issues the world has faced in the past 20 years. Nevertheless we still find the ocean in peril, coastal communities unable to cope with existing and emerging issues, and all levels of government unable to effect the institutional change required to address these issues.

### ***j) Background, Problems and Opportunities***

Since the early 1970's with the Brundtland Report and following with UNCLOS, Chapter 17 of Agenda 21 and the World Summit on Sustainable Development in Johannesburg (the Johannesburg Plan of Implementation, JPOI), major global initiatives have advanced principles, goals, timelines and targets for managing the issues facing the ocean and coasts, and the living and non-living resources therein. Despite this long list of aspirations cutting across the environmental, social and economic pillars of sustainable development, progress

has been very limited in many of the priority areas, some of which are new whilst others are emerging. Problems, for example, include the fact that very little of the world's ocean is monitored or protected; coastal habitats continue to be lost or degraded; the majority of global fish stocks are under pressure; invasive species are expanding;

hypoxic zones are increasing; the ocean is acidifying; sea level is rising. Technological advances and the impact of climate change, as well as increased intensification of human development have also driven major increases in the nature, and scale of challenges facing ocean and coastal areas. Ocean services are being subjected to human activity that is having a measurable impact in reducing ocean productivity. A reduction can also be attributed to global climate warming that is increasing ocean stratification and reducing nutrient mixing, thereby reducing the natural productivity services that can lead to significantly diminished food security from fisheries, particularly in the warmer latitudes around the globe. It is within these latitudes (tropical and sub-tropical) that evidence from a Global Ocean Observing System (GOOS) and Large Marine Ecosystem (LME) assessments is already showing significant warming trends, for which model projections from the years 2040 to 2060 forecast a steady decline in ocean productivity.<sup>1</sup>

There are emerging opportunities for the global community to enhance the contribution of the oceans to sustainable

<sup>1</sup> Boyce D.G., M. R. Lewis & B. Worm. (2010). Global phytoplankton decline over the past Century. *Nature*, doi:10.1038/591-596



development, increase recognition of the concept of a Green Economy (and its relationship to the three pillars of sustainability sustainability and more equitable distribution of benefits from ocean resources), renewable blue energy, genetic bio-resources, ecosystem services, and the ocean's place in the Earth system, to name a few. Existing industries are playing a key role in the identification of emerging opportunities, such as the expansion of aquaculture in scale and to deeper areas, or the efforts of the shipping industry to reduce its climate footprint. Sound science in the execution of the Rio and Johannesburg objectives, and in informing decision making processes is critical at all scales of sustainable development.

### **ii) Aim of the report**

The aim of this Report is to provide context for Rio+20 discussions through analysis of current challenges in ocean and coastal management around the world, assessment of how well the multiple goals and objectives of previous international efforts have been met, and building on recent dialogue and inputs including the meeting of the UN Informal Consultative Process on Oceans and the Law of the Sea (UNICPOLOS) and the Secretary General's report on Oceans and Law of the Sea. The above mentioned issues are presented in Sections One to Four of the Report.

Importantly, this Report presents a number of tangible proposals towards ocean sustainability that should be regarded as priorities for consideration in the Rio+20 outcomes (Section Five). Each is assessed against the three pillars of sustainable development (environmental, social and economic), a range of cross-cutting issues, as well as the dual focus of Rio+20: Green Economy and institutional framework for sustainable development. In the lead-up to

Rio+20, considerable momentum is building to ensure that ocean and coastal management challenges and innovative strategies are incorporated in the new sustainable development approaches that will emerge from Rio+20. This Report is a product of several UN agencies and programmes (IOC/UNESCO, UNDP, IMO, and FAO) and has benefited from comments from a range of ocean stakeholders, including the World Bank, the Global Ocean Forum, the Pew Foundation, and the World Ocean Council as well as a number of dedicated experts.

This Report also responds to the United Nations General Assembly (UNGA) Resolution (A/RES/64/236) of 31 March 2010 which *inter alia* "... invites relevant stakeholders, including organisations and bodies of the United Nations (UN), international financial institutions and major groups involved in the area of sustainable development, to provide ideas and proposals reflecting their experiences and lessons learned as a contribution to the preparatory process". Recognising that Rio+20 is a country led-process, the purpose of this Report is to contribute to the international debate on oceans and gather expert opinion and analysis on a number of options that nations could consider in their preparation towards Rio+20 and beyond.

In this Report, the term 'Blue-Green' Economy is used to refer to the transition toward a human-ocean centered relationship where humankind would be "living with the ocean and from the ocean in a sustainable way"<sup>2</sup>. It is also understood that this concept integrates its two dimensions— that of provision of goods and services as well as that of destruction of human property and life.

<sup>2</sup> Definition from Dr Awni Behnam, President IOI

## objective 1

Actions to reduce stressors and maintain or restore the structure and function of marine ecosystems for equitable and sustainable use of marine resources and ecosystems.

- 1.a Implement Actions to Adapt to and Mitigate Ocean Acidification
- 1.b Develop and Execute a Global Program aimed at Greater Protection and Restoration of Vital Ocean and Coastal Habitats, and develop a Global Blue Carbon Market as a means of Creating Direct Economic Gain through Habitat Protection
- 1.c Strengthen the Legal Framework to Effectively Address Aquatic Invasive Species



## objective 2

Actions that support the Green Economy concept leading to alleviation of poverty and promotion of sustainable ocean sectors and livelihoods including actions to improve implementation at local levels through participatory processes.

- 2.a Build Green Societies in Small Island Developing States: Addressing Key Vulnerabilities
- 2.b Increase Efforts for Responsible Fisheries and Aquaculture in a Green Economy
- 2.c Green the Nutrient Economy and Reduce Ocean Hypoxia through Policy, Regulatory and Economic Instruments that Promote Nutrient Efficiency and Recovery





## objective 3

Actions resulting in Policy, Legal and Institutional Reforms for effective Ocean Governance, including in the High Seas, and strengthening the institutional framework, mandate and coordination of UN bodies with marine competencies.

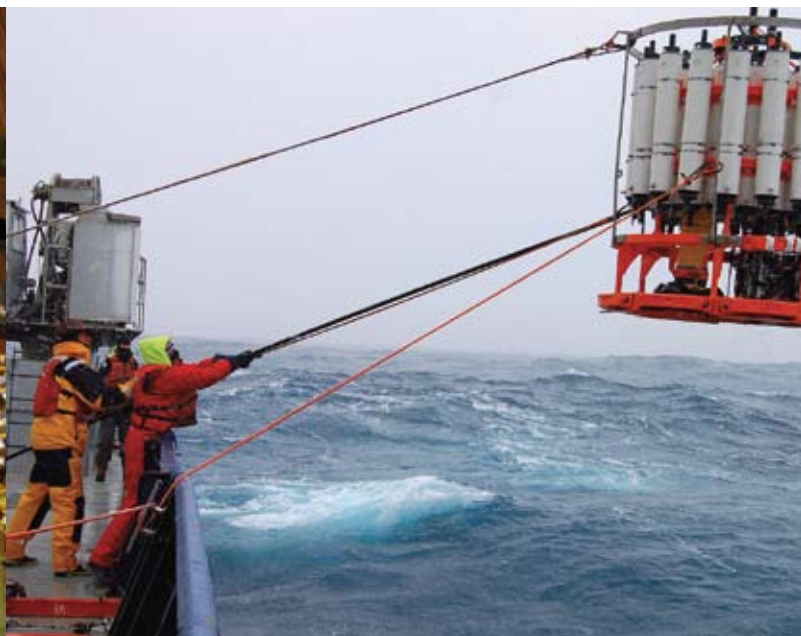
- 3.a Create and Implement an Institutional and Legal Framework to Protect Habitats and Biodiversity Beyond National Jurisdiction
- 3.b Reform Regional Ocean Management Organisations
- 3.c Enhance Coordination, Coherence and Effectiveness of the UN System on Oceans Issues



## objective 4

Actions supporting marine research, monitoring and evaluation, technology and capacity transfer as a mean for improving knowledge, addressing emerging issues, developing capacities in support of sustainable use of the ocean

- 4.a Increase Institutional and Human Capacity for Sustained Observations, Monitoring, Marine Research, and Progress evaluation of International commitments



# 2

## THE importance OF THE ocean TO global SUSTAINABILITY

**Climate change and ocean acidification do not operate in isolation but are impacting the marine environment in multiple interactive ways. Ocean acidification, for example, increases the sensitivity of corals to thermal stress, with coral bleaching occurring at lower temperatures when exposed to lower pH.**

Maintaining the quality of life that the ocean has provided to humankind while sustaining the integrity of ocean ecosystems, requires changes in how we view, manage, govern and use ocean resources and coastal areas. Ocean and coastal areas provide many benefits to sustainable development, including both human (social and economic) and environmental (ecosystem services). This includes benefits to economic sectors such as fisheries, energy, tourism, and transport/shipping, as well as 'non-market' benefits such as climate regulation, carbon sequestration, habitat and biodiversity, among many others. The scale and intensification of the stresses on the ocean mean that deferring action will increase costs in the future leading to even greater losses of benefits. Many traditional economic and consumer values that formerly served society well, when coupled with current rates of population increase and economic growth, are not sustainable.

The fragile and interconnected nature of ocean ecosystems and human activities has in recent decades become readily apparent. From climate change and its diverse impacts on oceans, through to the destruction of and damage to marine ecosystems, the loss of biodiversity and the degradation of the natural environment, including from over-fishing and destructive fishing, human impact on the ocean has been profound. One recent estimate found that at least 40% of the global oceans are 'heavily affected' by human activities. This has a direct impact on sustainable development, with the majority of human settlements located on or near the coasts. Hundreds of millions of people depend on the quality of the marine environment and the availability of

living marine resources for their wellbeing. Poor and marginalised people are usually directly dependent on environmental services, such as local fisheries and other food sources, employment from coastal tourism, coastal forests for

fuel etc., and the steady degradation of the natural resource base therefore impacts their lives and livelihoods disproportionately.

The ocean, once thought to be a vast, resilient area able to absorb practically unlimited waste and withstand increasing human population, fishing and shipping pressures, is increasingly vulnerable. 60% of the world's major marine ecosystems that underpin livelihoods have been degraded or are being used unsustainably<sup>3</sup>. Economic growth related to oceans in recent decades has been accomplished mainly through unsustainable exploitation of many marine resources. In the case of fisheries, such growth has commonly not allowed fish stocks or habitats to regenerate resulting in widespread ecosystem degradation and habitat and biodiversity loss.

In addition to the contribution of the ocean to economic development and the provision of key ecosystem services, the ocean drives change and variability in the climate system, influencing rainfall and desertification even far from coasts. Global sustainability and stewardship will need to be underpinned by good understanding and monitoring of the global ocean.

<sup>3</sup> UNEP (2011). *Towards a Green Economy: pathways to sustainable development and poverty eradication (a synthesis for policy makers)*, United Nations Environment Programme

## 2.1 OCEAN PROVIDES LIVELIHOODS AND A PLACE TO LIVE

Ocean and coastal areas are major contributors to the global economy and fundamental to global wellbeing;

through direct economic activities, provision of environmental services, and as home to the majority of the world's population. Table 1 presents some facts that illustrate the importance of the ocean and its habitats, and the human population that depends on them.

**Table 1:** Importance of the Ocean as a Life-Support System for Human Societies

IMPORTANCE / ISSUES	
Communities	
Territories & Settlements	<p>More than 40% of the world's population (more than 2.8 billion people) live within 100 kilometres of the coast. Rapid urbanisation will lead to more coastal mega-cities containing 10 million or more people. Thirteen of the world's 20 megacities lie along coasts and nearly 700 million people live in low lying coastal areas less than ten metres above sea level.</p> <p>In Asia, the coastal mega-cities of Chennai (2005: population 6.9 million), Dhaka (12.4 million), Karachi (11.6 million), Calcutta (14.3 million) and Mumbai (18.2 million) are located only a few metres above sea level. One quarter of Africa's population is located in resource-rich coastal zones and a high proportion of gross domestic product (GDP) is exposed to climate influenced coastal risks.</p> <p>In West Africa, the 500 kilometres of coastline between Accra (Ghana) and the Niger delta (Nigeria) is expected to become a continuous urban megalopolis of more than 50 million inhabitants by 2020. In North Africa, the Nile Delta is one of the most densely populated areas of the world and is highly vulnerable to sea-level rise. It is estimated that by 2050, adverse effects associated with global climate change will result in the displacement of between 50 and 200 million people globally.</p>
Small Island Developing States (SIDS)	<p>SIDS are among the most vulnerable nations to changing climate and ocean and coastal degradation. Activities within the ocean and coastal sector in SIDS are important sources of income and foreign exchange. For example, in the Seychelles, coastal tourism contributes 46 to 50% of GDP, 70% of foreign income and employs 20% of the population. In Cape Verde, tourism is the most important economic resource. In Pacific SIDS, fishing can provide between 30 and 80% of exports and GDP – an advantage of the very large Exclusive Economic Zones (EEZs) and the economic values they are able to capture; e.g. transboundary and highly migratory fisheries such as the tuna fishery.</p> <p>In the Caribbean and Pacific islands, more than 50% of the population lives within 1.5 kilometres of the coast. Almost without exception, international airports, roads and capital cities in the small islands of the Indian and Pacific Ocean and the Caribbean are sited along the coast, or on tiny coral islands. The tsunami of December 2004 in the Indian Ocean caused massive loss of life, severe damages to the physical infrastructure of many small islands estimated at USD 470 million, amounting to 62% of the GDP in the Maldives.</p>
Economic Activities (main 4 sectors)	
Fisheries & Aquaculture	<p>In 2009, capture fisheries and aquaculture production was approximately 145 million tonnes, of which marine capture production was 78.6 million tonnes. Almost 81%, or 118 million tonnes, of world fish production was destined for human consumption and provided about 4.2 billion people with more than 15% of their average per capita intake of animal protein.</p> <p>Fish used for human consumption grew by more than 90 million tonnes in the period 1960-2009 (from 27 to 118 million tonnes). The share of fishery and aquaculture production entering international trade increased from 25% in 1976 to about 39% in 2009. In 2008 the value of world exports reached a record value of USD 102 billion, declining by 6% in 2009. Aquaculture now provides 47% of global fish used for human consumption and has been the fastest growing food sector for many years.</p> <p>Employment in fisheries and aquaculture has grown substantially in the last three decades, with an average rate of increase of 3.6% per year since 1980. In 2008, 44.9 million people were employed in capture fisheries or in aquaculture, at least 12% of whom were women. For each person employed in capture fisheries and aquaculture production, approximately three jobs are produced in secondary activities, with an estimated total of more than 180 million jobs in the entire fish industry. Employment in the fisheries and aquaculture sectors has grown faster than the world's population and faster than employment in traditional agriculture.</p>

**Table 1: Importance of the Ocean as a Life-Support System for Human Societies**

<p>Tourism</p>	<p>While the growth of tourism has been accompanied by significant challenges – for instance, in terms of Greenhouse Gas (GHG) emissions, water consumption, discharge of untreated water, waste generation, damage to local terrestrial and marine biodiversity, and threats to the survival of local cultures and traditions – tourists are driving the greening of the sector, as seen by the recent 20% annual growth rate enjoyed by ecotourism; about six times the industry- wide rate of growth.</p> <p>Travel and tourism are human-resource intensive, employing 230 million people or 8% of the population of developing countries, and it is estimated that one job in the core tourism industry creates about one and a half additional or indirect jobs in the tourism-related economy. In the Seychelles, coastal tourism contributes 46 to 50% of GDP, 70% of foreign income and employs 20% of the population. In Cape Verde, tourism is the most important economic resource. The downside of tourism which many coastal nations are pursuing as the ‘engine of growth’ includes capital intensive infrastructure, inadequate services for waste disposal and inadequate enforcement of environmental or coastal regulations on construction and waste minimisation, placing serious pressures on the near shore marine ecosystem. Tourism has also frequently been found to displace local people from their livelihoods while others benefit from the new activity. This reinforces the need for sound planning, regulation and enforcement.</p>
<p>Ports &amp; Infrastructure/ Maritime Transport</p>	<p>Ports and associated infrastructure provide significant employment and economic benefits to local areas, and also act as the hub for the majority of incoming and outgoing ocean commerce. International shipping transports more than 90% of global trade and is therefore a crucial underpinning of sustainable development. Both developing and developed countries benefit from seaborne trade. The nature of shipping is such that developing countries can and do become major participants in the industry itself generating income and creating wealth by so doing. Short-sea-shipping, which encompass the movement of cargo and passengers mainly by sea, without directly crossing an ocean, could play a vital role in developing countries’ future transport systems by creating low carbon supply chains and Green Economy jobs. The development of short-sea-shipping can help to reduce the growth of road transport, establish a balance between modes of transport, bypass bottlenecks and contribute to green transports as well as improved safety and have general positive effects on human health and local ecosystems.</p> <p>Measures adopted by IMO, or under development, have put shipping companies and the industry in general under increasing scrutiny and have increased expectations regarding reduction of ships’ emissions, including GHGs, prevention of the spread of invasive species through ballast water and hulls, and decreased pollution from ships. While the contribution of shipping to GHG emissions is only 2.7% at present, rapid growth of the global economy including exports means this proportion is increasing relative to many other sources. In July 2011, IMO formally adopted treaty obligations to reduce GHG emissions from international shipping.</p>
<p>Energy</p>	<p>In 2009, offshore fields accounted for 32% of worldwide crude oil production. It should rise to 34% in 2025 (that is, 23 million barrels per day)<sup>4</sup>. There are 14,000 deep water wells (&gt; 1000 ft) drilled around the world, and over 4,000 wells drilled in the Gulf of Mexico at all depths. New technologies will allow greater exploitation of oil and gas at increasing depths in the future. Oil spills from oil tankers operating at sea world-wide account for only 7.7% of oil entering the marine environment.</p> <p>Marine energy technologies which exploit the energy of the tides, waves and currents of the sea, as well as temperature and salinity gradients, for the generation of electricity is an emerging source of renewable energy that in principle, exists in all the world’s regions. It is however exploitable in practice only at sites that are close to demand centres and where, at the same time, damage to local ecosystems can be contained. As a result, marine technologies are the least developed of the renewable energy technologies and would require much further research and public investment to become cost-efficient and scalable.</p> <p>Offshore wind on the other hand will be a major influence on future renewable energy development. As of October 2010, 3.16 gigawatts of offshore wind power capacity was operational, mainly in Northern Europe. More than 16 gigawatts of additional capacity will be installed before the end of 2014 and the UK and Germany will become the two leading markets. Offshore wind power capacity is expected to reach a total of 75 gigawatts worldwide by 2020, with significant contributions from China and the US. The ever increasing demand for marine space to accommodate energy as well as other uses will require the establishment of planning and zoning processes such as marine spatial planning within nations’ EEZ.</p>

<sup>4</sup> IEA (2010), World Energy Outlook. Paris: OCDE/IEA.



**Table 1:** Importance of the Ocean as a Life-Support System for Human Societies

Ecosystem Services	
Biological Services	In addition to producing half of the oxygen in the earth's atmosphere, marine phytoplankton produce the organic matter that determines the carrying capacity of the ecosystem which sustains the food web up to fish and marine mammals, and ultimately human consumption. Biodiversity and habitat protection and restoration are of fundamental importance to maintaining resilience of ocean ecosystems.
Regulating services	<p>57% of atmospheric carbon captured by living organisms is captured by marine organisms, and of this between 50 and 71% is captured by the ocean's vegetated habitats including mangroves, salt marshes, sea grasses and seaweed, so-called blue forests, which cover less than 0.5% of the seabed<sup>5</sup>.</p> <p>Currently the ocean absorbs more than 26% of the carbon dioxide emitted to the atmosphere from human activities, resulting in increased acidity of the ocean. Oceans play a key role in atmospheric and climate regulation, while coastal areas provide flood protection, and erosion control for low lying communities, and act as a sink for waste and nutrient disposal. With climate change, a warmer ocean would tend to evaporate more water vapour into the air and to warm the atmosphere, increasing air temperature gradients and, consequently winds. In turn, winds push horizontally against the sea surface and, in combination with the Coriolis effect due to the earth's rotation, drive ocean surface current and upwelling patterns. In parallel, differences in the density of surface waters (driven by the balance between precipitation, run-off, and evaporation), drive the vertical or 'thermohaline' circulation of the deeper oceans. Through this ocean circulatory system, the oceans and atmosphere distribute heat and regulate global climate. Sustained observations of ocean climate change and variability will provide insight into the future climate factors underpinning local sustainable development all over the globe, including far from the coast.</p>
Cultural and aesthetic services	Coastal areas and marine resources are of substantial cultural and historic significance to the communities that inhabit and use them. In developing countries and SIDS, they sometimes provide not only the main sources of food, including protein and important nutrients from fish, but have been providing settlement areas for millennia for many communities in developing countries and SIDS. The aesthetic benefit of coastal areas and marine resources provides corresponding tourism benefit in many cases, and although difficult to value in economic terms, is the basis upon which some tourism is founded.

## 2.2. KEY ISSUES AFFECTING OCEAN SUSTAINABILITY

### i) Unsustainable Fishing

There are many inter-related issues affecting the sustainability of fisheries, including overcapacity in fishing fleets and a related increase in illegal, unregulated and unreported (IUU) fishing, a failure to take into consideration ecosystem effects of fishing into management plans (e.g.

bycatch, discards, destructive fishing practices), lack of incentives-based management, weak monitoring, control and surveillance capacity and inability and/or unwillingness to accept short-term costs for long-term benefits. The continuing contribution of fisheries to sustainable development depends on the health of functioning, productive ecosystems and on their optimal utilisation. The proportion of marine fish stocks estimated to be underexploited or moderately exploited declined from 40% in the mid-1970s to 15% in 2008, and the proportion of overex-

<sup>5</sup> Nellmann, C., Corcoran, E., Duarte, C. M., Valdés, L., De Young, C., Fonseca, L., Grimsditch, G. (Eds). (2009). Blue Carbon. A Rapid Response Assessment. United Nations Environment Programme, GRID-Arendal, [www.grida.no](http://www.grida.no)



exploited, depleted or recovering stocks increased from 10% in 1974 up to 32% in 2008<sup>6</sup>. Subsidies were estimated to be between USD 10-30 billion per year, 10 to 13% of the total value of world capture fisheries. The benefits lost to fishing nations as a consequence of overfishing are in the order of USD 50 billion per annum. Fisheries are critical to developing states for food security, as income and livelihoods of local communities and social and cultural importance.

The need for improvements in ocean and fisheries governance has been widely recognised in international fora such as the FAO Committee on Fisheries<sup>7</sup> and expert scientific meetings, in particular, the adoption and implementation of integrated, ecosystem-based approaches, relying on the best available science, adopting a precautionary approach, and the removal of subsidies that encourage overfishing.

Coastal fish farming is increasing and will continue to increase and expand in the marine environment as the demand for food fish increases and as freshwater becomes more limited. Mariculture with fed species, if not managed properly, could impact on biodiversity and ecosystem functions through the release of nutrients beyond the recycling capacity of ecosystems and through the release of farmed species, diseases and chemicals. The improvement in, and expansion of, green technologies for mariculture together with adoption of an ecosystem approach to aquaculture that includes identification and management of risks, can ensure sustainable increase in fish production from the seas.

### **ii) Climate Change and Ocean Acidification**

Climate change and variability and its impacts on sea level rise, ocean warming and stratification, and increased vulnerability to natural hazards expose coastal areas to increased risk and increasingly threaten biodiversity and ocean ecosystem services. Sea-level rise from climate change is projected not only to expose coastal areas to increased risks, including coastal erosion and flooding, but also to cause loss of habitat and livelihood for people.

Rising sea levels could make entire areas, even nations, uninhabitable or much more vulnerable. Coastal populations are often disproportionately vulnerable to ocean-related natural disasters including tsunamis, floods, and tropical cyclones. Many lose their homes, property and livelihoods. Most suffer from food insecurity and become vulnerable to malnutrition and disease.

Given that over a third of the world's population lives in coastal zones within 100 kilometres of the shore, the effects of coastal flooding on human settlements could be highly disruptive. According to the Intergovernmental Panel on Climate Change (IPCC), many millions more people are projected to be flooded every year due to sea-level rise by the 2080s. The significant challenge for this century is how to both mitigate and adapt to the impacts of climate change since such impacts are now inevitable even if aggressive action is taken in the near term to mitigate

## **Resilience of the ocean to climate change impacts is severely compromised by the other stressors from human activities, including fisheries, pollution, invasive species and habitat destruction.**

GHG emissions. The productivity and distribution of fishery resources is already changing in some areas and this will continue with serious disruption to fisheries and aquaculture in many areas, while other areas will benefit from these changes.

The ocean currently absorbs approximately 26% of carbon dioxide emitted into the atmosphere<sup>8</sup> – resulting in increasing acidity (lower pH) of the ocean at a rate that may not have been seen for the last 30 million years or more<sup>9</sup>. This emerging issue is widely acknowledged by scientists but little known by the public and policy makers. Unlike climate change with its inherent modelling uncertainties, the science on ocean acidification and future ocean acidity scenarios in ‘business as usual’ GHG emissions context is unequivocal. Ocean acidification is known to have significant impacts on ocean areas, including reduced ability of many key marine organisms, including calcareous phytoplankton, the base of much of the marine food chain, to build their shells and skeletal structures; increased physiological stress, reduced growth and survival of early life stages of some species. Ocean acidification will also reduce carbon accretion in coral reef building organisms and, if current trends continue, will lead to net decreases in global coral reef coverage with declines in abundance of associated fish species. Many marine mollusc species, important in capture fisheries and mariculture, will also be negatively impacted. Risks of ocean acidification are particularly high in northern and polar regions where carbon dioxide dissolves more readily in colder water, and these areas feature some of the world's most important fisheries.

Several key coastal habitats, such as seagrasses and mangroves fix carbon at a much higher rate than land-based systems on an areal basis and present an important opportunity for ecosystem-based climate mitigation (known as ‘blue carbon’) which also preserves the essential ecosystem services of these habitats. In the case of blue carbon, given the value of oceans in the context of restoring / protecting the carbon sequestration capacities of physical coastal habitat there is a viable market that could be created for carbon trading much like it does on land, although significant efforts are required to develop this into reality. Blue carbon could be traded and handled in a similar way to green carbon (such as forest carbon under the UN collaborative initiative on Reducing Emissions from Deforestation and forest Degradation, UN-REDD) and entered into emission and climate mitigation protocols along with other carbon-binding ecosystems.

<sup>6</sup> FAO (2010). The state of world fisheries and aquaculture. Rome: FAO.

<sup>7</sup> FAO (2011). Committee on Fisheries (COFI) - Fisheries and Aquaculture Department. Retrieved from: [www.fao.org/fishery/about/cofi/en](http://www.fao.org/fishery/about/cofi/en)

<sup>8</sup> Le Quere C., Raupach M.R., Canadell J.G., Marland G. et al (2009). Trends in the sources and sinks of carbon dioxide. *Nature Geoscience*, 831(2). doi : 10.1038/ngeo 689

<sup>9</sup> Ridgwell A., Schmidt D.N. (2010). Past constraints on the vulnerability of marine calcifiers to massive carbon dioxide release. *Nature Geoscience*. doi:10.1038/ngeo755



Knowledge about the ocean's role in climate change and variability, and of climate's role in impacting ocean ecosystem services on which human populations depend is key in developing sustainable development strategies. This knowledge can only be developed through sustained observation and monitoring of the ocean's climate and ecosystems.

### **iii) Pollution and Waste**

Marine pollution from land based sources such as agricultural run-off, untreated sewage, and discharge of nutrients and pesticides from land has long been a serious problem in coastal areas, despite long standing international agreement on cause and effect, and options for mitigation. The management of non point source pollution is as much an institutional issue as it is an industry issue – governments have historically been unwilling or unable to enact and/or enforce the regulations needed to reduce or remove the problem.

The disposal of waste is also a serious constraint to sustainable development. Agricultural practices, coastal tourism, port and harbour developments, damming of rivers, urban development and construction, mining, fisheries, aquaculture, and manufacturing, among others, are all sources of marine pollution threatening coastal and marine habitats.

The occurrence of marine and coastal hypoxic areas or 'dead zones' has been increasing at a massive rate in recent years with increased population growth and urbanisation, economic development, and expansion of agriculture. These zones result from a roughly three-fold increase in global loads of the nutrients nitrogen and phosphorus to

the oceans since pre-industrial times from both agricultural run-off and poorly or untreated sewage. This results in coastal eutrophication characterised by excessive plankton growth, consumption of oxygen by decaying plankton, and low oxygen/hypoxic conditions with associated impacts on ecosystems. Based on a business as usual model of nitrogen input to the world's LMEs, it is estimated that fluxes of dissolved inorganic nitrogen to the oceans will increase by an additional 50% by 2050<sup>10</sup>.

The shortage of land area and resources available for safe disposal of solid and liquid wastes makes the management of waste an especially critical issue for SIDS. Since long-term waste disposal options in SIDS are limited, there is a need to look for ways of minimising and/or converting wastes such as sewage into a resource (e.g. fertiliser for agriculture).

As the world saw in 2010, the Gulf of Mexico deep-water oil spill had a devastating effect on the entire marine ecosystem, as well as the populations that depend on the marine areas for their livelihoods. Improving technological capacity, coupled with increased volatility of secure oil supplies mean there is likely to be more deep water drilling for oil and gas, as well as increased exploration and exploitation of rare minerals that have to date been too difficult or expensive to access from the seabed but for which security of land-based supplies is limited and volatile. This poses pollution risk which, although being assessed and mitigated through prevention, preparedness and response capabilities by relevant organisations and the shipping, oil and gas industries, are still significant.

In addition to land based and marine pollution, plastic materials and other litter are widespread in the ocean

<sup>10</sup> Sherman, K., S. Adams (eds). (2010). Sustainable Development of the World's Large Marine Ecosystems during Climate Change: A commemorative volume to advance sustainable development on the occasion of the presentation of the 2010 Göteborg Award. Gland, Switzerland: IUCN.





and can become concentrated in certain areas such as the Great Pacific Garbage Patch, the North Atlantic Gyre and others formed gradually as a result of marine pollution gathered by oceanic currents. In the case of the Great Garbage Patch which occupies a large and relatively stationary region of the North Pacific Ocean, waste material from across the North Pacific Ocean, including coastal waters off North America and Japan, are drawn together. As material is captured in the currents, wind-driven surface currents gradually move floating debris toward the centre, trapping it in the region. Once discarded, plastics are weathered and eroded into very small fragments known as micro-plastics. These together with plastic pellets are already found in most beaches around the world. The impacts they have on the marine environment and on the marine food web are still poorly studied and understood.

#### iv) Loss Of Habitats and Biodiversity, Invasive Species

The loss of marine biodiversity is increasingly impairing the ocean's capacity to provide food and other market and non-market services, and the trend of biodiversity loss is accelerating on a global scale. Coastal habitats are under pressure, with approximately 20% of the world's coral reefs lost and another 20% degraded<sup>11</sup>. Mangroves have been reduced to 30 to 50% of their historical cover<sup>12</sup>, impacting biodiversity, habitat for inshore fisheries, and carbon sequestration potential. 29% of seagrass habitats are estimated to have disappeared since the late eighteenth century. Over 80% of the world's 232 marine ecoregions reported the presence of invasive species which is the second most significant cause of biodiversity loss on a global scale and the marine bio-invasion rates have been reported as high as up to one invasion every nine weeks. As with non-point source pollution, the challenge is as much institutional inertia as it is scientific consensus in terms of dealing with loss of biodiversity and habitat, and increasing both protection and restoration efforts.

Well-designed and managed Marine Protected Areas (MPAs) provide a valuable tool for habitat and biodiversity protection, ecosystem resilience, ecotourism, and as a contributor to sustainable fisheries. To date, a little over 1% of the world's ocean is protected and most marine and coastal protected areas are on the continental shelf and in coastal waters<sup>13</sup>. This notwithstanding, attempts

have been made through IMO to protect valuable oceans areas from the risk of damage from international shipping through the designation of Special Areas under the MARPOL Convention and particularly sensitive special areas (PSSAs). There is almost no protection of marine ecosystems and biodiversity occurring in deeper waters on the continental shelves and in the international waters of the high seas, including seamounts, which can be areas of high diversity and/or productivity. Approximately 4.3% of shelf areas to 200m depth are protected. About 65% of the total area that is protected lies in the tropics (between 30°N and 30°S), with most of the remainder in the northern hemisphere. Intermediate latitudes (30°N to 50°N) and the southern temperate and polar latitudes are least well represented. Recent concerns regarding the state of global MPAs include suggestions that MPAs are not succeeding in reducing the decline in marine biodiversity as much as hoped due to inadequate management<sup>14</sup> and their inability to protect against the broader suite of external threats such as ocean acidification, warming seas, etc. However, in certain sectors, there is some progress in protecting marine ecosystems and biodiversity in deep-sea waters, especially in areas beyond national jurisdiction (ABNJ), as demonstrated by the OSPAR initiative. Through this Commission, six high seas MPAs occupying a total of 285 000 kilometres<sup>2</sup> were created. The FAO International Guidelines for the Management of Deep-Sea Fisheries in the High Seas have been developed but their success depends on the willingness of States to effectively implement this voluntary instrument. Nevertheless, it is clear that a dramatic increase in the scale and management of MPAs needs to remain part of an integrated approach to ocean sustainability.

The resilience of ecosystems is crucial to their functioning, persistence and viability. Degraded ecosystems (i.e., those that have lost biodiversity, ecological functions or structural integrity) are less resilient, and, therefore, have less capacity to withstand the additional stresses. Reduced ecosystem resilience is of particular concern because of the anticipated impacts of climate change. Habitats as well as biodiversity and ecosystem resilience are negatively impacted by a wide array of factors including overfishing and destructive fishing, biodiversity loss, invasive species, excessive nutrient loading, other pollution and habitat loss due to industrialisation, population growth and urbanisation, adverse effects of climate change and poorly planned, managed and regulated development.

<sup>11</sup> Wilkinson, C. (2008). Status of coral reefs of the world: 2008. Townsville, Australia: Global Coral Reef monitoring Network and Reef and Rainforest Research Center.  
<sup>12</sup> Nellemann, C., E. Corcoran, C. Duarte, L. Valdés, C. De Young, L. Fonseca and G. Grimsditch. (2009). Blue Carbon. A Rapid Response Assessment. United Nations Environment Programme, GRID-Arendal, ISBN: 978-82-7701-060-1.  
<sup>13</sup> Toropova, C., Meliane, I., Laffoley, D., Matthews, E. and Spalding, M. (eds.) (2010). Global Ocean Protection: Present Status and Future Possibilities. Brest, France: Agence des aires marines protégées, Gland, Switzerland, Washington, DC and New York, USA: IUCN WCPA, Cambridge, UK : UNEP-WCMC, Arlington, USA: TNC, Tokyo, Japan: UNU, New York, USA: WCS.  
<sup>14</sup> WWF. (2011). Retrieved from: [wwf.panda.org/about\\_our\\_earth/blue\\_planet/problems/inadequate\\_protection/](http://wwf.panda.org/about_our_earth/blue_planet/problems/inadequate_protection/)



## 2.3 RELATIONSHIP BETWEEN THE OCEAN AND POVERTY ALLEVIATION/LIVELIHOODS

Eradicating poverty is the greatest global challenge facing the world today and an indispensable requirement for sustainable development, particularly for developing countries. Because each country has the primary responsibility for its own sustainable development and poverty eradication, the role of national policies and development strategies cannot be over-emphasised. Coasts and the ocean provide multiple opportunities for addressing poverty, through a range of economic sectors.

Vulnerability to climate change and ocean-related disasters, on the coast and inland, can be reduced through sustainable development practices leading to increased resiliency, and the development of effective early warning systems including the ocean on multiple timescales.

Marine capture production is estimated to have a first-sale value of USD 93.9 billion<sup>15</sup>. This figure includes industrial fisheries, some of which are carried out through partnership agreements between Distant Water Fishing Nations and the developing coastal states. Benefits derived from such fisheries could be more equitably shared with coastal fishing communities and there is an opportunity to alleviate poverty through direct income generation by greater participation in the fishery and associated industries by these communities. Opportunities exist through greater, direct involvement of local communities either on their own within their EEZs or through equitable sharing through partnership agreements. Aquaculture on the other hand, offers an

important opportunity to coastal communities worldwide, but efforts need to be made to ensure equity and environmental sustainability. FAO has been investing in the implementation by countries and regional fishery bodies of the Code of Conduct for Responsible Fisheries (the Code) and of an ecosystem approach to fisheries and aquaculture, thus aiming to find the right balance between environmental and social needs with participation and equity.

Offshore energy-related income generation provides significant opportunity, both through direct employment in sectors such as oil and gas exploration and development, and also through indirect contribution to other sectors as a result of foreign investment. The benefits in terms of poverty alleviation are of course balanced by the risk (and reality) of increased pollution from spills and/or poor management, and the flow-on impacts on coastal communities, habitats, and other sectors that are affected by spills. Overall, while offshore oil and gas development has clearly led to significant export earnings for key oil producers in the developing world, the livelihood, health, social and environmental impacts for local communities are decidedly mixed.

In conclusion, as we look to Rio+20, the Green Economy is highly interconnected with sustainable ocean and coastal management. Solutions and benefits do exist and are generally well understood, although promoting poverty reduction, economic growth and environmental improvement implies going a step further than occurs currently. Implementation, political and institutional willingness, capacity and desire to change at all levels of both government and industry are now needed.

<sup>15</sup> FAO. (2010). The state of world fisheries and aquaculture. FAO: Rome



# 3

## CONTRIBUTION

### OF **ocean** SECTORS TO THE **green** ECONOMY

Although there is no universally accepted definition of the Blue-Green Economy, for the purposes of this Report, key dimensions could include:

- Protection and restoration of ocean ecosystems and biodiversity, including beyond national jurisdictions;
- Development of blue carbon markets;
- Active sea-floor management (including oil and gas, mining, and cables) both within and outside national jurisdictions;
- Change in fisheries and aquaculture management regimes at regional and national levels toward, equitable, non subsidised, and sustainable practices;
- Adaptation to sea level rise and climate change;
- Integrated coastal management;
- Increasing sustainable use of bioresources, including biotechnology;
- Recognition and adoption of ocean/coastal carbon sinks and the creation of a market for trading ('blue carbon')
- Dramatically enhanced recycling of major ocean pollutants such as nutrients through market mechanisms
- Greater adoption of renewable energy from the ocean (a move away from land based focus)

In order to mitigate the continued degradation of the ocean and restore and sustain its critical market and ecosystem services, key sectors and governments must begin a transition towards a Green Economy, creating a viable socio-economic framework that generates jobs, assists in poverty alleviation, adapts to and mitigates climate change and other existing and emerging challenges, and embraces integrated environmental management.

#### 3.1 THE BLUE-GREEN ECONOMY – KEY TO A SUSTAINABLE FUTURE?

One of the two major areas of focus for Rio+20 will be the Green Economy. The concept has emerged in recent years as a widely accepted shift from traditional thinking about environmental protection and management being separate from economic development, to the now recognised fact

that future economic development is inextricably linked with both environmental and social considerations. This concept is arguably even more important in coastal and ocean areas than on land, as the interlinkages among economic sectors (such as fisheries and aquaculture, water and waste management, renewable ocean based energy, and tourism), human impacts, and all aspects of environmental health are at the same time very strong, yet challenging to manage.

There are three broad conclusions of the recent UNEP Green Economy<sup>16</sup> study that are also relevant to ocean:

- a. Greening not only increases wealth over the long term, but also produces a higher rate of GDP growth.
- b. There is a clear link between poverty eradication and better protection and restoration of habitat, marine fishery resources and biodiversity.
- c. In a transition to a Green Economy, new jobs are created, which over time exceed the losses in 'brown economy' jobs.

<sup>16</sup> UNEP (2011). Towards a Green Economy: pathways to sustainable development and poverty eradication (a synthesis for policy makers), United Nations Environment Programme



### 3.2 ASSESSMENT OF THE DIFFERENT DIMENSIONS OF SUSTAINABLE DEVELOPMENT

The fact that a healthy ocean is fundamental to achieving global sustainability reaffirms the need for a balance and linkages among the social, economic and environmental pillars of sustainable development, but in a fundamentally different way from the manner in which modern society has historically viewed the balance and linkages. States can derive optimal economic and social benefits from a healthy ocean whilst protecting the environment for the long term by adopting the dimensions of a Green Economy and changing institutional frameworks accordingly. Table 2 considers the three pillars of sustainable development as different issues affecting ocean



and coasts impact them. It is recognised that these pillars are inter-related and inter-dependent, and as such cannot be considered in isolation from each other.

**Table 2** The Three Dimensions of Sustainable Development as Related to the Ocean

	Environmental Pillar	Social Pillar	Economic Pillar
Ocean Acidification	<p>Ocean acidity has increased by 26% since the beginning of the industrial revolution and the rate of acidification is expected to accelerate in coming decades in any 'business as usual' scenario for CO<sub>2</sub> emissions. An increase in seawater CO<sub>2</sub> levels lowers ocean pH and leads to a slower calcification of shells and calcium carbonate fixing plankton.</p> <p>Ocean acidification in particular threatens marine ecosystems in colder temperate and polar regions where CO<sub>2</sub> is more readily absorbed. Business as usual projections on ocean acidity could lead to the extinction of key calcium carbonate phytoplankton and zooplankton species, which serve as the base of the marine food chain in these regions. Further monitoring and research is needed to make better projections of the acidification and its impact.</p> <p>Ocean acidification and rising temperatures of the ocean contribute to the estimated 58% of global coral reefs that are threatened, many of which will be gone by 2040. Loss of coral reefs impacts biodiversity values and habitat, including reduced abundance of associated fish species and fishery resources.</p>	<p>Ocean acidification impacts plankton communities and consequently the entire marine food chain could be disrupted or restructured if selected species were eliminated or reduced due to acidification. The impact on fisheries may be serious. As over 500 million people in developing countries depend on fisheries and aquaculture, social impact could be very large. This could lead to a sharp decrease in catches and export earnings. Local economies and employment, in particular in developing countries, would be greatly impacted, some of them threatening to collapse. The risk of food insecurity also increases the severity of social impact.</p>	<p>Livelihoods are being impacted through loss of habitat (such as coral reefs) caused by acidification and loss of fish and invertebrate species important in fisheries and aquaculture.</p> <p>The continued uptake of CO<sub>2</sub> by the ocean eventually leads to a reduced global capacity of the ocean to absorb carbon, accelerating climate change and potentially impacting the millions of people reliant on the ocean for their well-being. Loss of coral reefs will damage the tourism potential of many areas.</p>
Climate change	<p>The ocean absorbs 26% of all the anthropogenic carbon dioxide emitted each year.</p> <p>The ocean's capacity to store carbon emissions is decreasing, thus more significant CO<sub>2</sub> mitigation actions are needed in order to lower the impacts of both climate change and ocean acidification.</p> <p>Major changes in ocean currents driven by climate change could lead to shifts in regional climate and weather patterns and areas and strength of ocean upwelling and productivity.</p> <p>Changes in the geographical ranges of marine species such as permanent migration of species to higher latitudes and/or deeper depths and other changes in diversity and functioning of current marine ecosystems.</p> <p>It is predicted that the Arctic will be totally ice-free during the summer in less than 30 years.</p>	<p>Low lying communities at risk from sea level rise, global warming impacts traditional livelihoods.</p> <p>Many will have to relocate in the future or face inundation.</p> <p>It is estimated that by 2050, adverse effects associated with global climate change will result in the displacement of between 50 and 200 million people globally.</p> <p>Climate change will negatively impact food security, livelihoods and social stability of many coastal nations and communities.</p> <p>Many fishers, fish farmers and others dependent on fisheries and aquaculture for their livelihoods will be negatively impacted by changes in distribution and abundance, while in other areas these groups will benefit from the changes.</p>	<p>The 2006 Stern Report on Climate Change identified a number of economic consequences and opportunities, (albeit not specific to the ocean) including:</p> <ul style="list-style-type: none"> <li>• The benefits of strong, early action considerably outweigh the costs.</li> <li>• Unabated climate change could cost the world at least 5% of GDP each year; if more dramatic predictions come to pass, the cost could be more than 20% of GDP.</li> <li>• Each tonne of CO<sub>2</sub> we emit causes damages worth at least USD85, but emissions can be cut at a cost of less than USD 25 a tonne.</li> <li>• Shifting the world onto a low-carbon path could eventually benefit the economy by USD 2.5 trillion a year.</li> </ul>

**Table 2** The Three Dimensions of Sustainable Development as Related to the Ocean

	Environmental Pillar	Social Pillar	Economic Pillar
<b>Fisheries &amp; Aquaculture</b>	<p>Fishing can have two kinds of impact on the environment, direct physical damage and alteration to the ecosystem. The former includes damage to habitats and discarding of unwanted fish species and should be kept as low as possible. Ecosystem impact of fishing is related to changes in relative abundance of different species causing changes in food webs and loss in biodiversity and ecosystem functioning. From the fisheries sector perspective, ecosystem impact needs to be controlled to ensure target species are not overfished and fishing does not threaten the sustainability of associated and dependent species or ecosystem structure and functioning.</p> <p>Unsustainable aquaculture practices in some parts of the world have caused degradation, particularly in near-shore areas. Impacts are often associated with excess nutrient outputs from fish farms and deposition of organic matter to the benthic habitats. In some cases the release of chemicals and the escape of farmed species can have negative impacts on ecosystems.</p> <p>The use of fish meal and low value fish to feed marine farmed fish could add additional pressure to fishery resources.</p>	<p>More than 180 million people are directly or indirectly employed in fisheries and aquaculture. With dependents, they support the livelihoods of a total of about 540 million people (8% of the world population) of whom more than 90% live in developing countries. Fish and fishery products are a vital and affordable source of food and high-quality protein – in 2008 fish supplied over 4.2 billion people with at least 15% of their average animal protein intake. Fish are a vital source of nourishment, especially to people in the world's poorest nations. A recent study showed that 1/3 to 1/2 of commercial marine species had been overfished during the past half-century, with billions in potential revenue lost. The same study estimated that in 2000, the additional catch from sustainable fishing could have helped 20 million people cover their food deficit and avert undernourishment.</p> <p>Well-managed aquaculture has the potential to meet the growing demand of fish and lessen the pressure on heavily exploited wild fish stocks. This can increase production and contribute to food security for communities that would otherwise be at risk. Widespread overfishing has led to a decline in catch globally; however, the links between overfishing and food security have not been well-studied.</p>	<p>The fisheries and aquaculture sector is essential for economic development, employment, food security and wellbeing of millions of people around the world. The introduction and strengthening of equitable and responsible governance systems for fisheries and aquaculture are indispensable to enhance the sectors' contribution to food security and poverty alleviation.</p> <p>Emerging technologies have the potential to increase production and improve environmental performance of the aquaculture sector but new paradigms, such as integrated multi-trophic aquaculture, are needed for scaling up truly sustainable aquaculture.</p> <p>Overfishing has long-term negative consequences for food security, and coastal livelihoods.</p>
<b>Pollution and Waste</b>	<p>Land-based sources account for approximately 80% of marine pollution, globally.</p> <p>Excessive nutrients from sewage outfalls and agricultural runoff have contributed to a rise in the number of dead zones (hypoxic or anoxic areas), from 49 in the 1960s to over 400 in 2008, resulting in the collapse of some ecosystems. Nowadays, more than 245 000 kilometres<sup>2</sup> are affected, equivalent to the United Kingdom<sup>17</sup>.</p> <p>Risks of major oil spill increase as technology permits more deep sea drilling. However, actual spills have decreased steadily for several decades, and oil entering the marine environment from major spills is significantly lower.</p> <p>Abandoned, lost or otherwise discarded fishing gears (ALDFG) have the potential to continue fishing many years after loss (commonly referred to as ghost fishing). Catches of ecologically important and economically valuable species, including protected and endangered species are known to occur on a broad scale.</p>	<p>There is a negative impact on traditional lives through pollution impacting on quality of life, traditional association with the ocean and coastal areas, human health, as well as major sectors such as tourism, and fisheries.</p> <p>Aesthetic impacts for coastal communities. Growing populations are likely to continue to exacerbate pollution sources.</p> <p>Increased risk of successful invasive species introductions in marine ecosystems already stressed by eutrophication (e.g. comb jellyfish introduction into Black Sea in 1980's).</p> <p>Much of the abandonment, loss or discarding of fishing gears can be prevented through the adoption of responsible fishing practices, compliance with MARPOL Annex V. Good stewardship would also reduce ALDFG practices.</p>	<p>Emerging clean technologies have the potential to mitigate impact of pollution, and in some cases can generate economic opportunities.</p> <p>The impact of pollution on habitat, fish stocks and tourism removes economic opportunities for multiple generations.</p> <p>Externalities of land use and impacts on coastal areas not built into land use.</p> <p>Huge economic waste – billions of dollars per year - via 'linear' approach to nutrient management of manufacture/mining, use as fertiliser in agriculture, harvesting, consumption, release via wastewater systems of nitrogen and phosphorus to coastal waters and associated growth in hypoxic areas</p> <p>Because abandonment, loss and discarding of fishing gears occurs on productive fishing grounds, ghost fishing reduces the revenues to fishers from lost catch.</p>
<b>Biodiversity and Habitat Loss</b>	<p>Loss of biodiversity and key biological and physical habitat reduces ecosystem resilience and overall species diversity throughout the food chain, placing increased pressure on remaining biodiversity and habitat to maintain ecosystem values in the face of human impact.</p>	<p>Impact on fish stocks from biodiversity and habitat loss changes the dynamics of coastal communities, forcing change in employment, reduction in overall income levels, and ultimately contributing to poverty-related issues.</p>	<p>Fish stocks important for commercial fisheries are reduced by loss of biodiversity and habitat, ultimately impacting entire coastal communities that depend on fishing for livelihood.</p>

<sup>17</sup> Diaz, R.J., Rosenberg, R. (2008). Spreading Dead Zones and Consequences for Marine Ecosystems. *Sciences*. 321(5891), 926-929. DOI: 10.1126/science.1156401



Integrated ecosystem approaches and diversification of livelihoods and enterprise can improve sustainable development in all three pillars by providing the benefits of increased productivity and resilience of living marine resources (environmental pillar), by reducing the vulnerability of the coastal poor (social pillar) and increased incomes (economic pillar). Examples include the Asian Development Bank support of the Sindh Coastal Community Development Project in Pakistan and the Coastal Community Action Fund supported by the World Bank within the Tanzania Marine and Coastal Environmental Management Project. These projects support investments in mangrove planting, crab/prawn pond and bivalve raft development, hatchery rehabilitation as demand-driven community-managed initiatives within a framework of improved coastal management. Institutional support includes geographic information systems (GIS), coastal development planning and monitoring arrangements. World Bank support for economic gain includes credit and savings, public-private partnerships and small-scale infrastructure including markets. With its regional partners, FAO is helping promote collective action through small-scale cluster farmer organisations, responsible management and the application of better management practices in shrimp aquaculture in several countries in Asia. FAO also launched a regional fisheries livelihoods program for South and Southeast Asia to support small-scale fishing communities. Similarly, FAO's EAF-Nansen project<sup>18</sup> supports the ecosystem approach in 32 coastal African countries with a view to creative conditions needed to achieve food security.

A robust, responsible and sustainable Green Economy requires private sector industry collaboration and leadership, cross-sectoral synergies and economies of scale, and a focus on solutions and technologies for sustainability.

### 3.3 CONTRIBUTION OF DIFFERENT SECTORS TO THE BLUE-GREEN ECONOMY

Global ocean economic activity is estimated at between USD 3-6 trillion/year<sup>19</sup>. This includes a wide range of ocean industries essential to both current and future economic development, such as offshore oil and gas, shipping, ports, tourism, fisheries and aquaculture, renewable energy, recreation, desalination and others. The economic benefit from ocean activities is expected to grow substantially in the future through expansion of existing sectors, and the creation of new opportunities.

China's marine economy is expected to grow at an annual rate of more than 13% over the next five years, according to the State Oceanic Administration. Within the Qingdao Blue Economic Zone a number of zones will be developed to expedite the city's marine economy, with focus on port logistics, modern fisheries, coastal industries, seashore tourism, marine biology and seawater utilisation.

The City will also focus on constructing four bases for emerging marine industries, modern fisheries, marine manufacturing and marine services, including port logistics, coastal tourism, sports and cultural creativity. A world-class marine research and development center, comprehensive equipment manufacturing base and national new material industry will also be created. The city will speed up introduction and cultivation of high-end talent and improve vocational education to establish a center of international marine science and technology education.

The city also plans to promote construction of parks and projects to improve the influence of the blue economic zone. A regional pilot zone between China, Japan and South Korea is under discussion.

basis for adaptive ecosystem management, and developing solutions for existing and future challenges.

A major change for future green management will also include partnerships among industry, governments at all levels, and communities. The recognition of the fundamental role the private sector and public-private partnerships will play in changing current behaviours and technologies, and accepting that short term economic impact will be superseded by long term economic gain, is essential. Some nations, as illustrated by China in the text box adjacent, have already begun to embrace this philosophy and are therefore in prime position to take advantage of the transition to a Green Economy.

#### ***j) The Role of the Private Sector***

Private sector use of the ocean is expanding rapidly in its volume and kinds of activities, with increasing impacts on the marine environment at a cumulative global scale. User conflicts among industries and with other stakeholders are increasing. As the primary user of the ocean, industry is well placed to develop and implement solutions in response to society's increasing demands that marine ecosystem use is sustainable and impacts are reduced. Ocean industries have numerous serious impacts on the marine environment and most of them (like pollution or habitat loss) are multi-sectoral. Yet, ocean industries also have a huge potential to collect oceanographic and at-

Globally, non-market ecosystem services from earth's biosphere (climate, water, soil, nutrients, etc.) have been estimated at USD 33 trillion/year and of these, 63% derive from marine systems, one half each from coasts and the open ocean<sup>20</sup>. These services should be treated as if they were produced and consumed as market activities.

Science and technology are key to the identification and commercialisation of new opportunities and paradigms for ocean sustainability, and to mitigating any potential negative impacts. Together with those responsible for providing information and equitable governance arrangements, science and technology are critical for creating tools to assist in mitigating potential negative impacts. The role of science will include continuing and increasing monitoring and reporting, as well as 'proving the case' for changing economic and social behaviours, providing the ba-

<sup>18</sup> EAF-Nansen (2011). Retrieved from: <http://www.eaf-nansen.org/nansen/en>

<sup>19</sup> World Ocean Council. (2011). Retrieved from: <http://www.oceancouncil.org/site/faq.php>

<sup>20</sup> Costanza, R. et al (1987). The Value of the World's Ecosystem Services and Natural Capital. *Nature*. 387, 253-260.

ospheric data that contribute to better modelling and predicting ocean conditions, extreme weather events and climate change that impact economies and livelihoods. Developing public-private partnerships could be a good way to find solutions to impacts and improving ocean data. Collaboration between public and private sectors could catalyse, accelerate and strengthen the nascent private sector interaction on ocean sustainability.

### **ii) Fisheries and Aquaculture**

Future green practices in the ocean will see major changes in the nature, location and intensity of fishing and aquaculture. This will likely include the development of off-shore large scale aquaculture and the better management of fisheries, including foreign fishing activities in domestic waters, through improved monitoring, control and surveillance and the realisation of a greater share of net benefits from fishery resources. Green practices in aquaculture should promote the growth of extractive species (sea weeds and filter feeding shellfish) and lower trophic level farming which convert food to fish protein more efficiently than carnivorous species.

Green practice changes in the ocean include the consideration of institutional responses such as fishing capacity and effort reduction where required, adoption of responsible governance of tenure of fisheries, greater enforcement of existing regulations including through the use of technologies to assist enforcement, greater collaboration between regional and national fisheries bodies, capacity building, and the protection and restoration of key habitats and species that provide the basis for the fisheries value chain.

### **iii) Water**

Fresh drinking water is increasingly derived from marine waters in many parts of the world. The Arabian Gulf has about half of the world's desalination capacity, with a combined seawater desalination volume exceeding 11 million m<sup>3</sup>/day. Some countries are especially dependent on desalination, e.g. 90% of Kuwait's potable water comes from the sea. As desalination technology becomes more affordable and available to developing nations and SIDS, we expect to see its adoption increased around the world, thereby decreasing fresh water shortages and increasing the need to ensure marine waters are clean. At the same time, saline residues from desalination can have local negative impacts on marine ecosystems so proper management regimes need to be put in place to minimise these effects. Desalination also tends to be very energy intensive underscoring the need for nations that depend on desalination to also aggressively pursue low carbon energy strategies.

### **iv) Shipping & Transport**

Commercial exchanges among States have increased, thus increasing demand for international maritime transport and providing employment opportunities to numer-

ous seafarers and contributing to the development of nations. Modern industry has become sensitive to sustainability and environmental protection and its global regulator, IMO, has introduced significant reforms and new measures through international treaty instruments, which address many forms of ship source pollution of the seas and the atmosphere. IMO has also adopted (July 2011) energy efficiency measures for ships, constituting the first ever mandatory GHG-reduction regime for an international industry sector, which has been fully embraced by shipping. Other measures, also required by international treaties or other IMO instruments have yet to come into force internationally, including prevention of the spread of invasive species through ballast water and hulls, and safe and environmentally sound ship recycling. It is essential that international maritime trade is allowed to continue to flourish, as it provides significant income for coastal communities and enables global access to low priced consumer goods. With significant reductions in ship source pollution over the last three decades, technological developments towards improved hull design, alternative sources of ships' fuel, increasing fuel efficiency, and enhanced concern for environmental matters, maritime transport will be a core element of the Green Economy.

### **v) Tourism**

Tourism is one of the most important forms of revenue for coastal communities and much of this tourism derives from coastal amenities, which require healthy marine ecosystems – boating, scuba diving, fishing, swimming, etc. Many island nations rely extremely heavily on tourism for income, and any threat to the long-term viability of the tourism sector would have a massive effect on their economies. For tourism, greening the Blue Economy implies that switching from non-sustainable tourism to eco-tourism and other sustainable tourism practices goes along with the generation of other forms of revenues. Palau, the Pacific Island nation that declared its waters a sanctuary free of shark fishing, estimates the value to the tourism industry of an individual reef shark is USD 1.9 million over its lifetime<sup>21</sup>. In contrast, a single reef shark would bring only an estimated USD 108 in direct fishery revenue.

The greening of the tourism sector, within an integrated coastal development context, is expected to reinforce the employment potential of the sector with increased local hiring and sourcing. In greening the tourism sector, increasing the involvement of local communities, especially the poor, in the ocean and coastal tourism value chain is essential to developing the local economy and reducing poverty.

### **vi) Marine Energy (Fossil and Renewable) & Minerals**

In the energy sector, 30% (and growing) of global oil and gas supplies are from offshore production. Technological advances are allowing deeper oil and gas exploration and drilling. The impact on climate change from the fossil fuel energy sector will put increasing pressure on the sector to invest in alternative renewable technologies in the future. There will also be an expectation from governments and the public

<sup>21</sup> AIMS (2011). 'Million-Dollar Reef Sharks' an Economic Driver for Palau. Retrieved from: <http://www.aims.gov.au/docs/media/news2011/20110502.html>

alike that technology improvements will be required to avoid loss of oil and gas – both from extraction and transportation.

Offshore wind power refers to the construction of wind farms in bodies of water to generate electricity from wind. Better wind speeds are available offshore compared to on land, so offshore wind power's potential contribution in terms of electricity supplied is higher. Additional ocean renewable energy technologies, such as tidal power, are now becoming viable but have had relatively little uptake, due to a combination of prohibitive cost and lack of access to technologies. Proper pricing of carbon emitted by fossil fuels is essential to level the playing field and make many marine renewable energy technologies more economically competitive with fossil fuels.

New exploration and emerging technologies are increasing the viability of deep-sea mining of minerals such as phosphate, manganese nodules and crusts, hydrothermal sulphide deposits, and precious and specialty (such as rare earth elements) metals, both within EEZs and ABNJ. Through the UN Convention on the Law of the Sea, a regime is in place to manage deep sea mining in ABNJ through the International Seabed Authority (ISA).

#### **vii) Genetic Resources & Biotechnology**

Marine biotechnology including the protection of intellectual property rights will be an important part of the future Green Economy, with greater protection of biodiversity (including biodiversity beyond national jurisdictions, BBNJ ) alongside increases in investment in scientific research and commer-

cialisation of new and existing opportunities in sectors such as pharmaceuticals, food production, and aquaculture all being important. Differences remain regarding whether marine genetic resources are covered under the seabed mining provisions of UNCLOS. Marine species and thus genetic diversity can be extraordinary. On some tropical coral reefs, for example, there can be 1,000 species per m<sup>2</sup><sup>22</sup>. The deep sea is also a major hot spot for high levels of ocean biodiversity. Yet, for all the promise they contain, there are vast ocean regions that remain almost entirely unexplored. There is growing concern that we are losing many of the oceans' untold resources before we even fully understand them.

#### **viii) Pollution-Generating Activities**

A diverse range of land and ocean-based sectors generate pollution that impacts the marine environment, including shipping, agriculture, wastewater, mining, coastal development, fisheries and aquaculture, manufacturing, etc. Two of the most significant and largely unaddressed pollutants are the nutrients nitrogen and phosphorus whose export to the coastal zone has increased three-fold or more since pre-industrial times leading to rapid increases in coastal eutrophication and hypoxic zones. In the European Union (EU) alone, nitrogen pollution is estimated to cost the EU economy as much as GBP 280 billion per year. The expectations of the international community regarding pollution-generating

<sup>22</sup> Wilkinson, C. (2008). Status of coral reefs of the world: 2008. Townsville, Australia: Global Coral Reef monitoring Network and Reef and Rainforest Research Center.







activities are that there should be an overall reduction in the impact and quantity of such activities in the future. A combination of technological advances through clean technologies, aligned with much greater institutional willingness to deal with difficult issues, and the application of state-of-the-art policy, regulatory and economic instruments, should provide a basis for reducing the impact of excess nutrients in the marine environment. In addition, the increasingly global nature of pollutants such as nitrogen underscores the urgency of implementing strategies which 'internalise' the nutrient externality (i.e. make the entity responsible for the pollution pay for the cost of preventing or mitigating environmental degradation) through regulatory, policy and economic instruments to transform the nutrient economy from a linear to much more cyclic management paradigm. Policy and regulatory instruments could include more strict regulation of nutrient removal from wastewater, mandatory nutrient management plans in agriculture, enhanced regulation of manure, and others. Economic instruments could include taxes on fertiliser and/or agricultural and wastewater emissions, cap and trade frameworks on nutrient emissions and/or fertiliser production, and subsidies that encourage nutrient recycling. Core to the global implementation will be capacity building, technology transfer, and funding of new technologies.

### 3.4 OCEAN GOVERNANCE AND INSTITUTIONAL CHALLENGES

Management of the ocean is a complex web of inter-related, intertwined, converging and competing demands and interests. The modern governance framework reflects this disaggregation. Today, this special international space is regulated by 576 bilateral and multilateral agreements<sup>23</sup>, a fact that in itself reflects the low priority that the calls for improving environmental, or ocean governance has among world political leaders. These legal instruments are diffused among a myriad of sectors in international, regional and national organisations that have the responsibility for monitoring implementation but often lack the means and authority to ensure compliance and enforcement.

Adequate governance structures and institutional coherence are therefore crucial to effectively respond to growing pressures on the world's ocean and inextricably linked with the necessary transition to a Green Economy. A comprehensive evaluation of existing institutional frameworks for ocean governance is necessary and reforms should be carried out where required. Hence the fact that institutional reform being one of the two areas of particular focus for Rio+20, provides a unique opportunity for addressing these issues. At national level, weak institutional systems can also create barriers to growth. Lack of transparency in permit systems for fisheries, aquaculture, coastal forests, tourism, and oil or gas production and lack of monitoring, non-enforcement or implementation of environmental regulations are among the institutional elements which should be addressed.

Similar to what happens at the national level, where almost all ministries of a government have some function or authority related to ocean sectors, in the UN system a sizeable number of the specialised agencies and programmes are involved in ocean affairs<sup>24</sup>. The International Maritime Organisation (IMO), the International Sea-bed Authority (ISA) and the Intergovernmental Oceanographic Commission (IOC/UNESCO) are exclusively devoted to ocean affairs: IMO for shipping, ISA for sea-bed mining and IOC for ocean sciences and ocean services.

The United Nations Educational Scientific and Cultural Organisation (UNESCO), the Food and Agriculture Organisation (FAO), and the United Nations Environment Program (UNEP), have broader mandates, including divisions dealing with ocean affairs: UNESCO although having eliminated its Oceans Sciences Division in 1982 in favour of concentrating ocean sciences under IOC, still maintains other programmes focusing on small island developing states (SIDS), culture (the secretariat for the Underwater Cultural Heritage Convention) and Education (Division on

<sup>23</sup> The University of Oregon maintains a project that catalogues and updates a data-base with all the existing bilateral and multilateral International Environmental Agreements (IEA). [Http://iea.uoregon.edu](http://iea.uoregon.edu)

<sup>24</sup> Bernal, P. 'For the Ocean'. Retrieved from: <http://4theocean.blogspot.com/>

Education on Sustainable Development), FAO for fisheries and aquaculture and UNEP for regional seas and marine environment. Other UN organisations are also involved with the ocean, for example the World Meteorological Organisation (WMO) dealing with ocean-atmosphere interaction, marine meteorology and climate and its implications, the International Atomic Energy Agency (IAEA) for nuclear marine pollution, the UN Industrial Development Organisation (UNIDO) with industrial marine technology, the International Labour Organisation (ILO) for the protection of maritime workers in the shipping and fisheries industries, the World Health Organisation (WHO) for ocean-related health problems and food-safety, the UNDP, on sustaining LMEs as key to livelihoods and economic development, and the World Bank, financing the sustainable development of ocean and coasts.

Several Divisions of the central UN Secretariat also play a role: the Division of Economic and Social Affairs (UN-DESA) acting as the Secretariat for the Commission on Sustainable Development, coordinating programmes of coasts and ocean, and the Division of Ocean Affairs and the Law of the Sea (UN-DOALOS), acting as the Secretariat for UNCLOS, the Commission on the Limits of the Continental Shelf, the UNGA Regular Process for Global Reporting and Assessment of the State of the Marine Environment (the 'Regular Process') and by default for any other meeting on ocean that is organised under the central UN system, such as the UNGA Informal Consultative Process on Oceans and the Law of the Sea.

Regional ocean governance is also an issue. Many regional programmes and organisations already exist, some of which have overlapping mandates – for example UNEP Regional Seas Programmes, the Global Environment Facility (GEF) LME Program, and Regional Fisheries Management Organisations (RFMO). While certain of these institutions and programmes have made progress within their specific areas, efficiency gains could be reached by improving coordination and cooperation among the different regional sectoral institutions, and/or strengthening individual ones.

In its effort to strengthen UN coordination and coherence on Oceans, the United Nations High-Level Committee on Programmes approved in 2003 the creation of the UN-Oceans<sup>25</sup> Network, composed of the relevant programmes, entities and specialised agencies of the UN system and the secretariats of the relevant international conventions. The UN-Oceans Terms of Reference include:

- Strengthening coordination and cooperation of the UN activities related to ocean and coastal areas;
- Reviewing the relevant programmes and activities of the UN system, undertaken as part of their contribu-

tion to the implementation of UNCLOS, Agenda 21, and the JPOI;

- Identification of emerging issues, the definition of joint actions, and the establishment of specific task teams to deal with these, as appropriate;
- Promoting the integrated management of the ocean at the international level;
- Facilitating as appropriate, the inputs to the Annual Report of the Secretary General on oceans and the law of the sea;
- Promoting the coherence of the UN system activities on oceans and coastal areas with the mandates of the General Assembly, and the priorities contained in the Millennium Development Goals, the JPOI and of governing bodies of all UN-Oceans members.

Ocean governance gaps, institutional failures and problems in the implementation of global and regional conservation measures, as well as the need to harness the expertise of scientific institutions are likely to feature prominently on the Rio+20 agenda. There is therefore a strong case for the UN system to provide leadership through the fostering of enhanced dialogue, coordination and cooperative action among UN agencies, funds and programmes, possibly leading to a proposal from the UN system on a reformed mechanism for ocean coordination to be put forward at Rio.

The integration of science into institutional decision making, including policy creation, regulatory enforcement, and adapting to new knowledge as it is created is essential for the future. Too often, scientific and technological opportunities are ignored or under-utilised in the absence of responsible and equitable governance arrangements and institutional willingness to promote change in industry and governments. The Blue-Green Economy will be science and technology driven but success will depend on sound policy processes and effective institutional arrangements, and will therefore require commitment and funding from the international community, as well as nations and industry.



<sup>25</sup> The list of potential members includes: UN-DESA, UN-DOALOS, FAO, IOC/UNESCO, UNEP, World Bank (IBRD), IMO, WMO, UNDP, IAEA, CBD, ISA, ILO, UNIDO, WTO, WHO, UNHSP ("UN-HABITAT"), UNFCCC, Ramsar, UNCTAD, UNU, OECD, and IHO.

# 4

## STATUS

### OF THE **international oceans** COMMITMENTS FROM RIO AND JOHANNESBURG: **progress** AND **gaps**

**It stands to reason that any future direction for ocean governance and management must be informed by not only the best science, but also previous discussions and decisions (...) Although many previous multilateral targets and commitments have been missed, these targets and goals are still relevant and commitment to achieving them should not waver<sup>26</sup>.**

Numerous international ocean and coastal commitments have been made over the past 20 years since Rio; some global in reach and covering multiple topics, and others more regionally or single sector or issue focused. This expansion reflects growing awareness of the importance and urgency of sustainable development issues and the important role of ocean and coastal areas in global sustainability. Chapter 17 of Agenda 21 and the JPOI, as well as various decisions of the Commission on Sustainable Development, helped set important goals and targets for the sustainable development of the ocean and its resources. Considerable (but incomplete) progress has been made towards these targets and goals, particularly in scientific understanding and monitoring, and in strengthening legal and policy frameworks, institutions and cooperation mechanisms. However, the full implementation of many of these goals and targets will require further efforts by States, intergovernmental organisations and the international community.

#### 4.1 ACHIEVEMENTS

Numerous achievements have been attained in the marine sector in terms of policy and institutional developments for the sustainable development of ocean and seas. Examples include:

- IOC/UNESCO with the WMO and the International Council for Science (ICSU) has led the successful establishment of a GOOS focused on climate and weather (currently 62% implemented);

- The LME Program has actively engaged in meeting marine-related targets set in Johannesburg to promote ecosystem based, integrated ocean and coastal management. GEF support of 17 LME projects since 1998 has been worth in excess of USD 3 billion including co-financing. This has led to the establishment of several new LME Commissions

and the world's first documented example of the reversal of a large scale 'dead zone' in the Black Sea through investments in pollution reduction and implementation of agricultural nutrient management reforms;

- Global agreement on the concepts of integrated coastal management (ICM) has been widespread since Rio, and most international entities and national governments agree on the broad principles. Scaling up and sustainability of ICM is starting to occur in some areas, notably Asia-Pacific through the GEF-UNDP initiated PEMSEA (Partnerships in Environmental Management for the Seas of East Asia ) program as well as under UNEP's Regional Seas Program e.g. Mediterranean. Marine spatial planning has been a more recent component of ICM that has received widespread adoption from the international ocean community;

<sup>26</sup>. Pew environment Group (2011). Ocean earth: how RIO+20 Can and must turn the tide. Washington, DC: Pew environment Group.



- Despite the delay in establishing the UN Regular Process for Global and Reporting on the State of the Marine Environment (JPOI decided to establish the Regular Process by 2004), the UNGA, building on the Assessment of Assessments conducted by IOC and UNEP, approved the Regular Process' scope and operational principles in 2010;
- Although work is only partially complete relating to SIDS, substantial GEF investment has been made in capacity building for SIDS sustainability through the Pacific Alliance for Sustainability (USD 100 million) and comparable work in the Caribbean and Afro-Indian SIDS. SIDS have received among the highest levels of GEF funding on a per capita or (land) area basis;
- Major binding and voluntary fisheries agreements have been reached covering issues such as Conservation and Management of Straddling Fish Stocks and Highly Migratory Fish Stocks, port state control of fisheries vessels, certification, deep sea high seas fisheries, by-catch as well as well as the more overarching FAO Code of Conduct for Responsible Fisheries;
- New Regional Fisheries Management Organisations/ Arrangements have been established, while many existing ones have been strengthened so that they, among other things, implement new international arrangements;
- The international community – governments, shipping companies, UN organisations – has effectively responded to the significant threat of aquatic invasive species in ship ballast water via the adoption by IMO in 2004 of the global convention on ship ballast water and sediments. Expected to come into force shortly, the Convention dramatically reduces risks from aquatic invasives through enhanced ballast water management, treatment, monitoring and enforcement and has already catalysed the creation of a global multi-billion dollar ballast water treatment and management industry;
- Responding to chapter 17 of Agenda 21 and its own universal mandate, IMO has adopted no less than 10 international treaties dealing with protection of the environment – both marine and atmospheric – from international shipping. Added to IMO's numerous other conventions, codes and guidelines, this has made international shipping the most energy efficient and environmentally sound means of bulk transportation;
- FAO and member countries' efforts continue to implement the Code of Conduct for Responsible Fisheries. The FAO Committee on Fisheries has recently agreed to complement the Code with a new international instrument on small-scale fisheries focusing on the needs of developing countries. COFI also agreed to improve the reporting on the progress in Code implementation during every COFI and COFI Subcommittee meetings;
- Guidelines on aquaculture certification and eco-labelling in capture fisheries have been approved and agreed by COFI. Implementation and compliance to these guide-

lines will help in overall aquaculture sustainability in the coming decades;

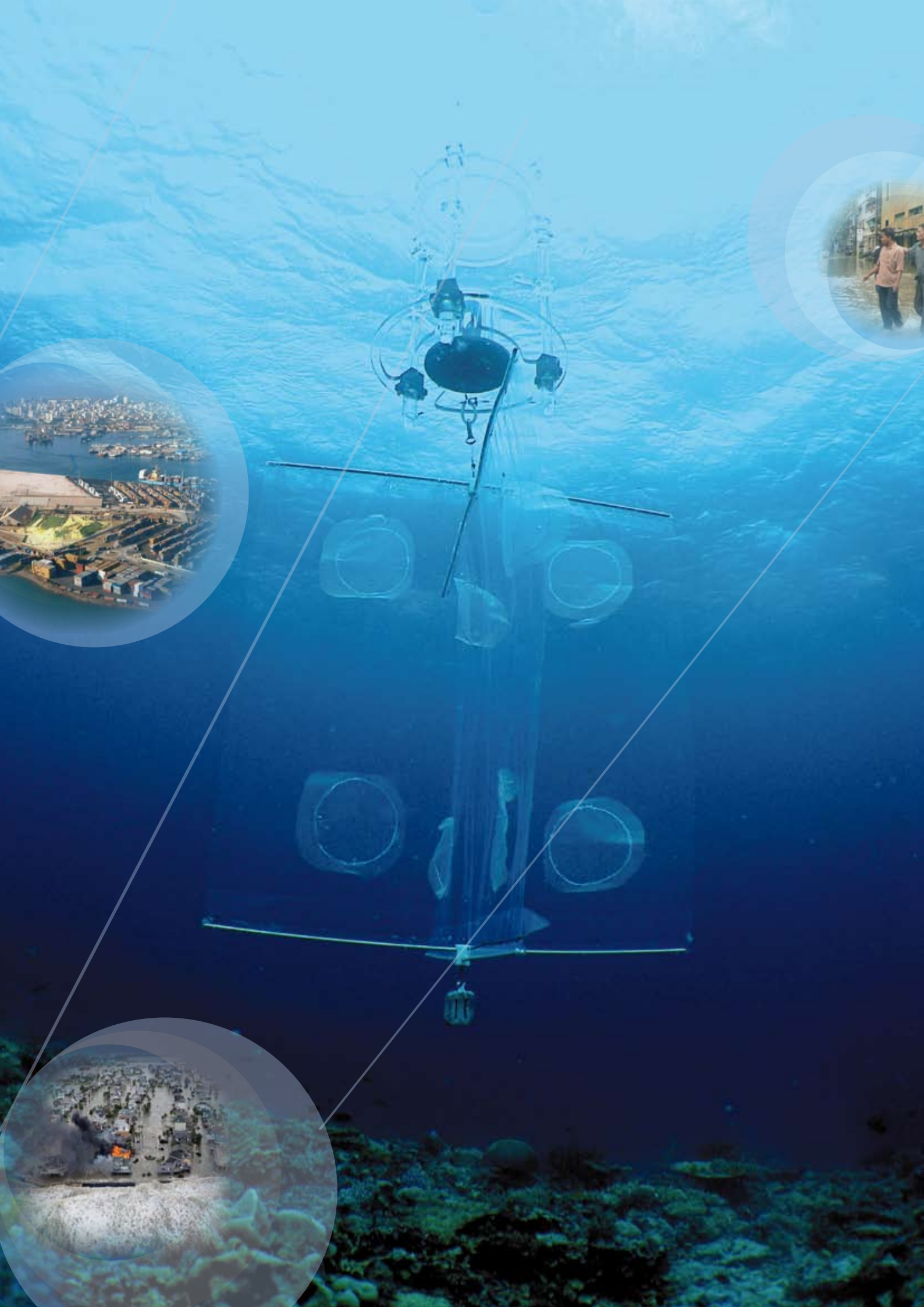
- FAO has developed specific guidelines on the ecosystem approach to fisheries and aquaculture and its implementation. These incorporate the precautionary approach and reference points which are specifically promoted in the binding UN Fisheries Stocks Agreement (UNFSA).

Sound science is vital to implementation of agreements and achievement of sustainable development outcomes for ocean and coastal areas. It is noteworthy that the international scientific community has largely addressed the commitments made in Rio, at least in terms of creating the required programmes of work and reporting on them. Most of the Global Environmental Change programmes were initiated in the early 1990's (after Rio) and will have their sunset very soon after Rio+20. These Global Environmental Change programmes (e.g. International Geosphere-Biosphere Programme - IGBP, World Climate Research Programme - WCRP, DIVERSITAS, International Human Dimensions Programme - IHDP - on Global Environmental Change and Earth System Science Partnership - ESSP) and projects together with others such as Census of Marine Life (CoML) which started in 2000 (a few years earlier than Johannesburg) have provided very valuable results in support of sustainable practices for the management of ecosystems and also for blue economies. Rio+20 is an opportunity to provide new guidelines on priorities in coastal and ocean sciences for global sustainability during the next 20 years.

## 4.2 GAPS

While progress is clearly being made and institutional efforts continue at the international, regional and national levels, some important commitments from Rio and Johannesburg have not been fully met. Examples of gaps include:

- The commitment to maintain or restore depleted fish stocks to levels that can produce their maximum sustainable yield no later than 2015 has not been implemented, and the JPOI commitment to support the sustainable development of aquaculture is not yet in place globally;
- Despite the hope for widespread implementation by 2010, very limited progress towards implementation of an ecosystem approach has been made. Some also maintain that little progress has been made on the commitment in the JPOI to implement the International Plan of Action to Prevent, Deter and Eliminate Illegal, Unreported and Unregulated Fishing (IPOA-IUU) by 2004 and the International Plan of Action for the Management of Fishing Capacity by 2005;
- Marine pollution from land based sources remains a serious problem, particularly in nations that lack either technical capacity, or physical space to deal with the issue. This is reflected (for example) in the continued rapid growth of hypoxia in the coastal zones of many coun-





tries. Very few developing countries have dedicated Land Based Sources and Activities management (LBS/A) legislation, policy or institutions;

- The 2004 international convention on ballast water management is expected to enter into force, but similar efforts are required to put in place the global, regional and national legal, policy and institutional mechanisms to address the other principal vector for aquatic invasives in the shipping sector – hull fouling. Initial efforts in this respect look promising with IMO promoting adherence to initial voluntary guidelines;
- Regarding biodiversity and MPA, commitments from the JPOI call for the reduction of biodiversity loss by 2010, the establishment of representative networks of MPAs by 2012, and reversing the trend in natural resource degradation. These have fallen far short.

A number of emerging issues post-JPOI continue to threaten or slow progress towards the sustainable development of the world's ocean and coastal areas, such as:

- A failure to fully build the open ocean components of the GOOS, targeted for full implementation in 2010;
- Increased nutrient over-enrichment and eutrophication, contributing to pollution, hypoxia and habitat degradation;
- Lack of utilisation of ocean based renewable energy, despite proven technological advances;
- Continuing threats to coral reefs, including from ocean acidification, warming, pollution, habitat loss, and invasive species;
- Marine debris (e.g. plastics) and flow on effects to human health, shipping and biodiversity;
- Lack of systematic environmental data exchange across nations and the international community;
- Need for greater protection of marine biodiversity, especially in ABNJ.

### 4.3 BARRIERS TO IMPLEMENTATION

It is beyond the scope of this paper to analyse implementation of all commitments in depth, but it is without question that overall progress in implementation of most of the international agreements in place has been slow. Much of this is due to alternative political priorities, insufficient institutional capacity or inappropriate institutions, market distortions, incomplete science, lack of financing, and/ or willingness of participants. Much relates to the fundamental perception that full implementation would require a trade off among the different pillars of sustainability.

There is no intergovernmental body that has evaluated and reported on effectiveness of implementation of any (or all) of the international commitments, although some international organisations such as the Global Ocean Forum has made significant efforts in this regard globally, as well as in its own specific area, the office of the London Convention and its Protocol, and the IMO through its Flag State implementation committee. There is a need to improve formal global evaluation and reporting on the ef-

fectiveness of implementation of the international commitments individually and as a whole. With this institutional gap, it is impossible at present to state the current successes and failures with certainty across all international and regional commitments.

As discussed above, while some progress has been achieved, the development and implementation of integrated ocean management and ecosystem approaches still present challenges - at a national, regional and international level. In terms of addressing historic implementation weaknesses, the Second Preparatory Committee for the UNCSD in March 2011 noted that "The majority of member States and UN system organisations ranked "strengthen existing institutions" highest while the majority of Major Groups ranked "improve coordination among existing institutions" as the most important avenue for reform of the global institutional framework for sustainable development. Among the avenues for strengthening existing institutions, vesting them with appropriate monitoring responsibilities and mechanisms was mentioned." Capacity, including ability to cover the costs for implementation will be facilitated by the development and sharing of new and emerging technologies that will enable many of the current challenges to be addressed with.

Long standing sectoral management mandates and approaches to addressing the impacts of human activities on the marine environment need to be strengthened and, as appropriate, integrated into multi-sectoral and multi-dimensional approaches to sustainable use and effective protection of the marine environment and its resources. Other impediments include:

- Conflicting priorities and policies, particularly at a national level between the different pillars of sustainability;
- Insufficient governance and management capacity and lack of political will to strengthen existing capacity;
- Lack of monitoring and coordinated reporting of implementation actions and outcomes at any level;
- Continuing gap between developed and developing countries (human and financial resources, capacity building, technology transfer);
- Limited educational, training and technical capacity and financial resources;
- Ineffective enforcement of obligations at national and international level;
- Limited data and information in some areas, such as small-scale fisheries, and vulnerable marine ecosystems.

Some agreements have been implemented more successfully and comprehensively than others. Typically these have been developed over long periods and have attained broad consensus in their development, such as UNCLOS. They have also involved states working cooperatively together, and generally occur when there are strong linkages from global bodies, to regional and national governments, and ultimately to sub-national government and local communities – or where sector-specific agreements, such as IMO's maritime treaties, are the outcome of enlightened interest and care for ocean and coastal issues.



# 5

## AWAY FORWARD

FOR **sustainable ocean societies**

PROPOSALS FOR A **healthy** OCEAN AND COASTS

**Governments around the world need much support and collaboration from all parts of the oceans, coasts, and islands community—to operationalize what needs to be done, to mobilize the requisite knowledge and financial resources, and to maintain the high-level political support essential to achieve the sorely needed “on-the-ground” improvements in the health and condition of marine ecosystems and in the wellbeing of coastal communities**

In order for future measures to be relevant and effective for the ocean, international, regional and national environmental institutions must be reviewed and strengthened where necessary. Many important governance measures are either insufficient to deal with modern realities, or have not yet been adequately implemented despite 20 years of global commitment to implementation. It is also necessary for governments and industry across all sectors to collaborate more than has occurred historically. The nature of this collaboration will differ by issue and across different geographies, but will include government initiatives to influence behavioural change and industry transformation, public-private partnerships, incen-

tives to shift to clean technologies, and industry funding of public programmes and scientific research. New global legal, institutional and financial frameworks will be needed to address selected ocean issues such as nutrient pollution. Lastly, a Green Economy by definition fully internalises the externalities of environmental degradation into the prices of goods and services and this is as vital for the Green Economy as it is for the terrestrial one.

The purpose of this section is to introduce proposals for a series of initiatives designed to address existing and/or future issues in a way that embraces both the Green Economy, and institutional development. Ten proposals are presented in summary, focusing on the rationale and objectives for each. Following broad agreement among the international ocean community, those meriting follow-up will need considerable future attention to develop the detail required for discussion at and beyond Rio+20.

### **5.1 OVERARCHING OBJECTIVES FOR TRANSITION TO THE BLUE-GREEN ECONOMY**

The changes that will be required to transition to a Blue-Green Economy will be a mix of physical, behavioural and institutional. The objectives below summarise the nature of changes that will be required. Each of the proposals presented in this section are compared against the objectives in the matrix; the purpose being to understand how broadly relevant each proposal is across the spectrum, which serves to re-emphasise the interconnected nature of the future transition.



**Objective 1 Actions to reduce stressors and maintain or restore the structure and function of marine ecosystems for equitable and sustainable use of marine resources and ecosystems.**

- Implement Actions to Adapt to and Mitigate Ocean Acidification
- Develop and Execute a Global Program aimed at Greater Protection and Restoration of Vital Ocean and Coastal Habitats, and develop a Global Blue Carbon Market as a means of Creating Direct Economic Gain through Habitat Protection
- Strengthen the Legal Framework to Effectively Address Aquatic Invasive Species

**Objective 2 Actions that support the Green Economy concept leading to alleviation of poverty and promotion of sustainable ocean sectors and livelihoods including actions to improve implementation at local levels through participatory processes.**

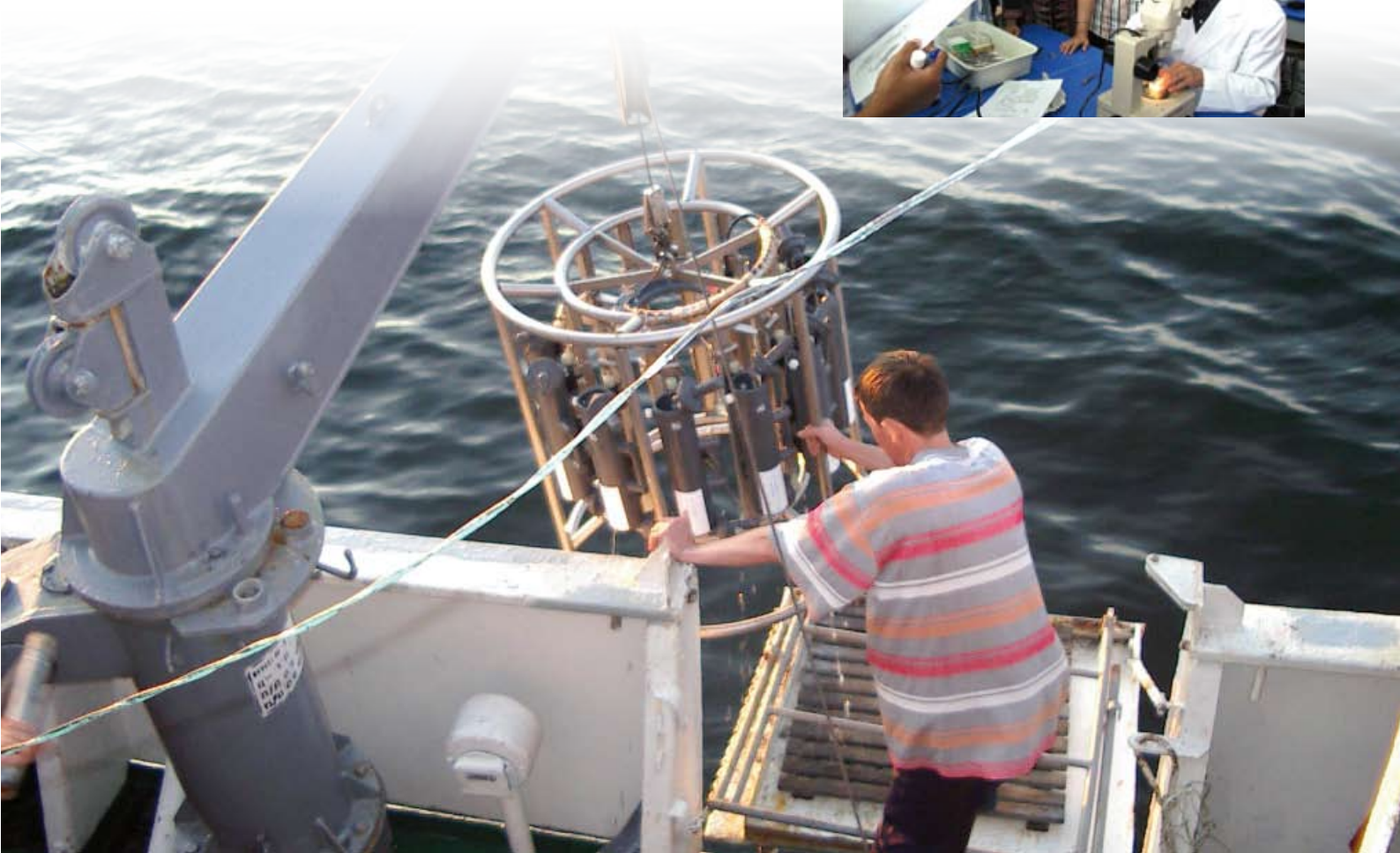
- Build Green Societies in Small Island Developing States: Addressing Key Vulnerabilities
- Increase Efforts for Responsible Fisheries and Aquaculture in a Green Economy
- Green the Nutrient Economy and Reduce Ocean Hypoxia through Policy, Regulatory and Economic Instruments that Promote Nutrient Efficiency and Recovery

**Objective 3 Actions resulting in Policy, Legal and Institutional Reforms for effective Ocean Governance, including in the High Seas, and strengthening the institutional framework, mandate and coordination of UN bodies with marine competencies.**

- Create and Implement an Institutional and Legal Framework to Protect Habitats and Biodiversity Beyond National Jurisdiction
- Reform Regional Ocean Management Organisations
- Enhance Coordination, Coherence and Effectiveness of the UN System on Oceans Issues

**Objective 4 Actions supporting marine research, monitoring and evaluation, technology and capacity transfer as a mean for improving knowledge, addressing emerging issues, developing capacities in support of sustainable use of the ocean.**

- Increase Institutional and Human Capacity for Sustained Observations, Monitoring, Marine Research, and Progress evaluation of International commitments



## MATRIX COMPARING WHICH OBJECTIVES ARE RELEVANT TO EACH PROPOSAL

	OBJECTIVE 1 Actions to reduce stressors & restore the structure and function of marine ecosystems	OBJECTIVE 2 Actions that support the Blue-Green Economy	OBJECTIVE 3 Actions leading to Policy, Legal and Institutional Reforms for effective Ocean Governance	OBJECTIVE 4 Actions supporting marine research, monitoring and evaluation, technology and capacity transfer as a mean for improving knowledge, addressing emerging issues, developing capacities in support of sustainable use of the ocean
Implement Urgent Actions to Mitigate and Adapt to Ocean Acidification	●			○
Develop and Execute a Global Program aimed at Greater Protection and Restoration of Vital Ocean and Coastal Habitats, and develop a Global Blue Carbon Market as a means of Creating Direct Economic Gain through Habitat Protection	●	○		○
Strengthen the Legal Framework to Effectively Address Aquatic Invasive Species	●	○	○	○
Build Green Societies in Small Island Developing States: Addressing Key Vulnerabilities		●		○
Increase Efforts for Responsible Fisheries and Aquaculture in a Green Economy	○	●	○	○
Green the Nutrient Economy and Reduce Ocean Hypoxia through Policy, Regulatory and Economic Instruments that Promote Nutrient Efficiency and Recovery	○	●	○	
Create and Implement an Institutional and Legal Framework to Protect Habitats and Biodiversity Beyond National Jurisdiction	○		●	○
Reform Regional Ocean Management Organisations			●	○
Enhance Coordination, Coherence and Effectiveness of the UN System on Oceans Issues			●	
Increase Institutional and Human Capacity for Sustained Observations, Monitoring, Marine Research, and Progress evaluation of International commitments		○		●

● Primary objective    ○ Secondary objective





# OBJECTIVE 1

## ACTIONS TO REDUCE STRESSORS AND MAINTAIN OR RESTORE THE STRUCTURE AND FUNCTION OF MARINE ECOSYSTEMS FOR EQUITABLE AND SUSTAINABLE USE OF MARINE RESOURCES AND ECOSYSTEMS

### Proposal 1.a

#### Implement Urgent Actions to Mitigate and Adapt to Ocean Acidification

##### RATIONALE/JUSTIFICATION

Currently the ocean absorbs more than 26% of the carbon dioxide emitted to the atmosphere from human activities resulting in increased acidity (lowered pH) of the ocean. This increased acidity has a number of effects on organisms and ecosystems, the most significant being a lowering in the concentration/availability of carbonate ion for plankton and shelled species that fix calcium carbonate. Once a pH 'threshold' is reached for a given organism, it can no longer fix calcium carbonate in its shells and is threatened with local extinction. These calcium carbonate organisms, primarily phytoplankton and zooplankton and also some molluscs, serve as the base of much of the marine food chain across all ecosystem types, underscoring the potential impact of acidification on entire ecosystems. Marine farming of molluscs can also be affected. This 'other CO<sub>2</sub> problem' has only emerged within the last decade and more research is needed to develop meaningful projections of its impacts on marine ecosystems and fisheries and to identify thresholds beyond which marine ecosystems may not be able to recover.

In addition to greater research, action is required to reduce and reverse the impacts of acidification. Immediate and coordinated action by the international scientific community and policymakers is required in order to urgently mitigate this emerging issue – this was encompassed in the Monaco Declaration in 2008 but has not yet been implemented. While this proposal currently addresses ocean acidification only, the issue of carbon-storage in sub-sea geological formations will also need addressing.

##### MAIN OBJECTIVES OF THE PROPOSAL

1. Launch a global inter-disciplinary program on ocean acidification risk assessment, to provide global, regional, and national forecasts, including socio-economic impacts, for use by decision makers. Include development of linkages between economists and scientists to evaluate the socioeconomic impacts. Identify 'point of no return' tipping points where acidification could lead to marine ecosystem collapse in selected regions most prone to acidification.
2. United Nations Framework Convention on Climate Change (UNFCCC) negotiations must consider not only the effect of increased levels of atmospheric carbon dioxide on the radiation balance of Earth but the negative impact on ocean chemistry and ecosystems. Results of above 'tipping point' analyses should inform the setting of aggressive targets and schedules for GHG reduction through shifts to low carbon energy production.
3. Promote research and build capacity to better understand the impacts of Ocean Acidification on marine ecosystems

##### EXPECTED RESULTS

Agreement by scientists, policy makers and industry will increase the likelihood of implementation of the Monaco Declaration on Ocean Acidification and reverse impacts of acidification. High level commitment to take urgent action on climate change mitigation to avoid approaching or reaching ocean acidification 'tipping points'.

## Proposal 1.b

**Develop and Execute a Global Programme aimed at Greater Protection and Restoration of Vital Ocean and Coastal Habitats, and develop a Global Blue Carbon Market as a means of Creating Direct Economic Gain through Habitat Protection**

### **RATIONALE/JUSTIFICATION**

Vital coastal habitats include those that provide breeding grounds and nurseries for fisheries, have strong biodiversity values, offer blue carbon opportunities, and offer opportunities for sustainable human uses such as ecotourism. The institutional response to this well recognised issue has been inadequate in many countries and in high seas areas. Ecosystem services provided by the marine environment are of crucial importance for food security and poverty eradication, as well as many of the sectors currently driving the economies of coastal nations.

Restoration of habitat and biodiversity values can only occur once protection measures are in place. In some cases this will mean creating new MPAs or Marine Management Areas, and in other cases it will require a change of use to allow key values to be protected including sustainable use. Implementation will require investment from the international community and nations; removal and/or addition of subsidies to change use patterns towards sustainability; other economic instruments (pollution taxes, payment for ecosystem services, etc.); creation and dissemination of research, tools, and capacity building. Buy-in will be required from industry, which seeks a predictable regulatory regime, to introduce sustainable development methods and tools and transition toward a Green Economy. Ultimately however, despite the best efforts of the global community, responsibility for protection and restoration of vital coastal habitats will require implementation from member states, as these habitats generally fall within national jurisdictions.

Economic incentives are one of the means by which increased protection of vital coastal and marine habitats will occur in a Green Economy.

### **MAIN OBJECTIVES OF THE PROPOSAL**

1. Set coastal habitat protection and restoration targets for nations with clear timelines and commitments, and promote the Green Economy through identification and development of tools for protection and sustainable management, including creation of financial sustainability mechanisms, economic valuation (both market and non-market values) of key habitats, promotion of research, and incentives to promote change to more sustainable uses such as ecotourism and small-scale fisheries.
2. Improve institutional capacity at the international and national level to implement tools through subsidising land / ocean use change to more sustainable methods, monitoring and reporting implementation, and building capacity through training.
3. Develop and implement a global strategy on blue carbon, including:
  - a. agreed standards for blue carbon monitoring and certification
  - b. economic valuation methodologies for blue forest ecosystem services.
4. Work with existing international carbon markets to define and implement a blue carbon market for protecting marine and coastal carbon sinks, and set targets for habitat protection in the context of blue carbon.
5. Create global acceptance of ocean and coastal habitats as a new form of tradable carbon market via a global blue carbon fund.
6. Within international climate change policy instruments, create mechanisms to allow the future use of carbon credits for marine and coastal ecosystem carbon capture and effective storage.

### **EXPECTED RESULTS**

Increase in the amount and type of protected coastal habitats around the world. Move toward a Green Economy implemented through change to environmentally and socially sustainable, but economically profitable practices, such as ecotourism, small-scale fisheries and sustainable aquaculture practices, and other habitat market values. Provision (or removal, as appropriate) of subsidies and other incentives through partnerships with the private sector/ industry, and institutional capacity building leads to national level of institutional capacity and willingness to change existing practices. Greater percentage of protected habitats and economic gain through a blue carbon market demonstrate the value of a Blue-Green economic perspective.



# OBJECTIVE 1

## ACTIONS TO REDUCE STRESSORS AND MAINTAIN OR RESTORE THE STRUCTURE AND FUNCTION OF MARINE ECOSYSTEMS FOR EQUITABLE AND SUSTAINABLE USE OF MARINE RESOURCES AND ECOSYSTEMS

### Proposal 1.c

#### Strengthen the Legal Framework to Effectively Address Aquatic Invasive Species

##### RATIONALE/JUSTIFICATION

The diverse and widespread impact of aquatic invasive species means that they affect nearly all ocean and coastal management programmes. Invasive species threaten biodiversity, marine and upstream industries (fisheries, hydropower, tourism, etc.) and human health. The global economic impacts of invasive aquatic species, including through disruption to fisheries, fouling of coastal industry and infra-structure and interference with human amenity, have been estimated at USD 100 billion per year, while the projected response costs are merely in the range of four per cent of the impact. Moreover, unlike other key threats to marine ecosystems such as habitat loss, pollution and overfishing, impacts of established aquatic invasives are virtually impossible to reverse once a species has established itself.

A lot has been achieved since the call for urgent action from Rio 1992 Conference, including the notable adoption by IMO of the International Convention for the Management and Control of Ships' Ballast Water and Sediments, however, until the Convention comes into force and is fully under implementation, risks from invasives will persist. The marine bioinvasions rate has been reported as high as up to one every nine weeks and over 80% of the world's 232 marine ecoregions reported the presence of invasive species. Invasion of the European Zebra Mussel in the North American Great Lakes, the Asian Golden Mussel in the inland waterways of Argentina, Brazil, Paraguay and Uruguay threatening the whole Amazon Basin, the Comb Jelly Fish in the Black and Caspian Seas are some of the classic examples of bio-invasions, mainly mediated through ballast water and hull fouling. The anticipated coming into force of the Convention has catalysed the creation of a completely new ballast water treatment industry already valued in the tens of billions of dollars.

The severe economic and ecological impacts of these invasions provide some of the starkest case studies of the devastating effects of aquatic invasive species. Without timely and globally coordinated measures and a legally binding framework applicable world-wide, the impact of invasive species will only get worse over time. The adoption of an international treaty to address invasions through ships' ballast water paved the way towards a global approach and demonstrated the effectiveness of Member States working together under the right auspices. This should be followed by a similar response to ships' hull fouling, possibly the second most significant vector for aquatic invasions and by regulatory measures to control other means of transferring unwanted organisms from one place to another.

Poorly managed aquaculture (and often recreational fisheries) can also result in the invasion of alien species. Such is the case of tilapia that can be found in many basins in Latin America and the Caribbean and salmonids that are currently wide spread in the southern hemisphere. Although in both cases there are relevant positive food security and livelihoods effects from the farming and fishing of these species. FAO has made important efforts to guide the proper use of alien species in aquaculture and this has been clearly expressed in article 9 of the Code and in specific guidelines.

The global efforts need to focus on building the right legal framework to address aquatic invasions in a coordinated and consistent manner. Without such a focused, sustained and coordinated approach, the significant progress achieved since Rio 1992 will not be capitalised on, and the global benefits and momentum accrued so far in addressing one of the greatest threats to world's oceans may well be lost.

##### MAIN OBJECTIVES OF THE PROPOSAL

1. Accelerate the global efforts to bring the ballast water and sediments management convention into force.
2. Continue the efforts to implement the voluntary guidelines on hull fouling and, based on the lessons learned, invite the IMO to explore the possibility of progressing towards a more effective instrument to address this issue.
3. Identify ongoing threats including species and pathways and prevent movement and utilisation of potentially invasive species into specific areas of ecological importance without proper risk assessment and management.
4. Working with industry, facilitate the development of mechanisms for compliance with regulatory measures
5. Develop and promote the use of market instruments to control/ manage invasive species transfers.
6. Increase scientific knowledge of aquatic invasive species, and improve its availability and dissemination.
7. Continued innovation in ballast water treatment technologies catalysed by anticipated coming into force of ballast water convention.

##### EXPECTED RESULTS

Decline (or halt) of the introduction of new invasive species and reduction in the adverse impacts from existing species through technology innovation, coordinated global monitoring and enforcement and effective international, regional and national responses.

# OBJECTIVE 2

**ACTIONS THAT SUPPORT THE GREEN ECONOMY CONCEPT LEADING TO ALLEVIATION OF POVERTY AND PROMOTION OF SUSTAINABLE OCEAN SECTORS AND LIVELIHOODS INCLUDING ACTIONS TO IMPROVE IMPLEMENTATION AT LOCAL LEVELS THROUGH PARTICIPATORY PROCESSES.**

## Proposal 2.a

### Build Green Societies in Small Island Developing States: Addressing Key Vulnerabilities

#### RATIONALE/JUSTIFICATION

SIDS are keenly aware of the importance of the marine environment and its resources to their sustainable development and economic stability. However, as highlighted at the 2010 five-year Review of the Mauritius Strategy for Sustainable Development in SIDS, they are faced with increasing vulnerabilities in spite of progress made over past decades. SIDS remain particularly at risk due to their vulnerability to climate change, their relative geographical isolation and small size, and their exposure to global financial and other crises. In order for SIDS to effectively address these vulnerabilities, human, technical, and financial resources are required to develop and implement cross-cutting approaches to the planning and management of the ocean and coasts. For SIDS, as reiterated at PrepCom II, a Green Economy is a Blue Economy. After all, nearly all SIDS are coastal zones in their entirety. Consequently, ocean, coastal and fisheries-related issues must be given prominence.

SIDS expect Rio+20 to provide support for sustainable ocean development and protection of resources. Measures could include actions to reduce fishing overcapacity, to establish MPAs, enhance and support local coastal management efforts, improve wastewater treatment as well as solid waste management and recycling. Significantly, capacity development could take place through SIDS-SIDS partnerships based on the sharing and consolidation of unique SIDS approaches to coastal management; such as the Pacific Locally Managed Marine Areas (LMMA) network, the recognition and transmission of local and indigenous knowledge and customary management of the coastal environment, and community participation in scientific coastal monitoring, management and decision-making as practiced in UNESCO's Sandwatch programme.

Greater understanding is required of the opportunities associated with economic sectors of particular importance to SIDS economies, such as fisheries, tourism, renewable ocean energy, and waste management. Awareness of where the opportunities lie to identify and reinforce appropriate and useful practices in the SIDS context, and – with a point of departure anchored in SIDS – advance the development of green SIDS societies. This, in turn, will contribute towards planning within the global ocean community for a transition from non-sustainable to sustainable approaches. This will help with poverty reduction, food security, and provide long-term benefits.

#### MAIN OBJECTIVES OF THE PROPOSAL

1. Understand and plan how unique SIDS approaches to ocean, coastal and fisheries management may contribute towards the perpetuation and reinforcement of Green Societies and sustainable development in SIDS. Undertake an analysis of the key vulnerabilities, challenges and opportunities facing SIDS in areas such as fisheries, tourism, water, energy and waste management; as well as the required enabling technological, policy and institutional requirements to enhance Green Societies in SIDS.
2. Develop plans for capacity building, technology transfer and interregional SIDS-SIDS exchanges in support of strengthened ICZM and ecosystem based management in SIDS, that recognise and build upon endogenous institutions and practices.
3. Provide and strengthen SIDS access to global databases, establish national data management systems, and promote innovative and cost-effective technologies, including community-based observing and management systems, with technology transfer to and between SIDS
4. Identify and develop sustainable financing plans for SIDS, including through public-private partnerships

#### EXPECTED RESULTS

A clear plan to address the particular vulnerabilities of SIDS, including their finite natural resource base, while supporting the attainment of sustainable development targets by contributing to poverty reduction, climate change adaptation and environmental management. This work will identify how knowledge relating to science, technology and innovation alongside local and indigenous knowledge can assist in the building of Green Societies. Particular emphasis will be placed on reducing and addressing environmental degradation in SIDS, and on providing economic opportunities from appropriate technologies in areas such as local coastal and marine management, waste reduction, water supply and sanitation, fisheries, and ocean-based renewable energy production.

# OBJECTIVE 2

**ACTIONS THAT SUPPORT THE GREEN ECONOMY CONCEPT LEADING TO ALLEVIATION OF POVERTY AND PROMOTION OF SUSTAINABLE OCEAN SECTORS AND LIVELIHOODS INCLUDING ACTIONS TO IMPROVE IMPLEMENTATION AT LOCAL LEVELS THROUGH PARTICIPATORY PROCESSES.**

## Proposal 2.b

Increase Efforts for Responsible Fisheries and Aquaculture in a Green Economy

### RATIONALE/JUSTIFICATION

In 2009, capture fisheries and aquaculture production was approximately 145 million tonnes, of which marine capture production was 78.6 million tonnes. Almost 81%, or 118 million tonnes, of world fish production was used for human consumption, providing about 4.2 billion people with more than 15% of their average per capita intake of animal protein. The sectors provided jobs for about 45 million part-time and full-time fishers and fish farmers of whom at least 12% were women. If secondary activities are included, there are approximately 180 million people employed in the entire fish industry, supporting the livelihoods of a total of about 540 million people. In addition to a critical contribution to food security and poverty alleviation, the two sectors also contribute to economic growth and an estimated 39% of total fish production entered into international trade in 2009 with an export value of nearly USD 100 billion. Approximately 50% of the fish in international trade originates from developing countries.

With approximately 1 billion people currently suffering from under-nourishment and the anticipated growth in the world population to 9 billion people by 2050, responsible and sustainable fisheries and aquaculture have an essential role to play in ensuring food security and nutrition for all. This will require simultaneously meeting and overcoming widespread over-fishing which currently threatens the future of capture fisheries in many areas, and encouraging increased fish production through sustainable aquaculture in accordance with an ecosystem approach. This proposal aims to increase awareness at all levels of the critical need to ensure responsible fisheries management and aquaculture development through rapid progress in implementation of the FAO Code of Conduct for Responsible Fisheries and its related instruments and approaches. It responds to the calls from the international community to take the actions necessary to restore exploited fish stocks to levels that can produce the maximum sustainable yield, to support the sustainable development of aquaculture and to maintain the productivity and biodiversity of important and vulnerable marine areas, including areas within and beyond national jurisdiction.

### MAIN OBJECTIVES OF THE PROPOSAL

1. Promote and raise awareness of the important role, benefits and contribution of fisheries and aquaculture to food security, nutrition and economic development. Connect with other sectors and policy and decision-makers at all levels to ensure that related issues are included on the global agenda and considered in national and international policies and action plans. Advance the benefits of responsible fisheries management and aquaculture development, highlighting the principles of long-term sustainable use and conservation.
2. An all-inclusive application of the Code and its four associated International Plans of Action<sup>27</sup> through the ecosystem approach to fisheries (EAF) and to aquaculture (EAA), in support of fisheries and aquaculture operations that are sustainable, promote equity and are resilient to climate change and other external forcing factors.
3. To promote fisheries and aquaculture food production systems and strategies that minimise damage to the aquatic and atmospheric environment, improve energy efficiency and reduce waste throughout the supply chain. Such approaches include awareness raising of GHG mitigation technologies, low impact fuel efficient fish capture techniques and training in resource stewardship.
4. Participatory development and implementation of voluntary guidelines for securing sustainable small scale fisheries to better integrate the sector into national development policies and to enhance the sector's contribution to food security and poverty alleviation, within a pro-poor, human rights and ecosystem based framework.
5. Promote aquaculture development strategies that ensure human and ecological wellbeing and achieve sustainability through effective governance at relevant scales (e.g. farm, local, regional, and global), also considering the application of main principles underlying the FAO aquaculture certification guidelines
6. Optimise the value of fisheries and aquaculture products through the development of technologies and practices to reduce post-harvest losses and by improving the utilisation of low value species and, where appropriate, by-catch. Improve the capacity of the fisheries and aquaculture sectors to implement these measures throughout the value chain.

### EXPECTED RESULTS

Increased efforts and resources from global, regional and national institutions towards achieving the already agreed goals related to fisheries, aquaculture and sustainable use of marine resources and ecosystems included in the Millennium Development Goals, the WSSD Plan of Implementation and other agreements and declarations, leading to greatly enhanced progress towards those ends. Commitment by Leaders in 2012 in Rio: Implementation through FAO, UNGA and regional fisheries bodies by 2013.

<sup>27</sup>. International Plans of Action for: i) Reducing Incidental Catch of Seabirds in Longline Fisheries; ii) Conservation and Management of Sharks; iii) Management of Fishing Capacity; and iv) Prevent, Deter, and Eliminate Illegal, Unreported and Unregulated Fishing



## Proposal 2.c

### Green the Nutrient Economy and Reduce Ocean Hypoxia through Policy, Regulatory and Economic Instruments that Promote Nutrient Efficiency and Recovery

#### RATIONALE/JUSTIFICATION

Mankind has arguably perturbed the global cycle of nitrogen even more than that of carbon; a 2009 Nature Report, “A Safe Operating Space for Humanity”, determined that excess nitrogen in the environment was one of 3 of the 9 ‘planetary boundaries’ that had already been exceeded. Since the early 1900s with the invention of the “Haber-Bosch” process, and dramatically accelerating beginning in the 1950’s, humans have been converting atmospheric nitrogen gas into ‘reactive’ forms like ammonia and nitrate to produce fertilisers for agriculture, at current levels of about 100 million mt/year. This of course has generated substantial benefits in feeding a burgeoning global population through the ‘green revolution’ which featured massive increases in application of industrial fertilisers to agriculture and delivered dramatic increases in agricultural productivity. However, the massive increase in available reactive nitrogen over the last 50 years has led to a roughly three-fold increase in the amount of nitrogen – from agricultural runoff (fertiliser ~45% and manure ~45%) and wastewater (~10%) - reaching coasts and oceans from the continents. Nitrogen (and phosphorus) are essential nutrients for growth of the ocean’s plankton, but excess amounts can create dead zones in which large numbers of decomposing plankton consume almost all available oxygen, seriously impacting coastal ecosystems and the livelihoods that depend on them. In recent decades, there has been an alarming increase in such hypoxic zones across the world’s bodies of water, such as in the Black Sea, Baltic Sea and Gulf of Mexico. While the emergence of modern wastewater collection and treatment systems in the late nineteenth century made enormous contributions to human health by reducing the incidence of water borne diseases in rapidly growing, dense urban environments, much of the world’s sewage remains poorly treated or not treated at all, which, combined with nutrient burdens from agricultural run-off (fertiliser, manure), has led to continued growth in the occurrence of coastal hypoxic zones and economic damages approaching USD 100 billion per year in the EU alone. At present, most of humanity – particularly in the industrialised world but increasingly in fast developing middle income countries - practices a ‘linear’ approach to managing nutrients involving: harvesting nitrogen from the air for conversion to fertiliser, applying to agricultural land (with often substantial losses to rivers and downstream coasts), growing and harvesting crops for human and livestock consumption, consuming food products and excreting human and livestock waste, collecting human excreta through wastewater systems, and releasing a sizeable fraction of these waste products, untreated, to the coastal zone. The urgency of the ocean hypoxia issue underscores the need to begin a transition to much more cyclic management of nutrients whereby efficiency of fertiliser use is increased and the majority of human and livestock ‘waste’ nutrients are recovered and reused for fertiliser and other needs. In parallel, some analyses project that available phosphorus reserves could run out as early as this century with unprecedented effects on global food security; whether it is this soon or somewhat longer doesn’t negate the fact that eventually, phosphorus recovery from the waste stream will need to become the norm, not the exception if long-term global food security is to be ensured.

#### MAIN OBJECTIVES OF THE PROPOSAL

1. Application of appropriate legal, regulatory and economic instruments should be scaled up to catalyse incremental transformation of the nutrient economy from linear to much more cyclic approaches over an appropriate time frame. Policy and regulatory instruments could include stricter regulation of nutrient removal from wastewater (and recycling of recovered nutrients into agriculture), mandatory nutrient management plans in agriculture, enhanced regulation of manure, and others. Economic instruments could include taxes on fertiliser and/or agricultural and wastewater nutrient emissions, cap and trade frameworks on nutrient emissions and/or fertiliser production, and ‘good’ subsidies that encourage nutrient recovery and recycling.
2. Send clear regulatory and market signals to the agriculture, wastewater management and fertiliser industries of the urgent need to transition towards enhanced fertiliser use efficiency and sizeable recovery and reuse of nutrients from the human and livestock waste streams, and create new business partnerships between the agriculture, fertiliser, and wastewater management industries.
3. Catalyse innovation in fertiliser management and use efficiency and human and livestock waste nutrient recovery technologies, and create whole new sectors and associated jobs.
4. Fertiliser companies in countries with Emissions Trading Schemes that successfully partnered and innovated in waste nutrient recovery and fertiliser ‘remanufacture’ would also be able to sell carbon emissions reduction credits due to the sizeable reductions in their emissions of greenhouse gases as they transition away from energy intensive Haber-Bosch production.

#### EXPECTED RESULTS

Gradual increase in the volume of fertiliser produced from recovered nitrogen (and phosphorus); this diversification of sources for fertiliser raw materials helps to moderate fertiliser prices and their volatility, enhancing global food security. Increased efficiency in agricultural use of both manufactured and recovered fertiliser in response to market and regulatory signals. Market and regulatory mechanisms help to catalyze the creation and dissemination of nutrient recovery technologies and supply chains, create sizeable numbers of new businesses and jobs, and are consistent with the Green Economy concept. Decreases over time in the loads of nitrogen and phosphorus entering coastal areas will reduce coastal hypoxia and restore associated ecosystems and livelihoods..

# OBJECTIVE 3

**ACTIONS RESULTING IN POLICY, LEGAL AND INSTITUTIONAL REFORMS FOR EFFECTIVE OCEAN GOVERNANCE, INCLUDING IN THE HIGH SEAS, AND STRENGTHENING THE INSTITUTIONAL FRAMEWORK, MANDATE AND COORDINATION OF UN BODIES WITH MARINE COMPETENCIES.**

## Proposal 3.a

**Create and Implement an Institutional and Legal Framework to Protect Habitats and Biodiversity Beyond National Jurisdiction**

### **RATIONALE/JUSTIFICATION**

Habitats and biodiversity that lie outside the jurisdiction of nations - referred to as BBNJ, increasingly require urgent attention. Technological change and the emergence of new economic opportunities such as deep sea mining, more intensive fishing in ABNJ, biogenetics, and deeper oil and gas drilling all increase risks to areas that historically were not under threat. The biodiversity and habitats in these areas have major value, but are generally not as well understood. Inadequate governance is likely to affect the conservation and sustainable use of marine biodiversity in ABNJ. A process should be initiated, with a view to ensure that the legal framework for the conservation and sustainable use of marine biodiversity in ABNJ effectively addresses those issues by identifying gaps and ways forward, including through the implementation of existing instruments and the possible development of a multilateral agreement under the United Nations Convention on the Law of the Sea. Such a process could both provide crucial momentum to stimulate cooperation between existing international institutions that manage the marine environment, and resolve long-standing issues relating to the legal regime for establishment of protected areas in marine ABNJ.

### **MAIN OBJECTIVES OF THE PROPOSAL**

1. Initiate a process towards the identification of gaps and ways forward, including through the implementation of existing instruments and the possible development of a multilateral agreement under the United Nations Convention on the Law of the Sea. This process, including a possible implementing agreement would address the conservation and sustainable use of marine biodiversity in ABNJ, in particular, together and as a whole, marine genetic resources, including questions on the sharing of benefits, measures such as area-based management tools, including marine protected areas, and environmental impact assessments, capacity-building and the transfer of marine technology
2. Agree targets and a process for identification and protection of BBNJ, including implementation of Nagoya decisions (Conference of the Parties to the Convention on Biological Diversity, CBD COP 10) on marine biodiversity conservation.
3. Create institutional mechanisms for implementation, which should emphasise better coordination and cohesion among relevant intergovernmental organisations concerned with the marine environment, better implementation of existing instruments and should examine the need for designation of a lead UN agency.

### **EXPECTED RESULTS**

A globally consistent and universally applied governance framework for ABNJ, including an adequate institutional support, based on the precautionary principle and ecosystem approach that ensures the long term conservation and sustainable management of ABNJ marine biological diversity and marine ecosystems which leads to the greater protection of ABNJ.

## Proposal 3.b

### Reform Regional Ocean Management Organisations

#### **RATIONALE/JUSTIFICATION**

Effective ocean management requires multilateral and regional management frameworks. Many regional marine institutions exist to this end, often with a sectoral mandate. While certain of these institutions have made progress within their specific sector, efficiency gains could be reached by improving coordination and cooperation among the different regional sectoral institutions, and/or strengthening individual ones. For regional management organisations that deal with ABNJ, this is even more important. There is a need to assess whether existing institutional structures are prepared to face future challenges.

Regional marine organisations should be able to effectively manage marine areas and provide guidance on the coordination and implementation of international commitments. Operational ability and flexibility to implement and enforce management measures through regional cooperation must be reflected in appropriate mandates and effective institutions.

Guidance on how to coordinate, integrate, or implement these various international commitments and demands should be developed. There is an urgent need to reform regional ocean governance, in order to ensure that either existing organisations meet the new challenges or new organisations are put in place that have the mandate, operational ability and flexibility to implement and enforce reforms.

#### **MAIN OBJECTIVES OF THE PROPOSAL**

1. Improve coordination and cooperation among the different regional marine organisations and strengthen the individual ones to ensure effective management, including conservation and sustainable use of the marine environment through ecosystem-based approaches.
2. Regional organisations with a sectoral mandate should increase cooperation with other regional marine organisations to ensure a broad ecosystem focus.
3. Implementation of 'better practice' with assistance to and through cooperation among Regional Fisheries Management Organisations and Arrangements (RFMO/As).
4. Where appropriate, consideration should be given to creation of ocean management organisations with a broad ecosystem focus such as those being advanced through the GEF LME Program in areas such as the Benguela Current and Guinea Current LME.

#### **EXPECTED RESULTS**

Stronger regional institutional capacity, across a range of issues rather than a single-sector focus, will bridge the gap that currently exists between international and national bodies, and will provide the framework for implementing global and regional agreements in an ecosystem-based way that is tailored for each regional context. Stronger regional institutional cooperation and coordination across a range of issues, will ensure effective implementation global and regional agreements in a way that is tailored for each regional context.



# OBJECTIVE 3

**ACTIONS RESULTING IN POLICY, LEGAL AND INSTITUTIONAL REFORMS FOR EFFECTIVE OCEAN GOVERNANCE, INCLUDING IN THE HIGH SEAS, AND STRENGTHENING THE INSTITUTIONAL FRAMEWORK, MANDATE AND COORDINATION OF UN BODIES WITH MARINE COMPETENCIES.**

## Proposal 3.c

Enhance Coordination, Coherence and Effectiveness of the UN System on Oceans Issues

### RATIONALE/JUSTIFICATION

The current UN interagency mechanism relating to oceans and coastal issues, UN-Oceans, was created by the UN High-Level Committee on Programmes in 2003 to *inter alia* establish an effective, transparent and regular inter-agency coordination mechanism on ocean and coastal issues within the UN system, as well as to facilitate, as appropriate, inputs to the annual report on Oceans and the Law of the Sea of the Secretary-General. UN-Oceans operates as a flexible network to coordinate and review joint activities, establish interagency programmes of work and support the programmatic framework of recommendations from the JPOI and the ICP. Given the complex, multi-sectoral and multi-national nature of ocean issues, where management responsibilities are fragmented, there is a need for a stronger and more visible mechanism for foster dialogue, coordination and cooperative actions among UN Agencies. Strengthening and improving such coordination would enhance UN system delivery, performance and impacts and allow for more transparent and open procedures in addressing current and emerging issues at all levels. It could serve to reinforce assessment and monitoring and enable more coherent and strategic approaches among all UN agencies.

UNCLOS provides an integrated legal framework on which to build sound and effective regulations to the different uses of the ocean. These have been implemented by the UN specialised agencies and programmes over the last 30 years, including the members of UN Oceans since 2003. Nevertheless, severe limitations exist for monitoring and enforcing these regulations. National and international institutions are fundamentally weak. They are usually compartmentalised on a sector by sector division of duties and responsibilities, leaving little room for integrated policy-making or addressing issues that cut across several domains.

Failure to halt environmental degradation is at least partially caused by institutional weaknesses in developing and implementing policies on sustainable development. International environmental governance for the ocean (including UN Oceans) must be strengthened through:

- Implementing what has already been agreed;
- Creating a strong and accessible science base and policy interface;
- Developing a global authoritative voice for environmental sustainability;
- Achieving effectiveness, efficiency and coherence within the UN system;
- Securing sufficient and predictable funding;
- Ensuring a responsive and cohesive approach to meeting the needs of countries

### MAIN OBJECTIVES OF THE PROPOSAL

1. Review UN-Oceans structure, function and achievements and consider strengthening for a more effective, cross-cutting, high-level, and transparent coordination mechanism for ocean and coastal issues.
2. Various options and models such as a marine stewardship council, Inter-agency Platform (e.g. the Joint United Nations Programme on HIV/AIDS - UNAIDS), High-level mechanism in the Secretary General's Office could be assessed in this context.
3. Review and strengthen institutional relationships between UNICPOLOS and the Commission on Sustainable Development in order to ensure that oceans are considered regularly within the Commission on Sustainable Development (CSD) work program.
4. Ensure that an effective, UN Regular Process on Global Reporting and Assessment is supported to underpin the coordination processes that have been established.
5. States and international organisations to provide sufficient resources for the UNICPOLOS and UN coordination mechanism (UN-Oceans) to fulfil their roles.
6. Improve coordination and delivery of ocean interventions at the national level through One UN process.
7. Create actions that strengthen the LME project coordination among the UN agencies (UNDP, UNEP, UNIDO, IOC/UNESCO, FAO). Such efforts can lead to an additional USD 3 billion by 2020 for the LME approach for the assessment and management of ocean goods and services

### EXPECTED RESULTS

An enhanced UN-Oceans would improve interagency coordination, coherence and cost efficiency, lead to more strategic outcomes across UN system on oceans issues, promote joint programming building on comparative advantages of agencies on ocean matters, etc.

# OBJECTIVE 4

**ACTIONS SUPPORTING MARINE RESEARCH, MONITORING AND EVALUATION, TECHNOLOGY AND CAPACITY TRANSFER AS A MEAN FOR IMPROVING KNOWLEDGE, ADDRESSING EMERGING ISSUES, DEVELOPING CAPACITIES IN SUPPORT OF SUSTAINABLE USE OF THE OCEAN.**

## Proposal 4.a

Increase Institutional and Human Capacity for Sustained Observations, Monitoring, Marine Research, and Evaluation of Progress Toward International Commitments

### RATIONALE/JUSTIFICATION

The formulation of sustainable, ecosystem-based policies and measures for oceans and coasts needs to be supported by science including research and observations, and their implementation requires strong institutional frameworks at national, regional and global scales.

Policy making and implementation related to sustainable development must begin, and end, with collecting and analysing data and information about what is happening, including information on natural systems (physical, chemical, and biological providing ecosystem services), and on relevant related human systems (institutional, implementation effectiveness, social and economic information). The ocean is no different. This has been recognised by the UNGA and the WSSD, which have both called for a mechanism for the global reporting and assessment of the ocean, which will have to rely on sustained observations and monitoring of the ocean, human impact on the ocean, and relevant governance at multiple levels. In 2005, the UNGA launched the start-up phase of the Regular Process, called the assessment of assessments, to initiate such a mechanism. After completing the start-up phase, the Regular Process has entered its first cycle (2010-2014). It is critical that UN Member States fulfil commitments made in 2002, and provide the Regular Process with appropriate support so that the planned global assessment can be delivered in 2014, in time for the CSD review of the ocean, and thereafter on a five-year basis.

Scientific monitoring and assessment are essential to provide best possible advice in identification of impact of management options and where there is uncertainty, to use the precautionary approach and adaptive management that allows change in practice over time as scientific evidence increases. Although scientific monitoring and research are strong in many developed countries, greater institutional capacity is required in developing countries and at the international level. The oceans remain the least explored and understood part of our planet.

Capacity development remains an issue of central importance to developing states and SIDS, which have continued to reiterate this priority in various fora, such as the 2010 meeting of the UN Informal Consultative Process on Oceans and the Law of the Sea (2011). In addition to weaknesses at the national level for scientific monitoring, there is no single agency within the international community responsible for monitoring and reporting on the implementation of global environmental programmes, targets and institutions such as those arising from Rio and the JPOI. It is therefore impossible to comprehensively and consistently evaluate progress at a global, regional or national level.

### MAIN OBJECTIVES OF THE PROPOSAL

1. Promote a science-policy mechanism at national and regional levels through the UN Regular Process as a key mechanism to ensure that emerging issues are promptly reviewed and properly addressed in various decision-making and regulatory frameworks.
2. Improve the readiness of the GOOS to meet the requirements for global ocean assessment, in addition to requirements for climate, through reinforcement of national and intergovernmental action.
3. Commit Member States and international financial institutions to provide appropriate means for the Regular Process to operate.
4. Conduct a global and regional assessment of capacity development needs in the field of ocean management, governance, marine scientific research, and observation and develop and implement a global strategy for addressing these needs, through partnership with member states, donors, UN agencies, global financial institutions, and the private sector.
5. Promote effective conservation and management measures in developing countries by scientifically assessing environmental factors and trends, including climate change and ocean acidification.
6. Appoint an international body charged with collecting and collating national, regional and international information on oceans and coastal areas for program, target and institutional evaluation purposes.
7. Develop agreed tangible outcomes against which to report and demonstrate implementation success of international programmes and targets.

### EXPECTED RESULTS

Improved knowledge of impact of human activities and a stronger scientific basis for decision-making will provide a more secure foundation for decision making and allow effective adoption of the precautionary approach and adaptive management.

An agreed evaluation framework and indicators against which to assess progress by a single agency would assist progress toward the sustainable development of oceans and implementation of agreements. This will contribute to the coming together of the three pillars of sustainable development through the regular collection and assessment of information on the social and economic wellbeing of coastal communities by a singular body charged with monitoring and evaluation.

## LIST OF ACRONYMS

ABNJ	Area Beyond National Jurisdiction
ALDFG	Abandoned, lost or otherwise discarded fishing gears
BBNJ	Biodiversity Beyond National Jurisdiction
CBD COP	Conference of the Parties to the Convention on Biological Diversity
COFI	Committee on Fisheries
CoML	Census of Marine Life
CSD	Commission on Sustainable Development
EEZ	Exclusive Economic Zone
ESSP	Earth System Science Partnership
ETS	Emissions Trading System
EU	European Union
FAO	Food and Agriculture Organisation
GDP	Gross Domestic Product
GEF	Global Environment Facility
GHG	Greenhouse Gas
GIS	Geographic Information Systems
GOOS	Global Ocean Observing System
IAEA	International Atomic Energy Agency
ICM	Integrated Coastal Management
ICSU	International Council for Science
IGBP	International Geosphere-Biosphere Programme
IHDP	International Human Dimensions Programme on Global Environmental Change
ILO	International Labour Organisation
IMO	International Maritime Organisation
IOC/UNESCO	Intergovernmental Oceanographic Commission of the United Nations Educational, Scientific and Cultural Organisation
IPCC	Intergovernmental Panel on Climate Change
IPOA-IUU	International Plan of Action to Prevent, Deter and Eliminate Illegal, Unreported and Unregulated Fishing
ISA	International Seabed Authority
ITCP	Integrated Technical Co-operation Programme
IUU	Illegal, Unreported and Unreported fishing
JPOI	Johannesburg Plan of Implementation
LBS/A	Land Based Sources and Activities
LME	Large Marine Ecosystem
LMMA	Locally Managed Marine Areas
MARPOL	International Convention for the Prevention of Pollution from Ships
MPA	Marine Protected Area
OSPAR	Convention for the Protection of the Marine Environment of the North-East Atlantic
PEMSEA	Partnerships in Environmental Management for the Seas of East Asia
PSSA	Particularly Sensitive Seas Areas
RFMO/As	Regional Fisheries Management Organisations and Arrangements
SIDS	Small Island Developing States
UN	United Nations
UNAIDS	Joint United Nations Programme on HIV/AIDS
UNCLOS	United Nations Convention on the Law of the Sea
UNCSD	United Nations Conference on Sustainable Development
UNICPOLOS	United Nations Informal Consultative Process on the Law of the Sea
UN-DESA	United Nations Division of Economic and Social Affairs
UN-DOALOS	United Nations Division of Ocean Affairs and the Law of the Sea
UNDP	United Nations Development Programme
UNFCCC	United Nations Framework Convention on Climate Change
UNFSA	United Nations Fish Stocks Agreement
UNGA	United Nations General Assembly
UNIDO	United Nations Industrial Development Organisation
UN-REDD	United Nations collaborative initiative on Reducing Emissions from Deforestation and forest Degradation
WCRP	World Climate Research Programme
WHO	World Health Organisation
WMO	World Meteorological Organisation



