INTERGOVERNMENTAL OCEANOGRAPHIC COMMISSION
(of UNESCO)

Twenty-ninth Session of the Assembly
UNESCO, Paris, 21-29 June 2017

Items 3.2 and 11.1 of the Provisional Agenda

REPORT ON BUDGET EXECUTION 2016 AND OUTLINE OF 2017 BUDGET

ADDENDUM

COMPLEMENTARY ADDITIONAL PROGRAMME
OF EXTRABUDGETARY RESOURCES 2016–2017

This document is the revised version of the CAP presented to the Executive Council at its 49th session in 2016 as document IOC/EC-XLIX/2 Annex 2 Add.

This Complementary Additional Programme of Extrabudgetary Resources for 2016–2017 was amended in accordance with Resolution EC-XLIX.2 and was circulated in September 2016 through IOC Circular Letter 2643.
COMPLEMENTARY ADDITIONAL PROGRAMME OF EXTRABUDGETARY RESOURCES

Proposals for 2016–2017
The IOC proposals for extrabudgetary funding

EXPECTED RESULT 4 – Scientific understanding of ocean and coastal processes bolstered and used by Member States to improve the management of the human relationship with the ocean

World Climate Research Program (WCRP) and the International Ocean Carbon Coordination Project (IOCCP): contributing to increasing the understanding of the ocean’s role in climate change and variability ................................................. 6
Increase the understanding of the impacts of climate change and ocean acidification on marine ecosystems and their living resources .............................................. 8
Deoxygenation of the open ocean and coastal waters
Climate change and eutrophication reducing habitable space for marine life .............. 10
Sustaining and strategically expanding global and basin-scale ocean observations for societal benefit in GOOS and JCOMM .................................................. 12
Developing regional ocean observing systems (including GLOSS) for local priorities, as a contribution to GOOS ................................................................. 14
Resourcing to support Member State engagement as stakeholders in the Second International Indian Ocean Expedition (IIOE-2): 2015-2020 ......................... 16
Online interactive maps on the status of global marine species distribution and diversity, an analysis on completeness, species richness, endemism, gaps and changes over time ................................................................................ 18
The IODE Ocean Data Portal .............................................................................. 20
IODE Clearing House Service for Data/Information Management Practices Project .... 21
Development of a Standard Operating Procedure for the monitoring of ecologic impacts of ocean acidification on coral reef ecosystems in the Western Pacific and its adjacent regions, including the SIDS in the region .................................................................................................. 22

EXPECTED RESULT 5 – Risks and impacts of tsunamis and other ocean-related hazards reduced, climate change adaptation and mitigation measures taken, and policies for healthy ocean ecosystems developed and implemented by Member States

Promote integrated and sustained monitoring and warning systems for tsunami and other sea level related hazards ................................................................. 25
Educate communities at risk with respect to impact prevention, preparedness and mitigation measures for tsunami and other sea level related hazards .................. 26
Contribute to develop Member States’ capacities for coastal hazard assessment ........ 28
Promote the development and local use of ocean analysis and forecast systems .......... 29
Mitigating the effects of marine harmful algal blooms through enhanced systematized data exchange and enhanced capabilities for monitoring and research (ME-HAB) ................................................................. 30
Mitigating the impacts of macro-algal Sargassum occurrences through research and development of management capabilities .............................................. 32
Regular Process for Global Reporting and Assessment of the State of the Marine Environment – UN World Ocean Assessment (WOA) ................................................................. 34

Nutrients and Coastal Impacts Research Programme (N-CIRP):
Models for nutrient export from watersheds – user scenario evaluation: quantitative analysis of impacts of nutrient loading and changing nutrient stoichiometry in coastal ecosystems ......................................................... 36

Climate change adaptation for Africa and SIDS .................................................................. 38

Development of a regional ocean forecasting system for the Southeast Asian countries and demonstration of its value through its application to local societal needs ................................................................................................................................. 40

EXPECTED RESULT 6 – Member States' institutional capacities reinforced to protect and sustainably manage ocean and coastal resources

Supporting Member States in the implementation of Agenda 2015 and the related Sustainable Development Goal on Ocean (SDG#14) ........................................ 42

PRIORITY AFRICA: IOCAFRICA: Capacity Development for Marine Science and Technology in Africa .................................................................................. 44

Re-activation of IOCINDIO .................................................................................................. 46

Global Ocean Science Report .................................................................................................. 48

IODE – Capacity development necessary for maintenance of healthy ocean ecosystems focusing on the regional needs and OBIS .............................................. 50

Decision-support tools for improved Integrated Coastal Management and Marine Spatial Planning ........................................................................................................ 51

Strengthening Global Governance of Large Marine Ecosystems and their Coasts .......... 53

Supporting Member States in the implementation of the IOC Capacity Development strategy .................................................................................................................. 55

Communication plan for the IOC .......................................................................................... 57
EXPECTED RESULT 4

Scientific understanding of ocean and coastal processes bolstered and used by Member States to improve the management of the human relationship with the ocean

Responsible: Henrik Enevoldsen
Deputy: Albert Fischer
World Climate Research Program (WCRP) and the International Ocean Carbon Coordination Project (IOCCP): contributing to increasing the understanding of the ocean’s role in climate change and variability

Overall goal
Climate change and variability will continue as the major problem to human wellbeing and sustained development for XXI century and scientific models are crucial to correct and adopt the right decisions when premises change as well as to generate better forecasts scenarios and delivering them in due time. The main goal is to enhanced capacity in IOC Member States to understand the ocean's role in the climate system and global carbon cycle to anticipate the effects of climate change and thereby protect marine living resources and coastal territories on event occurrences and impacts. The underlying goal is to strength capabilities of national oceanographers and climatologist in developing countries to produce climate services and models to ensure that decisions and management is based in scientific knowledge.

Estimated funding required
US$ 370,000

Contact
Henrik Enevoldsen (h.enevoldsen@unesco.org) & Albert Fischer (a.fischer@unesco.org)

Description
The interaction with WCRP is addressed to enhance these three main elements
• There is a need to increase efforts in regional modeling that aim to downscale the impacts of global climate models to regional scales and provide regional detail in finer resolution. This is especially important for developing countries.
• There is a need to deliver decadal-scale forecasting to inform adaptation strategies which will require improved ocean observations and modeling.
• It will be desirable to widening the ocean climate research with inclusion of more activities aimed at adaptation and mitigation of climate change on the oceans. This can be considered within the future functions and role that WCRP must play in enabling the Global Framework for Climate Services as defined by the WCC3.

The IOCCP provides an email and web-based data and information directory for the international ocean carbon community, with up-to-date compilations of ongoing and planned field programmes including hydrography, VOS, and time series stations, and provides a central information service for data, standards, methods, and technical coordination issues:

• Standards and methods: the IOCCP implements international meetings of experts to establish agreements on standards, methods, and data sharing activities.
• Field programme coordination: the IOCCP implements international meetings of experts to establish joint global and basin-scale field programme implementation plans
• Assessments: the IOCCP organizes expert groups to periodically review the global ocean CO2 observations network and to assess whether this network meets the stated research objectives.

Beneficiary groups:
• Global scientific community participating in ocean CO2 and oceanographic measurements, including national marine science and decision makers for security and adaptation for climate change ecosystems, tourism, etc.
• Africa is prioritized in terms of identification of most vulnerable ecosystems and coastal areas to suffer the effects of climate change, such as sea level rise, and anticipating adaptation strategies when possible.
• Both elements WCRP and IOCCP are relevant for and will strength the links between IOC Regional Programmes and National Oceanographic Committees.

Expected results
• Participation of the ocean research community promoted and catalyzed, and their cutting-edge results integrated into international climate and polar research.
• Coordinated international ocean carbon research through technical coordination and communication services, international agreements on standards and methods, and advocacy and links to the global observing system.
• Increase in data sharing among the international carbon programmes and institutions

Key expected outputs
• Best Practices Guides
• Reports on International Agreements and activities in peer-reviewed literature
• Surface Ocean CO2 Atlas Data Set (biennial)

Assessment of needs and deliver capacity:
# Understanding, monitoring and modelling climate change to produce trends, anticipate scenarios and consider actions for mitigation is a priority for all member states and the IOC-UNESCO was asked to work closely with WCRP and IOCCP, two of the main international programmes on climate change under the auspices of IOC.
# Climate change is a key priority to IOC and UNESCO.
# The IOC has the expertise in some fields to develop the expected results, but we will need to work closely with our field offices and establish agreements and hire consultants to develop the full workplan.

**Opportunities for resource mobilization:**

For WCRP:
China hosts the CLIVAR International Project Office
A more project-oriented focus on regional downscaling or regional sea level is more likely to attract funding

For ocean carbon:
European Commission H2020 projects for ocean carbon-related coordination work (in context of regional oceanographic observing systems or GEO / global carbon observations)
Australia, Japan, Norway, UK, Germany - due to their high level of involvement in ocean carbon observing systems
Korea has provided extrabudgetary funds in the past for ocean carbon activities

**Accountability for resource mobilization:** IOC Headquarters through centralized fund mobilization
Increase the understanding of the impacts of climate change and ocean acidification on marine ecosystems and their living resources

**Overall goal**
The ultimate objective is to develop a reliable holistic and predictive capability and so forecast the impact of climate change and ocean acidification on the structure and function of coastal and open ocean pelagic ecosystems and their living resources (small pelagic fishes and top predator species) by elucidating the key processes involved in open ocean ecosystem functioning.

**Estimated funding required**
US$ 400,000

**Contact**
Henrik Enevoldsen (h.enevoldsen@unesco.org)

**Description**
Oceans absorb both heat and carbon from the atmosphere, therefore alleviating the impacts of climate change in the environment. It is important to note that approximately 30% of the anthropogenic CO2 emitted to the atmosphere has been absorbed by the oceans. However, this comes at a steep ecological cost, as the dissolved CO2 in seawater lowers the oceans' pH level, causing acidification, and changing the biogeochemical carbonate balance. Concerns about ocean acidification, first expressed in the early 1980s, have now been confirmed, and the potential extent of the impacts on marine ecosystems is only now being investigated.

Warming and acidification may have significant ecological and economic consequences, and several national groups are suggesting using ocean pH levels to define "dangerous anthropogenic interference with the climate system", as defined by UNFCCC, to set CO2 stabilization targets.

In 2015 the observation of Ocean Acidification and its impacts was included in the agenda 2030 as one target of the SDG 14. In order to align the measurements and facilitate technology and knowledge transfer globally the IOC is member of the Executive Council of the Global Ocean Acidification Observing Network (GOA-ON) and coordinating the biological working group within it. In this function it is also currently co-organizing the third GOA-ON Workshop to be held in Tasmania, Australia in May 2016.

There is a growing momentum around the concept of 'blue carbon' as a key component of climate change mitigation options. Clear demonstration of the carbon storage and sequestration services provided by coastal ecosystems may transform the investment in, and effectiveness of, conservation, management, and restoration of coastal ecosystems. A fundamental barrier to this is a global lack of consistent, reliable, and interoperable spatial data sets of ecosystem extent, health, and carbon stock and flux, that are available at the required spatial and temporal resolutions and readily accessible by a range of communities around the globe. The IOC-UNESCO plays an important/leading role in a number of ongoing activities in 'blue carbon' including the IOC-CI-IUCN Blue Carbon partnership and the development of a global Blue Carbon partnership with Australia, CI and IUCN.

The activities address:
- The need for a global comparative approach of processes linking climate and ecosystem response in productivity and trophic pathways in marine ecosystems.
- The need for an international effort to urgently elucidate those processes in a global change context that is a constant and rapid process.
- The need for improving our basic knowledge and developing a reliable predictive capability in pelagic ecosystems from primary producers to top predator's ecosystems.

The beneficiary groups include the Global scientific community and policy community concerned with the protection of marine ecosystems.

Beneficiaries within the UN System include the UN-Oceans Task Force on Climate Change, UNFCCC and the IPCC.

**Expected results**
- Improved understanding of and access to information about the potential ecological impacts of climate change and ocean acidification on the marine ecosystem
- Incorporate climate change and ocean acidification as key stressors to be addressed in the ecosystem based management approach
- Update IPCC wetlands amendment to improve the calculations for GHG caused by the destruction of blue carbon ecosystems

**Key expected outputs**
- Tool box for biological observation to detect the impacts of ocean acidification on marine life
- Blue Carbon Data Base to improve the comparability of blue carbon data sets and facilitate international cooperation
- Incorporate Ocean warming and acidification, as well coastal blue carbon ecosystems in the climate change negotiations in the UNFCCC COP22
Assessment of needs and deliver capacity:
# Understanding and modelling climate change impacts on marine ecosystems and its living resources is a priority for all member states to create scenarios and manage under sustainable principles the services that marine ecosystems provide for human well-being.
# The IOC-UNESCO is focusing their activities on the effects of warming and ocean acidification in order to improve socio economic scenarios and to enable Member States to measure fulfill the targets of the agenda 2030.
# Further IOC-UNESCO tries to improve the valuation and management practices of blue carbon ecosystems (mangroves, sea grasses, etc.), as they are a natural mechanism to mitigate the impact of ocean warming and acidification.
# The IOC has the expertise in some fields to develop the expected results, but we will need to work closely with our field offices and establish agreements and hire consultants to develop the full workplan.

Opportunities for resource mobilization:
# Germany has provided extrabudgetary funds in the past for ocean carbon activities
# Spain has provided extrabudgetary funds in the past to monitor ecosystem trends in the CCLME (Western Africa countries)

Accountability for resource mobilization: IOC Headquarters through centralized fund mobilization
Deoxygenation of the open ocean and coastal waters
Climate change and eutrophication
reducing habitable space for marine life

Overall goal
The creation of a sustained interdisciplinary network, focusing on ocean oxygen and the risks related to its changing concentration, and connecting scientists investigating the open ocean and coastal areas, will help to improve the communication and cooperation among experts and decision makers with the support of IOC-UNESCO. This group is envisaged to provide guidance to improve oxygen monitoring in order to improve the availability of globally comparable data.

Estimated funding required
US$ 250,000

Contact
Henrik Enevoldsen (h.enevoldsen@unesco.org)

Description
Oxygen is critical to the health of the planet. It impacts the biogeochemical cycling of carbon, nitrogen and other key elements, it structures aquatic ecosystems, and it is a fundamental requirement for aerobic life from the intertidal to the greatest depths of the ocean. Climate change, agricultural runoff and human waste cause decreasing oxygen concentrations in the interior of the open ocean, as well as in estuaries and coastal areas. Global and regional models project that the deoxygenation of marine waters will further worsen with continued increases in global temperatures and human population size, leading to widespread consequences for ocean health and ultimately human wellbeing.

This global threat with multiple consequences needs to be addressed at different levels - local, regional and global. The creation of an international network that involves scientists from a wide variety of disciplines and geographic research foci aims to increase scientific cooperation and to successfully advocate for directing research resources towards deoxygenation, potential mitigation and adaptation measures. Further, this network is expected to communicate the importance and risks of deoxygenation to relevant stakeholders, decision and policy makers, to increase the awareness of the potential negative impacts on the marine environment, to highlight the importance for sustainable management of ocean resources and to encourage and support capacity building for research and development.

Future challenges for the network include the need to:

Expected results
- Integrate the disparate research efforts on deoxygenation that are taken worldwide and to offer a global and multidisciplinary view of the problem. This overview of current knowledge will allow the network to identify gaps and to propose a framework/strategy to fill these;
- Facilitate communication with established networks, observation systems, IOC member states, stakeholders, policymakers in order to stimulate the awareness on the deoxygenation issue with meaningful and understandable messages;
- Promote scientific development and cooperation and identify emergent fields of research;
• Increase research capacity and knowledge transfer.

**Key expected outputs**
• Produce of a technical brief, highlighting the threat of deoxygenation for ocean health and the possible impacts on human wellbeing.
• Identification of knowledge gaps, with regard to spatial coverage of data with recommendations through GOOS and thematic understanding of the underlying processes.
• Create an internet representation, highlighting the objectives, structure and products of GO2NE.

**Assessment of needs and deliver capacity:**
# Improving the understanding of decreased oxygen concentrations in the ocean and the impact on marine life and human wellbeing was identified as one emerging scientific issue by UN in its Global Sustainable Development Report 2015.
# While the impacts of increased temperatures and ocean acidification are in the focus of policy and decision makers, deoxygenation remains overlooked, though the impacts might be more direct and are already detected.
# There is a significant need to improve engagement with the scientific community, including the open ocean and coastal areas, to increase the awareness towards the responses to the threat of reduced oxygen concentration in the ocean.

**Opportunities for resource mobilization:**
# Germany has provided extrabudgetary funds in the past for ocean carbon activities.
# France as it showed interest in these issues during the UNFCCC COP21.

**Accountability for resource mobilization:** IOC Headquarters through centralized fund mobilization
Sustaining and strategically expanding global and basin-scale ocean observations for societal benefit in GOOS and JCOMM

Overall goal
Support IOC Member State needs for ocean information for scientific and societal benefit, through work on defining consensus requirements, observations coordination, and data and information systems as a part of a sustained Global Ocean Observing System (GOOS), coordinating implementation of some elements through the Joint WMO-IOC Technical Commission for Oceanography and Marine Meteorology, at the global and regional levels through GOOS Regional Alliances.

Estimated funding required
US$ 850,000

Contact
Albert Fischer (a.fischer@unesco.org)

Description
The Global Ocean Observing System (GOOS) is coordinating IOC Member State and partners’ activities in creating a global collaborative system of sustained ocean observations. GOOS is based on a Framework for Ocean Observing, with strategic requirements identified by Essential Ocean Variable (EOV) and implementation plans guided by feasibility and impact, making optimal use of available platforms in aiming at an integrated system. Observations coordination focuses on the promotion of standards and best practices, identification of positive synergies, and common technical coordination, and is done in close coordination with JCOMM and GOOS Regional Alliances. Data management, coordinated with IODE, is an essential step in transforming data into useful information, as are synthesis activities, analysis, and forecasts. GOOS works closely with the relevant communities to ensure the outputs of the observing system are fit-for-purpose, and in order to evaluate whether the system as a whole is meeting requirements. GOOS also works with the scientific community to improve readiness for sustained ocean observations, encouraging emerging technologies.

The GOOS work plan proposed by its Steering Committee includes activities of three disciplinary panels:
- for physics, led by the Ocean Observations Panel for Climate (OOPC), jointly with the Global Climate Observing System (GCOS) and the World Climate Research Programme (WCRP);
- for geochemistry, led by the SCOR-IOC International Ocean Carbon Coordination Project (IOCCP); and
- a panel for biology and ecosystems variables led by GOOS.

The primary activities requiring extrabudgetary support (both financial and human) are: workshops to revisit or define observing requirements for particular scientific or societal challenges, phenomena or regions, evaluation of the observing system in partnership with the scientific and forecasting community, and development of communities of practice using similar observing systems.

GOOS Development Projects (such as the Tropical Pacific Observing System in 2020 project) on global thematic or regional activities improve the readiness of requirements, observing techniques, or the capacity through mutual assistance, and are at present expected to be independently financed and managed outside of the IOC context. IOC extrabudgetary funding would enhance their connection to IOC Member State priorities and increase the likelihood of future re-integration into the GOOS work plan.

The JCOMM work plan in observations focuses on the Observations Programme Area Coordination Group (OCG) and its teams and programmes:
- the Data Buoy Cooperation Panel (DBCP),
- the Ship Observations Team (SOT),
- the Global Sea level Observing System (GLOSS),
- cooperation with the Argo profiling float network, the OceanSITES time series network, the GO-SHIP repeat hydrography network for ocean physics and carbon, emerging global glider coordination, and engagement with other observing networks, and
- the JCOMM Observing Programme Support Center (JCOMMOPS) technical coordination to in situ networks.

The primary activities requiring extrabudgetary support (both financial and human) are work helping teams define standards and best practices, technical support to operators of particular types of observing networks, development of tracking and network health tools, and support for developing global capacity in observing system techniques.

Expected result
- Scientific research enabled and ocean forecast systems initialized and validated
- Enhanced Member States capability to make science-supported decisions about a series of societal challenges (climate adaptation and mitigation, operational ocean services for ocean-related hazards and efficient development of the Blue Economy, sustaining ocean ecosystem services including food security), through a platform creating a coordinated and enhanced ocean observing system and data exchange standards
Donor interest
NOAA, World Bank, Republic of Korea, Global Environment Facility (GEF)

Resource mobilization (US$ 2 115 773 for 2012-2013 as of 4 March 2012)
- China: US$ 119 215
- Belgium: Government of Flanders: US$ 350,000
- Korea Rep. of: US$ 350 000
- United States of America: US$ 433,872
- European Commission: US$ 1,545,800
- Voluntary contribution: US$ 1,621,627
- World Meteorological Organization (WMO): US$ 120,000

Key expected outputs
- Strategic planning and defined requirements for an ocean observing system responding to stakeholder needs

Assessment of needs and deliver capacity:
# Sustained ocean observations underpin a wide variety of ocean science related to climate, ocean acidification, ecosystem change and human impact. They also underpin a number of services which can inform human management of risk, including ocean hazard early warning, seasonal forecasting, and assessment of ocean ecosystem services.
# The GOOS Steering Committee and JCOMM Management Committee have outlined an ambitious work plan - RP is estimated to cover only 25% of activity costs and human resources required to serve the IOC Member States in this area
# There is a significant need to improve engagement with the scientific community providing sustained observations, with stakeholder communities in science, ocean services, and user groups; as well as with the IOC Member States to ensure their national priorities are engaged in global ocean observations.
# Improving the connection to user communities, creating a flagship sustained observing enterprise that is able to demonstrate societal benefit and delivery to the next round of a World Ocean Assessment.

Opportunities for resource mobilization:
# IOC Member States engaged in global and basin-scale observations, including those with longstanding and emerging ocean observing capability

Accountability for resource mobilization: IOC Headquarters through centralized fund mobilization

Associated extrabudgetary projects
- AtlantOS European Commission Horizon 2020 project
- Secondment of an official from SOA/PR China to IOC/UNESCO
- JCOMMOPS support from Brest, Finistère, Brittany
- GOOS Co-sponsor contributions (WMO)
Developing regional ocean observing systems (including GLOSS) for local priorities, as a contribution to GOOS

Overall goal
Develop regional capacity in GOOS and JCOMM for all IOC Member States to benefit from ocean observing systems and forecasts, and to participate in GOOS, including in coastal observing networks such as GLOSS.

Estimated funding required
US$ 750,000

Contact
Albert Fischer (a.fischer@unesco.org), Thorkild Aarup (t.aarup@unesco.org), IOC Field Offices, and GOOS Regional Alliance coordinators and secretariats.

Description
GOOS consists of global and basin-scale observing networks coordinated through the three GOOS panels under its Steering Committee, of regional GOOS programmes coordinated for local priorities through GOOS Regional Alliances, and of national contributions to GOOS.

Projects will address the development of local capacity based on local priorities and requirements for information related to the ocean, and will reinforce, where appropriate, the local GOOS Regional Alliance.

Expected result
- Improved Member State capacity to address societal challenges (coastal hazards, safety of life and property at sea, management of ocean resources) with better use of ocean observations and forecasts
- Improved Member State capacity to take local ocean observations for local and global use as a contribution to GOOS

Donor interest
NOAA, World Bank, Republic of Korea, Global Environment Facility (GEF)

Resource mobilization (US$ 2 115 773 for 2012-2013 as of 4 March 2012)
- China: US$ 119 215
- Belgium: Government of Flanders: US$ 350,000
- Korea Rep. of: US$ 350 000
- United States of America: US$ 433,872
- European Commission: US$ 1,545,800
- Voluntary contribution: US$ 1,621,627
- World Meteorological Organization (WMO): US$ 120,000

Key expected outputs
- Strategic planning and defined requirements for an ocean observing system responding to regional stakeholder needs, including summaries for policymakers
- Establishment of strengthening of regional coordination mechanisms that contribute to the global system
- Mutual assistance in coastal ocean observing techniques

Assessment of needs and deliver capacity:
# GOOS Regional Alliances differ enormously in their priorities and their local capacities to sustainably monitor the ocean and develop locally-relevant information and services that give societal value to those observations
# The GOOS Regional Council has outlined a work plan that has very little UNESCO RP support, and requires additional engagement in the field

Opportunities for resource mobilization:
# IOC Member States engaged in global and basin-scale observations, including traditional and emerging ocean science communities
# GOOS Regional Alliances through partnership arrangements
# GEF Large Marine Ecosystem projects
# Regional development banks

Accountability for resource mobilization: IOC Headquarters through centralized fund mobilization, IOC Sub-Commission Secretariats, GOOS Regional Alliance secretariats
Associated extrabudgetary projects (*proposed*)

- Improving local outreach with decision-makers on the importance of ocean observations to address societal challenges
- Assessing and using regionally-available ocean forecast products for local priorities
- Coastal ocean observing techniques adapted to local technical capacity, in the framework of an ocean information system
Resourcing to support Member State engagement as stakeholders in the Second International Indian Ocean Expedition (IIOE-2): 2015-2020

**Overall goal**
A fully operational and resourced IIOE-2 Joint Project Office in Australia, through the IOC Perth Programme Office in order to oversee all aspects of the coordination and implementation of IIOE-2, in support of the aim of facilitating the engagement of Member States in the IIOE-2.

**Estimated funding required**
US$ 500,000

**Contact**
Nick D’Adamo (n.d-adamo@unesco.org)

**Associated Field Offices**
IOC PPO

**Description**
The Second International Indian Ocean Expedition is a 5-year program co-sponsored by the IOC, the Indian Ocean Global Ocean Observing System Regional Alliance (IOGOOS) and the Scientific Committee on Oceanic Research (SCOR) aimed at advancing our understanding of the Indian Ocean and its role in the Earth System in order to enable informed decisions in support of sustainable development and the well-being of humankind. The collaborative oceanographic and atmospheric research undertaken through IIOE-2 will reveal new information on the Indian Ocean (i.e. its currents, its influence upon the climate, its marine ecosystems) which is fundamental for the future sustainable development and expansion of the Indian Ocean’s blue economy.

A large number of scientists and their research institutions from around the world will be engaged in IIOE-2 and it is critically important that their contributions are appropriately coordinated, managed and publicized in order for their important discoveries to be linked to Member State’s needs. IIOE-2 activities will also include a significant focus on building the capacity of all nations to understand and apply observational data or research outputs for their own socio-economic needs and decisions.

The purpose of the call for extra-budgetary funds will be to assist the IIOE-2 Joint Project Office (JPO) in Australia (within the IOC Perth Programme Office) in its day-to-day coordination and implementation of IIOE-2. The IOC PPO (as an IIOE-2 JPO Node) will also work closely with the other major node of IIOE-2, the JPO Office in India (INCOIS, Hyderabad). The JPO facilitates all aspects of IIOE-2, particularly the science and associated infrastructure, capacity building, operational coordination, outreach/communication, data/information management, sponsorship facilitation and knowledge transfer for societal benefit.

Principally the funds would support the IIOE-2 JPO in Australia in the following ways:
- Support for IOC’s IIOE-2 Coordinator position, which in itself then will enable Member State involvement in IIOE-2, including through the function of:
- Secretariat support for the IIOE-2 Co-Sponsors and other tiers of the IIOE-2 Steering Committee who will set the high level policies of IIOE-2 and take responsibility for project delivery over the 2015-2020 period;
- Organisation of annual IIOE-2 Steering Committee meetings and bi-annual IIOE-2 Science Symposium (with the latter providing opportunities, through this funding proposal, to significantly engage participants from SIDS);
- Coordination of IIOE-2 capacity building programs within the 2016-17 period as part of the IIOE-2s’ portfolio of activities;
- Targeted international sponsorship facilitation;
- Basin-wide scientific research activities including an evaluation of IndOOS in partnership with the scientific and user community.

**Expected results**
- Fully operational IIOE-2 JPO Office in Australia and supported IOC IIOE-2 Coordinator position.
- IIOE-2 Steering Committee appropriately resourced and supported to fulfill their objectives.
- Improved scientific understanding of the Indian Ocean which is accessible and appropriately communicated to Member States
- Improved scientific development and cooperation within IIOE-2 amongst Member States
- Increased research capacity and knowledge transfer

**Key expected outputs**
- Improved visibility and authority of IOC as a leader in collaborative international research projects, in particular improving global understanding of the physical and biogeochemical oceanography of the Indian Ocean
• Bi-annual IIIOE-2 Science Symposia which further communicate and foster increased collaboration and enhanced scientific research efforts in the Indian Ocean
• Identification of design and observational gaps in IndOOS and recommendations to address these to meet the needs of the scientific community and their translation of science to end-users for operational/policy/management decisions.
• Development of increased capacity in the science and societal applications stemming from the IIIOE-2.

Assessment of needs and delivery capacity:
#Improved understanding of geologic, oceanic and atmospheric processes that give rise to the complex physical dynamics of the Indian Ocean region is fundamental to understand how those dynamics are affecting the climate, extreme events (inc. monsoons), marine biogeochemical cycles, ecosystems in the Indian Ocean and the resultant effect on human populations surrounding the Indian Ocean basin.
# Sustained ocean observations such as those through IndOOS underpin a wide variety of ocean science related to climate, ocean acidification, ecosystem change and human impact. They also underpin a number of services which can inform human management of risk, including ocean hazard early warning, seasonal forecasting, and assessment of ocean ecosystem services. Understanding and improving these observations through new research will enhance their utility.
# There is a significant need to improve engagement between the scientific community as well as with the stakeholder communities in science, ocean services, and user groups; as well as with the IOC Member States to ensure that all work collaboratively and contribute to global ocean observations.

Opportunity for resource mobilization:
IOC Member States as primary beneficiaries.

Accountability for resource mobilization:
The IOC PPO will be the implementing office with the support of IOC Headquarters

Resource mobilization (US$ 698,287 as of April 2016 for 2016-17)
• Australia (cash and in-kind) US 698,287

Associated extra-budgetary projects (proposed)
A range of IIIOE-2 related projects under the IOC Capacity Development Fund (i.e. IIIOE-2 Capacity Building Workshops on Ocean Observations and Data Applications; IIIOE-2 Student and Early-career Research Exchange Grant Scheme; IIIOE-2 IOP-SIBER winter school on 'Indian Ocean Physical and Biological Oceanography: from observations to modelling').
Sustaining and strategically expanding global and basin scale ocean observations for societal benefit in GOOS and JCOMM
Developing regional ocean observing systems (including GLOSS) for local priorities, as a contribution to GOOS
Promote the development and local use of ocean analysis and forecast systems
Online interactive maps on the status of global marine species distribution and diversity, an analysis on completeness, species richness, endemism, gaps and changes over time

**Overall goal**
Building on the Ocean Biogeographic Information System (OBIS) and other data sources, this project will allow the assessment of the state of knowledge on global, regional and national marine species diversity and distribution, and in particular address the data gaps around the globe. The results will provide the necessary data and information for national/regional and global assessments on the state of the marine environment (UN World Ocean Assessment, GEF TWA, CBD biodiversity indicators for the Global Biodiversity Outlook, IPBES assessments etc.)

**Estimated funding required**
US$ 500,000

**Contact**
Ward Appeltans (w.appeltans@unesco.org)

**Associated Field Offices**
Ostend

**Description**
The proposed project will provide an open-access, online data and information sharing platform for marine scientific research data. A data clearing house mechanism and helpdesk will serve as a data curation function to turn data into high-quality, standardized and readily available information products.

Costs will include the salary for one IT/data scientist (P2) and at least four high-level scientific and expert workshops and travel grants.

**Expected result**
- Improved conservation and management of marine biodiversity in areas beyond national jurisdiction

**Key expected outputs**
- Data portal, data publication and curation tools, data analysis and visualization tools

**Assessment of needs and delivery capacity:**
A tool that improves the way in which biodiversity and environmental data is managed and made available to support (i) area-based management; (ii) reporting on the status and change of marine biodiversity, (iii) environmental impact assessment. (iv) enhanced access to research data and information on application of marine genetic resources, (v) facilitation of international cooperation in marine science and (vi) building capacity in conservation and sustainable use of marine living resources in areas beyond national jurisdiction are critical requirements recognized at the UN level. IOC has significant expertise in this domain. OBIS is already moving in this direction by building demand-driven products and services, but it needs additional resources to deliver this particular product within the next 2 years.

**Opportunity for resource mobilization:**
Member States actively engaged in the negotiations on a new legally binding instrument under UNCLOS for the conservation and sustainable use of marine biodiversity in areas beyond national jurisdiction; Global Environmental Facility (GEF, World Bank, SDG Fund under the Addis Ababa Action Agenda, Green Climate Fund.

**Accountability for resource mobilization:**
IOC Project Office for IODE (Ostend) should lead the development process with support from IOC HQ.

**Donor interest**
NOAA, World Bank, Republic of Korea, Global Environment Facility (GEF)

**Resource mobilization** (US$ 2,115,773 for 2012-2013 as of 4 March 2012)
- China: US$ 119,215
- Belgium: Government of Flanders: US$ 350,000
- Korea Rep. of: US$ 350,000
- United States of America: US$ 433,872
- European Commission: US$ 1,545,800
• Voluntary contribution: US$ 1,621,627
• World Meteorological Organization (WMO): US$ 120,000
The IODE Ocean Data Portal

Overall goal
The Ocean Data Portal (further, ODP) aims at providing seamless access to collections and inventories of marine data from the NODCs (National Oceanographic Data Centres) of the IODE network and allows for the discovery, evaluation (through visualization and metadata review) and access to data via web services. The ODP does not intend to replace or compete with existing national or regional networks but to interconnect these systems or, where no networks exist, provide assistance to establish portal nodes.

Estimated funding required
US$ 500,000

Contact
Peter Pissierssens (p.pissierssens@unesco.org)

Associated Field Offices
Ostend

Description
The purpose of the call for extra-budgetary funds will be to assist IOC with the establishment and management of an ODP project management office, as well as to assist with training activities to enable Member States to establish Ocean Data Portal national networks and nodes. While there are now a number of national or regional data portals in existence (eg the European SeaDataNet and EMODNET projects, Australia, USA) these developments have not been implemented in developing countries and regions. In order to avoid a digital divide between developed and developing countries it is essential that data from these countries and regions are inter-connected and linked to the emerging global platforms. The ODP project will assist developing countries and regions to reach this objective.

Expected results
- ODP Secretariat established at the IOC Project Office for IODE, Ostend, Belgium
- Training missions/sessions organized for at least 10 member states (2016-2017)
- ODP national nodes established for at least 10 member states with special attention to developing countries (2016-2017)

Key expected outputs
- Ocean Data timely, openly and freely available
- Improved visibility and authority of IOC as ocean related data provider.
- Costs include the running an ODP project secretariat and organization of training courses and technical assistance for setting up national/regional ODP nodes

Donor interest
Government of Flanders (Belgium) - ODIN support; Governments of Australia, Brazil, Canada, (USA): OBIS support

Resource Mobilization (US$ 294,318 for 2012-2013 as of 4 March 2012)
- Australia: US$ 86,106
- Brazil: US$ 10,000
- Canada: US$ 20,000
- Belgium: Government of Flanders: US$ 100,000
- European Commission: US$ 194,318

Assessment of needs and delivery capacity:
Datasets are widely scattered and difficult to access. This project will improve the discovery and access to data and metadata on the ocean worldwide for model forecasting and better informed decision making.

Opportunity for resource mobilization:
IOC Member States as primary beneficiaries.

Accountability for resource mobilization:
The IOC project office for IODE will be the implementing office.
IODE Clearing House Service for Data/Information Management Practices Project

Overall goal
The IODE CLEARING HOUSE SERVICE FOR DATA/INFORMATION MANAGEMENT PRACTICES PROJECT will create a global reference infobase of existing methodologies, standards, best practices and other documentation related to ocean data and information management. This infobase will be of special interest and importance to the growing number of ocean research and observation groups that need to develop a data management plan.

Estimated funding required
US$ 500,000

Contact
Peter Pissierssens (p.pissierssens@unesco.org), Aditya Naik-Kakodkar (a.naik-kakodkar@unesco.org)

Associated Field Offices
Ostend

Description
The purpose of the call for extra-budgetary funds will be to establish the IODE Clearing House service for Data/Information Management Practices. While we observe on one hand a growing number of ocean research and observation projects and groups, and on the other hand the low threshold to make data available over the Internet, there is currently no global reference infobase (library) where documentation can be found on recommended methodologies or best practices (beyond the documentation for NODCs). The proposed Clearing House will make access to such documentation and assistance available for the many additional stakeholders that exist today.

Expected results
- Clearing House established (online) and Secretariat established at the IOC Project Office for IODE, Ostend, Belgium
- Clearing House used by target stakeholder communities

Key expected outputs
- Clearing House available online
- Improved interoperability of data systems and increased use of common formats, quality control procedures etc
- Improved visibility and authority of IOC as a standard setting body.

Donor interest
Government of Flanders (Belgium) - ODIN support; Governments of Australia, Brazil, Canada, (USA): OBIS support

Resource Mobilization (US$ 294,318 for 2012-2013 as of 4 March 2012)
- Australia: US$ 86,106
- Brazil: US$ 10,000
- Canada: US$ 20,000
- Belgium: Government of Flanders: US$ 100,000
- European Commission: US$ 194,318

Associated extrabudgetary projects
- n/a

Assessment of needs and delivery capacity:
While we observe on one hand a growing number of ocean research and observation projects and groups, and on the other hand the low threshold to make data available over the Internet, there is currently no global reference infobase (library) where documentation can be found on recommended methodologies or best practices (beyond the documentation for NODCs). The proposed Clearing House will make access to such documentation and assistance available for the many additional stakeholders that exist today.

Opportunity for resource mobilization:
IOC Member States as primary beneficiaries.

Accountability for resource mobilization:
The IOC project office for IODE will be the implementing office.
Development of a Standard Operating Procedure for the monitoring of ecologic impacts of ocean acidification on coral reef ecosystems in the Western Pacific and its adjacent regions, including the SIDS states in the region

Overall goal
The ultimate objective is to develop a consistent, comparable and cost-effective "Standard Operating Procedure (SOP)" for the monitoring of ecologic impacts of ocean acidification on coral reef ecosystems at selected sites among IOC Member States in the Western Pacific region and its adjacent regions, with a view to develop meaningful projections on future impacts of ocean acidification on marine ecosystems, especially on coral reefs in the region to enable resource and fisheries managers, and policy makers to develop effective long-term mitigation and adaptation strategies for the people of the region.

Estimated funding required
US$ 300,000

Contact
Wenxi Zhu (w.zhu@unesco.org)

Description
The ocean has absorbed about one third of the anthropogenic carbon dioxide (CO₂) emissions since the industrial revolution, greatly reducing the impact of this greenhouse gas on the climate. However, this massive input of CO₂ is generating global changes in the chemistry of seawater, especially on the carbonate system. These changes are collectively referred to as “ocean acidification” because increased CO₂ lowers seawater pH (i.e., increases its acidity). According to geological records, this acidification is happening at rates not seen for at least 50 million years.

Recent studies have shown that the resulting decrease in ocean pH will make it more difficult for marine calcifying organisms, such as corals, molluscs, and calcareous plankton, to form biogenic calcium carbonate, and existing calcium carbonate structures will become vulnerable to dissolution. Thus, ongoing acidification of the oceans poses a threat to ocean-based security. Since this ocean acidification may be occurring more rapidly than prior ocean acidification events that are thought to have coincided with mass extinction events, there are concerns that marine ecosystems will change, that biodiversity will be lost, and that important ecosystem services that human societies depend upon for food security, livelihoods, and coastal protection could be significantly impacted. Unfortunately, the effects of ocean acidification on organisms and ecosystems remain poorly understood, with most of our knowledge based on simplified laboratory experiments.

The Western Pacific and its adjacent regions are among the richest and most productive in the world as a home to more than 600 coral species (more than 75% of all known coral species) and ~53% of the world’s coral reefs. Most Southeast Asian coastal communities are socially and economically dependent upon coral reef ecosystems and an estimated 70-90% of fish caught in Southeast Asia are dependent on coral reefs. Globally, it has been estimated that coral reefs support greater than 25% of all known marine species.

Despite the recognition that ocean acidification from increasing levels of atmospheric CO₂ represents a major global threat to coral reefs and other calcifying marine organisms, awareness of the impacts of this ‘other CO₂ problem’ has emerged only over the last decade. The ecosystem responses to ocean acidification are poorly understood in the region and more research and long-term monitoring are critically needed to develop meaningful projections on future impacts of ocean acidification on marine ecosystem, especially on coral reefs, in the region to enable resource and fisheries managers, and policy makers to develop effective long-term mitigation and adaptation strategies for the people of the region.

Since the very beginning IOC supports investigation and observation of ocean acidification and the related impacts on the marine environment, e.g., via collaboration with the OA-ICC, support to IOCCP and Ocean in a High CO₂ World Symposia, the GOOS Biology and Ecosystems Panel, as well as the Global Ocean Acidification Observing Network (GOA-ON). In this context, the IOC Sub-Commission for the Western Pacific (WESTPAC), in cooperation with the IOC Ocean Science Section, the related ‘Ocean Carbon Sources and Sinks’ activities, and the GOOS Biology and Ecosystems Panel, aims to establish regional research and monitoring network on ocean acidification in the Western Pacific and its adjacent regions, and develop a regional program, as one regional component of the GOA-ON and GOOS, to monitor the impacts of ocean acidification on coral reef ecosystems, mainly through a series of regional trainings & workshops, selection of pilot areas, and transfer of knowledge and technology among experts, institutions within and outside the region.

The activities address:
• The need for concerted OA research and monitoring efforts in this vast region towards the attainment of global objectives;
• The need to establish a research and monitoring network in the most productive region on OA and its ecological impacts on coral reef ecosystems;
• The need for improving our knowledge and developing a consistent, comparable and cost-effective SOPs to monitor the ecological impacts of OA on coral reef ecosystems.

The beneficiary groups include the national, regional
and global scientific community and policy community concerned with the protection of marine ecosystems. (NOAA), GOA-ON (IOC is part of the GOA-ON Executive Council and coordinates the biological working group), IAEA Ocean Acidification International Coordination Center (OA-ICC), and the GOOS Biology and Ecosystems Panel.

The project will be conducted in partnership with the US National Oceanic and Atmospheric Administration (NOAA), GOA-ON (IOC is part of the GOA-ON Executive Council and coordinates the biological working group), IAEA Ocean Acidification International Coordination Center (OA-ICC), and the GOOS Biology and Ecosystems Panel.

**Expected results**

- established network and improved scientific understanding on the potential ecological impacts of ocean acidification on coral reef ecosystems in the region.

**Key expected outputs**

- a regional OA research and monitoring network established;
- a consistent, comparable and cost-effective "Standard Operating Procedure (SOP)" developed for the monitoring of ecologic impacts of ocean acidification on coral reef ecosystems at selected sites among IOC Member States in the Western Pacific region and its adjacent regions;
- ocean acidification and its ecological impacts on marine ecosystem, especially on coral reefs, in the region incorporated into national long-term mitigation and adaptation strategies for climate change.

**Assessment of needs and deliver capacity:**

# Understanding OA and its impact on marine ecosystems, particularly on coral reef ecosystems, has been emerging as a priority for all IOC Member States in the region to address. The need is also reflected in the UNESCO-ASEAN Cooperative Framework.
# There exists various coral reef monitoring systems in the region, it would be cost effective to develop the SOP building on existing coral reef monitoring system by defining and agreeing upon a suite of metrics, which could discern, to the extent possible, attribution of changes to coral reef ecosystems in response to ocean acidification; recommending the most efficient, robust, and cost-effective monitoring approaches for these defined metrics; mapping gaps in current capabilities; and selecting pilot study areas for the application of the identified monitoring approaches.
# WESTPAC has the well-established research network of coral reef expertise, but it still lack of expertise on OA. Therefore, cooperation has been established with these OA pioneer agencies and research institute in the world, such as NOAA, and Woods Hole Oceanographic Institute (WHOI). Therefore, partnership with these institutions will be one of key components in the implementation of this project.

**Opportunities for resource mobilization:**

# Thailand because they have provided financial support for two regional OA workshops in 2015
# NOAA because they have expressed strong willingness to lend their expertise;
# Korea has been providing extrabudgetary funds in the past for WESTPAC marine biodiversity programmes
# China has been providing voluntary contribution to WESTPAC capacity building programmes.

**Accountability for resource mobilization:**

WESTPAC will lead the development and implementation of this project with support from IOC HQs
EXPECTED RESULT 5:

Risks and impacts of tsunamis and other ocean-related hazards reduced, climate change adaptation and mitigation measures taken, and policies for healthy ocean ecosystems developed and implemented by Member States

Responsible: Thorkild Aarup
Deputy: Albert Fischer
Promote integrated and sustained monitoring and warning systems for tsunami and other sea level related hazards

**Overall goal**
Reducing losses of lives from natural sea level hazards such as tsunamis

**Estimated funding required**
US$ 1,000,000

**Contact**
Thorkild Aarup (t.aarup@unesco.org)

**Associated UNESCO Field Offices**
Bangkok and Regional Bureau for Education, Apia, Doha, Islamabad, Jakarta and Regional Bureau for Sciences, Kingston, Lima, Quito, Santiago and Regional Bureau for Education, Port-au-Prince, San José

**Description**
The aim of this project is to assist national authorities in providing comprehensive and detailed information as well as technical advice for defining the requirements for National Tsunami and other marine hazards Early Warning systems.

The goal is to guide the process of establishing the Early Warning system and its infrastructure, embedded in a national policy to avert disasters from natural sea level hazards. In the process of technical assistance IOC/UNESCO will use the existing tools for tsunami monitoring (i.e. Seismic monitoring network, the established agreement between UNESCO and the Preparatory Commission for the Comprehensive Nuclear-Test-Ban Organization concerning provision of seismic observations to National Tsunami Warning Centres, the IOC Sea Level Station Monitoring Facility) as well as the existing tools for tsunami preparedness (Web-based on CD-ROM based Tsunami Teacher kit available in several languages, Manuals and Guides for Tsunami Risk Assessment, Preparedness, Standard Operating Procedures) with focus on LDCs, SIDS as well as on countries in the four regional tsunami warning system regions (Caribbean, Indian Ocean, North East Atlantic and Mediterranean and connected seas, and the Pacific).

Complete coverage of PTWS and CARIBE-EWS Member States with training addressing a new enhanced set of PTWC products will be targeted.

To this background IOC will continue to provide, via extrabudgetary projects under the CAP, assistance for countries to develop/strengthen their national TWC to be able to detect tsunami source, assess threat to the local communities, compile and issue warnings/advisories and disseminate the messages in the most efficient and effective manner. Another component is maximizing community response through creation of education and awareness as well as assisting with community alert systems and response and education plans.

**Expected results**
- National Tsunami Warning Centres (TWCs) established and operating in participating countries
- Community education and awareness created with response and education plans developed

**Key expected outputs**
- National Multi-Hazard Early Warning Centers established in countries that do not have it

**Associated extrabudgetary projects**
- Tsunami early-warning systems, especially in the Indian Ocean
- Tsunami and Other Coastal Hazards Warning System for the Caribbean and Adjacent Regions
- Technical Expert Advice to Establish a National Multi-Hazard Early Warning System – Oman
- Secretariat for the Indian Ocean Tsunami Warning and Mitigation System
- DIPECHO projects in Haiti and Dominican Republic (SOP components)

**Assessment of needs and delivery capacity:**
Needs are regularly expressed at the national and regional level through the Summary Reports of subsidiary bodies (ICG/PTWS, ICG/CARIBE EWS, ICG/IO TWS, and ICG/NEAMTWS) forwarded and noted by the IOC Governing Bodies. Capacity of implementation is closely linked to the ability to get secondments or project based staff with a managerial time-bound technical assistance from regular staff. There might be some opportunities for inter-sectoral cooperation with the sector of Communication and Information. Close cooperation with field offices is mandatory.

**Opportunity for resource mobilization:**
Governments, and regular calls of ESCAP, the Department of Humanitarian Affairs of the European Commission (DIPECHO), Global Facility for Disaster Risk Reduction.

**Accountability for resource mobilization:**
IOC Headquarters through centralized fund mobilization.
Educate communities at risk with respect to impact prevention, preparedness and mitigation measures for tsunami and other sea level related hazards

Overall goal
Sustainable Regional Tsunami Information Centers established and producing tsunami preparedness educative materials in different languages, culturally and gender-sensitively adapted, and supporting the sharing on best practices through a disaster risk reduction information platform.

Estimated funding required
US$ 1,000,000

Contact
Bernardo Aliaga (b.aliaga@unesco.org)

Associated UNESCO Field Offices
Santiago and Regional Bureau for Education, Kingston, Bangkok and Regional Bureau for Education, Jakarta and Regional Bureau for Sciences, Apia, Port-au-Prince, San José, Quito, Lima, Havana, Rabat

Description
IOC has been coordinating the Pacific Tsunami Warning System for more than 40 years. Since 2005, IOC has also been leading the development of tsunami warning systems in the Indian Ocean, NE Atlantic, Mediterranean and Caribbean. Real time observation networks of seismometers, sea level stations and deep ocean pressure sensors and the associated communication service form the base of the network. Few resources have been available from the international community towards the development of the observation and dissemination systems in the NE Atlantic, Mediterranean and Caribbean.

The detection network including the satellites for transmission of real time seismic and sea level observations as well as the national warning centers is one element of the end-to-end warning system. But an effective tsunami early warning system is achieved when all persons, especially in vulnerable coastal communities are prepared and respond appropriately and in a timely manner upon recognition that a potential destructive tsunami (local or regional) may be approaching. The communities should build capacity and awareness at the local level and place the tsunami hazard and response in the local context as well as empower communities to collectively engage in developing an appropriate tsunami response and in preparedness and mitigation activities.

This project is designed to establish sustainable and long-term Regional Tsunami Information Centers in the Indian Ocean, Caribbean and Adjacent Regions and Mediterranean (focus on North African countries) while reinforcing the IOC International Tsunami Information Center (ITIC, established in 1965) with special focus on requirements of small island developing States (SIDS).

The Regional Tsunami Information Centers will build on and strengthen national and regional institutional arrangements for disaster risk reduction through provision of tsunami information materials, support of regional best-practice and cross-learning activities in disaster risk reduction, and community-based programs with emphasis on preparedness education in schools, and of disadvantaged populations (gender, social, cultural, economic).

Expected results
- Enhanced awareness and community based disaster risk reduction for coastal hazards

Key expected outputs
- Multilingual awareness and education materials, coastal community preparedness plans.

Associated extrabudgetary projects
- Strengthening Pacific Islands Regional and in-country tsunami preparedness: from Pacific Tsunami Warning Center (PTWC) Enhanced Products to Evacuation Maps (proposal presented to UN-ESCAP).
- Life-Saving Actions: Disaster preparedness and seismic and tsunami risk reduction in the south coast of San Cristóbal province, Dominican Republic

Assessment of needs and delivery capacity: Needs are regularly expressed at the national and regional level through the Summary Reports of subsidiary bodies (ICG/PTWS, ICG/CARIBE EWS, ICG/OTWS, and ICG/NEAMTWS) forwarded and noted by the IOC Governing Bodies. Capacity for implementation is closely linked to the ability to get secondments or project based staff with a managerial time-bounded technical assistance from regular staff. There are clear synergies and inter-sectoral cooperation opportunities with the Education Sector. Close cooperation with field offices is mandatory.

Opportunity for resource mobilization: Through regular calls of the Department of Humanitarian Affairs of the European Commission (DIPECHO), and the UN ESCAP Fund in Trust for Disaster Risk Reduction.

Accountability for resource mobilization: IOC Headquarters through centralized fund mobilization
Resource mobilization

- Caribbean - Dominican Republic (ECHO) US $167,000 for 2013-2014
- Caribbean - Haiti - UNDP for Haiti (2014, $ 200,000) – funded
- Caribbean - Dominican Republic (2015, 163,000) – funded
- Caribbean - Haiti (April 2015, 170,000) – funded
- South West Pacific ESCAP (2015, $ 575,000) – no decision yet
- Caribbean (Emergency Fund): US$110,000 for 2015
- South West Pacific (Emergency Fund): US$ 45,000
Contribute to develop Member States’ capacities for coastal hazard assessment

**Overall goals**
(a) To advance scientific and technical skills for coastal hazard assessment and forecasting; (b) To ensure the continuity of relevant networks of expertise, projects and research stations involved in developing coastal hazard assessment and forecasting techniques; (c) To support developing / least developed countries to build up their capacity in coastal hazard assessment and forecasting system; and (d) To support the sharing on best practices through existing framework.

**Estimated funding required**
US$ 1,000,000

**Contact**
Tony Elliott (t.elliott@unesco.org)
Bernardo Aliaga (b.aliaga@unesco.org)

**Associated UNESCO Field Offices**
Apia, Jakarta, Nairobi and Regional Bureau for Sciences, Kingston, Bangkok and Regional Bureau for Education, San José, Santiago and Regional Bureau for Education, Port-au-Prince

**Description**
UNESCO presents a comparative advantage in dealing with the coastal hazard issues through the IOC in (i) leading the coordination of global/regional tsunami warning systems, (ii) coordinating scientific and technical expert groups organized under the Joint WMO-IOC Technical Commission for Oceanography and Marine Meteorology (JCOMM), (iii) coordinating of sustained ocean observations under the IOC's Global Ocean Observing System (GOOS) and (iv) standard setting for coastal management and marine spatial planning through the IOC's Integrated Coastal Area Management (IOC/ICAM) program.

Modalities for action will include:
- Provision of sound scientific and technical guidance based on local needs and in collaboration with the international scientific hazard community will provide the foundation for interventions.
- Support developing/least developed countries to enhance capacity in coastal hazard assessment, monitoring and forecasting systems (i.e. through best practice manuals and guides and training for coastal management community)
- Training on tsunami numerical modeling
- Promotion and sharing of best practices through existing intergovernmental / global framework within the IOC of UNESCO
- Sponsorship of relevant hazard science assessment workshops/conferences

The target group for the program is global with an emphasis on developing nations to enhance capacity for assessment of coastal hazards in support of adaptation to extreme sea level events and climate change.

Equal opportunities for male and female scientists/experts to participate in the activities will be ensured

**Expected results**
- Capacity of Member States to assess, mitigate or adapt to risks related to coastal hazards strengthened
- Member States capacity to conduct assessments of coastal sea level related hazards developed and sustainability of this capacity strengthened

**Key expected outputs**
- Hazard assessment approaches and tools
- Website for sharing region specific information for contributing to the development of assessments of coastal sea level related hazards.

**Resource mobilization**

**Associated extrabudgetary projects**
- Indian Ocean (UNESCAP)
- UNESCO Emergency Fund 2012-2013 $ 40,000
- Enhancing Tsunami Risk Assessment and Management, Strengthening Policy Support and Developing Guidelines for Tsunami Exercises in Indian Ocean Countries
- Communicating the effects of the 1945 Makran tsunami to increase awareness and preparedness of tsunami hazards in the Makran region

**Assessment of needs and delivery capacity:** Needs are clearly expressed in the reports of the Working Group on Tsunamis and Other Hazards related to Sea Level Warning and Mitigation Systems (TOWS-WG). Capacity of implementation is closely linked to availability of funds from Open International Competition (OIC) calls.

**Opportunity for resource mobilization:** Through regular calls of the Department of Humanitarian Affairs of the European Commission (DIPECHO), and Self-benefit Fund in Trust for Oman.
Accountability for resource mobilization: IOC Headquarters through centralized fund mobilization.
Promote the development and local use of ocean analysis and forecast systems

Overall goals
To support (a) the access and use in developing / least developed countries of available global ocean analysis and forecast products, applied to local societal challenges, (b) develop critical capacity to interpret ocean forecasts and develop relevant services, and (c) lay the groundwork to develop local ocean forecasting capability.

Estimated funding required
US$ 350,000

Contact
Albert Fischer (a.fischer@unesco.org),
Denis Chang-Seng (d.chang-seng@unesco.org)

Description
The JCOMM Services and Forecast Systems Programme Area addresses IOC Member State and WMO Members' needs for operational services for safety of life at sea, coastal hazards, and to address other societal challenges.

Areas of action include the development and promotion of standards and guides for service provision, quality management, and the evaluation of forecasts and services.

Available human and financial resources have thus far only addressed the coordination of those agencies and institutions providing operational services.

Expected results

- Capacity of Member States to address local ocean-related hazards and management problems improved through the use of globally-available information and ocean forecast products
- Improved local understanding of the role of the ocean in human well-being

Donor interest
Republic of Korea

Key expected outputs
- Training courses and networks of mutual assistance

Assessment of needs and deliver capacity:
# The Global Ocean Observing System's global and regional streams of data and related forecasting products have great untapped local potential for use in the development of locally- and spectrally-specific information to support the human relationship to the ocean
# Improving use of ocean observations will improve the value proposition for those Member States that are funding the majority of the observations, and serve IOC's goal of improving the capacity of all Member States to fully engage in IOC's High Level Objectives
# Creating local demand for ocean information through its provision will develop local cultures of science informing decisions and policy, and encourage local investment in ocean science, observations and services

Opportunities for resource mobilization:
# EC DEVCO
# Regional development banks

Accountability for resource mobilization: IOC Headquarters through centralized fund mobilization, IOC Sub-Commission Secretariats, GOOS Regional Alliance secretariats

Associated extrabudgetary projects (proposed)
Ocean services summer schools and training courses
Mitigating the effects of marine harmful algal blooms through enhanced systematized data exchange and enhanced capabilities for monitoring and research (ME-HAB)

Overall goal
Because harmful algae continue to pose a major problem to fisheries, sustainable aquaculture, public health and tourism the overall goal is to enhance and maintain capacity in IOC Member States to manage marine harmful algal events and thereby protect marine living resources and public health, and freely access and exchange data on event occurrences and impacts. It is the underlying goal that the acquired skills integrate into national management schemes for marine living resources and to strengthen capabilities of national authorities and industries to comply with national or regional legislation re. biotoxins.

Estimated funding required
US$ 450,000

Contact
Henrik Enevoldsen (h.nevoldsen@unesco.org)

Description
The approach is programmatic with two main elements within harmful algal bloom (HAB) monitoring, management, mitigation and research as identified by the IOC Intergovernmental Panel on Harmful Algal Blooms: 1. Targeted and demand driven capacity enhancement in developing states. 2. Systematized data exchange as a knowledge base for improved management of marine living resources.

Element 1 will consist of stipends for IOC-UNESCO training courses; GlobalHAB summer schools development and publication of methodological manuals and guides; and targeted assistance to development states. Element 2 will consist of the continued development of a data platform (within OBIS and linked with WoRMS and HAEDAT), stakeholder involvement and training, demand driven data product development and publication including a Global HAB Status Report. (IOC Assembly Decision IOC-XXVII/Dec.5.4.2, 2013 and Decision IPHAB-XI.2)

IOC-UNESCO has for two decades been leading in setting standards for training in HAB management and for several decades in exchange of marine data within the International Ocean Data Exchange programme (IODE). This experience positions IOC-UNESCO better than any agency to offer these services upon demand from developing Member States.

Capacity enhancement and training ‘on demand’ implies that those trained acquire skills that are immediately applicable in a national context. This implies that established capacity in principle can be passed on to younger specialists within national institutions as long as there is a national or legislative need for the expertise. All manuals, guides, and teaching materials will remain freely accessible (for e.g. trained trainers) at the IOC-UNESCO website.

The beneficiary group is national marine science, food safety, veterinary, fisheries or food inspection agencies in charge of monitoring and managing harmful algae and their diverse effects on fisheries, aquaculture, ecosystems, tourism etc. It is targeted to individuals and institutions with an already established infrastructure for managing HABs as well as to LDC institutions with only initial or no infrastructure.

Africa is prioritized in terms of strengthened regional and national capacities to i) provide and exchange data for management of living marine resources and ii) protection of public health/seafood safety.

The field traditionally has an overrepresentation of women. This strongpoint in science of women is strengthened and supported through upgraded skills and improved tools for application of knowledge in practical management of living marine resources.

LDCs are prioritized through selection of trainees for individual training and through selection of institutions for enhancement of institutional capacities.

Expected results
- Impacts of harmful algae on living resources, public health and tourism reduced
- An easy-to-navigate, dynamic, integrated, and distributed data system with: visual and interactive quality-assured data and scientific information on harmful algae provided by experts, coupled with general information on authorities and institutions involved with sea food safety, statutory monitoring of harmful algae / toxins and institutions involved in HAB research

Key expected outputs
- Enhanced, national, institutional and human capacity to monitor and manage HAB events. A long-term IODE global system for compiling and accessing data on harmful algal events and their impacts and based here upon a Global HAB Status Report.

Assessment of needs and delivery capacity: The long term need for a strong priority to enhancing the capacity in developing Member States on HAB monitoring and mitigation has been identified and maintained by the IOC Intergovernmental Panel on Harmful Algal Blooms and was reconfirmed at its Twelfth Session 2015 (IPHAB-XII). The
development and publication of an IOC UNESCO Global HAB Status Reports was decided by Decision IPHAB-XI.2 and IOC Assembly Decision 5.4.2XXV-10. The Secretariat and partner institutions have the experience, capacity and network to deliver.

**Opportunity for resource mobilization:** Member States through IPHAB A number of Member States and regional organization have funded in the past capacity development activities and data products on HAB. The Gulf Region has shown interest in activities targeted at HABs and Desalination and capacity development.

**Accountability for resource mobilization:**
IOC Headquarters through centralized fund mobilization.

**Donor interest**
Belgium: Government of Flanders

**Associated extra-budgetary projects:** DIPS-4-Ocean Assessments: Development of Information Products and Services based on OBIS and HAEDAT to support the WOA, IPBES and a Global HAB Status Report.
Mitigating the impacts of macro-algal *Sargassum* occurrences through research and development of management capabilities

**Overall goal**
As mass occurrences of the brown algae genus *Sargassum* pose a major problem to coastal states in the Americas and West Africa and affects fisheries, tourism and other ecosystem services there is a need to enhance capacity in IOC Member States to manage and mitigate *Sargassum* mass occurrences and landing.

**Estimated funding required**
US$ 250,000

**Contact**
Cesar Toro (c.toro@unesco.org); Henrik Enevoldsen (h.enevoldsen@unesco.org); Mika Odido (m.odido@unesco.org)

**Associated Field Office**
IOC SCC-HAB, Copenhagen; IOCARIBE, Cartagena, IOCAFRIA, Nairobi

**Description**
*Sargassum* is a genus of brown macroalgae (seaweed). The genus is widely known for its free-floating species of which two species (*S. natans* and *S. fluitans*) reproduce vegetatively and never attaching to the sea floor during their lifecycle. Huge floating mats of *Sargassum* are home to, and source of food for, a huge variety of sea life. It is a prime nursery habitat for a diversity of large fish, such as mahi mahi (a.k.a. dorado, dolphin), sailfish, jacks, amberjacks, etc. *Sargassum* is edible, it is harvested to feed livestock, and it can be fried, boiled, steamed or dried. It is used in Chinese medicine. When *Sargassum* loses its buoyancy, it sinks to the sea floor, providing energy in the form of carbon to fishes and invertebrates in the deep sea. However, sudden beaching of huge seaweed masses smother the coastline and form rotting piles on the shore. The number of reports of these events in previously unaffected areas has increased worldwide in recent years (Nature, 504, 84–88, 2013, doi:10.1038/nature12860). These 'seaweed tides' can harm tourism-based economies, smother aquaculture operations or disrupt traditional artisanal fisheries. Coastal eutrophication might explain for the increase in seaweed biomass, but the proximate processes that are responsible for individual landing events are complex and require dedicated study to develop effective mitigation strategies. Harvesting the macroalgae, a valuable raw material, before they beach could well be developed into an effective solution.

The approach is with two main elements:

1. Identification of research priorities to understand *Sargassum* growth dynamics and to develop improved management and mitigation technologies for *Sargassum* beaching.

2. Targeted capacity enhancement for *Sargassum* management and mitigation in affected Member States.

Element 1 will consist of a thorough review of current knowledge on *Sargassum* dynamics to be able to present a plan identifying research and technology development priorities. This will be achieved through expert networks and workshops. Key questions to be addressed includes:

- Does global warming influence the increase in *Sargassum* mass occurrences?
- To which degree does nutrient loading to the sea influence *Sargassum* growth?

- What is the role of physics, winds, storms, and spiraling currents in dispersing *Sargassum* throughout the world’s oceans? Is there a long-term cyclical pattern? The blooming is it incidental or permanent?

The results will be published as a white paper and possible peer reviewed review papers.

Element 2 will consist of a series of training workshops to enhance the general knowledge on both the biology of *Sargassum* and in particular on management and mitigation possibilities. This will involve close cooperation with private sector with a view to include possible ways to exploit *Sargassum* as a resource. A manual/guide on *Sargassum* management will be developed and published as part of this element.

IOC-UNESCO has for two decades been leading in setting standards for training in Harmful Algal Bloom management. This experience positions IOC-UNESCO better than any agency to offer these services upon demand from Member States.

The beneficiary group includes national marine science, food safety, veterinary, fisheries, tourism or related agencies in charge of monitoring and managing coastal environments in the Caribbean and West Africa primarily. Activities are targeted to individuals and institutions with an already established infrastructure for managing phenomena such as *Sargassum* as well as to LDC institutions with only initial or no infrastructure.
Key expected outputs
- Enhanced, national, institutional and human capacity to monitor and manage Sargassum events.
- Better management and mitigation of Sargassum

Assessment of needs and delivery capacity: The need for an effort to enhance the capacity in Member States on Sargassum monitoring and mitigation has been identified by IOCARIBE and IOCAFRICA/HAB. The Secretariat and partner institutions have the experience, capacity and network to deliver.

Accountability for resource mobilization:
IOC Headquarters through centralized fund mobilization.

Donor interest
Belgium: Government of Flanders

Associated extra-budgetary projects:
N/A
Regular Process for Global Reporting and Assessment of the State of the Marine Environment – UN World Ocean Assessment (WOA)

Overall goal
Strengthen the scientific and technical contribution of IOC to the Regular Process and increase the capacity of Member States to conduct marine assessment.

Estimated funding required
US$ 600,000

Contact
Julian Barbière (j.barbiere@unesco.org)

Description
This outline will support the role of IOC in the implementation of the UN Regular Process for Global Reporting and Assessment of the State of the Marine Environment, established in 2010. The first cycle of the Regular Process was completed in 2015 with the publication of the World Ocean Assessment report. In response to UNGA Resolution 65/37, IOC has provided technical and scientific support to the Regular Process and Group of Expert tasked with the preparation of the report. As second cycle of the Regular Process will be launched in 2016 with the aim of being completed in 2020-2021. In close consultation with the Regular Process Secretariat, its Bureau and UNEP, IOC will develop a number of activities building on its science and observation programmes and will focus its strategy on:

(i) assistance with the information and data management component of the Regular Process though the established WOA website;
(ii) assistance to the UN Group of Experts in charge of organizing and drafting the second World Ocean Assessment report to be delivered in 2020/2021, including though support to the editorial process;
(iii) the provision of assessment products, results and data to the UN Group of Experts through IOC science and observation programmes, and specific global projects such as the GEF Transboundary Water Assessment Programme which provides baseline indicators for the world’s 66 Large Marine Ecosystems.
(iv) the conduct of capacity-building activities to increase the participation of developing nations in the Regular Process activities and support technical capacity of nations for conducting

In order to support the later, it is proposed that IOC and UNEP develop and implement a specific Regular Process Training Module. This Module would provide:

(i) common information content /common approaches towards assessment methodologies;
(ii) defining approaches for scaling up assessments (national- regional –global);
(iii) promote the use of standardized procedure to integrate the ecological and socio-economic dimensions of assessments, with the aim of securing coherence, consistency and comparability across regions.

At the initial stage, investment would be required to design the course structure and methodology. This would require working in collaboration with other technical agencies and partners that have experience in the conduct of marine assessments. Agencies such as IMO, FAO, IAEA (MEL) and ICES (International Council for the Exploration of the Sea) have expressed interest to contribute to this process. Expertise on the integration socio-economic aspects which is a recurrent gap would also need to be brought in.

Once designed, the Course would be implemented by organising a cycle of Regional Training courses to be conducted through and in cooperation with the Regional Seas and IOC regional bodies, hence bringing the environmental management and marine science under one single platform.

The Global Ocean Teacher Academy would provide a platform for delivering training in the regions and in local language. To support face to face training, a comprehensive web-based training system that would support virtual classroom training, online tutoring and access to a dedicated electronic library providing a number of methodological resources related to marine assessments, would also be established.

Expected results
- Increased scientific and technical contribution of IOC to the implementation of the Regular Process
- Increased capacity of Member States to participate in the Regular Process and to conduct integrated marine assessment.

Key expected outputs
- Second Global Assessment initiated under the Regular Process on the Global Reporting on the State of the Marine Environment.
- Trained national experts in the conduct of integrated marine assessment
- An international technical and scientific network to support present and future Regular Process cycles.
Assessment of needs and delivery capacity:

The need for the setting up the World Ocean Assessment was formulated in 2002 at the Johannesburg WSSD and more recently at Rio+20. IOC through its scientific programme and training programme such as the Ocean Teacher has the technical knowledge and expertise for developing a focused training programme on marine assessments.

Opportunity for resource mobilization:
A number of countries (Sweden, Norway, Belgium) and regional organization (European Commission) have funded in the past WOA activities or expressed interest in the supporting the process.

Accountability for resource mobilization:
IOC Headquarters through centralized fund mobilization.

Donor interest
Belgium: Government of Flanders

Associated extrabudgetary projects
Transboundary Water Assessment Programme - TWAP
Contribution to the UN World Ocean Assessment
Nutrients and Coastal Impacts Research Programme (N-CIRP): Models for nutrient export from watersheds – user scenario evaluation: quantitative analysis of impacts of nutrient loading and changing nutrient stoichiometry in coastal ecosystems

Overall goal
To develop a tool that will allow scientists, managers and policymakers to predict how natural and anthropogenic factors interact to modulate coastal zone ecosystems and stresses on organisms ranging from phytoplankton to fish.

Estimated funding required
US$ 450,000

Contact
Henrik Enevoldsen (h.enevoldsen@unesco.org)

Description
One central goal of the RP N-CIRP program is to act as a link between several IOC programs with interest in aspects of coastal zone biology, chemistry or management (IOC XXV-9, 2009, IOC XXVI, 2011) The primary UNESCO-IOC product will be an assessment tool for use by scientists as an aid to, and in close collaboration with, managers and policy makers from developed and developing regions to use in the evaluation and implementation of policies to improve coastal water quality.

The CAP build on that the IOC of UNESCO is an active partner in the Global Partnership on Nutrient Management (GPNM) and in the implementation of the GPNM Project: GLOBAL FOUNDATIONS FOR REDUCING NUTRIENT ENRICHMENT AND OXYGEN DEPLETION FROM LAND BASED POLLUTION POLLUTION OF COASTAL WATERS IN SUPPORT OF GLOBAL NUTRIENT CYCLE (GNC). This project has provided the foundations (including partnerships, information, tools and policy mechanisms) for governments and other stakeholders to initiate comprehensive, effective and sustained programs addressing nutrient over-enrichment and oxygen depletion from land based pollution of coastal waters in Large Marine Ecosystems. The project consists of four components: (A) a fully established Global Partnership on Nutrient Management; (B) quantitative analysis of relationship between nutrient sources and impacts to guide decision making on policy and technological options; (C) establishment of scientific, technological and policy options to improve coastal water quality policies in LMEs and national strategy development - the development of a ‘Policy Tool Box’; (D) pilot testing of quantitative modeling outcomes from B and best practice measures/options from ‘Policy Tool Box’ developed under C in development of nutrient reduction strategies in main demonstration area and additional sites. The science component B was designed to support the N-CIRP work plan, with a focus on global relationships between nutrient loading of coastal marine ecosystems on the basis of primarily the Global NEWS models and scenarios. Component C will contribute to the toolbox development envisaged in the N-CIRP work plan, and component D is a demonstration region in India and the Philippines.

The CAP will not only complement this work but will also focus on the capacity building aspect of nutrient management and to reach out to the broader community. This will be achieved through training workshops and summer schools for scientists and policy specialists from IOC Member States to enhance national capabilities to apply N-CRP and GNC deliverables in a national and or regional context. During these training workshops, stakeholders will be trained in the use and application of N-CIPR models and datasets. IOC-UNESCO through the IOC Global Nutrient Export from Watersheds project (Global NEWS), developed models of nutrient export for dissolved inorganic, dissolved organic and particulate N, P and carbon (C), as well as for dissolved silica. The Global NEWS framework includes the Integrated Model for the Assessment of the Global Environment to generate spatially explicit land use, greenhouse gas emissions, and climate fields. This experience positions IOC-UNESCO better than any agency to take the lead in developing scenarios for nutrient impacts on coastal ecosystems.

Developed tools will be freely available and may in combination with the provided training be further applied and developed in national, regional and international context. The beneficiary group includes researchers; national and local governments and regulatory agencies; policy-makers from developing regions experiencing, or likely to experience, nutrient related changes in coastal zone function; resource managers; coastal inhabitants; coastal fisheries and shellfisheries; the tourism industry; aquaculturists; commercial and recreational fishermen; conservationists; policy makers, both national and international; students and general public.

Expected results
- A quantitative analysis of relationship between nutrient sources and impacts
- Improved management of nutrient loading to the marine environment
- 

Key expected outputs
- Provision of guidance to decision making on policy and technological options for reduction of nutrient loading to the marine environment
- Enhanced, national, institutional and human capacity to monitor and manage nutrient loading to the marine environment

39
**Assessment of needs and delivery capacity:** The need for an international coordinated research and capacity development effort in relation to developing tools for managements of nutrient loading and its impact on coastal ecosystems is expressed by IOC XXV-9, 2009, and IOC XXVI, 2011 through Resolution XXV-9. The Secretariat and partner institutions have the experience, capacity and network to deliver. **Estimated budget requirements:** 4500,000 USD

**Opportunity for resource mobilization:** To be identified.

**Accountability for resource mobilization:** IOC Headquarters through centralized fund mobilization.

**Donor interest**
Belgium: Government of Flanders

**Associated extra-budgetary projects:** Global Foundations for Reducing Nutrient Enrichment and Oxygen Depletion from Land-based Pollution in Support of Global Nutrient Cycle (GF-Nutrients)
Climate change adaptation for Africa and SIDS

Overall goal
Assisting Member States to develop and implement climate change adaptation strategies and cost-effective measures in their coastal areas, building on sound science and marine observations.

Estimated funding required
US$ 800,000

Contact
A.Fischer (a.fischer@unesco.org); Julian Barbierre (j.barbiere@unesco.org); Denis Chang-Seng (d.chang-seng@unesco.org); Mika Odido (m.odido@unesco.org)

Associated Field Office
IOCARIBE, Cartagena, IOCAFRICA, Nairobi, WESTPAC, Bangkok

Description
This outline will complement regular programme activities on coastal adaptation. These will initiate the development of a number of regional project on coastal adaptation for each region (IOCARIBE, WESTPAC, AFRICA, Mediterranean) based on identified regional needs and complementing existing initiatives. With a view to build on the experience of the Adaptation to Climate Change in Coastal Zones of West Africa (ACCC project) the regional coastal adaptation initiatives will undertake:

i) An Analysis of local physical, social and economic impacts of climate change using regional climate model projections;

ii) the Formulation of adaptation strategy for local implementation in collaboration with site managers, local government and stakeholders, in the context of existing coastal management initiatives;

iii) Enhancement of local capacity for adaptation to climate change and coastal erosion, including capacity to monitor the impact of climate change though modeling;

iv) Developing a learning mechanism and tools for replication in other sites including in biosphere reserves and WHC marine sites.

These initiatives will be specifically targeted to international donors and in particular the Adaptation Fund to which UNESCO has been accredited Executing Agency.

The decentralized activities to be conducted through IOC/UNESCO regional offices could focus in a first step in organizing a regional consultation in the form of a workshop, where an exchange with countries for which erosion, sea-level hazards and adaption are priority areas. The objective would be to present to the countries the type of measures that can be put in place, also looking at the scientific and technical requirements that IOC programmes can provide, and then ironing out a strategy for a regional approach that would be supported through the Adaptation Fund. Specific IOC international guidelines related to coastal risk reduction and coastal adaptation will be translated in the regional context and will guide the methodological approach to be implemented at local level. Following the workshop, a project brief could be developed, with all partners providing their inputs, and with endorsement of national entities. A further link to establish will be with the IOC global activities on coastal adaptation and the recently established IOC/ICAM Expert Group on Coastal Hazards which could upon request provide guidance and expertise to such regional initiatives.

Cooperation will be pursued with UNESCO’s International Hydrological Programme (IHP) with a view to develop a number of actions targeted to SIDS focusing Adaptation to climate change through management of coastal groundwater resources. The Caribbean region will provide a pilot area for developing such approach.

Expected results
- Member States assisted to formulate coastal adaptation strategies and measures using sound science and best practices

Key expected outputs
- Improved capacity of countries to incorporate climate change and coastal risk reduction dimensions in their coastal management plans leading to increased community resilience

Donor interest
GEF, UNDP, UNFCCC Adaptation fund

Associated extrabudgetary projects
- Adaptation au Changement de Climat - Répondre à la transformation du littoral dans ses dimensions humaines en Afrique de l'ouest dans le cadre de la gestion intégrée du littoral (ACCC)

Assessment of needs and delivery capacity:

Climate change adaptation in coastal zone is a priority for many countries (and in particular SIDS) as reflected in the SDGs Agenda 2030, UNFCC COP21, Sendai Framework and other regional/global fora.
**Estimated budget requirements:**
800,000 USD for regional project (supporting CC adaptation in 4 or 5 countries)

**Opportunity for resource mobilization:**
Global Environment Facility, Adaptation and Green Climate Funds are the main multilateral funds that could support these kinds of initiatives. Donor countries such as Germany, France, the Netherlands could also be interested in these issues. The 2015 COP UNFCCC that would be organized in Paris could represent an opportunity for engaging France.

**Accountability for resource mobilization:**
IOC Field offices (IOCARIBE, WEPTPAC, IOCAFRI) should lead the development process with support IOC HQ.
Development of a regional ocean forecasting system for the Southeast Asian countries and demonstration of its value through its application to local societal needs

Overall goals
To develop an ocean forecasting system for the wider Southeast Asian region and its adjacent seas through the coordination of model development, validation and capacity development; and to demonstrate the value of this system, on a pilot basis, through its application to scientific research and local societal needs.

Estimated funding required
US$ 300,000

Estimated Duration
2 years

Contact
Wenxi Zhu (w.zhu@unesco.org)

Description
Ocean forecast system (OFS) is a crucial tool in the management of marine resources and mitigation of marine hazards. OFS can provide essential information of ocean current and circulation, sea surface temperature, sea level, ocean surface wave, transport of sediment and marine organisms (larvae or planktonic form) and also for activities related to oil and gas exploration, fisheries, navigation, marine parks management and coastal recreational activities. Effective management of marine and coastal resources requires knowledge of sea temperature, circulation and transportation of water-borne materials (e.g. marine organism larvae, suspended sediment, radionuclides) to support decision-making.

Given lack of such an OFS in the region, and responding to the need of its Member States in the region, the IOC Sub-Commission for the Western Pacific (WESTPAC) has attempted to develop an ocean forecasting demonstration system for the Peninsular Malaysia eastern shelf and Gulf of Thailand with three days forecast products and downloadable archived data provided on surface wave height (Hs), wind, current, sea temperature and salinity.

Building on the present accomplishments, and in closer collaboration with the JCOMM Expert Team on Operational Ocean Forecast Systems (ETOOFS), other GOOS Regional Alliances, and the GODAE OceanView Task Team on the Coastal Ocean and Shelf Seas (TT-COSS), this project aims to extend the demonstration system to cover a broader geographic coverage, and develop high-resolution models in a couple of selected sub-domains. Meanwhile, the project will enhance the forecasting capability of member states, and demonstrate its value through its application to scientific research and local societal needs on a pilot basis.

The project will be conducted mainly in the form of regional workshops, expert missions, model development and validation, and associated trainings.

Expected results
- Ocean forecasting capability of Member States improved through their engagement into model development, validation and capacity building; as well as cooperation with global and other regional ocean forecast system activities;
- Scientific understanding fostered on key regional oceanographic processes and local societal concerns through the application of this system.

Key expected outputs
A regional ocean forecasting system established, higher-resolution model developed, associated trainings conducted, and cooperation with global and other regions established.

Assessment of needs and deliver capacity:
# Local demands for ocean forecasting information have been expressed many times by IOC Member States at various occasions, including WESTPAC Session, WESTPAC International Scientific Symposia, and the UNESCO-ASEAN Cooperative Framework;
# WESTPAC has made tremendous efforts since 2010 to develop national and regional capacity for ocean models mainly through the IOC Regional Training and Research Network on Ocean Dynamics and Climate, and the development of a SEAGOOS Ocean Forecasting Demonstration System;

Opportunities for resource mobilization:
# Government of Thailand;
# Republic of Korea;
# China, and its hosted IOC Regional Training and Research Center on Ocean Dynamics and Climate;
# Government of Indonesia

Accountability for resource mobilization:
WESTPAC will lead the development and implementation of this project with support from IOC HQs.
EXPECTED RESULT 6

Member States' institutional capacities reinforced to protect and sustainably manage ocean and coastal resources

Responsible: Peter Pissierssens
Deputy: Julian Barbière
Supporting Member States in the implementation of Agenda 2015 and the related Sustainable Development Goal on Ocean (SDG#14)

Overall goal

To ensure that IOC provides scientific and technical support to Member States through IOC regional subsidiary bodies to assist Member States, particularly the most vulnerable, in implementing Sustainable Development Goal (SDG) on Ocean as part of the 2030 Agenda.

Estimated funding required

US$ 1,600,000

Contact

Julian Barbière (j.barbiere@unesco.org)
Wenxi Zhu (w.zhu@unesco.org)
Mika Odido (m.odido@unesco.org)
Cesar Toro (c.toro@unesco.org)
P. Pissierssens (p.pissierssens@unesco.org)

Associated Field Office

IOCARIBE, Cartagena, IOCAFrica, Nairobi, WESTPAC, Bangkok

Description

In September 2015, following a 2 year negotiation process, UN Member States adopted Agenda 2030, together with its 17 Sustainable Development Goals for the planet, including a dedicated goal for the ocean, SDG 14, entitled “Conserve and sustainably use the oceans, seas and marine resources for sustainable development”. SDG 14 contains ten targets which include marine pollution, ocean acidification; ecosystem protection and resilience; fisheries conservation; as well as economic opportunities for those most vulnerable. A cross cutting target to Ocean SDG calls for specifically “Increasing scientific knowledge, develop research capacity and transfer marine technology, taking into account the IOC Criteria and Guidelines on the Transfer of Marine Technology (…)”. This target clearly highlight the role of science in supporting all three pillars of ocean sustainability.

IOC with its unique mandate within the UN System for ocean science and its recognized field expertise, structure and world-wide presence, working in full cooperation with the UN System, is in a unique position to lead on these aspects.

The objective of this proposal is assist Member States in the SDG implementation by:

1. Developing capacities, brokering innovation and learning, and facilitating the transfer of marine technology
2. Providing normative support to countries to establish, implement, monitor and report on implementation of the Ocean SDG
3. Providing science-based policy advice for the implementation of integrated ocean governance and management
4. Maximizing IOC’s convening role and outreach capacity to mobilize multiple stakeholders networks

The IOC Regional Subsidiary Bodies, making up IOC’s arms in the regions, will be instrumental in assisting their respective Member States to achieve this standalone ocean SDG and to enhance countries’ marine scientific capacity to underpin the achievement of this ocean SDG. The following actions are foreseen:

- In collaboration with other relevant UN agencies involved in the definition of SDG indicators (primarily FAO, UNEP, DOLAOS), a suite of technical expert meeting will be implemented by IOC to finalise the SDG indicators methodology, and preliminary identification of datasets

- A series of regional workshops organized through IOC RSBs will be implemented to translate the indicators at regional level, identify reporting mechanism, and identify regional capacity development needs.

- Regional training programmes will be developed through the IOC Regional Network of Training and Research Centers on Marine Sciences, and Global Ocean Teacher Academy.

- Possible regional mechanism to facilitate the transfer of marine technology will be assessed, building on the IOC Guidelines on Transfer of Marine Technology.

Development of outreach materials highlighting SDGs issues through the work of IOC Regional Subsidiary
Bodies and decentralized offices will be developed and showcased at the UN Conference on Ocean SDG implementation to be organised in Fiji in June 2017.

Expected results
- Technical and scientific contribution provided to global and regional implementation of SDGs
- Marine science capacity enhanced towards the achievement of ocean SDG;
- Methodology defined to guide countries to translate ocean indicators at national level;
- National and regional science-policy interface improved

Key expected outputs
- Tailored training programs developed and implemented for the SDG;
- Regional network of RTRC strengthened
- A set of methodology defined and transferred;

Assessment of needs and delivery capacity:
The needs have been expressed at various global and regional gatherings

Opportunities for resource mobilization:
# Government of Sweden;
# Government of Japan, through its Japan Funds-in-Trust
# Republic of Korea;
# China, and its hosted Regional Training and Research Center on Ocean Dynamics and Climate;
# Government of Indonesia, and its hosted Regional Training and Research Center on Marine Taxonomy and Ecosystem Health
# Government of Vietnam
# European Commission, GEF, World Bank, Regional Development Banks

Accountability for resource mobilization:
IOC RSBs and IOC HQ will work closely on the development and implementation of this project.
PRIORITY AFRICA - IOCAFRICA: Capacity Development for Marine Science and Technology in Africa

Overall goal
Facilitate the utilization and integrated management of the marine and coastal resources of Africa by developing capacities for marine science and technology.

Estimated funding required
US$ 250,000

Contact
Mika Odido (m.odido@unesco.org); Peter Pissierssens (p.pissierssens@unesco.org)

Associated Field Office
IOCAFRICA, Nairobi, UNESCO/IOC Project Office for IODE, Ostend, Belgium.

Description
The oceans and seas around the African continent offer excellent opportunities towards social and economic development of Member States and their respective citizens. Much of the vast oceanic environment/space around the continent is mainly unexplored despite the potential economic benefits that the EEZ of respective Member States can offer. This can be achieved through research and technological development in areas of ocean observation and operationalization of the data and the application of products thereof.

A holistic approach to address these issues will ensure the sustainability of the coastal and marine areas and the resources within. An important aspect of this holistic approach is the dearth of human and infrastructural capacity to undertake ocean related sciences and observations which provide necessary data and information for management of the coastal areas and the resources. Marine institutions in Africa particularly suffer from limited financial resources and poor coastal and ocean observation infrastructure (platforms and equipment). Other constraints include limited human resources (need for capacity development), insufficient data and information for managing coastal resources and decision making (including long-term monitoring data for climate and climate change studies), and the limited collaboration between institutions in the region in addressing common concerns.

Though progress has been achieved in capacity development for marine sciences in the region the last 20 years through national efforts and the support of IOC and other organizations, a critical mass of experts is still not available in many of the African coastal countries.

IOCAFRICA’s Capacity Development programme focuses on the following elements:

(i) Improving the capacity of institutions and experts in the region for the collection, analysis and interpretation of baseline data required for understanding and exploitation of coastal environment and resources.

(ii) Strengthening existing or creating new university programmes for marine sciences, including UNESCO Chairs and “Centres of Excellence”

(iii) Fellowships/scholarships for long term training at MSc/PhD level

(iv) Continuous professional development to ensure that scientists and technical staff keep up to date with new developments in their fields (including short-term fellowships for training, participation in conferences, and exchange programs between research institutions and universities in the region - intra and inter regional mobility of scientists from research institutions and university).

(v) Organization of focused training, such as workshops and ‘summer schools’, addressing specific needs identified by Member States.

(vi) Exposure to new methodologies and tools in operational oceanography, including application of modelling and remote sensing for the understanding of coastal processes and hazards.

Expected results
- Increased understanding of ocean and coastal processes around Africa, and how they impact on environment and resources.
- Increased technical capacity for monitoring and early warning for coastal and oceanic natural hazards
- Improved understanding of how African Oceans and Coastal areas will be impacted by changing climates.
- Enhanced capacities of experts and institutions in Africa for research and management of the coastal and marine areas. Enhanced preparation by member states and coastal communities to and mitigate the impacts of coastal hazards and climate change.

Key expected outputs
- Marine and oceanographic institutions strengthened
- Critical mass of marine science professionals to identify and address key issues relevant to Africa.

Assessment of needs and delivery capacity: The third session of IOCAFRICA (14-15 April 2015, Nairobi, Kenya) identified priority areas for capacity development that need to be addressed. IODE’s Ocean Teacher Global Academy (OTGA) project have also identified priority areas related to capacity development for ocean data and information. IOCAFRICA emphasized the need to strengthen existing regional mechanisms such as the UNESCO Chairs in marine
sciences and the OTGA Regional Training Centres for training purposes. The Western Indian Ocean Island States have also proposed the establishment of a UNESCO Regional Centre for Ocean Sciences and Innovation.

**Opportunity for resource mobilization:** FUST, China-Africa collaboration

**Accountability for resource mobilization:**
IOC Headquarters through centralized fund mobilization.

**Donor interest**

**Associated extra-budgetary projects:** 191ICD2038.2 (Contributions from China to the IOC Special Account)
Re-activation of the IOC Regional Committee for the Central Indian Ocean (IOCINDIO): Fostering national and regional capacity building towards the implementation of the 2030 Sustainable Development Goals on Ocean (SDG#14) and Climate Change (SDG #13)

Background, justification and overall goal

The 49th Session of the IOC Executive Council (7-10 June 2016) re-affirmed the critical importance of the IOC Regional Committee for the Central Indian Ocean (IOCINDIO) to foster cooperation in the region, aiming at implementing IOC mission, objectives and programmes; at a time when ocean and climate related disasters have become great challenges in the region. The Executive Council adopted Resolution EC-XLIX.1 approving the Recommendations of the Fifth Session of the Committee (IOCINDIO-V) which was successfully organised in Chennai, India, 25-27 April, 2016. The Resolution requested the IOC Executive Secretary to develop a proposal in support of IOCINDIO in the Complementary Additional Programme proposals for 2016–2017, and to work with the Member States of IOCINDIO as well as other Member States to explore, as a matter of priority, all possibilities for mobilization of additional extra-budgetary resources, including contributions to the IOC Special Account, to fund core activities, notably the scoping workshop; as well as the possible organization of the Sixth Session of IOCINDIO in 2017.

The proposal aims to advocate for and support the re-activation and future reinforcement of IOCINDIO as an effective regional intergovernmental umbrella for promoting and implementing IOC programmes and joint activities, notably the IIOE-2 for the benefit of its Member States, with a particular attention to the least developed countries in the fields of ocean science and technology, infrastructures and governance. The re-activation will assist the operationalization of the Committee to become fully functional and self-sustaining with the view to contribute effectively to the successful implementation of IOC programmes and strategy at national and regional levels.

The direct beneficiaries are the IOCINDIO Member States, including the following: Australia, Bangladesh\(^1\), France, India\(^1\), Indonesia\(^1\), Iraq, Iran\(^1\), Kuwait\(^1\), Malaysia, Maldives, Myanmar, Oman, Pakistan, Qatar, Saudi Arabia, Sri Lanka, Thailand\(^1\), United Arab Emirates, United Kingdom\(^1\). (\(=\)Member States having attended the IOCINDIO-V in Chennai, India, 25-27 April 2016)

Furthermore, it is worth noting that the outputs and results of this proposal will also benefit all Indian ocean countries and beyond. In fact, scientifically, the Central Indian Ocean programs and issues identified are relevant to the entire Indian Ocean basin. To address these adequately, the entire Indian Ocean needs to be considered as a one inter-connected system. Hence, communication and collaboration with other IOC regional initiatives active in the Indian Ocean such as IOC-Africa and WestPac will be pursued.

Estimated funding required

US$ 30,000

Contacts: Justin Ahananzo, IOCINDIO Coordinator a.i., (j.ahanzo@unesco.org) Nick D’Adamo, IIOE-2 Coordinator, (n.d’adamo@unesco.org)

Description of activities

The Fifth Session of the Committee (IOCINDIO-V) adopted a number of priority activities including: (i) drafting of a mid-term strategic plan document based on the listing of high-priority starting projects for 2016-2017; (ii) convergence of IOCINDIO activities towards the new global frameworks including, Agenda 2030, notably SDG 14 (Ocean), Climate Regime (Paris Agreement, COP21); Sendai United Nations post-2015 Disaster Risk Reduction Framework; and the SIDS Accelerated Modalities of Action [S.A.M.O.] Pathway; (iii) emerging initiatives under UNCLOS, (iv) efforts of Member States to develop the Blue Growth (“Blue Economy” approach in their national waters); (v) contribution to IIOE-2 and its capacity development component; (vi) development of a communication and awareness initiative; (vii) organization of scientific fora.

It is therefore proposed to organise a scoping workshop aimed at rationalizing and integrating the priorities leading to the development of mid-term strategic plan with implementable work programme. It is also proposed to organise the Sixth Session of IOCINDIO (IOCINDIO-VI) which report should be submitted to and adopted by the 29th Session of IOC Assembly in June 2017.

1- Organisation of a scoping workshop to finalise the work programme and to initiate priority areas/activities in 2017

Following the recommendations of the Executive Council, the IOCINDIO scoping workshop should be held prior to the 29th Session of the IOC Assembly in June 2017. The workshop should focus on the following high-priority project topics as identified by the IOCINDIO-V, including:

• IOCINDIO/IIOE-2 strategic and tactical engagement project based on guiding frameworks for IIOE-2 engagement, including the IIOE-2 Science Plan and IIOE-2 Implementation Strategy; with a focus on the emerging IIOE-2 Western Indian Ocean Upwelling Research Initiative; and addressing the related issue of harnessing, managing and making existing data (metadata or actual data) available to Member States, including through the Ocean Data and Information Network for the Central Indian Ocean Region (ODINCIINDIO).
• IOCINDIO capacity development Project shall build on relevant recent capacity development needs identified by other regional groups or communities of programme (e.g. BILKO Steering Committee, IOGOOS, Bay of Bengal LME and Bay of Bengal intergovernmental Organisation) which have identified stakeholder priorities, needs and gaps in relation to capacity building, in the interests of IOCINDIO.

• IOCINDIO stakeholder communication and awareness project will develop a plan to support IOCINDIO Member States interests and priorities thus facilitating trust building amongst IOCINDIO stakeholders, with a greater support, resourcing and material commitment of IOCINDIO Member States to a clear programme of work.

In addition to the above, some additional topics which deserve special attention in the region were identified as follows:

• Hazards – e.g. tsunami, meteorological, hydrological, Harmful Algae Blooms, etc.
• Climate change impacts – including sea level, acidification/bleaching, human impacts (famine related, heat stress, vector borne diseases etc.)
• BILKO capacity building using existing training/education mechanisms and programmes, both direct and e-based.
• Marginal Seas multi-disciplinary bio-physical/climate studies.
• Vandalism awareness and mitigation.
• IOCINDIO fora for science and related achievements.
• Coastal Zone Management (e.g. focussing on water quality, nearshore primary producer communities

[corals, seagrasses, mangroves, etc.], coastal erosion, inundation, etc.)
• Sea-level rise and related coastal salinization.
• Modelling for Ocean Forecasting and Process Studies (referring to the IOGOOS project for historical underpinning).
• Remote sensing (referring to the IOGOOS project for historical underpinning).
• Fisheries Ecosystem-Based Management (EBM) linkage to project complementing existing FAO programmes in the IOCINDIO region.
• Marine/climate science expertise and knowledge transfer.
• Enhancement/completion of the Indian Ocean Observing System in the western Indian Ocean.

The above is not exhaustive and any other relevant areas identified by Member States can be considered as appropriate. The IOC Secretariat, in close collaboration with the IOCINDIO officers, will set up the scientific committee which will develop the full programme and agenda for the scoping workshop. Member States will be invited to nominate national experts to contribute to the preparation of the documents and will also be invited to attend the workshop.

2- Organization of the Sixth Session of IOCINDIO in 2017

Following the decision of IOCINDIO-V which recommended the organisation of the Sixth Session of IOCINDIO (IOCINDIO-VI). The report will be submitted to the 29th Session of the IOC Assembly in June 2017.

Key expected outputs:

- The Scoping workshop for the finalisation of the IOCINDIO work programme organised.
- The Sixth Session of IOCINDIO organised prior to the 29th Session of the IOC Assembly scheduled for June 2017.
- IOCINDIO Work programme is developed and distributed to Member States for implementation.
- IOCINDIO-VI Report submitted to and adopted by the 29th Session of the IOC Assembly in June 2017.

Associated programmes

All IOC programmes including GOOS (notably, IOGOOS); IODE (with the view to re-activate ODINCINDIO); ocean sciences (notably, harmful algal blooms, ocean acidification), IOC Marine Policy programmes (ICAM, LME, MSP) and tsunamis are associated in order to build synergies and save costs. Relevant IOC regional subsidiary bodies in particular, IOCAFRICA and WESTPAC and field offices are also called on to support through joint activities, the re-activation of IOCINDIO.

Assessment of needs and delivery capacity

Member States are invited to contribute their own national needs and priorities to the scoping workshop and in the drafting of the work programme in order to ensure that resulting documents reflect both national and regional priorities and needs.

Opportunity for resource mobilization

# Resolution EC-XLIX.1 advocated for a dedicated seed funding from IOC.
# IOC Member States, in particular a core group of IOCINDIO Member States, notably India (sponsored IOCINDIO-V in Chennai in April 2016 and to support the Committee through in-kind and financial contributions); the United Kingdom, the Islamic Republic of Iran and Kuwait (offered to host IOCINDIO-VI in 2017)
# Regional Education and Research Centre on Oceanography for West Asia as a Category 2 Centre under the auspices of UNESCO in the Islamic Republic of Iran.
# Ocean Teacher Global Academy
# Bay of Bengal LME Programme
# Bay of Bengal intergovernmental Organisation
# PERSGA
# UNDP, UNEP, FAO, DOALAOs.
Accountability for resource mobilization: IOC-HQ
Global Ocean Science Report

Overall goal
The Ocean Science Capacity Report (OSCAR) will assist local and national governments, academic and research institutions, as well as international organizations and donors, in making informed decisions regarding the status of ocean research, investment in research infrastructure and human capacity, as well as potential gaps in marine sciences programs in need of further investments.

Estimated funding required
US$ 200,000

Contact
Henrik Eenevoldsen (h.eenevoldsen@unesco.org)

Description
At present, there is no global mechanism for assessing and reporting the level of capacity, investments, and needs of nations in ocean science, observation and services. As part of its Voluntary Commitment to the Rio+20 process, IOC will play a leading role in facilitating the development and implementation of a global strategy to build national and regional capacity in ocean affairs. To support this, a mechanism is required to assess on a regular basis nations' needs and investments on these issues. It is thus proposed that the Global Ocean Science Report be put in place under the IOC intergovernmental framework. The report would be framed around the sustainable development concepts and how science contributes to these.

The GOSR is envisaged to provide an overview about (i) investments, (ii) resources, and (iii) productivity in Ocean Science. Furthermore, this initiative would contribute to identifying areas for international cooperation in marine scientific research to implement the relevant provisions of Part XIII of UNCLOS as well as to facilitate the transfer of marine technology as mandated by Part XIV of UNCLOS based on the IOC Criteria and Guidelines on Transfer of Marine Technology (2005).

The report will be divided into two parts. The first part will focus on quantitative information beneficial for marine scientists, including bibliometric indicators, investment strategies, and research infrastructure, while the second part is outlined to focus on qualitative descriptions, elucidating regional development and ocean governance, which is of especially high value for managers, policy makers, governments etc.

For the collection of indicators and evidence used to assess capacity, progress and challenges for ocean science in Member States, a tailored questionnaire (41 questions), asking for national information on ocean science conducted in IOC Member States was disseminated by IOC Circular IOC Circular Letter 2560 in January 2015. The analysis of the responses is finalized. In addition, the results for the bibliometric were received. Based on this information the secretariat drafted some parts of the report.

In May 2015 the Editorial Board, a group of international experts, will meet for the first time to review, discuss and draft chapters of the publication.

A second meeting is scheduled to take place at the end of 2016.

The GOSR is intended to be published every 4-5 years and the production phase of the report would be restricted to less than 2 years to ensure that the analysis produced is updated with the annual varying statistical indicators.

Expected results
- The OSCAR as a reporting mechanism on national capacity would also strengthen the role and position of National Oceanographic Committees (NOC) and reinforce the visibility of IOC at the national level.
- The OSCAR will address the key aspects of Ocean sciences regarding sustainable development and blue economy.
- The OSCAR will deliver an overview on where and by whom Ocean Science is conducted, its quality and impact on national and international governance. In brief, the OSCAR will inform the member states of where the science capacity exists to address the challenges raised by the WOA, IPBES and IPCC.

Key expected outputs
Depending on the extrabudgetary funds provided the Ocean Science Capacity Report could be published by the end of 2016.

Assessment of needs and deliver capacity:
# There is a need to assess on a regular basis nation's capacities on ocean research in order to develop global and regional strategies on marine research, enhance the transfer of technology and improve ocean governance and sustainability for all.
# The IOC is the UN organization with a specific mandate on ocean sciences and it is capable to lead and produce such report, which should be seen as a flag product of the commission.
# The IOC has the capacity to lead and coordinate the Global Ocean Science Report, but would need to contract experts to gather & analyse the data and develop the full workplan accordingly with the guidelines provided by the member states.
Opportunities for resource mobilization:
# Norway because they have demonstrated interest in the Ocean Science Capacity Report
# Korea because they showed interest in hosting the second meeting of the Editorial Board.

Accountability for resource mobilization: IOC HQ
IODE – Capacity-development necessary for maintenance of healthy ocean ecosystems focusing on the regional needs and OBIS

Overall goal
To build national and regional capacity for the sustainable management and exploitation of coastal areas in developing regions, and to mitigate the impact of natural ocean based disasters and climate change.

Estimated funding required
US$ 600,000

Contact
Peter Pissierssens (p.pissierssens@unesco.org) , Ward Appeltans (w.appeltans@unesco.org), Claudia Delgado (c.delgado@unesco.org)

Associated Field Offices
Ostend

Description
The purpose of the call for extra-budgetary funds will be to strengthen the regional Ocean Data and Information Network (ODIN) capacity development platforms for oceanographic data and information management, coastal management and ocean observations. The ODINs foster the development of national as well as regional end-to-end coordinated mechanisms that respond to the need for (i) national and regional coastal

Expected results
- All IOC Member States have established and operate oceanographic data and information facilities, including OBIS data nodes, as well as national coordination mechanisms to organize the data flow and to provide services to all stakeholders through the further development and strengthening of ODIN projects, as cross-cutting and integrated capacity-building, observation and product development platforms, in all regions
- Member States have agreed on a set of standards for management, exchange and dissemination of oceanographic, including biogeographic data and information, with the aim of consolidating a set of standards that will provide interoperability between Member States of IODE, JCOMM and the broader oceanographic data community
- OceanTeacher Global Academy established and providing annual curricula in oceanographic data and information management for students and professionals, male and female, from all region
- The Ocean Biogeographic Information System training programme fully operational

Key expected outputs
- Equitable participation of developing countries in activities of the International Oceanographic Data and Information Exchange (IODE) programme and the Ocean Biogeographic Information System (OBIS)
- Free and open access to all data and information by all Member States, developed and developing alike.

Assessment of needs and delivery capacity:
There is still a huge inequity of available resources and capacity in developing countries to participate in activities of the International Oceanographic Data and Information Exchange (IODE) programme and the Ocean Biogeographic Information System (OBIS). OBIS and IODE need to strengthen the capacity of all Member States to provide free and open access to (environmental) data and information.

Accountability for resource mobilization:
The IOC project office for IODE will be the implementing office.
Decision-support tools for improved Integrated Coastal Management and Marine Spatial Planning

Overall goal
Assist IOC Member States in their efforts to build marine scientific and technical capabilities in the field of Integrated Coastal Management and Marine Spatial Planning

Estimated funding required
US$ 1,500,000

Contact
Julian Barbière (j.barbiere@unesco.org)

Associated Field Office
IOCARIBE, Cartagena, IOCAFrica, Nairobi, WESTPAC, Bangkok

Description
This extra-budgetary outline is to support and complement the work of the IOC programme on Integrated Coastal Area Management in three specific areas, where the programme has developed technical leadership in the applications of tools and guidelines for supporting the national and regional coastal management cycles, and which are technically applicable and adaptable in different geographical and socio-economic contexts. These tools need to be applied in real-life case especially through local and regional applications. In this process, capacity development of individuals and institutions of IOC Member States will be strengthened.

The three components that the Outline should support are:

(i) Support the technical and scientific capacity of Member States to implement Marine Spatial Planning activities within their national waters;

(ii) Develop Member States' capacity for the application of ecosystem-based management tools, such as indicator-based marine and coastal assessments;

(iii) Promote the integration of climate change adaptation and coastal hazards preparedness into the application of area-based management approaches.

Recognizing the need to promote ICAM at the regional and national levels, and in response to the needs identified by IOC Regional Subsidiary bodies (RSBs), the outline will support the implementation of a number of projects mostly at the regional level, and in transferring and applying some of the global methodologies (Indicators, MSP) through the development and implementation of field projects.

The outline will build on the experience existing within IOC ICAM projects such as:
- SPINCAM indicator development for South East Pacific countries (Flanders)
- Marine Spatial Planning methodology development and technical support to Vietnam, Canada, and US (Moore/Packard Foundations)
- Aquacross (H2020, European Commission).

Whilst the general objective of the project is to assisting countries through the development and implementation of regional projects that will catalyse national commitments to piloting and scaling up ICAM and Marine Spatial Planning, specific objectives include:

- strengthening consensus among public institutions and stakeholders on approaches and strategies for addressing the identified threats, risks and vulnerability to coastal and marine environment, as well as sustainable development in the regions

- building a lasting partnership among stakeholders through collaborative and participatory projects and programmes at local, municipal and provincial scale in order to demonstrate ecosystem based management approaches such as ICAM/MSP at local and/or provincial demonstrative pilot sites.

- achieving synergies and linkages in implementing ICAM/MSP concepts among demonstrative pilot sites and countries in the region,

- building capacities and reduce in-country (local, provincial, national) disparities in capacities for ICAM/MSP.

- developing and implement a communication and outreach strategy to enhance public participation during the project implementation and their involvement in the coastal and marine management processes linked with ICAM/MSP to be executed at the demonstrative pilot sites.

- developing strategies to reduce human activities impacts and pressures by promoting green and blue infrastructures towards a local/municipal coastal sustainable development, specifically in those countries that have not developed yet their own national ICAM/MSP strategies in order to complement the demonstration work undertaken at the local demonstrative pilot sites.

- and developing decision support system tools and related capacity to support ICAM/MSP performance.
Key expected outputs

- Development of a collaboration framework for coastal and marine management and planning in favour of sustainable national development, strengthening regional consensus, public participation
  Technical and institutional capacity-building to reduce disparities between countries;

- Development of methodological tools to support decision-making with the aim of increasing synergies to apply methodological concepts, for both integrated coastal management and marine spatial planning;
  Development of local pilot cases through identification of the most representative actors and socio-economic players that define the potential of the local ecosystem as a basis for sustainable development and blue growth;

- Development of regional and national strategies for coastal and marine management and spatial planning in the context of existing regional ocean governance frameworks;

- Design and implementation of communication products and initiatives.

Assessment of needs and delivery capacity:

Over the past 10-12 years Marine Spatial Planning (MSP) has become the preferred approach of many countries to manage increasing conflicts among the multiple uses of their exclusive economic zones. There is also an increasing interest in MSP in the developing world. IOC has provided guidance and training to most of these MSP initiatives and is recognized as the leading international organization on MSP issues.

Opportunity for resource mobilization:

A number of countries and organizations have expressed interest in the three defined areas:
Korea, Germany, Norway, European Commission (DG Env/ DG Mare), GEF.
Private foundations also represent a good opportunity: Moore Foundation, Waitt Foundation, Ricard, Total, Veolia, EDF.

Accountability for resource mobilization:

IOC Headquarters and IOC RSBs through centralized fund mobilization.

Donor interest
Belgium: Government of Flanders, European Commission, GEF

Associated extrabudgetary projects:

- **SPINCAM-II**
- **Global Assessment of Marine Spatial Planning Practices**
- **Aquacross**
Overall goal
To improve global ecosystem-based governance of Large Marine Ecosystems and their coasts by generating knowledge, building capacity, harnessing public and private partners, and supporting south-south and north-south learning.

Estimated funding required
US$ 700,000
(to complement the GEF share of the project (2,500,000 USD)

Contact
Julian Barbière (j.barbiere@unesco.org)

Associated UNESCO Field Offices
Bangkok, Montevideo, Kingston and Nairobi

Description
Over the past 15 years, the GEF assisted 127 recipient countries to work together within 19 of the world’s 64 LMEs (including 2 LME equivalents, the Pacific Warm-water Pool and Caspian Sea). The GEF increment in the LME projects enables countries to collectively identify the root causes of the priority issues affecting their shared LME through a Transboundary Diagnostic Analysis (TDA), and to develop joint actions to address the root causes through Strategic Action Programmes (SAPs) to aid the recovery of ecosystem goods and services.

A Global GEF Governance project for learning and generating knowledge among LME projects and practitioners and related coastal and marine initiatives is being proposed (LME/ICM-Governance). The LME/ICM-governance project will establish a dynamic global support network for the GEF LME and ICM projects for practitioners needed to increase the capacity of nation States to realize adaptive ecosystem-based management and governance. IOC will execute this GEF project and will host an international LME coordination unit with the scientific and technical capacity to interact with UN and non UN entities at global and regional scales, to coordinate the network and experience sharing and learning partners and to provide oversight in the delivery of coherent development assistance to nation States. Key knowledge needs will be identified, relevant information synthesized and user-friendly materials developed and shared through interactive discussions with policymakers at local to global levels.

The project will be organized around 4 components:
1. Global and regional network of partners to enhance ecosystem-based management and to provide support for the GEF-LME/ICM projects to address MPA needs and incorporate climate variability and change.
2. Synthesis and incorporation of knowledge into policy-making, capture of best LME governance practices, and development of new methods and tools to enhance the management effectiveness of LMEs and to incorporate ICM, MPAs and climate variability and change within the 5 LME modules.
3. Capacity and partnership building through twinning and learning exchanges, workshops and training among LMEs and similar initiatives (e.g. Seascapes)

Whilst GEF core funding is secured for this project, IOC co-financing from extra-budgetary resources is required to incrementally support the position of project coordinator, and the operations of the LME Coordination unit.

Expected results
- Enhanced network of partners working together to provide consistent management and ecosystem-based methods and technical support to GEF-LME/ICM/MPA projects.
- LME/ICM/MPA projects equipped with new tools that incorporate ICM, MPAs and climate variability and change.
- LME/ICM/MPA practitioners trained in new techniques and approaches for ecosystem-based assessment, management and governance practices for ecosystem and mitigation of effects of climatic variability and change in LMEs.

Key expected outputs
- Established network (community of practice) of GEF Large Marine Ecosystems projects, and other marine and coastal initiatives supported by GEF
- Series of validated methods and new tools to address priority transboundary issues and national governance reforms
- Project twinning, learning exchanges, and training workshops
Assessment of needs and delivery capacity:
More than 17 LME projects have been established in the last 20 years, hence reflecting the interest of countries to implement ecosystem based management in their waters. IOC, together with NOAA, UNDP and UNEP has promoted the LME concept since 1995, as well as implemented a number of LME related activities and projects.

Opportunity for resource mobilization:
A number of countries (USA, Norway) and UN organization (UNDP) have funded in the past LME activities.

Accountability for resource mobilization:
IOC Headquarters through centralized fund mobilization.

Donor interest
Belgium: Government of Flanders, European Commission, GEF

Associated extrabudgetary projects:
Supporting Member States in the implementation of the IOC Capacity Development Strategy

Overall goal
Through international cooperation, IOC assists its Member States to collectively achieve the IOC’S high-level objectives (HLOs), with particular attention to ensuring that all Member States have the capacity to meet them.

Estimated funding required
US$ 1,500,000

Contact
P. Pissierssens (p.pissierssens@unesco.org)
Julian Barbière (j.barbiere@unesco.org)
Wenxi Zhu (w.zhu@unesco.org)
Mika Odido (m.odido@unesco.org)
Cesar Toro (c.toro@unesco.org)

Associated Field Office
IOCARIBE, Cartagena, IOCAFRICA, Nairobi, WESTPAC, Bangkok

Description
In June 2015, the IOC Assembly adopted the IOC Development Strategy through Resolution XXVIII-2. Capacity building is an essential tenet of IOC’s mission: It enables all Member States to participate in and benefit from ocean research and services that are vital to sustainable development and human welfare on the planet. This Strategy’s vision identifies capacity development as the primary catalyst through which IOC will achieve its four high level objectives in the current 2014–2021 IOC Medium-Term Strategy.

The Strategy provides six outputs. These outputs call for investing in people and the institutions of which they are a part, enhancing access to scientific tools and methodologies, reinforcing IOC’s capabilities to provide services to Member States, enhancing the communication between scientific and policy maker’s communities, expanding ocean literacy in civil society and mobilising resources to accomplish these goals.

UN Member States adopted Agenda 2030, together with its 17 Sustainable Development Goals for the planet, including a dedicated goal for the ocean, SDG 14, entitled “Conserve and sustainably use the oceans, seas and marine resources for sustainable development”. A cross cutting target to Ocean SDG calls for specifically “Increasing scientific knowledge, develop research capacity and transfer marine technology, taking into account the IOC Criteria and Guidelines on the Transfer of Marine Technology (…)”. IOC with its unique mandate within the UN System for ocean science and its recognized field expertise, structure and world-wide presence, working in full cooperation with the UN System, is in a unique position to lead on these aspects.

The objective of this proposal is assist Member States in collectively achieving the IOC’S high-level objectives (HLOs), with particular attention to ensuring that all Member States have the capacity to meet them, as well as to achieve SDG-14.

The proposal is a framework proposal that will operate through the 3 regional sub-commissions to enhance their activities through targeted capacity development actions following the CD strategy.

Expected results
The expected result of the IOC’s capacity development interventions is for Member States to learn more about the nature and resources of the ocean and coastal areas and to apply that knowledge for the improvement of management, sustainable development, the protection of the marine environment, and decision-making processes.

Key expected outputs
- The activities and actions undertaken by the IOC within the framework of targeted capacity development will result in a number of outputs that, through their use by Member States should result in desired “changes” at the national and sub-regional level in areas such as decision-making, policy, governance, and knowledge.
- The outputs include: (i) human resources developed; (ii) access to physical infrastructure established or improved; (iii) global, regional and sub-regional mechanisms strengthened; (iv) development of ocean research policies in support of sustainable development objectives promoted; (v) visibility and awareness increased; (vi) sustained (long-term) resource mobilization reinforced

Assessment of needs and delivery capacity:
The needs have been expressed at various global and regional gatherings
**Opportunities for resource mobilization:**
A number of IOC Member States have actively contributed to CD activities in the 3 regional sub-commission areas.

**Accountability for resource mobilization:**
IOC RSBs and IOC HQ will work closely on the development and implementation of this project.
Overall goal

Raise awareness among key national decision-makers, scientists and the public of the critical role played by IOC as the only intergovernmental organisation that can help to coordinate the global ocean science needed to inform the development of effective marine policy in all its 148 Member States. It will also focus on promoting the unique role the IOC plays in enabling its member states in developing the technical and scientific capacity required to understand and sustainably manage their oceanic and coastal resources.

Estimated funding required

US$ 500,000

Contact

Julian Barbière (j.barbiere@unesco.org)
Albert Fischer (a.fischer@unesco.org)

Associated UNESCO Field Offices

IOC Regional Sub-Commissions Secretariats (Cartagena, Nairobi, Bangkok) and Decentralised IOC offices

Description

The IOC Secretariat developed a new Communication Action Plan in order to support its strategic objectives. This Communications Plan will increase awareness among specific target audience such as key national decision-makers, scientists, and the public, of the critical role played by IOC as the intergovernmental organisation that can help to coordinate the global ocean science needed to inform the development of effective and sustainable marine policy in all IOC 148 Member States. This Action Plan represent a major investment in communication activity which is needed in order to strengthen the perception of IOC’s overall performance, effectiveness and credibility across all programme areas.

The development of this Communications Action Plan is largely based on a multi-stakeholder analysis (approximately 50 stakeholders interviewed) representing the interests of Member States, the ocean science community, partner agencies, donor organisation, civil society groups, and the IOC Secretariat. General consensus is that IOC should urgently provide clear and compelling stories that demonstrate how the organization is delivering tangible benefits for its Member States in a rapidly changing ocean science environment. A stronger communications portfolio will assist IOC to effectively engage national decision-makers, secure additional funding, and enhance the delivery of key service for Member States.

The IOC can build awareness, engagement and momentum by taking a logical, step-wise approach to the development and implementation of this Communications Plan. It will also maximize its limited communications resources by focusing on decision/policy makers from two priority groups: on the one hand, countries that have already made extensive investments into national ocean science initiatives and draw direct benefit from the intergovernmental benefits provided by IOC; and on another hand, developing countries that would stand to benefit most from IOC’s capacity building and technology transfer activities.

The Communications Action Plan will be organized around 4 components:

1. Developing corporate marketing products, such as a corporate brochure, a 2-minute video and a Policy Brief Series that clearly outline the value and benefits provided by IOC to its Member States and partners.
2. Developing a Campaign around science and capacity development in support of SDG14 as well as other international ocean related agreements (Sendai, SIDS, UNFCCC) that will enable developing countries to build the national capacities to measure and manage their progress toward SDG14
3. Structuring of the IOC Communications framework through the creation of a Communications Team and the development of management tools including an IOC Communications Network, and a marketing database of focal points and key decision-makers from all IOC Member States.
4. Redevloping the IOC website in pursuit of a more effective and coherent web architecture

All recommended products and activities will include their own bespoke evaluation mechanisms. A baseline survey will also provide a regular means to monitor impacts of the Communications Plan among members of the primary target audience by measuring key changes such as: increased awareness of IOC services; direct use of IOC services and; perceived contribution of IOC services towards improved national, regional and global management of marine resources.
Expected results

- Structured institutional communications plan that:
  - Clearly defines and communicates strategic objectives and priorities for IOC;
  - Develops a strong core brand focused on IOC’s unique ability to support intergovernmental cooperation on key ocean science issues;
  - Communicates the practical value IOC services to key decision-makers in Member States through clear and simple messages;
- Enhanced integration between IOC programmes, based on a shared vision and purpose developed with key partners and stakeholders;
- Stronger strategic partnerships to boost the IOC brand, maximize communications resources and champions from the wider IOC network, and help IOC co-develop targeted communications products with target policy and science audiences.

Key expected outputs

- Corporate marketing products: integrated brochure outlining the value and benefits provided by IOC through 8-10 compelling stories about the direct benefits IOC is providing to Member States; a 2-minute video to communicate the core benefits, services and brand values of IOC to its target audiences;
- a Policy Brief Series, to be developed in collaboration with first-tier scientists;
- SDG 14 campaign designed to mobilize funding in support of IOC’s science and capacity development intervention;
- Website redevelopment to provide one engaging and user-friendly homepage as a portal to IOC’s other 22 technical websites;
- Media Plan, including bespoke media training for senior IOC Officers, IOC programme managers, managers of Sub-commissions as well as more structured outreach activities with media outlets.
- Development of a Marketing Database of key national decision-makers and policy-makers from IOC Member States, and of an IOC Communications Network of key support resources in national marine and ocean science agencies.

Assessment of needs and delivery capacity:

The development of this Communications Action Plan is largely based on semi-structured interviews that were undertaken with approximately 50 stakeholders from Member States; the ocean science community; partner agencies, donor bodies; civil society groups and the IOC Secretariat. While the IOC now plays a critical role in coordinating billions of dollars’ worth of national investment in ocean science activities, most of these stakeholders believe the IOC needs to urgently improve the way it communicates the value and benefits of its key services to key decision-makers and policy-makers in all its Member States. This Communications Plan seeks to maximize IOC’s limited communications resources by focusing on key decision-making audiences from both developed and developing countries.

Opportunity for resource mobilization:

Member states/national institutions with interest in ocean science communication through in-kind/cash contributions
Private sector/Foundations

Accountability for resource mobilization:

IOC Headquarters through centralized fund mobilization.

Donor interest

Belgium: Government of Flanders, European Commission, GEF

Associated extra-budgetary projects:

Sea-Change, Word Ocean Day Portal Project