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INTERGOVERNMENTAL OCEANOGRAPHIC COMMISSION
(of UNESCO)

THE IMPLEMENTATION PLAN FOR IOC CAPACITY-BUILDING

The goal of the proposed implementation plan is self-directed Capacity-Building through projects addressing local priorities with modern oceanographic tools. This information document is intended to representatives of IOC Member States attending the 23rd session of IOC Assembly (Paris, 21–30 June 2005).

A summary has been prepared in English, French, Russian and Spanish and is available for the session as working document IOC-XXIII/2 Annex 7.

Executive Summary

Every effort was made for this plan to reflect the needs and concerns of Member States. It consists of prioritised requests from regions that were collected through months long consultation, which the IOC Secretariat has assembled in one format for presentation to the Executive Council. In accordance with instructions from the Assembly, the plan pays special attention to evaluation of performance and funding issues.

The race between accelerating degradation of marine resources and Capacity-Building:

There is urgency in developing the Capacity of many Member States to:

- manage their ocean resources more effectively and sustainably; and
- enable more countries to be involved in addressing the many challenges of ocean sciences and applications today.

The risks of not achieving this include increased negative impacts from ocean hazards, drastic decrease in vital fish stocks, irreversible damage to precious ocean resources and loss of an essential source of wealth and well being for future generations. The rate of degradation and loss of life-sustaining ocean resources is accelerating, and it is one of the great challenges of this century to develop capacity rapidly enough to protect and preserve them.

IOC Capacity-Building must grow to address this urgent challenge:

IOC has successfully developed a unique network with the most talented scientists across the world and with research institutes in all regions, and is playing an essential role in addressing the critically urgent issues related to the protection and sustainable development of the ocean and coasts. However, it is clear that Capacity-Building activities will need to grow significantly for IOC to meet this responsibility. For this reason, this Implementation Plan places strong emphasis on developing new strategies for partnership and funding sources. This is a crucial time at which IOC Capacity-Building capability needs to be adapted and expanded to meet the new challenges.

Regional requests show a need for both immediate applications and self-directed Capacity-Building as the long-term goal:

A long consultation process with experts from all regions shows a need for fast action with immediate applications, namely building capacity to use existing operational products, as well as remote sensing and model data for hazard mitigation, and coastal and fisheries management. However, the consultation also clearly showed that *self-directed Capacity-Building is the longer-term goal*, for which interventions focussing on enhancing management, team building and proposal writing are requested.

Setting the conditions to achieve the long-term goal through immediate applications:

This Implementation Plan seeks to develop the conditions necessary for this longer-term goal to be achieved through projects with immediate applications, by enhancing the regions capacity to formulate proposals and conduct research addressing regional priorities *through the use of available operational products.* Hence, capacity will be developed not only to *address* important marine issues, but also to *identify* them. The consultation confirmed agreement that only by achieving a balance between immediate operational needs and longer-term goals can support for ocean sciences, and capacity to apply it, be built in a sustainable manner.

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I. Approach to the Implementation Plan

The document leading to this Implementation Plan is the 23rd Assembly Information Document *Draft IOC Principles and Strategy for Capacity-Building* (IOC/INF-1211 prov.). An accompanying document in progress is the *Guidelines on Best Practices for Capacity-Building*.

The drafting of this plan followed the Executive Council recommendations:
Resolution EC-XXXVII.9 passed at the 37th Executive Council in June 2004, instructed the Executive Secretary to produce a final draft Strategy for Capacity-Building and develop an associated Implementation Plan, building on existing initiatives, for consideration by the 23rd Session of the IOC Assembly, that:

(i) is in accordance with the new IOC Medium-Term Strategy;
(ii) assesses the extent and impact of existing and past Capacity-Building efforts;
(iii) has specific Terms of Reference and associated performance measures for all elements;
(iv) takes account of GOOS and JCOMM Capacity-Building action plans; and
(v) outlines a feasible robust means of support and resources for Capacity-Building.

This plan synthesizes inputs from long and inclusive consultation:
Every effort has been made to reflect the priorities and concerns of the regions and countries where Capacity-Building is to be conducted. Experts from regions provided inputs during the 37th Executive Council, and since then through regular communications with the IOC secretariat. An initial draft was made available online early this year for comments and suggestions, and with funding made available for this purpose by the USA, an experts workshop was conducted during which further inputs to the Implementation Plan were provided (see Appendix I for list of participants). All the Capacity-Building interventions in this Implementation Plan have been requested by experts from the regions. The role of the IOC secretariat has been to initiate discussions within a framework, collate regional inputs, follow-up discussions, and present the requested interventions in a format that is in accordance with the instructions from the Executive Council.

II. Requested interventions by region and along IOC main themes

Miguel Fortes, Mika Odido and Cesar Toro of the IOC field office, have written much of this section. Essential input was kindly provided by IOC chairs in regions.

This section presents the requests received from regions with minimal secretariat input:
This section presents, for each IOC region, the Capacity-Building interventions that were requested and prioritised by experts in marine sciences in the respective regions. Following the recommendations of Member States, the interventions were assigned within one (or more) of IOC main themes, and are presented accordingly in the tables that follow in this section. The Secretariat's input in this section is minimal, and consisted for the most part in providing a unified framework to present requested interventions. The secretariat also estimated costs for interventions where they were not estimated by the regions, and proposes a preliminary uniform cost of US$40,000 per region for regional workshops and training courses.

More details on the interventions are available online:
This document provides a summary of the regional inputs. The original documents for each region, including more details on major milestones, performance indicators, terms of reference, major projects used as primary vehicles of Capacity-Building and interventions detailed by countries are available online at ftp://ioc.unesco.org/CB STRATEGY MEETING.

II.1 Western Pacific (WESTPAC) region

The Strategy and Implementation Plan for the Western Pacific (WESTPAC-Capacity-Building) is a product of discussions and consultations with experts and focal persons in 13 of the 20 Member States of the WESTPAC region. It incorporates the relevant points raised in related capacity building initiatives, which have been implemented and planned by various institutions with direct or indirect involvement in national and regional goals in the development of ocean sciences and ocean services in the region. Guided by the principles of capacity building in its truest sense, the Strategy and Implementation Plan is constituency-driven and issue-based. Hence, for Western Pacific, it puts more emphasis on the coastal region because this is where the basic needs of its people reside and alarmingly, where most environmental degradation and destructive events emanating from both natural disasters and human-induced activities take place.

The Capacity-Building interventions will be through the 'Coastal Ecosystem and Biodiversity Assessment' project. The Countries participating in the project are Australia, Cambodia, Fiji, Indonesia, Japan, Rep. of Korea, Malaysia, Philippines, Samoa, Thailand, and Vietnam. However, the links to other projects are indicated and in this way the entire region will be involved in a capacity-enhancement exercise. Regional experts will conduct all workshops, and the enhanced capacity will contribute to other projects.

1. Regional perspective

The Western Pacific region comprises 22 countries, encompassing roughly 140 degrees from the Andaman Sea part of Thailand to the Pacific coast of the USA and 120 degrees from the southern tip of New Zealand to the northern part of the Bering Sea. It is has vast marine genetic richness and diversity. But a significant portion of its coastal habitats is at high risk of being lost in the next decade as mangroves are cut, seagrass beds and coral reefs destroyed. The rates of loss of the habitats are the highest in the world and are directly associated to the activities of more than half of the total world population, a large percentage of which are poor and resides along the coasts -over 440 million for peninsular and insular Southeast Asia, where the population is expected to double over the next 25-35 years. One quarter of the world's 75 largest cities are situated near or on its coastlines. Only 10–30 per cent of natural habitats remain in many countries of the region so that any further decrease would have serious consequences for biodiversity and lives of people. Growth in both population and economy is rapid and generally higher in the coastal regions than the national average due to migration. This is causing severe pressure on coastal and marine environment, resources and biodiversity. These resources are economically important to most countries since 30% of the world marine fisheries and 87 per cent of total global mariculture production occurs in this region, and the need for marine fish catch is steadily increasing with population growth. Marine-based tourism is playing an increasingly important role in the economy of many member countries.

The Western Pacific is experiencing explosive population growth and uncontrolled modification of the coasts, coupled with rapidly dwindling resources, which is underpinning short-term economic development mostly at the expense of the coastal and marine environment and biodiversity. The region's vulnerability index is high and it is affected by several types of natural disasters.

The region's coastal ecosystems are severely damaged: over 80% of coral reefs face risks, mangroves have lost 70% of their cover in the last 70 years, while seagrass beds loss range from 20-60%. Unless managed, reefs will face collapse within 20 years, all mangroves will be

lost by 2030, and seagrass beds will follow suit. With the above, total marine fish production in the region has fallen dramatically. The situation is alarming.

Many Asia-Pacific countries are making great efforts to review their coastal and marine management programmes in a thorough and competent way, with a view to changes in practice and policy reform at the national and regional levels. Academic institutions, private and public agencies and international donors, have substantially aided this effort. A more holistic and regional approach has been adopted via regional activities and agreements.

Over the past 10 years, the coastal zone has improved in a few localities in the region. This has been helped along by extensive use of remote sensing to obtain data on suspended sediments in the water column, topography, bathymetry, sea state, water colour, chlorophyll-a, sea-surface temperature, fisheries, oil slicks, and submerged and emergent vegetation, including mangroves and seagrass. But these gains are still far from a point where the increasing degradation can be halted and turned around.

2. Current and anticipated Regional Capacity-Building needs and Priorities

Interventions of the following types are most needed in this region:

1. Training: regional and overseas fellowships, advanced specialized course, on the job;
2. Support: advisors, instruments, research vessels, literature;
3. Communication: regional meetings and workshops, electronic information and communication systems, scientific journals;
4. Institutional infrastructure: universities, research institutes, national and regional organizations;
5. Joint research projects: joint cruises, joint shore-based projects and programmes

All these are aimed at:

1. Enhancing research, coordination, and monitoring capacity to make them more relevant and useful to management;
2. Conducting and publicizing analysis and synthesis of different and ‘effective’ management regimes to serve as effective learning tools for the region;
3. Using the research process as a means to enhance political support for ocean biodiversity, coastal management and operational oceanography; and
4. Strengthening the value adding capacity and impact of local representative marine science organizations.

3. Objectives met through enhanced capacity

1. Coastal populations and the general public will be more aware and prepared for natural disasters;
2. Coastal ecosystems and associated oceanographic processes will be better understood by a critical mass of coastal communities, professionals, general public, and decision makers;
3. National scientists, technologists and concerned agencies will have better predictive capabilities in connection with the occurrence of oceanographic and meteorological phenomena;
4. Coastal habitats and resources will be sustainably utilised and managed, their health restored and public health protected;
5. Coastal protection and use will be supported by higher level decision-makers and by sound governance

4. Tabulation of requested interventions within IOC main themes

Interventions requested within the PI-GOOS framework are in a following table.

Priority Interventions	Deliverables	Regional Importance	Partners	Cost in K$	Time frame (years)		
					2	4	8
OCEAN SCIENCES							
Training workshops on coastal sedimentation & ecosystem rehabilitation **HP**	Tools for region, country plans, models, policy guidelines on sediment discharges, ecosystem restoration	Siltation and coastal habitat degradation are region's 2 top coastal issues. Tools are needed to better understand and use available data	SEAGOOS, ecosystems & biodiversity, GOOS, KOICA, JSPS, GLOSS, ICAM, LOICZ, IMEDEA	120	•	•	•
Popularisation, regional adoption of seagrass ecosystem assessment & monitoring protocols **C**	Widely distributed, translated into languages and easily understandable regional seagrass assessment and monitoring protocols; networks developed in each country	Physical & mental gaps characterizing coastal resource assessment & monitoring in the region due to its islandic nature must be shortened to best preserve this marine habitat essential for biodiversity and future resources	SEAGOOS, ecosystems & biodiversity, WSA, UNEP/GEF, JSPS, Packard	100	•	•	
Coral-seagrass-mangrove conservation **C**	Recommendations to policy makers & local stakeholders	It is essential that these habitats be conserved for future resources, and linkage to policy and decision makers will compliment past & current conservation efforts esp. in oceanographic data gathering	SEAGOOS, ecosystems & biodiversity, GCRMN, WSA, IOI, PEMSEA, UNEP/GEF	60	•	•	•

Priority Interventions	Deliverables	Regional Importance	Partners	Cost in K$	Time frame (years)		
					2	4	8
		& use					
Implementation of Asian TTR program **C**	Annual research cruises allowing gathering, monitoring and packaging of data and information for regional use	Collaboration among Member States must be enhanced to ensure better gathering and common use of critically needed ocean, climate data	SEAGOOS, NEARGOOS, TTR, LIPI, JSPS, JOMSRE, SPICE	600	•	•	•
TTR Programs to mitigate effects of HABs **C**	Strengthened networks, enhanced monitoring & research capacity for better understanding of HAB, to reduce its incidence and ultimately improve fisheries	HAB are a significant and increasing problem for fisheries and aquaculture. Existing HAB programmes have been successful but must be expanded and made more receptive to actual regional needs	SEAGOOS, HAB, IPHAB	120 already funded	•	•	•
Sub-total for high priority interventions in ocean sciences theme							120
Sub-total for all requested interventions in ocean sciences theme							1000

OPERATIONAL OCEANOGRAPHY							
Training workshops on GOOS products usable for project goals **HP**	Proficiency using available operational products for projects that address issues important for the region while contributing to global observation	GOOS products could help address essential regional concerns. Better understanding and use of these products will help address these concerns and increase	GOOS, SEAGOOS, NEARGOOS, Remote sensing and GIS	80	•	•	

Priority Interventions	Deliverables	Regional Importance	Partners	Cost in K$	Time frame (years)		
					2	4	8
		regional support for GOOS.					
Installation of tide gauges at selected GLOSS sites **U**	10 gauges upgraded/installed at 10 GLOSS stations, and confidence built in agencies for timely response	More GLOSS gauges are needed for more confident prediction of, and timely reaction to natural hazards associated with sea-level change	PSMSL, UHSLC, SEAGOOS, NEARGOOS, GLOSS, WMO and IODE	60	•		
Training courses on sea-level observation & analysis **U**	20 regional tide gauge operators trained to install & operate gauges to GLOSS standards; analyses for tide predictions	Better use of existing GLOSS data would allow better prediction, and hence preparation against natural hazards associated with sea-level change, and help monitor essential aspects of global climate change	PSMSL, UHSLC, SEAGOOS, NEARGOOS, GOOS, SEACAMP	80	•	•	
Sub-total for high priority interventions in operational oceanography theme				80			
Sub-total for all requested interventions in operational oceanography theme				120			
TSUNAMI AND OTHER MARINE HAZARDS							
Training workshops on tsunami, tropical cyclones, storm surge, wind waves **HP**	Preparedness in mitigation using GOOS and other products, enhanced coordination of regional efforts and transfer of technology	Impact and toll from these hazards can be reduced by raising knowledge & skill in understanding, using data on ocean and climate phenomena in the region	ISDR, ITSU, ADPC, IOI, AEIC, KOICA, JCOMM/'TOWS', ASMC, WMO/TCP, SEAGOOS, NEARGOOS, Remote sensing and GIS	120	•	•	•

Priority Interventions	**Deliverables**	**Regional Importance**	**Partners**	**Cost in K$**	**Time frame (years)**		
					2	**4**	**8**
Training courses, workshops on coastal habitat protection & hazard mitigation (engineering models, demos for decision makers) **U**	Enhanced ecosystem and hazard mgmt capacity through use of local operational models, regional expertise sharing; and increased interest of decision-makers for science-based recommendations	Critically needed coastal habitat protection and hazard mitigation necessitates better regional cooperation, robust engineering models that provide development scenarios, and increased interest of decision-makers in recommendations from scientists and engineers	CSI, ICRI, TNC, UNEP, JSPS, LIPI, SEAGOOS, Remote sensing and GIS, GLOSS, GODAE, IOI, SEACAMP, PEMSEA	240	•	•	•
Training workshops on coastal bathymetry & mapping **U**	Improved prediction for long-range tsunami and other hazards; enhanced capacity to assess risk and develop baselines for coastal protection & resources development	Modelling of tsunami propagation and other ocean hazards necessitates quality bathymetry	GLOSS, IMO, IHO, SEAGOOS, NEARGOOS, Remote sensing and GIS	80	•	•	
Training courses, workshops, on assessment & monitoring of coastal ecosystems & biodiversity	Proceedings with priority actions, available protocols and enhanced assessment and monitoring	Natural disasters, of which the frequency may increase with climate change, inflict damages on ecosystems	SEAGOOS, ecosystems & biodiversity, Remote sensing and GIS, UNEP/GEF, JSPS, WB, Packard, IOI,	320	•	•	•

Priority Interventions	Deliverables	Regional Importance	Partners	Cost in K$	Time frame (years)		
					2	4	8
vis-à-vis natural disasters **C**	capacity through regional sharing of expertise and best practices	already weakened by stress from industrial development and population growth. Enhanced capacity to monitor this impact is needed to identify weak points and critical needs	MAB, WHS, CoML, PEMSEA				
Sub-total for high priority interventions in tsunami and marine hazards theme				120			
Sub-total for all requested interventions in tsunami and marine hazards theme				760			
DATA AND INFORMATION EXCHANGE – IODE							
Workshops on data sharing for coastal project and GOOS networks **U**	Increased, more practical and free availability of operational products for regional scientists; enhanced capacity for application; through data and experience sharing	To enhance capacity to address coastal issues using operational products, data must be made more relevant and freely available to Member States, and knowledge and experience must be shared	IODE, SEAGOOS, NEARGOOS, HAB, Ecosystems & Biodiversity, Remote sensing and GIS, GLOSS	160	•	•	•
Sub-total for high priority interventions in data and information exchange theme				0			
Sub-total for all requested interventions in data and information exchange theme				160			
CAPACITY-BUILDING SCHEMES							
Workshop on regional Capacity-Building pilot proposal for resources mobilization	Regional proposals submitted for funding. Improved output of universities &	Increased funding needed for capacity building initiatives, and marine related research. Heads	Universities, national research institutions, UNESCO, UNEP	200	•	•	

Priority Interventions	Deliverables	Regional Importance	Partners	Cost in K$	Time frame (years)		
					2	4	8
[including leadership training and team-building program] **HP**	research institutes, closer industrial collaboration	of institutes play a pivotal role in development of institutional and regional capacity					
Workshop on country capacity-building pilot proposal for resources mobilization [including leadership training] **HP**	Networking established between heads of universities, institutes and industries to address country concerns	Addressing differing capabilities between countries so that all states participate to full potential in regional programs	Sponsors targeting specific countries	40 per state, ≈200	•	•	
Training workshop on Remote sensing and GIS, & demos for decision makers **HP**	Better, wider use of these tools facilitating assessment and management of coastal ecosystems; and interest of decision-makers allowing the drafting of country plans for sustainability – man & coastal ecosystems	Large gaps in capacity for use of RS and GIS in the region must be reduced and decision-makers made aware of the potential of these tools to improve assessment and management of coastal ecosystems	SEAGOOS, NEARGOOS, Ecosystems & biodiversity, remote sensing and GIS, CEOS, GOOS, JCOMM, PEMSEA, IOI	120	•	•	
Setting up coastal TTR program for in situ measurements & validation **C**	TTR attuned to specific regional needs, and cruise protocols for future assessment & monitoring programs	Coastal research cruises needed to address demanded research, and current cruise program in the region is weak and uncoordinated	SEAGOOS, NEARGOOS, Remote sensing and GIS, IFREMER (RV Marion Dufresne), Univ. of Sydney, TTR, JAMSTEC	40	•		

Priority Interventions	Deliverables	Regional Importance	Partners	Cost in K$	Time frame (years)		
					2	4	8
Research & Education Mentors Program **C**	New UNESCO Chairs & Visiting Researchers Program initiated, facilitating exchange among regional institutions	Regional exchange and visiting researchers are an effective way to reduce gaps in capacity, which is needed to address much of the critical regional marine issues, since they are transboundary by nature	UNESCO Chairs Programme, UNITWIN, universities, SEGOOS, Remote sensing and GIS	240	•	•	•
Sub-total for high priority interventions in Capacity-Building theme				520			
Sub-total for all requested interventions in Capacity-Building theme				800			
Total for high priority interventions				**840**			
Total for all requested interventions				**2940**			

Some workshops in the same intervention will focus on observations, others, on ocean services; Letters in parentheses, degree of priority (HP = Highest Priority; U = Urgent; C = Critical); numbers in parentheses, regional project assisted (1 = SEAGOOS; 2 = NEARGOOS; 3 = HAB; 4 = Ecosystems & Biodiversity; 5 = Remote sensing & GIS)

Interventions requested for PI-GOOS

All these interventions are within the operational oceanography main theme, although some are crosscutting and also address issues within other themes. Note that unless indicated otherwise, column 4 gives costs per annum.

Prioritised Interventions	Deliverables	*Partner Programmes	Cost in K$ p.a.	2	4	8
HIGHEST PRIORITY						
Implement national GOOS Coordinating Committees	National GOOS Coordinating Committees and Focal Points	PI-GOOS	40	•	•	•
Coastal GOOS implementation	Integrate coastal GOOS into region using Implementation Plan and establish coastal GOOS network	IOGOOS, UNEP, FAO, LME	2,000	•	•	•
Participation in international	Provide input to GOOS activities to set direction	PIGOOS	50 (yr)	•	•	•

Prioritised Interventions	**Deliverables**	***Partner Programmes**	**Cost in K$ p.a.**	**2**	**4**	**8**
conferences and meetings of GOOS	of, and planning program					
Annual PIGOOS meeting support	Coordination and oversight of program	PIGOOS	60 (yr)	•	•	•
URGENT						
User Sector Workshops	Informed industry and govt. sectors on GOOS benefits	PIGOOS, WMO	200	•	•	
Web site development	Active web site at each PIGOOS member institution related to GOOS products	PIGOOS	20	•	•	•
Establish product, data and information Centre with nodes throughout region	Make available data and products for use throughout region	PIGOOS	50 (yr)	•	•	•
Operational products Conference in 2006	Use of GOOS and GCOS products and applications in region	GCOS, WMO, BOM, PIGOOS, NOAA, Uni of H	200	•		
SEREAD development to additional countries	Education materials and instruction on science related to operational oceanography	NOAA, IOI, ARGO, POGO, PIGOOS	160 (20 yr)	•	•	•
Tide-gauge maintenance	Capability in region to maintain GLOSS network for various providers and informed, motivated personnel	GLOSS, PIGOOS, BOM, Uni of H	50	•	•	
Tsunami training course on mitigation, vulnerability, preparedness, awareness, education including conferences and media materials	Informed populace prepared to respond to tsunami and other natural disasters	PIGOOS, ISDR Agencies	3,000	•	•	•
Higher level training and education in oceanography and related management and technical programs	Increase capacity in region to improve management, operate systems and protect environment	PIGOOS, USP and others	100 (yr)	•	•	•

Prioritised Interventions	**Deliverables**	***Partner Programmes**	**Cost in K$ p.a.**	**2**	**4**	**8**
CRITICAL						
Coastal Mapping Program	Accurate bathymetry for modelling and safe navigation	PIGOOS and ISDR agencies	10,000	•	•	•
Media and promotional brochures	Informed communities on GOOS products and information	PIGOOS	20 (yr)	•	•	•
High level training and education in oceanography and related management and technical programs	Increase capacity in region to improve management, operate systems and protect environment	PIGOOS, universities, others	100 (yr)	•	•	•
IMPORTANT						
National workshops and meetings	Awareness and program development	GCOS, SPREP, PIGOOS	130	•	•	•

Partner programs codes: see Appendix II.
HP, U, C, I refer to decreasing priorities, respectively High Priority, Urgent, Critical and Important.

II.2 Caribbean (IOCARIBE) region

1. Regional Perspective

The Wider Caribbean Region extends from the mouth of the Amazon River, Brazil, in the south, through the insular Caribbean, Central America, the Gulf of Mexico and north along the east coast of North America to Cape Hatteras.

The region includes 26 countries and 19 dependent territories of 4 other countries. These countries range from among the largest (e.g. Brazil, USA) to among the smallest (e.g. Barbados, St. Kitts and Nevis) in the world, and from the most developed to the least developed. Consequently, there is an extremely wide range in their capacities for marine resource management. Throughout the region, the majority of the population inhabits the coastal zone, and there is a very high dependence on marine resources for livelihoods from fishing and tourism, particularly among the small island developing states (SIDS), of which there are 16. In addition 18 of the 19 dependent territories are SIDS. The region is characterized by a diversity of national and regional governance and institution arrangements, stemming primarily from the governance structures established by the countries that colonised the region.

The Caribbean Sea has been severely impacted by a variety of human uses. These include overexploitation of most coastal and offshore living marine resources, destruction of coastal habitats by tourism, industrial and urban development, and degradation of the marine environment by pollution from land and ship-based sources. Caribbean coastal states, especially Small-Island Developing States (SIDS), are highly dependent on the marine environment for their economic, nutritional and cultural well-being.

The Wider Caribbean Region is a biogeographically distinct area of coral reef development within which the majority of corals and coral reef associated species are endemic. Thus, as a whole, the region is of considerable global biodiversity significance. The Meso-American Barrier Reef is the second longest barrier reef system in the world.

The IOC (UNESCO) Sub-Commission for the Caribbean – IOCARIBE – covers a wide range of scientific programmes, dealing with collection, management and exchange of data on physical, chemical and biological properties of the ocean, coastal seas and estuaries; ocean mapping, research, and monitoring; survey and observation programmes and systems at the regional level. The Sub-Commission major activities include: Regional Component of the Global Ocean Observing System (GOOS), IOCARIBE-GOOS, International Oceanographic Data Exchange (IODE), Ocean Data and Information Network for the Caribbean and South America (ODINCARSA), International Bathymetric Chart of the Caribbean and the Gulf of Mexico (IBCCA), Tsunami Warning System for the Caribbean, Caribbean Large Marine Ecosystem (CLME), Pacific Central American Large Marine Ecosystem Project (PACLME), Harmful Algae in the Caribbean (HAB-ANCA),White Water to Blue Water Initiative (WW2BW), and Integrated Coastal Area Management (ICAM).

The objectives of the Sub-Commission are to align with IOC's priorities and follow three main interactive lines of action: (i) Oceans and Climate; (ii) Ocean Ecosystems Science; and, (iii) Marine Science for Integrated Coastal Area Management.

The Role of IOCARIBE: "As a regional Sub-Commission of IOC, IOCARIBE is responsible for the science base, the gathering of knowledge, the implementation of scientifically based information, the quality control, the voice of scientific credibility, and for ensuring that knowledge and data can be shared and used by all. Without these elements, there cannot be a sustainable development. IOCARIBE is in its own right the best instrument available for implementing these strategies at the regional and sub-regional level in the Wider Caribbean Region".

2. IOC sponsored and other regional programs

Current regional Capacity-Building initiatives in IOCARIBE include:

1. Regional Ocean and Coastal Observing System in the Wider Caribbean Region – IOCARIBE GOOS
2. Sustainable Management of the Shared Living Marine Resources of the Caribbean Large Marine Ecosystem (CLME) and Adjacent Regions
3. Regional Network in Marine Science and Technology for the Caribbean: The "Know-why Network"
4. IOC/CIDA Marine Science Proposal for Water Quality Criteria for Latin America and the Caribbean
5. Ocean Data and Information Network for the Caribbean and South America Regions – ODINCARSA
6. Harmful Algal Blooms for the Caribbean
   IOCARIBE HAB –ANCA
7. International Bathymetric Chart of the Caribbean Sea and the Gulf of Mexico – IBCCA
8. Tsunami Warning System for the Caribbean - A Wider Caribbean Sea Tsunami Warning System Proposal

3. Objectives and benefits

The main objective of IOC Capacity-Building in this region can be summarized as follows:

1. to foster the collection and shared use of operational and remote sensing data for coastal zone and fisheries management.
2. to participate in the development of coastal management capacity in the region by:
   a. developing the use of the adopted water quality criteria
   b. fostering the sharing of regional expertise in applied coastal models and monitoring of water quality, ecosystem health and biodiversity
3. to train regional researchers in Harmful Algae Bloom monitoring and toxicity assessment
4. to increase awareness of benefits from marine sciences in the general public and among decision makers, and of safety measures in case of tsunami or hurricanes.
5. to foster the development of a regional network of researchers creating products demanded by their stakeholders.

The main benefits from the achievement of these objectives can be summarized as follows:

1. coastal zone and fisheries management decisions are using operational and remote sensing data for more sustainable economic development and use of resources
2. better knowledge of ecosystem health and water quality, and regional experts provide recommendations to decision makers to minimize the impact of economic and urban development on coastal ecosystems
3. decrease in the damage to ecosystems and fishery industry of harmful algae blooms in the region.
4. better preparedness for ocean related hazards, increase in support for marine sciences, and improvement of coastal management from policy-makers and industry.
5. fostering of active networks of researchers that enhance the regional capacity to address ocean-related issues.

4. Tabulation of requested interventions within IOC main themes

Prioritised Interventions	**Deliverables**	**Regional importance**	***Partner program**	**Cost K$**	**Time frame years**		
					2	4	8
OCEAN SCIENCES							
Workshop on water quality criteria for Latin America and the Caribbean **HP**	At least 2 scientist from each country trained to monitor water quality with adopted criteria	Water quality criteria adapted to regional waters will allow better monitoring and comparison	CIDA /ICAM/CLME LBS	40	•		
Workshop on applied coastal models for pollution **U**	Capacity to provide recommendations to minimize impact of pollution from economic development	Applied coastal models can significantly reduce pollution from economic development in a cost-effective way	ICAM, GOOS-COOM	40	•		

Prioritised Interventions	**Deliverables**	**Regional importance**	***Partner program**	**Cost K$**	**Time frame years**		
					2	4	8
Workshop on regional Transboundary Diagnosis Analysis (TDA) **C**	Prepare development of a preliminary TDA for the Region as required by CLME	Many important marine issues must be analysed across boundaries	CLME	40	•		
Training workshop on assessment and monitoring of coastal ecosystems and biodiversity **C**	Enhanced monitoring capacity through regional expertise sharing	Ecosystems and biodiversity, essential wealths for the economy and well-being in the near future, are under great stress and must be monitored in order to develop effective preservation strategies	CLME UNEP	40	•		
Training courses in Harmful Algae Bloom (HAB) monitoring **C**	Regional researchers are trained in the sampling, identification and quantification techniques involved in monitoring plans	Monitoring is an essential aspect of mitigating the increasing detrimental impact of HAB on fisheries, aquaculture and tourism	GEOHAB	100	•	•	
Training courses in HAB toxin assessment **C**	Regional researchers can assess toxicity of local blooms	Toxin assessment is also an essential aspect of mitigating the impact of HAB on fisheries, aquaculture and tourism	GEOHAB	100	•	•	
Training Courses on ICAM **C**	20 young researchers trained in Integrated Coastal Area Management	An integrated approach is needed for the sustainable development of coastal regions	ICAM	80	•	•	

Prioritised Interventions	**Deliverables**	**Regional importance**	***Partner program**	**Cost K$**	**Time frame years**		
					2	4	8
Training Courses on Ecology of Tropical Coastal Ecosystem **C**	20 young researchers trained on Ecology of Tropical Coastal Ecosystem	Coastal ecosystems in the region will be better preserved if regional researchers trained on their specific characteristics		40	•		
Sub-total for high priority interventions in ocean sciences theme					40		
Sub-total for all interventions requested in ocean sciences theme					480		
OPERATIONAL OCEANOGRAPHY							
IOCARIBE-GOOS products for coastal zone management workshop **HP**	Scientific capability to support, participate in and take advantage of IOCARIBE-GOOS related activities for coastal area management. including tsunami related items and impacts of climate change.	Coastal zone management has high priority in most developing regions. Delivery and dissemination of concrete GOOS applications in this domain is needed to address regional issues and to increase regional support for and participation in GOOS	IOCARIBE-GOOS ICAM	40	•		
IOCARIBE-GOOS products for CLME management workshop **HP**	Enhanced Scientific capability to support, participate in and take advantage of IOCARIBE-GOOS related activities to accomplished CLME objectives, particularly those related to fisheries	CLME addresses important issues in the region, such as fisheries related ones, and enhanced use of GOOS products will help achieve CLME objective and increase visibility and support of GOOS	IOCARIBE-GOOS GEF	40	•		
JCOMM/ IODE Workshop on Ocean	Enhanced modelling capacity	Several important modelling issues must be addressed	JCOMM	40	•		

Prioritised Interventions	**Deliverables**	**Regional importance**	***Partner program**	**Cost K$**	**Time frame years**		
					2	4	8
Modelling **C**		in this region in order to improve these tools for basic science and regional applications					
Sub-total for high priority interventions in operational oceanography main theme					80		
Sub-total for all interventions requested in operational oceanography main theme					120		
TSUNAMI AND OTHER MARINE HAZARDS							
Tsunami Early Warning System Workshop to develop an implementation plan and timetable **HP**	Implementation plan, timetable, and enhancement or initiation of collaborative networks for the development of an effectively coordinated warning system.	For an implementation plan and time table to be effective it must be developed in close consultation with all countries scientists and relevant agencies	IOCARIBE GOOS ISRD ITSU WMO UNEP	40	•		
School-level awareness raising of ocean hazards **HP**	Awareness of safety measures in case of alert	Knowledge of safety measures by the general public is a necessary and efficient mitigation strategy. Schools provide a tool to achieve this in a cost effective and sustainable manner	Tsunami WS, ASP, national education authorities	1500	•	•	•
Regional training on hurricane and tsunami damage mitigation and environmental risk assessment **C**	Proficient countries in the region share their expertise	Certain countries in the region have vastly more effective and economical mitigation systems than others. This experience, if shared regionally, will significantly reduce the toll from ocean hazards, in particular hurricanes.	JCOMM, WMO (Tropical Ocean Waves and Surges-TOWS), IOCARIBE-GOOS	80	•	•	

Prioritised Interventions	**Deliverables**	**Regional importance**	***Partner program**	**Cost K$**	**Time frame years**		
					2	4	8
Sub-total for high priority interventions tsunami and other marine hazards theme					1540		
Sub-total for all interventions requested in tsunami and other marine hazards theme					1620		
DATA AND INFORMATION EXCHANGE – IODE							
Workshop on the use of ODINCARSA resources **U**	Strengthen regional networks of ocean data management and exchange to benefit all regional IOCARIBE Programmes	Many essential marine issues require data over the region, for which exchange is the most cost effective way, in addition, this will initiate collaborations	ODINCARSA	40	•		
Workshop on management of pollution and water quality data **C**	Capacity developed for management of pollution and water quality data and information	Data management and dissemination is a critical step for delivery of more benefits from measurements of pollution and water quality	IOCARIBE, UNEP/CEP, SIDA	40	•		
JCOMM/ IODE Workshop on Data Management **C**	Enhanced data management capacity	Management is an essential aspect of increasing use and benefits of marine data	JCOMM	40	•		
Publish the two latest IBCCA charts **C**	Charts Nos X2, X1	Bathymetric charts are essential for safe navigation	IBCCA, TWS, IOCARIBE-GOOS	15	•		
Training in bathymetric data measurement and archival **I**	20 (?) regional experts trained in hydrographic digitalisation, marine cartography, and archival of these data	Bathymetric data is essential for tsunami impact mitigation and coastal management, convenient access will increase the benefits from new and existing data	IBCCA, TWS, IOCARIBE-GOOS	80	•	•	
Sub-total for high priority interventions in data and information exchange theme					0		
Sub-total for all interventions requested in data and information exchange theme					215		

Prioritised Interventions	**Deliverables**	**Regional importance**	***Partner program**	**Cost K$**	**Time frame years**		
					2	4	8
CAPACITY-BUILDING SCHEMES							
Workshop on regional Capacity-Building pilot proposal for resources mobilization [including leadership training and team-building program] **HP**	Regional proposals submitted for funding. Improved output of universities & research institutes, closer industrial collaboration.	Increased funding needed for capacity building initiatives, and marine related research. Heads of institutes play a pivotal role in development of institutional and regional capacity	Universities, national research institutions, UNESCO, UNEP, ODINCARSA	200	•	•	
Workshop on country capacity-building pilot proposal for resources mobilization [including leadership training] **HP**	Networking established between heads of universities, institutes and industries to address country concerns	Addressing differing capabilities between countries so that all states participate to full potential in regional programs	Sponsors targeting specific countries	40 per state ≈200	•	•	
Training courses in satellite oceanography and geographical information systems **HP**	improved capacity to use satellite data for Integrated Coastal Area Management and oceanography. Tools for CLME and Land Base Sources of Pollution Project	These are essential tools for the success of essential programs in this region, and more expertise is needed in use and application	BILKO, CEOS, ODINCARSA IOCARIBE-GOOS Space Agencies	80	•	•	
IOC Eminent visiting researcher **C**	Sharing of the visitor's experience and development of active networks between the visitors home and host institute	Visiting researchers can have a profound impact on transmission of state of the art methods, creation of active networks and collaborations	UNESCO chairs, marine science institutes	40	•		

Prioritised Interventions	**Deliverables**	**Regional importance**	***Partner program**	**Cost K$**	**Time frame years**		
					2	4	8
General public awareness raising of benefits from ocean observations **C**	Raised awareness of the socio-economic benefits of, and fundamental dependence on, an ocean observing system	Benefits from an ocean observing system are largely unknown by the general public. Awareness must be raised in order to increase delivery of benefits and obtain long-term political support	IOCARIBE-GOOS	100	•	•	•
Awareness raising in fishing industry **C**	Increased participation in sustainable management of fisheries resources Decreased use of destructive fishing practices	Sustainable management of fish stock will only be possible with the involvement of fishing industries, which do have a medium to long term interest in preserving resources and switching to less destructive fishing practices	Countries fisheries authorities, FAO, UNEP	50	•	•	•
Awareness raising in tourism industry **C**	Stakeholders more aware of benefits and ways to reduce environmental impact of tourism industry	Tourism contributes significantly to pollution and errosion, and stakeholder have medium and long-term interest in preserving coasts and oceans. Awareness raising is the first step in including them more efficiently in the preservation effort.	Countries tourism authorities and companies	50		•	•
Regional training and	Capacity to draft new laws for	In order for marine research	Countries marine	50	•	•	

Prioritised Interventions	**Deliverables**	**Regional importance**	***Partner program**	**Cost K$**	**Time frame years**		
					2	4	8
mutual assistance for lawmakers **I**	building code, fisheries and coastal management, harmonization of regional codes	to deliver tangible benefits, the legal framework of several countries need update and harmonization	science institutions and legislative authorities				
Facilitating donation of equipment **I**	Donated equipment more efficiently distributed	Administrative and customs laws hurdles complicates donation of equipment between countries	Countries executive and legislative authorities, regional institutes	50	•	•	•
Sub-total for high priority interventions in Capacity-Building theme					480		
Sub-total for all interventions requested in Capacity-Building theme					820		
Total cost for all high priority interventions					2140		
Total cost for all requested interventions					3255		

Partner programs codes: see Appendix II.
HP, U, C, I refer to decreasing priorities, respectively High Priority, Urgent, Critical and Important.

II.3 Eastern Atlantic (IOCEA) Region

1. Regional perspective

There are 24 Member States in the IOCEA region. A good overview of important marine issues is given on the Large Marine Ecosystems programme website, which is summarised here.

This region is characterized by its warm climate, several areas with seasonally and inter-annually variable upwelling with associated high productivity, and three large circulation patterns: the Canary, Guinea and Benguela currents.

Despite the complexity of the influence of climate and upwelling variability on fish stocks, and significant natural variability in the relative abundance of different species, there is increasing evidence that the current pattern of exploitation is not sustainable and has resulted in significant decrease in catch in recent years. Overexploitation by industrial foreign fleets has depleted stocks and is threatening the livelihood of coastal communities of artisanal fishermen.

There has been significant degradation of essential habitat in the last decade due to pollution from coastal and industrial development, and severe disruption of food webs and balance from the introduction of invasive alien species. The occurrence of harmful algae bloom and eutrophication is becoming more frequent due to increased use of fertilizer and other anthropogenic sources of nutrients.

Rapid enhancement in scientific and management capacity for marine related issues is needed, to match accelerating coastal and industrial development, in order to monitor and control their impact on ecosystems and essential resources. Several large projects (UNEP, World Bank) are being conducted with the goal of providing the tools to help formulate sustainable development and preservation strategies. Cooperation between countries in the region will be essential for an improved management of marine resources.

2. Current IOC and other regional marine science programs

i. Guinea Current large Marine Ecosystem (GCLME)
ii. Benguela Current Large Marine Ecosystem (BCLME)
iii. African Monsoon Multidisciplinary Analysis (AMMA) Project
iv. Application of Remote Sensing for Integrated Management of Ecosystems and Water Resources in Africa - GOOS Africa.
v. BILKO Project on Remote Sensing
vi. Regional Project on Shoreline Protection Through Integrated Coastal Area Management – IOC UNESCO, NEPAD

3. Goals and benefits achievable with Capacity-Building interventions

Further goals achievable with Capacity-Building interventions

- recover depleted fish stocks, degraded habitats and reduce land and ship-based pollution by improving the understanding of processes and scale interactions
- formulate and implement an integrated observing strategy for West Africa
- implement a strategy to use observations and modelling for applications
- develop training and education activities for African countries
- forging Sub-Regional, South/South and North/South co-operation for enhancing the transfer of remote sensing technology and applied sustainable management of Ecosystems and Water Resources in Africa
- bridging the digital divide between North and South
- facilitate "hands-on" training in coastal and marine remote sensing for those traditionally excluded from such training
- contribute to a more in-depth understanding of shoreline change/coastal erosion in the participating countries, with special reference to the impact of climate change, and the formulation and implementation of appropriate adaptive and remediation strategies within the wider context of integrated coastal area management through coastal erosion.

Benefits

- create an ecosystem-wide assessment and management framework for sustainable living and non-living resources in the GCLME
- integrated management, sustainable development and protection of the BCLME
- improving the ability and capacity of African Nations to access and use remotely sensed data from satellites, making use of the new communication systems, to monitor, assess and preserve Water Resources (freshwater and coastal resources)
- enhance the capacity of the participating countries to restore and protect the coastal ecosystems from loss or modification of the degraded habitats.
- preserving healthy coastal environments,
- mitigating the impact of natural hazards;
- detecting and predicting the effect of climate change.

4. Tabulation of requested interventions prioritised

The major platform for Capacity-Building interventions will be the ODINAFRICA project. Regional experts will conduct all workshops.

Prioritised interventions ↓	**Deliverables**	**Regional Importance**	***Partners and countries**	**Cost in K$**	**Years**		
					2	4	8
OCEAN SCIENCES							
Training workshops on Integrated Coastal Area Management **U**	Sustainable management of the coastal zone and its resources	Sustainable coastal management is needed to optimise medium and long term development, and preservation of coastal ecosystems is essential for future marine resources	ODINAFRICA, NEPAD, GOOS AFRICA, ICAM	80	•	•	
Training Workshop on coastal engineering models & demos for decision makers **U**	Capacity to operate/build local operational models and applications	These models are cost-effective tools to evaluate medium-term impact and sustainability of different development options in coastal areas	GLOSS ODINAFRICA ICAM	80	•	•	
Training workshop on assessment & monitoring of coastal ecosystems & biodiversity **C**	Enhanced monitoring capacity through regional expertise sharing	This monitoring capacity is needed to evaluate medium-term costs of various coastal industrial and urban development strategies	UNEP GEF, Packard Foundation	120	•	•	•
Assessment of the occurrence of potentially harmful micro-algae **C**	Enhanced capacity to monitor Harmful Algae Bloom (HAB); an assessment of HAB occurrence and a guide to	HAB can inflict tremendous damage to fisheries and aquaculture, which need to be developed to match growth in	HAB Programme	100	•	•	

Prioritised interventions	**Deliverables**	**Regional Importance**	***Partners and countries**	**Cost in K$**	**Years**		
					2	4	8
	identification.	population and protein needs					
Seagrass beds monitoring and conservation **I**	Capacity built in each country to monitor seagrass beds on their coastlines	Seagrass beds are essential habitats for biodiversity and marine resources, and are under great stress everywhere	UNEP-world atlas of seagrasses	200	•	•	
Beach monitoring by junior scientists **I**	Sustainable, cost-effective beach profiling for monitoring of erosion; awareness raising of importance of marine issues and of marine science career options for young people	Beach erosion and sediment transport are among the important impacts of coastal development and must be monitored to inform policy.	ASP, CSI, countries educational authorities	400	•	•	•
Sub-total for high priority interventions in ocean sciences theme							0
Sub-total for all interventions requested in ocean sciences theme							980
OPERATIONAL OCEANOGRAPHY							
Training Workshops on GOOS products usable for project goals **HP**	Proficiency using available operational products	Operational oceanography is a powerful tool with potentially extremely beneficial applications, but is not being used sufficiently	GOOS AFRICA, ACMAD	40	•		
Installation of GLOSS gauges **U**	10 GLOSS gauges updated/installed	Better coverage will benefit research on sea-level related issues both in this region and for global studies	GOOS, GLOSS, IODE ODINAFRICA	60	•	•	
Training workshop for sea-level measurements **U**	20 (?) regional scientists trained to install and use GLOSS gauges	Participation of regional scientists to this process is essential for cost-effective,	GOOS, GLOSS, IODE, ODINAFRICA	80 +20 for on-site training	•	•	

Prioritised interventions	**Deliverables**	**Regional Importance**	***Partners and countries**	**Cost in K$**	**Years**		
					2	4	8
		sustainable maintenance and interest for these data					
Training workshop on numerical models for storm surges, wind waves and oil spills. **C**	Developed expertise in the use of the numerical models and adapted to the region	Numerical models are effective tools in reducing occurrence and impact of this marine hazards	JCCOM, IODE	40	•	•	
Sub-total for high priority interventions in operational oceanography theme							40
Sub-total for all interventions requested in operational oceanography theme							240
TSUNAMI AND OTHER MARINE HAZARDS							
Workshop on regional Capacity-Building needs for enhanced participation of regional scientist and institutions to an Atlantic Ocean Tsunami warning system **HP**	Capacity-Building needs determined for increased regional participation resulting in improved warning system	Capacity-Building is an essential aspect of a warning system most efficient in the regional context	UNEP, NEPAD, International tsunami warning system, western Atlantic oceanographic institutions	40	•		
Coastal habitat conservation and hazard mitigation **I**	Enhanced hazard management capacity through regional expertise sharing	Coastal habitat (e.g. mangroves, reefs) have played a important mitigation role in past tsunamis, and are under great stress	CSI, TNC	300	•	•	•
Sub-total for high priority interventions in tsunami and other marine hazards theme							40
Sub-total for all interventions requested in tsunami and other marine hazards theme							340
DATA AND INFORMATION EXCHANGE – IODE (interventions already funded within the framework of ODINAFRICA are not included in this table)							
Data sharing programs pilot programs **U**	Operational data available to regional scientists	Data sharing is essential for studying the ocean on all its scales, saves	IODE, ODINAFRICA	120	•	•	•

Prioritised interventions	**Deliverables**	**Regional Importance**	***Partners and countries**	**Cost in K$**	**Years**		
					2	4	8
		financial resources, and fosters regional collaboration					
Development of Marine Atlases based on LMEs (GOG, Canary, BCLME) **I**	Marine Atlas available for research and policy information	Convenient access to marine data is needed for more effective research and interfacing with policy makers	ODINAFRICA	100	•	•	
Training on development of repository of marine related documents **I**	Results from marine research available for research and policy information	Convenient access to results from marine research is needed for more effective research and interfacing with policy makers	ODINAFRICA	100	•	•	
Sub-total for high priority interventions in data and information exchange theme							0
Sub-total for all interventions requested in data and information exchange theme							320
CAPACITY-BUILDING SCHEMES							
Workshop on regional Capacity-Building pilot proposal for resources mobilization [including leadership training and team-building program] **HP**	Regional proposals submitted for funding. Improved output of universities & research institutes, closer industrial collaboration.	Increased funding needed for capacity building initiatives, and marine related research. Heads of institutes play a pivotal role in development of institutional and regional capacity	Universities, national research institutions, UNESCO, UNEP, ODINAFRICA, Water Research Fund for Southern Africa	200	•	•	
Workshop on country capacity-building pilot proposal for resources mobilization [including leadership training] **HP**	Networking established between heads of universities, institutes and industries to address country concerns	Addressing differing capabilities between countries so that all states participate to full potential in regional programs	Sponsors targeting specific countries	40 per state ≈200	•	•	

Prioritised interventions	**Deliverables**	**Regional Importance**	***Partners and countries**	**Cost in K$**	**Years**		
					2	4	8
Assessment / Update of human capacity in the Region **HP**	Classification of / updated information on human capacity / expertise available in the Region.	This is a necessary step to conduct targeted Capacity-Building and assess effectiveness of interventions	ODINAFRICA	40	•		
Training Workshop on Remote Sensing and GIS, and demos for decision makers **HP**	-Country plans for sustainability -Mitigate impacts of natural hazards	Those are cost-effective tools that help address essential issues sustainability and marine hazards	GOOS AFRICA, ACMAD, ODINAFRICA	40	•	•	
Strengthening oceanographic institutions and universities through equipping laboratories, acquisition of instruments and provision of visiting professors/researchers to conduct joint research and update curricula in marine science and oceanography. **HP**	Enhanced capability of training institutions to offer quality training; enhanced research abilities of research institutions and updated curricula in marine science and oceanography for universities	Strengthening of local capacity for marine sciences is needed	IOC-TEMA and other IOC Programmes, GEF	500	•	•	•
Assisting in PhD scholarships with emphasis on Physical Oceanography and marine geosciences and travel grants **HP**	Facilitating expert formation and training; addressing the imbalance in expertise in oceanography available in the region.	Junior scholars will play a leading role in developing expertise in countries that are lagging, and countries with comparable capacity will collaborate most actively	IOC-TEMA	90	•	•	•

Prioritised interventions	**Deliverables**	**Regional Importance**	***Partners and countries**	**Cost in K$**	**Years**		
					2	4	8
Regional workshop for coastal TTR cruise plans bearing in mind the Canary, Guinea and Benguela currents **U**	Common understanding of TTR cruise plans and developed plans	Regional collaboration is needed to set-up a regional TTR. TTR has an excellent record at forming junior scholars and creating active networks that produce cutting edge science	TTR programme	40	•		
Awareness raising and development in fishing industry **U**	Sustainable management of fisheries by improvement of fishing methods	Inefficient or destructive fishing practices impact sustainability of resources, industrial or artisanal fisheries are the main partners in this task	WFC	150	•	•	
Awareness programs for decision makers **U**	Decision are being taken with better awareness of consequences for marine environment	Increased awareness of marine issues is the key to improved management of marine resources and national support for marine sciences	National institutes, universities, industries and relevant ministries	120	•	•	•
Organisation of national workshops on country Capacity-Building needs. **C**	Harmonised Capacity-Building needs for countries that will feed into Regional Capacity-Building proposals.	Country approach needed to complement regional interventions, for which determination of national Capacity-Building needs and priorities is necessary.	ODINAFRICA. IOC-TEMA, Countries	40 per state ≈200	•		

Prioritised interventions	**Deliverables**	**Regional Importance**	***Partners and countries**	**Cost in K$**	**Years**		
					2	4	8
Leadership and Exchange Programs for heads of institutes-universities-industries – Visiting researcher program **C**	Enabling networks of heads of institutes to work in major country programs & facilitate innovative leadership programs for heads of institutes	Exchange/visiting programmes for heads of institutes and researchers are needed to foster networks and dissemination of excellency and state of the art methods	UNESCO chairs-UNITWIN network	150	•	•	•
Research and education mentors program **C**	New UNESCO Chairs and Visiting Researchers Program initiated	UNESCO chairs and visiting researchers are needed to foster collaboration between institutes and dissemination of excellency and state of the art methods.	UNESCO chairs, UNITWIN network	150	•	•	•
Networking regional scientists & establish contacts with decision makers **C**	Existing capabilities & infrastructures better used for science; increased interest of decision-makers for science-based recommendations	Networking creates more dynamic and cost-effective research, and interface with decision makers is necessary for research to benefit society at large and for raising support for marine sciences	ROOFS Africa GOG-LME	90	•	•	•
Sub-total for high priority interventions in Capacity-Building theme							1070
Sub-total for all interventions requested in Capacity-Building theme							1970
Total cost of high priority interventions requested							1150
Total cost of all interventions requested							3850

Partner programs codes: see Appendix II.
HP, U, C, I refer to decreasing priorities, respectively High Priority, Urgent, Critical and Important.

II.4 Black Sea Region

1. An overview of the region and its primary marine-related concerns

The Black Sea region is made up of 6 countries with a combined population of about 300 million. It is characterized by pollution on several fronts – air, water, and soil, radiation contamination in some areas, deforestation, acid rain, and concerns over oil spills from increasing Bosporus ship traffic. The water pollution aspects arise from dumping of chemicals, raw sewerage, heavy metals and detergents by countries surrounding the Black Sea. Changes in the political and economic realities however have provided an opportunity for collaboration between countries. The Black Sea countries are signatories to many conventions and the IOC Black Sea regional committee is working with the long-term objective of sustainable development as a means of protection against pollution within the framework of UNCLOS and relevant pollution conventions.

2. Tabulation of requested interventions within IOC main themes

Prioritised Interventions	**Deliverables**	**Regional Importance**	***Partner program**	**Cost in K$**	**years**		
					2	**4**	**8**
OCEAN SCIENCES							
Development of new methods and indices to assess current pollution level, and ecosystem status, and biodiversity **HP**	Reliable reports and information on fish stocks levels and health of the ecosystem	The impact on ecosystems of industries and agriculture on the Black and on discharging rivers is large. Improved, practical assessment methods are necessary to improve management and develop preservation strategies	Black Sea-GOOS ARENA, GLOSS, BSERP, and forthcoming EU projects	200	•	•	
Implementation of state-of-the art data assimilation techniques for circulation and ecosystem dynamics (**U)**	The upgraded models are available to the scientific community for regional implementations	Upgraded circulation models are essential for pollution impact mitigation, navigation, and scientific studies	Black Sea-GOOS ARENA, GLOSS, and forthcoming EU projects	100	•		
Development of optimally complex ecosystem models and	The upgraded models are available to the scientific community for regional implementations	Coupling of biology with physical parameters is necessary for ecosystem studies	Black Sea-GOOS ARENA, GLOSS, BSERP,	200	•	•	•

Prioritised Interventions	Deliverables	Regional Importance	*Partner program	Cost in K$	years 2	4	8
their coupling with the circulation models **(I)**		and management, and for long-term prediction of the climate	and forthcoming EU projects				
Sub-total for high priority interventions in ocean sciences theme							200
Sub-total all requested interventions in ocean sciences theme							500
OPERATIONAL OCEANOGRAPHY							
Establishment of an optimal observational network **HP**	A network that is operational and functioning reliably	Improvement of observations in this region will benefit GOOS as well as regional projects	Black Sea-GOOS ARENA, GLOSS, BSERP, and forthcoming EU projects	600	•	•	•
Implementation of remotely-sensed physical and ocean colour data in operational mode **HP**	Free access for users and scientific community to processed and gridded data sets	Study of location of biomass and timing of bloom is essential for fisheries and resource management. Convenient access to these data will increase their use and beneficial impact	Black Sea-GOOS ARENA, GLOSS, BSERP, BILKO, and forthcoming EU projects	200	•	•	
Installation of new sensors and equipments for near-real time data acquisition **U**	New sensors installed, effectively functioning	More in-situ observations are needed, and near-real time acquisition of their data will optimise their use	Black Sea-GOOS ARENA, GLOSS, BSERP, and forthcoming EU projects	500	•	•	•
Coupling of regional high resolution ocean and atmospheric circulation models **C**	The upgraded models are available to the scientific community for regional implementations	Coupling with an atmospheric component is necessary to improve simulation realism and develop regional climate monitoring and prediction	Black Sea-GOOS ARENA, GLOSS, and forthcoming EU projects	200	•	•	
Sub-total for high priority interventions in operational oceanography theme							800
Sub-total all requested interventions in operational oceanography theme							1500

Prioritised Interventions	**Deliverables**	**Regional Importance**	***Partner program**	**Cost in K$**	**years**		
					2	**4**	**8**
TSUNAMI AND OTHER MARINE HAZARDS (no Capacity-Building interventions were requested in this theme)							
DATA AND INFORMATION EXCHANGE – IODE							
Setting-up efficient data transmission links between countries/ institutions **U**	Fast internet connection between oceanographic institutions of the riparian countries	Fast data transmission enhances efficiency of collaboration and can be a cost-effective way of sharing computer and data resources	Black Sea-GOOS ARENA, IODE, GLOSS, BSERP, and forthcoming EU projects	200	•		
Development of an efficient multi-disciplinary data base management system for near-real time operational oceanography **C**	An established database providing continuity for implicit knowledge. Free access to processed data, efficient data exchange between oceanographic institutions of the riparian countries	Convenient access to multi-disciplinary data is necessary for research to address essential regional marine issues, and use of resources can be optimised by sharing	Black Sea-GOOS ARENA, IODE, GLOSS, BSERP, and forthcoming EU projects	200	•		
Sub-total for high priority interventions in ocean sciences theme							0
Sub-total all requested interventions in ocean sciences theme							400
CAPACITY-BUILDING SCHEMES							
Workshop on regional Capacity-Building pilot proposal for resources mobilization [including leadership training and team-building program] **HP**	Regional proposals submitted for funding. Improved output of universities & research institutes, closer industrial collaboration.	Increased funding needed for capacity building initiatives, and marine related research. Heads of institutes play a pivotal role in development of institutional and regional capacity	Universities, national research institutions, UNESCO, UNEP, ODINAFRICA, Water Research Fund for Southern Africa	200	•	•	
Workshop on country capacity-building pilot proposal for resources	Networking established between heads of universities, institutes and industries to	Addressing differing capabilities between countries so that all states participate to full	Sponsors targeting specific countries	40 per state =200	•	•	

Prioritised Interventions	**Deliverables**	**Regional Importance**	***Partner program**	**Cost in K$**	**years**		
					2	**4**	**8**
mobilization [including leadership training] (**HP)**	address country concerns	potential in regional programs					
Collaboration with advanced institutions on training and education **U**	At least 3 PhD students from each country trained abroad.	Training of junior scholars abroad will bring needed state of the art methods in regional institutions and create new networks	Black Sea-GOOS ARENA, GLOSS, BSERP, and forthcoming EU projects	150	•	•	•
Promoting technology transfer and collaboration between Black Sea countries **U**	Technology and knowledge transfer by joint cruises and observations and publications	Collaboration and knowledge transfer is needed for all riparian countries to participate in observation and management of the Black Sea, and more inclusive, active collaboration will result in more dynamic research.	Black Sea-GOOS ARENA, GLOSS, BSERP, and forthcoming EU projects	60	•	•	•
Summer schools and training workshops on interdisciplinary Black Sea science **C**	Quantity and quality of qualified technical and scientific personnel improve.	Increase in interdisciplinary expertise is needed to address critical regional issues such as ecosystem preservation	Black Sea-GOOS ARENA, GLOSS, BSERP, and forthcoming EU projects	120	•	•	•
Promoting joint multi-disciplinary research, and scientific collaboration with advanced institutions **C**	Technology and knowledge transfer by joint cruises and publications	State of the art Multi-disciplinary research is needed to address critical regional issues	Black Sea-GOOS ARENA, GLOSS, BSERP, and forthcoming EU projects	120	•	•	•
Promoting public awareness on sustainable use of marine	Workshops, brochures, media campaigns, web sites, lobbying with policy makers for	The general public behaviour has strong impact on pollution and other marine issues, and	Black Sea-GOOS ARENA, GLOSS, BSERP,	500	•	•	•

Prioritised Interventions	Deliverables	Regional Importance	*Partner program	Cost in K$	years 2	4	8
resources **C**	more effective use of marine living-nonliving resources, higher marine security	public awareness of importance marine issues is the key to long-term support of marine sciences and for consideration of the medium and long term in decision-making	and forthcoming EU projects				
Sub-total for high priority interventions in ocean sciences theme							400
Sub-total all requested interventions in ocean sciences theme							1350
Total for all high priority interventions							1400
Total for all requested interventions							3750

Partner programs codes: see Appendix II.
HP, U, C, I refer to decreasing priorities, respectively High Priority, Urgent, Critical and Important.

II.5 Western Indian Ocean (IOCWIO) Region

1. Regional perspective

There are 12 IOC Member States in the Western Indian Ocean region. Three have not participated actively in the activities of the IOC's Regional Committee for the Western Indian Ocean (IOCWIO) in recent years. These are Ethiopia, which is land-locked, Eritrea and Somalia.

IOC Member States in the Western Indian Ocean:

1. Comores
2. Eritrea
3. Ethiopia
4. France (La Réunion)
5. Kenya
6. Madagascar
7. Mauritius
8. Mozambique
9. Seychelles
10. Somalia
11. South Africa
12. Tanzania.

About 30% of the 100 million inhabitants of the Western Indian Ocean region reside in coastal areas and are heavily dependent on goods and services provided by the ocean and coasts. The diverse ecosystems in the region, comprising coral reefs, seagrass beds, mangroves and beaches, make the area attractive for tourism. IOCWIO region continues to face a number of challenges related to the coastal environment and use the associated natural resources. These include increase in population along the coasts, poverty, environmental degradation, and declining coastal and marine resources. In most cases these problems are limited to some specific areas (hotspots). However as population and development pressure increases, these problems are likely to grow in intensity and their distribution throughout much of the region's coastline. There is an increasing awareness of coastal issues in the region as demonstrated by the three conferences held at ministerial level to discuss integrated coastal management policies (Arusha, Tanzania 1993; Mahe, Seychelles 1996; and Maputo, Mozambique 1998). These conferences led to the launching of the African Process for the Development and Protection of the Coastal and Marine Environment in Sub-Saharan Africa.

The Nairobi Convention, under the UNEP Regional Seas Programme, which was signed in 1985, continues to provide a framework for regional cooperation for better management of marine resources and environment. Efforts have been made to revitalise the convention and increase the level of implementation of activities identified within the framework of the convention. Other organisations that contribute to capacity building in the region include the Intergovernmental Oceanographic Commission of UNESCO (through its Regional Committee for the Western Indian Ocean-IOCWIO), Western Indian Ocean Marine Science Association (WIOMSA), International Maritime Organisation, World Meteorological Organisation, WWF, and IUCN.

The GEF/MSP project on the *African Process for the Development and Protection of the Marine and Coastal Environment in sub-Saharan Africa*, was a major effort in identifying the key marine related issues along the African coasts. It was implemented in two phases: (i) An Integrated Problem analysis, and (ii) Project proposal development phase. The objective of the first phase was to identify root causes of environmental degradation in coastal and marine areas, with a focus on hot spots and sensitive areas. Comprehensive assessments of (i) regionally or nationally significant sites already affected by degradation (hotspots) or in risk of suffering degradation (sensitive areas), (ii) priority issues that require urgent interventions, (iii) severity of impacts of identified issues upon critical ecosystems and related human communities, from an environmental, social and economic perspective, and (iv) the main causes of environmental degradation were undertaken. The objective of Phase II was the preparation of project proposals on the basis of Phase I outputs, and their integration into a comprehensive Portfolio programme of interventions to address the keys issues identified.

The assessments identified five key areas that need to be addressed:

i) Coastal erosion,
ii) Management of key ecosystems and habitats
iii) Pollution
iv) Sustainable use of living resources
v) Tourism

This process resulted in the development of nineteen framework project proposals. These have formed the basis of several projects currently being considered by GEF.

2. IOC sponsored and other regional programs

The main IOC capacity building initiative in the region is the Ocean Data and Information Network in Africa (ODINAFRICA). IOC has also collaborated with the Western Indian

Ocean Marine Science Association (WIOMSA) in organizing training courses in remote sensing and integrated coastal management. Other intergovernmental organisations that have been active in marine related capacity building include FAO, IMO and UNEP.

A number of NGOs also have Capacity-Building programs in the region. Those include:

1. IUCN's Eastern Africa Marine Programme: focuses on the issues of destructive fishing practises, overfishing, development and pollution, introduction of alien invasive species, policy and legislation. The objective is to achieve sustainable fishing methods, community based management of natural resources, integrated coastal area management, biodiversity and socio-economic assessments and long-term monitoring programmes. IUCN have produced a toolkit for Managing Marine Protected Areas in the Western Indian Ocean, and a "Western Indian Ocean Fisheries database".
2. World Wildlife Fund for Nature (WWF) is developing a network of Marine Protected Areas in Eastern Africa Marine Ecoregion, and implementing programmes on "Western Indian Ocean Islands Marine Ecoregion", and a "Study on the status of dugongs in the Western Indian Ocean region".
3. Western Indian Ocean Marine Sciences Association has been implementing the Marine Science for Management programme through which grants of up to US$50,000 are provided to groups of researchers in the region. They also have a small grants programme of up to US$6000 for young scientists.
4. Coral Reef Degradation in the Indian Ocean (CORDIO) aims at helping mitigate the widespread degradation of coral reefs throughout the Central and Western Indian Ocean. Focus includes vulnerability assessments, biological and socio-economic monitoring, information sharing, capacity building and development of mitigation strategies for coral reefs and their resources.
5. International Ocean Institute (IOI) has two operational centres in Cape Town, South Africa and Mombasa, Kenya. These focus on improvement of livelihood of coastal communities.

3. Objectives and benefits

The main objectives of capacity building in the IOCWIO region can be summarised as follows**:**

1) improve the understanding of marine and coastal ecosystem dynamics,
2) improve the monitoring and forecasting of coastal and oceanic processes, and enhance participation in global research programmes,
3) improve the skills and facilities available for marine related teaching, research and resource management.

The achievement of these objectives will contribute to addressing the key issues that were identified during the African process and have now been incorporated as the Coastal Marine sub-theme of the NEPAD Environment Programme. These include**:** Coastal erosion, Management of key ecosystems and habitats, Pollution, Sustainable use of living resources, and Tourism.

4. Tabulation of requested interventions within IOC main themes

Prioritised Interventions ↓	**Deliverables**	**Regional Importance**	**Partners**	**Cost in K$**	**Time frame years**		
					2	**4**	**8**
OCEAN SCIENCES							
Training courses on water and sediment quality analysis **HP**	Enhanced monitoring of environment, leading to improvement in environment quality. Harmonised methodologies, enabling inter-comparison of results in region.	Increasing urbanization and industrialization in coastal areas of the region will lead to increased pollution. Expertise in assessing pollution loads and impacts on coastal environment and resources critical	WIOLAB	75	•	•	•
Training course on models for coastal management (ecosystem models, ocean/climate models with demonstration for selected sites (**HP)**	Models developed and used for management of ecosystems and resources	Modelling are a useful and cost effective tool for studying processes with wide geographic coverage, as well as forecasting evolution of processes	WIOMSA UNEP, ICAM	120	•	•	•
Training in monitoring and assessment of potentially harmful algal blooms **C**	HAB occurrences mapped	Models provide a powerful tool for understanding and forecasting marine and oceanic processes and are a useful tool for integrated management of coastal areas	HAB	75	•	•	•
Sub-total for high priority interventions in ocean sciences theme							195
Sub-total for all requested interventions in ocean sciences theme							270
OPERATIONAL OCEANOGRAPHY							
Installation and upgrade of coastal observing stations **C**	Operational oceanographic data from key sites available to users Improved prediction of sea	Baseline data required for understanding and exploitation of coastal environment and resources.	GLOSS ODINAFRICA GOOS	200	•	•	•

Prioritised Interventions	Deliverables	Regional Importance	Partners	Cost in K$	Time frame years		
					2	4	8
	state and climate	Similarly for forecast of sea state and weather					
Training workshop on sea level data analysis and interpretation **C**	Tidal prediction for all ports in the region done locally	Most countries in the region still rely on outside expertise for very basic services such as tide predictions	GLOSS, ODINAFRICA, National Institutions	30			
Sub-total for high priority interventions in ocean sciences theme							0
Sub-total for all requested interventions in ocean sciences theme							230
TSUNAMI AND OTHER MARINE HAZARDS							
Workshop on development of regional tsunami and other hazard warning system **HP**	Implementation and management plan for tsunami warning system in WIO finalized	The Indian Ocean tsunami of December 2004 and other hazards that have affected the region such as cyclones, and storm surges have caused losses of human life and property.	ICPAC RANET ISDR UNDP UNEP	40	•		
Training workshop on vulnerability indices and mapping **HP**	Sufficient number of regional scientists trained to allow mapping of vulnerability of all densely populated coastal areas.	Ability to plan for response, and mitigate impacts of hazards depends on knowledge of vulnerability of the coastal areas.	UNEP UNDP	40	•		
Sub-total for high priority interventions in ocean sciences theme							80
Sub-total for all requested interventions in ocean sciences theme							80
DATA AND INFORMATION EXCHANGE – IODE (Interventions already funded within the framework of ODINAFRICA are not included in this table)							
Training and support for development of repositories of marine related publications **C**	Electronic repository of marine related publications from the region finalized and availed on CD and the internet	Access to up to date information is crucial for research and resource management.	ODINAFRICA	40	•		
Training on Marine Biodiversity data	Marine Biodiversity data base for the region finalized and	The marine biodiversity of the region is not yet	WIOMSA, UNEP	75	•	•	

Prioritised Interventions	Deliverables	Regional Importance	Partners	Cost in K$	Time frame years		
					2	4	8
management **C**	availed on CD and the internet	fully mapped.					
Training workshop on development of Marine Atlas **I**	Marine atlases developed for two LMEs (Somali and Agulhas) as well as for the Mascarenhas	Atlases are an important tool for management of environment and resources	ODINAFRICA	40	•		
Sub-total for high priority interventions in ocean sciences theme							0
Sub-total for all requested interventions in ocean sciences theme							155
CAPACITY-BUILDING SCHEMES							
Workshop on regional capacity-building pilot proposal for resources mobilization [including leadership training and team-building program] **HP**	Regional proposals submitted for funding. Improved output of universities & research institutes, closer industrial collaboration.	Increased funding needed for capacity building initiatives, and marine related research. Heads of institutes play a pivotal role in development of institutional and regional capacity	Universities, national research institutions, UNESCO, UNEP, and WIOMSA	200	•	•	
Workshop on country capacity-building pilot proposal for resources mobilization [including leadership training] (**HP)**	Networking established between heads of universities, institutes and industries to address country concerns	Addressing differing capabilities between countries so that all states participate to full potential in regional programs	Sponsors targeting specific countries	40 per state ≈200	•	•	
Training workshops on application of remote sensing to marine sciences, including demonstration. (Ocean circulation/living resources,	Improved capacity to prepare resource and ecosystem maps Better charting and understanding of environment status	Remote sensing are a useful and cost effective tool for studying processes with wide geographic coverage	UNEP WIOLAB WIOMSA ODINAFRICA	120	•	•	•

Prioritised Interventions	**Deliverables**	**Regional Importance**	**Partners**	**Cost in K$**	**Time frame years**		
					2	**4**	**8**
water quality, coastal erosion, forecasting ocean weather/climate) **HP**							
Exchange programs between research institutions and universities in the region (intra and inter regional mobility of university students and lecturers) (**HP)**	Network of experts developed and strengthened Shared experiences and expertise	This would be an effective way of networking experts and institutions, and sharing experiences.	National universities and research institutions UNESCO Chairs	320	•	•	•
Facilitate the development of teaching curriculum, methods and tools (and accreditation of marine course modules) **U**	Networking of marine sciences lecturers in the region Improved and relevant curriculum used by universities in the region Teaching notes for undergraduate and post graduate programmes	Harmonisation of curriculum in the region would facilitate exchange of students and staff.	UNESCO Chair	40	•	•	
Short term fellowships to facilitate participation in training courses (including ship-board training), workshops, conferences etc **U**	Improved skills, Exposure to new methodologies and tools Increased networking with experts outside the region	These will enable experts from the region to sharpen their expertise in selected fields, and meet/exchange ideas and experiences with peers	WIOMSA, ACEP, UNEP, others	256	•	•	•
Scholarships for long term training at M.Sc and Ph.D. level **U**	Critical mass of scientists created in all the Member states in the region in relevant marine	Enable experts from the region to interact with those from other institutions,	National Universities UNESCO Chair	320	•	•	•

Prioritised Interventions	Deliverables	Regional Importance	Partners	Cost in K$	Time frame years		
					2	4	8
	related fields						
Strengthen teaching and research infrastructure in the region. **C**	Improved facilities in teaching and research infrastructure.	Equipment in most of the institutions in the region is in dire need of refurbishment and upgrading	National educational authorities, universities and research institutions, UNESCO Chairs	200	•	•	•
Application of GIS to coastal management **C**	GIS databases and resource maps	GIS databases are a useful tool for integrated management of coastal areas	ACEP, WIOMSA, UNEP	60	•	•	•
Sub-total for high priority interventions in ocean sciences theme							840
Sub-total for all requested interventions in ocean sciences theme							1716
Total cost for all high priority interventions							1115
Total cost for all requested interventions							2451

Partner programs codes: see Appendix II.
HP, U, C, I refer to decreasing priorities, respectively High Priority, Urgent, Critical and Important.

II.6 Central Indian Ocean (IOCINDIO) Region

1. Regional perspective

There are 19 Member States in IOC's central Indian Ocean region, which extends from the Middle East to the Western Coast of Australia and comprise a large variety of ecosystems, and, when compared to other IOC regions, a rich diversity of cultures along its coasts. A convenient overview of important marine issues in this region is on the Large Marine Ecosystems programme website.

Rapid economic and urban development has resulted in significant stress on coastal ecosystems. Mangrove and estuaries, coral, seagrass beds and wetlands, that provide essential habitats for biodiversity and the repletion of fish populations, have been severely impacted in many areas, particularly in the Bay of Bengal. Industrialization and agriculture have brought pollution from pesticides, heavy metals and other waste.

Aquaculture and sustainable exploitation of fishing resources is essential in order to meet the needs of a fast growing population, which will necessitate a large increase in fish production in the near future. Other important issues in the region include the effect of potential sea-level rise in densely populated, low-lying areas, and mitigating damages from a now likely increase in the frequency of cyclones with climate change.

Local expertise is rapidly developing for managing resources and the impact of industrialization and urban development. In this culturally diverse region, IOC bears special responsibility for enhancing the coordination of the growing research between countries.

2. Overview of Regional Initiatives and Benefits from Capacity-Building

Current IOC and other regional marine science programs

Those include:

- Indian Ocean Global Ocean Observing System (IOGOOS)
- Ocean Data and Information Exchange Network in the Central Indian Ocean region (ODINDIO)
- Large Marine Ecosystem in the Arabian Sea, Bay of Bengal, and on the Australian Shelves.

3. Tabulation of requested interventions within IOC main themes

Prioritised Interventions	**Deliverables**	**Regional importance**	**Partners**	**Costs in K$**	**Years**		
					2	4	8
OCEAN SCIENCES							
Harmful Algal Bloom **U**	Capacity building for monitoring and mitigation of HAB occurrence	Pressing need to develop aquaculture to compensate for decrease in fish stocks, for which HAB program addressing regional context is necessary.	HAB ROPME IOCINDIO	200	•	•	•
Mangrove monitoring **U**	Capacity built in each country to monitor mangroves on their coastlines	Mangroves are essential reservoirs of biodiversity and play important roles in coastal erosion. Human impact on these systems is large but not evaluated precisely.	IOGOOS IOCINDIO ROPME	200	•	•	•
Coral Reef monitoring **U**	Capacity built in each country to monitor corals in their coastal areas	Reefs create essential reservoirs of biodiversity and play important roles in coastal erosion. Human impact on these systems is large but not evaluated precisely.	GCRMN IOCINDIO ROPME	200	•	•	•
Training course on ICAM **C**	Enhanced Capacity for coastal area management	Coastal management is necessary for preserving marine	ICAM IOCINDIO ROPME	120	•	•	•

Prioritised Interventions	Deliverables	Regional importance	Partners	Costs in K$	Years		
					2	4	8
		resources and preserve marine resources for sustainable development					
Training course on Marine Pollution **I**	Capacity built for monitoring and management of Marine Pollution	Impact of pollution on human health, marine resources and ecosystems is increasing and can be mitigated in cost-effective ways with enhanced capacity.	IOCINDIO ROPME	80	•	•	
Sub-total for high priority interventions in ocean sciences theme							0
Sub-total for all requested interventions in ocean sciences theme							800
OPERATIONAL OCEANOGRAPHY							
Training course on Sea-level Observation and Analysis **HP**	20 regional tide gauge operators trained to install and operate gauges to GLOSS standards and to analyse data for tidal predictions	Sea-level observations are an essential aspect of ocean sciences and global changes studies, and for some low lying states it is a matter of survival to monitor sea-level rise effectively to optimising coping strategies.	IOGOOS GLOSS IODE	40	•		
Sub-total for high priority interventions in operational oceanography theme							40
Sub-total for all requested interventions in operational oceanography theme							40
TSUNAMI AND OTHER MARINE HAZARDS							
Training course system on tsunami detection and warning system **HP**	Regional Capacity to participate in the development of a warning system is enhanced.	A warning system adapted to local realities is essential to reduce the impact of potential future events.		10,000	•	•	
Training on tsunami mitigation, vulnerability, preparedness, awareness and education,	Informed populace, prepared to respond to tsunami and other natural disasters	Informed populace is essential for a warning system and for mitigation strategy, is often the most cost-effective way, and is essential	IOGOOS, ISDR agencies UNEP UNDP	10,000	•	•	•

Prioritised Interventions	Deliverables	Regional importance	Partners	Costs in K$	Years		
					2	4	8
including conferences, workshops and media materials **HP**		for the long-term support of a warning system.					
Coastal mapping programme **HP**	Accurate bathymetry for modelling and safe navigation	These maps are needed for modelling of Tsunami wave propagation and for safe navigation.	IOGOOS, and ISDR agencies	10,000	•	•	•
Sub-total for high priority interventions in tsunami and other marine hazards theme				30,000			
Sub-total for all requested interventions in tsunami and other marine hazard theme				30,000			
DATA AND INFORMATION EXCHANGE – IODE see next table for interventions requested for ODINCINDIO							
CAPACITY-BUILDING SCHEMES							
Workshop on regional capacity-building pilot proposal for resources mobilization [including leadership training and team-building program] **HP**	Regional proposals submitted for funding. Improved output of universities & research institutes, closer industrial collaboration.	Increased funding needed for capacity building initiatives, and marine related research. Heads of institutes play a pivotal role in development of institutional and regional capacity	Universities, national research institutions, UNESCO, UNEP, and ODINCINDIO	200	•	•	
Workshop on country capacity-building pilot proposal for resources mobilization [including leadership training] **(HP)**	Networking established between heads of universities, institutes and industries to address country concerns	Addressing differing capabilities between countries so that all states participate to full potential in regional programs	Sponsors targeting specific countries	40 per state ≈200	•	•	

Prioritised Interventions	**Deliverables**	**Regional importance**	**Partners**	**Costs in K$**	**Years**		
					2	4	8
Workshops on remote sensing applications for:	Regional experts are trained to use remote sensing data applied to important scientific and societal issues	Capacity for use of remote sensing product is needed to enhance marine sciences as well as monitoring and management of resources.	IOGOOS ODIN-CINDIO ROPME				
- coastal erosion **HP**				120	•	•	•
- mangrove mapping **HP**				120	•	•	•
- coral reef monitoring **HP**				120	•	•	•
- coastal biodiversity **(HP)**				40	•		
- prawn fisheries **HP**				40	•		
- biological products in coastal resource monitoring and management projects **(U)**				120	•	•	•
- understanding basic oceanography **U**				120	•	•	•
- fisheries and production of Potential Fishing Zones **U**				80	•	•	
- altimetry and analysis **(I)**				40	•		
Sub-total for high priority interventions in ocean sciences theme							840
Sub-total for all requested interventions in ocean sciences theme							1,200
Total for all high priority interventions							30,880
Total for all requested interventions							32,040

Partner programs codes: see Appendix II.
HP, U, C, I refer to decreasing priorities, respectively High Priority, Urgent, Critical and Important.

Interventions requested specifically for IOGOOS:
All interventions in this table are within the operational observing system main theme.

Prioritised Interventions	**Deliverables**	***Partner Programs**	**Cost in K$ p.a.**	**2**	**4**	**8**
Implement national GOOS Coordinating Committees **HP**	National GOOS Coordinating Committees and Focal Points	IOGOOS	40	•	•	•
Coastal GOOS implantation **HP**	Integrate coastal GOOS into region using Implementation Plan and establish coastal GOOS network	IOGOOS, UNEP, FAO, LME	2,000	•	•	•
Participation in international conferences and meetings of GOOS **HP**	Provide input to GOOS activities to set direction of, and planning program	IOGOOS	50 (yr)	•	•	•
Annual IOGOOS meeting support **HP**	Coordination and oversight of program	IOGOOS	60 (yr)	•	•	•
User Sector Workshops **HP**	Informed industry and govt. sectors on GOOS benefits	IOGOOS, WMO	200	•	•	
Establish product, data and information centre with nodes throughout region **HP**	Make available data and products for use throughout region	IOGOOS	50 (yr)	•	•	•
Higher level training and education in oceanography and related management and technical programs **HP**	Increase capacity in region to improve management, operate systems and protect environment	IOGOOS, USP and others	100 (yr)	•	•	•
Media and promotional brochures **U**	Informed communities on GOOS products and information	IOGOOS	20 (yr)	•	•	•
High level training and education in oceanography and related management and technical programs **U**	Increase capacity in region to improve management, operate systems and protect environment	IOGOOS, universities, others	100 (yr)	•	•	•
National workshops and meetings **C**	Awareness and program development	IOGOOS	130	•	•	•

HP, U, C, I refer to decreasing priorities, respectively High Priority, Urgent, Critical and Important.

Interventions requested for ODINCINDIO
The interventions listed in this table are all within the data management and exchange main theme, and all have equally high priority.

Objective	**Activities for ODINCINDIO Project**	**Timing**	**Cost 1000 $**
1 Establishment of National Data and Information Centres	Organization of advisory mission of IODE expert to member state to advise on establishment of national oceanographic data centre (NODC) and national oceanographic information centre (NOIC) – based upon relevant IOC Manuals and Guides	2005	12
	Meeting of national oceanographic committee to identify suitable host institutions for national oceanographic data centre (NODC) and national oceanographic information centre (NOIC) and identify their respective national coordinators; decide on distributed or centralized structure	2005	10
	Procurement of start-up hardware/software NODC	2005	50
	Procurement of additional hardware/software NODC	2005	25
	Procurement of start-up hardware/software NOIC	2005	50
	1.9 Procurement of additional hardware/software NOIC	2005	25
	1.10 Provision of operational support for start-up NODC	2005 2006 2007	20
2 Capacity Building	2.1 Organization regional data management training course (BASIC LEVEL) 3 courses	2005 (2nd half) 2006 (2007) possibly 2 courses in 2006	150
	2.2 Organization regional information management training course (BASIC LEVEL) 3 courses	2005 (2nd half) 2006 (2007) possibly 2 courses in 2006	150
	2.3 Organization regional data management training course (ADVANCED LEVEL) 2 courses	2005 (2nd half) 2006	100
	2.4 Organization regional information management training course (ADVANCED LEVEL) 2 courses	2005 (2nd half) 2006	100

Objective	Activities for ODINCINDIO Project	Timing	Cost 1000 $
	2.5 Remote sensing application training course (IOGOOS)	2005 or 2006	100
	2.7 Helpdesk service data management training	2005 2006 2007	15
	2.8 Helpdesk service information management training	2005 2006 2007	15
	2.9 Short-term visits to other data/information centres (1 week); Internships of data or information managers in other institutions inside or outside the region (up to 3 months); Short-term Visits of external experts to data/information centres in the region	2005 2006 2007	240
	2.10 Support for ASFA subscriptions	2005 2006 2007	150
3 awareness	3.1 Support to enhance national awareness	2005 2006 2007	150
	3.2 Development and maintenance of project web site	2005 2006 2007	3
	3.4 Development of regional awareness tools (posters, brochures,…)	2005 2006 2007	6
4 product dev	4.1 repatriation of data collected by other countries (GODAR activity)	2005	10
	4.2 development of national meta databases (NODC)	2005 2006	20
	4.3 updating of national meta databases (NODC)	2007	5
	4.6 development of national library holding databases (NOIC)	2005 2006	20
	4.7 updating of national library holding databases (NOIC)	2007	5
	4.10 development of national experts directory (NOIC)	2005	15
	4.11 updating of national experts directory (NOIC)	2006 2007	20
	4.14 develop national e-repository of publications produce by national experts (full-text electronic) (NOIC)	2005	30
	4.15 updating national e-repository of publications produce by national experts (full-text electronic) (NOIC)	2006 2007	15
5 dissemination	5.1 support for organization of national workshops on data/information services/products for the sustainable management of coastal resources	2006 2007	50

Objective	Activities for ODINCINDIO Project	Timing	Cost 1000 $
	5.2 support for development of data and information products	2006 2007	50
6. cooperation	Travel support for project coordinator to attend relevant meetings and project events	2005 2006 2007	45
7 project coordination	Annual meeting of Steering Committee	2005 2006 2007	120
	Project Office operational expenses	2005 2006 2007	6

III. Common Capacity-Building needs, global and country-specific interventions

The table below maps requested regional interventions against IOC's main themes. Although different regions have different priorities, a generic pattern of needs is discernible from the last two columns. Many requested interventions were common to several regions, reflecting how economic development in coastal areas of different regions is giving rise to similar challenges in terms of sustainability and preservation of resources and biodiversity.

Requested interventions show similarities between regions:
In the Ocean Sciences main theme, Capacity-Building interventions in the area of ecosystem dynamics/benthic ecosystems and management of the coastal area are requested the most. In the operational oceanography main theme, development of the capacity to use GOOS products is seen as a priority. In tsunami and other ocean hazards mitigation, interventions in awareness raising and preparedness against hazards are most requested. Although a number of interventions are requested in the Data and Information Exchange main theme, they are not often seen as a high priority. However, ODINAFRICA was the preferred regional project to be used as the main vehicle for Capacity-Building interventions in IOCWIO and IOCEA regions. Finally intervention in the Capacity-Building main theme are most requested for 'management' programs (workshops on leadership/ team-building, and proposal writing) and for the use of remote sensing and GIS data and applications.

Global approach to Capacity-Building:
IOC will also coordinate these overall global priorities across inter-regionally allowing best practices to be incorporated into standard modules and experience to be shared and built-upon, *without compromising regional concerns.* This is particularly important for very specialized topics for which little expertise is available in a single region.

Table of requested regional interventions by IOC main theme and by region:

PROGRAMS	WETPAC	IOCARIBE	IOCWIO	IOCEA	IOCINDIO	Black Sea	total high priority requests	total requests
OCEAN SCIENCES								
Benthic ecosystems, eco dynamics, ICAM, models	**H**	**H** U C	**2H**	2U C	C	UI	**4**	**12**
Ecosystem health indicator and habitat conservation	2C	2C		2I	2U	**H**	**1**	**9**
Harmful Algal Blooms	C	2C	C	C	U			**6**
LME		C						**1**
Open Ocean TTR	C							**1**
GLOBEC								
Pollution					I			**1**
OPERATIONAL OCEANOGRAPHY								
GOOS products	**H**	**2H**		**H**		**H**	**5**	**5**
Observational systems and training [sea-level and other observations]	2U		2C	2U	**H**	**H**U	**2**	**9**
JCOMM models		C						**1**
GODAE products						C		**1**
TSUNAMI AND OTHER MARINE HAZARDS								
Preparedness + Awareness		**H** C		**H**	**H**		**3**	**4**
Implement of TWS		**H**	**H**		**H**		**3**	**3**
Coastal bathymetry + map	U		**H**		**H**		**2**	**3**
Tsunami mitigation-GOOS	**H**	C					**1**	**2**
Habitat conserve/mitigate.	UC			I				**3**
DATA AND INFORMATION EXCHANGE								
Data exchange-management [hardware & software]	U	U 2C	C	U		UC		**8**
Publications & libraries			C	2I				**3**
Ocean mapping		CI	I					**3**
CAPACITY-BUILDING SCHEMES								
Capacity-Building Management	**2H**	**2H**	**2H** C	**3H** C	**2H**	**2H**	**13**	**15**
Remote Sensing & GIS	**H**	**H**	**H** C	**H**	**5H** ,3 UI		**9**	**14**
Capacity-Building Research & education	C	C	**H**3 U C	**H**2 C		UC	**2**	**12**
Infrastructure–research/labs				**H**			**1**	**1**
Capacity-Building for Operational activities	C	I		U		U		**4**
Capacity-Building Awareness for all		3C I		2U C		2C		**9**

Country-specific interventions:
In addition, in order to address the growing differences in capacities for marine scientific research and operations between nations, specific Capacity-Building activities will be tailored for requesting countries. Since collaboration is most effective between peers, this is an important step towards developing effective regional networks. Several regions provided details on country specific needs and interventions, those are available online from the Capacity-Building Forum.

Bilateral interventions:
Bilateral Capacity-Building programs, between countries of different IOC regions, are another example of activities that can sometimes be more efficiently implemented out of the framework of IOC regions, and IOC will play an active role in fostering such collaboration. Particular attention will be also paid to so-called "south-south" collaborations that address needs specific to developing nations and can be catalysed between scientists between regions.

IV. Partners in Capacity-Building

The regional entities of IOC are facilitators, coordinators and catalysers to the process of Capacity-Building, but not the actual 'doers'. The IOC therefore must work with partners in implementing suggested interventions. In training and creating operational products and services, local GOOS Regional Alliances (GRA) make natural partners, whilst in ocean science, universities, research establishments, UN and other organisations that have education or research as their major forte, will be our natural partners. A list of partners and partnership programs is tabled below.

Region	Partners	Programs	Funding agency
WESTPAC	JCOMM, CEOS, ISDR, ITSU, WMO, ADPC, AEIC, ASNC, KOICA, JSPS, JAMSTEC, SPICE, GCRMN, JOMSRE, CEOS.	GODAE, GLOSS, ICAM, LOICZ, IMEDEA, IMO, IHO, CSI, ICRI, TNC, UNEP, LIPI, CoML, IOC-Chairs, TTR, SEAGOOS, NEARGOOS.	GEF, Asian Development Bank, Packard Foundation.
IOCINDIO	ROPME, GCRMN, FAO, ISDR, WMO.	IOGOOS, GLOSS, IODE, HAB, ICAM.	GEF.
Black Sea		Black-Sea GOOS, ARENA, GLOSS, BSERP, IODE.	EU.
IOCWIO	UNEP, WIOLAB, WIOMSA, ICPAC, WMO, RANET, ISDR, ACEP, ITSU.	ODINAFRICA, IOC-Chairs, GLOSS, HAB, ICAM, GOOS-AFRICA, ROOFS-AFRICA.	GEF, African Development Bank.
IOCEA	ACMAD, NEPAD, JCOMM, ISDR, WMO, ITSU.	ODINAFRICA, GOOS-AFRICA, GOOS, GLOSS, TTR, IOC-Chairs, ROOFS-AFRICA, GoG-LME, CC-LME, BC-LME, GODAE, UNITWIN, IODE, HAB, CSI/UNESCO, ICAM.	WRF, GEF, African Development Bank, Packard Foundation.

Region	Partners	Programs	Funding agency
IOCARIBE	ISDR, ITSU, WMO, UNEP, CEOS, JCOMM, UNDP, CARICOM, IMO, IHO.	IOCARIBE-GOOS, LBS, PACLME, ODINCARSA, IOC-Chairs, GLOSS, ICAM.	GEF, CIDA, SIDA, NOAA, ONR, IADB, Science Councils, Space agencies,

For a list of acronyms please refer to Appendix II.

V. Performance indicators

A consultancy on Best Practices of Capacity-Building in IOC has recommended a three-tier approach of performance indicators to evaluate Capacity-Building.

1. Indicators of overall IOC performance

At the highest level, the performance indicators would be overarching and would provide an indication of the collective IOC Capacity-Building performance. The IOC custodian for overall Capacity-Building performance – MLA 5, would use the performance indicators to assess performance across IOC and as an indicator of his management and leadership of the function.

The following primary performance indicators have been recommended for inclusion at the IOC management level:

- *Identification and prioritisation of the Capacity-Building needs:* The Capacity-Building needs for Member States are identified and prioritised on a regional basis for short, medium and long-term timeframes;
- *Regional alignment:* Regional alignment and acceptance of the identified and prioritised needs is secured on an ongoing basis as evidenced by approved reports and ultimately, by Member States during General Assembly meetings and through continued extra-budgetary support;
- *Strategic Plan for Capacity-Building:* A Strategic Plan, is developed in response to identified and prioritised needs, it is approved by the General Assembly and is used to direct all IOC Capacity-Building activities including the formulation of an Implementation and Business Plan;
- *Implementation and Business Plan for Capacity-Building:* Important/critical Capacity-Building interventions/initiatives/activities have detailed implementation plans which include milestones, accountabilities, timings, performance indicators and resource requirements;
- *Programme Delivery:* The implementation and business plan is met as evidenced by periodic evaluations and comprehensive feedback from Member States, regional governing bodies, programme leaders and participants/beneficiaries;
- *Resources:* Resources available for IOC Capacity-Building interventions/initiatives/activities grow in real terms by a minimum of 5% per annum. Re-sources as provided for in the institutional budget and from extra budgetary grants/promotions are properly accounted for and utilised in accordance with approved UNESCO policies and procedures;

- *Strategic Relationships:* Strategic partners and collaborators including donor/ funding agencies recognise, acknowledge and continue to support IOC because of the impact and delivery of sustainable benefits flowing from IOC's Capacity-Building programmes and interventions.

Towards assessing concrete benefits of IOC Capacity-Building:
There is a serious merit in considering including an additional performance indicator focusing on the protection and health of oceans, coastal zones, and their resources. Ultimately, whether directly or indirectly, all IOC Capacity-Building programs/interventions should contribute to this end-goal. Whilst capacity building is not the only influencing variable, there should be a causal relationship between the health of the ocean and coastal zones and IOC Capacity-Building programs/interventions. It is conceivable that all of the aforementioned performance indicators may be met without actually having a meaningful and sustainable impact. A strategic performance indicator of this nature should at least be included at the most senior level within IOC.

2. Performance indicators at the regional level

The second tier of performance indicators would be at the Regional Governing Body and/or Consultant Group on Capacity-Building Committee level. The following primary performance indicators have been recommended for inclusion at this level:

- *Identification and prioritisation of Capacity-Building needs:* The Capacity-Building needs for the region are identified and prioritised following broad-based consultation with all member states in the region; where it will be possible, needs and benefits are quantified and where possible, consequences may emerge should the needs not be met;
- *Implementation and Business Plan:* An implementation and business plan for the region is approved by the General Assembly following broad-based consultation with the Member States; the plan is consistent with the Capacity-Building principles set out in the IOC strategy for capacity building and it is used to guide and review progress with capacity building in the region;
- *Programme/project/intervention delivery:* The objectives, milestones and performance indicators as set out in the implementation and business plan are met as evidenced by periodic evaluations and comprehensive feedback from member states, programme leaders, project/intervention facilitators and participants;
- *Cost/resource control:* Capacity-Building investments for the region are monitored and sound governance is applied to effectively manage/control costs and resources;
- *Development of products:* The scientific Capacity-Building actions include the development of products in response to specific needs of member states within the region;
- *Cost-benefit analysis:* Periodic reviews including cost -- benefit analysis of Capacity-Building activities are undertaken on an ongoing basis -- at least annually, to evaluate the relationship between investment and impact. Review outcomes are reported to IOC and immediate corrective action is taken where any variances from approved plans have occurred;
- *Database Maintenance:* Prescribed information concerning participants and programme activities are captured in an IOC information system on an ongoing basis; the database is reliable and current;
- *Capture and Dissemination of Learning:* A process is in place to capture, test and validate the most important lessons/insights being generated during IOC capacity

building activities; these lessons/insights are easily accessible/available to Member States.

3. Indicators of project or intervention performance

The third tier of performance indicators would be at the operational project/intervention level. The following primary performance indicators have been recommended for inclusion at this level:

- Project/Activity plan: Approved implementation plans with clear objectives, performance indicators, benefit statements, action steps/key milestones, deadlines and resource requirements are used to guide each capacity building project/activity;
- Capture and Publication of outputs/results: An evaluation of each Capacity-Building project/activity is completed by the project/activity leader and is evaluated by the regional governing body/program leader;
- Technology/Capacity Transfer: Evaluation reports clearly indicate the extent to which technology has been transferred and or what capacity has been built as a consequence of the completed project/activity;
- Participant/beneficiary Audit and Evaluation: Each participant in an IOC project/activity completes an evaluation of the process, content and of the service orientation of key role players who were involved; these evaluations are reviewed by the regional governing body/programme leader.

VI. Funding

This section addresses the financial and commercial aspects of IOC's implementation plan for Capacity-Building. It is based on an IOC consultancy on a business plan for Capacity-Building.

1. Primary funding strategy

Regions show a need both for projects addressing urgent regional issues and for interventions aiming at self-directed Capacity-Building as the long-term goal (see for instance table in Section III). The role of IOC in this context is to ensure that conditions will be developed in order that the long-term goal can be achieved *through* addressing immediate priorities.

The primary funding strategy is to enhance the regions capacity to secure funding for priority projects:
In accordance with the IOC Strategy for Capacity-Building, the primary funding strategy is to catalyse and strengthen regional networks of heads of institutes and scientists, in order that they formulate funding proposals for collaborative projects addressing regional priorities. This strategy is proving effective for a number of projects within which regional scientists are now conducting research and building capacity with external funding.

Enhanced and longer-term benefits can then be obtained from immediate interventions:
This approach ensures that the long-term goal of self-directed Capacity-Building is addressed, while developing a framework for an effective leverage of the benefits from interventions with more immediate deliverables such as the building of capacity to use available operational products and remote sensing or model data. There is general agreement that long-term interest and support for these modern tools in new regions can only be generated if they are used for projects addressing regional needs. This will be best achieved within projects that the regions have developed on their own. Sustainable benefits will be achieved because capacity will be built not only to *address* regional marine issues, but also to *identify* them.

2. The need for new resources and a new approach to fund-raising

IOC bears special responsibility for Capacity-Building
IOC, as the UN organisation responsible for marine science and technology transfer, bears a very special responsibility for Capacity-Building in this domain. With the escalating urgency to reverse the clear pattern of increasing degradation, overexploitation and long-term destruction of the ocean and coastal zones, it is imperative that the IOC is both equipped and empowered to deliver on its responsibilities. IOC will not be able to adequately respond to the critical call for support, guidance and leadership as set out by the respective regions in Section II, unless its own capacity to do so is strengthened.

Long-term funding resources will need to grow to answer this challenge:
Capacity-Building needs as expressed/identified by Member States far exceed the financial resources available within IOC to address even the most urgent of them, and some of the most successful Capacity-Building initiatives of IOC are now at risk due to funding constraints. It will be extremely difficult if not impossible to launch new, much needed Capacity-Building projects unless reliable medium to longer-term funding sources, as opposed to short-term ad-hoc grants, are secured. Sustainability, which is regarded as a key indicator of success in Capacity-Building, is almost totally dependent on longer-term projects, which in turn require dependable sponsorship.

The need for reserve funds to address needs and opportunities as they occur:
There are regional and even international opportunities that can be utilised to promote higher levels of awareness regarding the need for scientific Capacity-Building for the effective promotion and management of the ocean and coastal zones, which cannot at this stage be identified and listed. It is important that the IOC has the necessary resources to take advantage of these opportunities as they occur.

A new approach to fundraising is needed:
IOC, in effect, 'competes' with other institutions addressing environmental issues or poverty, sanitation, drinking water, housing and education needs when it comes to securing funding for Capacity-Building. This competition is becoming more intense due to ever-increasing demands being made on funding/donor organisations by institutions seeking support/help for the delivery of their services. In this context, for IOC Capacity-Building to deliver on its unique and crucial remit, a radical change in the approach to fundraising must be operated.

3. Intensifying fundraising efforts

The primary funding strategy presented above is designed to raise regional ownership and awareness of benefits of Capacity-Building through projects addressing regional priorities, which in turn will increase support, including eventually financial, for Capacity-Building. This plan also proposes to intensity efforts for fundraising at the secretariat level**.**

Promoting the role and achievements of IOC Capacity-Building:
During consultations with regions, it became clear that IOC Capacity-Building, and perhaps marine sciences in general, suffer from an image problem where their benefits are largely underestimated or even unknown by the general public, decision-makers, and funding agencies. With those agencies that fund marine sciences related Capacity-Building, IOC may not have fully capitalized on its past and current achievements and successes. The IOC Capacity-Building team, both at central and regional levels, will engage more proactively in promoting the role and programmes of IOC as a means to increase support and broaden the funding base. It is proposed to include the lobbying of high profile public figures to secure

support to promote the vision and mission of capacity building in marine sciences in member state.

Enhancing the competitiveness of proposals through efficient management and delivery of results:
An integral part of the fundraising effort is to approach donors/sponsors with proposals that demonstrate the commitment of IOC and its regional partners to efficient management of Capacity-Building projects. This includes using performance indicators such as those proposed in Section V, clear deliverables, specific accountabilities and major milestones.

Assessing existing capacity in order to focus interventions and evaluate their effectiveness:
Having an accurate baseline of current capacity is necessary to determine the impact of future Capacity-Building activities. It is also needed to improve effectiveness and show the commitment of IOC to efficient and effective management. In addition, for Capacity-Building activities to be focused on the most needed interventions, it is necessary to have reliable knowledge of existing capacity (or lack of) in each region or country. Moreover, a database of existing capacity will help to enhance networks of regional scientists. Hence, another task that must be undertaken as early as possible is an assessment of existing capacity on the ground. Estimated costs and funding requirements are given in the table below.

Appoint a contractor/consultant for liaison with donors and sponsors:
An essential aspect of fundraising that this plan seeks to address is the establishment and maintenance of win-win relationships and partnerships with potential donors and sponsors. At the moment, IOC does not have the capacity to take on this all-important marketing/fundraising role. It is proposed to appoint a contractor/consultant for a two-year period, and subject to a performance review, a further two-year period to: (1) identify and prospect new sources of funds for capacity building; (2) develop partnerships and collaborations with other agencies/institutions at the regional and local level to share resources, develop longer-term commitments and promote sustainable development rather than ad-hoc interventions; (3) develop a database for actual and potential funders/donors and (4) secure new funding linked to specific Capacity-Building programmes/projects.

Liaison with industrial concerns and other sources of funding:
Other tasks that need to be implemented with high priority include the identification and securing of new sources of funding, including philanthropic contributions from private foundations and tax-free contributions from industrial concerns. It is proposed to develop selected case study materials for promotion and circulation to senior-level leaders in both public and private sectors world wide, in order to create a higher level of awareness of the need for and benefits of effective protection and management of the ocean and coastal zones. Interventions of this type have been requested in several regions. There were also requests for developing partnerships and collaborations between universities, institutes and industry.

4. Budget allocation for the next biennium

Regular budget allocation:
The programme budget increased 12% between the 2000-2001 and the 2002-2003 biennia, and 22% between the 2002-2003 and 2004-2005 biennia, but shows a slight decrease (1%) in the 2006-2007 biennium. Capacity-Building will be implemented in this context. As approved 131st UNESCO Executive Board Meeting, the Capacity-Building regular program budget is allocated to 3 action lines under a Result-Based Management (RBM) framework, and regional interventions are considered under these headings:

I. Harmonising and focussing Capacity-Building interventions 136,000$
II. Research, education and technology in Capacity-Building 136,000$
III. Information Technology in building capacity 80,900$

The table below shows the proposed action items and costs. Of the US$136,000 allocated to heading I above, US$36,000 is used to seed-fund action items described in the next table. These action items remain in the theme of harmonising and focussing Capacity-Building activities.

Action item	Regular Budget allotted K$
Harmonising and focussing Capacity-Building interventions - *Remaining 36,000 used to seed-fund actions items in the following table*	**100,000**
Supporting IOC Chairs for science & operations TTR thru ship-board training and at labs [Moscow-Southampton, Univ. of Sydney, POGO]	50,000
Networking universities-research institutes-industries in major country projects	10,000
Mobility and research support for developing regions	40,000
Research, education and technology in Capacity-Building ▪ Training courses in RS, modelling, & GIS for coastal management ▪ Training in data and information management ▪ Scenario-building for decision makers ▪ Educational promotion for RS, modelling and GIS ▪ Scholarships for young researchers for higher studies	**136,000**
Information Technology in building capacity ▪ Project implementation through web-media ▪ Provide access to RS data sources ▪ Provide access to modelling and other software ▪ Current directories of operational products practitioners ▪ Reports of capacities in science, operations and modelling ▪ Reports on benefits of Capacity-Building efforts for communities & environment	**80,900**

Extra-budgetary funding allocation:

The table below shows the action items and costs for which extra-budgetary funding is requested. First three action items are part of draft resolution 4.7.1, the following three part of resolution 4.7.2. Their importance for regions is presented in Section VI (respectively in Subsection 1, on the primary funding strategy and Subsection 3, on intensifying fundraising efforts).

Table of interventions and costs for baseline assessments and external consultancies:

Action item	Regular Budget	Assembly Request US$
Initiating the primary funding strategy		
Leadership programs for heads of institutes	8,000	**35,000 per region**
Team-building programs for regional scientists	8,000	**50,000 per region**

Action item	Regular Budget	Assembly Request US$
Proposal writing workshops		**25,000 per region**
Increasing Capacity-Building activities and intensifying fundraising efforts		
Assessing baselines on science & operational capacities in countries entailing: field data collection, populating net-based databases, and liaising with national institutions and agencies.	10,000	**50,000 per region**
External consultant for liaison with sponsoring agencies:	10,000	**50,000**
Assisting in Capacity-Building activities		**42,000** (or secondment)

Appendix I: List of Participants to the Expert Workshop
"Drafting an Implementation Plan for the IOC strategy for Capacity-Building"

The workshop was held at UNESCO Headquarters, 9-11 March 2005.

IOC VICE-CHAIR REGIONS/CB
CHAIR - BSRC V.N. EREMEEV
CHAIR – IOCEA
Julius WELLENS MENSAH
CHAIR - IOCARIBE
Marco Polo BERNAL YARAHUAN
CHAIR - IOCINDIO
Nasser Hadjizadeh ZAKER
CHAIR - IOCWIO
Antonio HOGUANE
CHAIR – IOC WESTPAC
Hyung Tack HUH

CONSULTATIVE GROUP FOR CAPACITY-BUILDING
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MEMBERS
Bradford BROWN, USA
Guillermo GARCIA MONTEIRO, Cuba
Johannes GUDDAL [JCOMM], Norway
Temel OGUZ, Turkey
Jan SOPAHELUWAKAN, Indonesia
Julius WELLENS MENSAH, Ghana

MEMBER STATES
AUSTRALIA
Peter DEXTER
BELGIUM
Rudy L. HERMAN
ITALY
Ezio BUSSOLETTI
MADAGASCAR
Onésime RATOMAHENINA
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Alejandro YAÑEZ-ARANCIBIA
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Alfredo PICASSO de OYAGUE
UNITED STATES OF AMERICA
Arthur E. PATERSON
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IOC VICE-CHAIR FOR CAPACITY-BUILDING
Mario Ruivo

Chairperson JCOMM Capacity-Building
Miriam ANDRIOLI

IOC CONSULTANT
Ian DEAN

IOC FIELD OFFICES
IOCARIBE office
Cesar TORO
ODINAFRICA/IOCWIO Projects Office
Mika ODIDO
IOC Regional Secretariat for the Western Pacific (WESTPAC)
Miguel FORTES
IOC Perth Programme Office
William ERB
IOC Science & Communication Centre on Harmful Algae
Henrik ENEVOLDSEN

IOC SECRETARIAT
Patricio BERNAL
Keith ALVERSON
Candyce CLARK
Ehrlich DESA
Maria HOOD
Alexei SUZYUMOV
Joannes BERQUE
Peter ENONE
Sonia GUIRAUD

OBSERVER
NIWA, NORWAY
Kim Chi TRAN

Appendix II: List of Acronyms

ACEP	African Coelacanth Ecosystem Program
ACMAD	African Centre for Meteorological Applications to Development
ADPC	Asian Disaster Preparedness Centre
AEIC	ASEAN Earthquake Information Centre
ARENA	A Regional Capacity Building and Networking Programme to Upgrade Monitoring and Forecasting Activity in the Black Sea Basin (ARENA)
ASMC	ASEAN Specialized Meteorological Centre
ASP	Associated School Programme (UNESCO)
BCLME	Benguela Current Large Marine Ecosystem
BOM	Bureau of Meteorology (Australia)
BSERP	Black Sea Ecosystem Recovery Project
CARICOM	Caribbean Community
CEOS	Committee on Earth Observation Satellite
CIDA	Canadian International Development Agency
CLME	Caribbean Large Marine Ecosystem
CoML	Census of Marine Life
CSI	Ecosystem and development in Coastal regions and Small Islands
FAO	Food and Agriculture Organisation
GCLME	Guinea Current Large Marine Ecosystem
GCOS	Global Climate Observing System
GCRMN	Global Coral Reef Monitoring Network
GEF	Global Environment Facility
GEOHAB	Global Ecology and Oceanography of Harmful Algae Bloom
GIS	Geographic Information Systems
GLOSS	Global sea-level Observing System
GODAE	Global Ocean Data Assimilation Experiment
GoG-LME	Gulf of Guinea Large ecosystem project
GOOS	Global Ocean Observing System
GOOS-COOM	Coastal Ocean Module of GOOS
HAB	Harmful Algae Bloom program
IBCCA	International Bathymetric Chart of the Caribbean sea and the gulf of Mexico
ICAM	Integrated Coastal Area Management
ICPAC	IGAD Climate Prediction and Application Center
IGAD	Intergovernmental Authority on Development
ICRI	International Coral Reefs Initiative
IFREMER	Institut Francais de Recherche et d'Exploitation de la Mer
IHO	International Hydrographic Organization
IMO	International Maritime Organisation
IODE	International Ocean Data and information Exchange
IOGOOS	Indian Ocean GOOS
IOI	International Ocean Institute
IPHAB	Intergovernmental Panel on Harmful Algae Bloom
ISDR	International Strategy for Disaster Reduction
ITSU	International coordination group for the Tsunami warning system in the Pacific
JAMSTEC	Japan Agency for Marine Science and Technology
JCOMM	Joint technical Commission for Oceanography and Marine Meteorology
JCOMM/'TOWS'	JCOMM Tropical Ocean Wind waves and Storm surges
JOMSRE	Joint Oceanographic Marine Scientific Research Expedition

JSPS	Japanese Society for Physical Sciences
KOICA	Korean International Cooperation Agency
LBS	Land-Based Source of marine pollution protocol
LIPI	Lembaga Ilmu Pengetahuan Indonesia (Indonesian Institute of Science)
LOICZ	Land Ocean Interaction in the Coastal Zone
MAB	Man and the Biosphere
NEARGOOS	North East Asian GOOS
NEPAD	New Partnership for African Development
NOAA	National Oceanic and Atmospheric Administration
ODIN	Ocean Data and Information Network
ODINAFRICA	ODIN Africa
ODINCARSA	ODIN for the IOCARIBE and South American regions
PEMSEA	Partnership in Environmental Management for the Seas of East Asia
PIGOOS	Pacific Islands GOOS
PSMSL	Permanent Service for Mean Sea Level
RANET	RAdio InterNET project
ROOFS Africa	Regional Ocean Observing and Forecasting System for **Africa**
ROPME	Regional Organization for the protection of the Marine Environment
SEACAMP	South East Asia Centre for Atmospheric and Marine Prediction
SEAGOOS	South East Asian GOOS
SEREAD	Scientific Educational Resources and Experience Associated with the Deployment
SIDA	Swedish International Development Agency
SREP	South Pacific Regional Environment Programme
TTR	Training Through Research
TWS	Tsunami Warning System
UHSLC	University of Hawaii Sea-Level Centre
UNDP	United Nation Development Program
UNEP	United Nations Environment Program
UNESCO	United Nation Education Scientific and Cultural Organisation
UNITWIN	University Twinning Network
USP	University of the South Pacific
WFC	World Fish Center
WIOLAB	Land Based Activities in the Western Indian Ocean
WIOMSA	Western Indian Ocean Marine Science Association
WMO	World Meteorological Organisation
WMO/TCP	WMO Technical Cooperation Program
WSA	West Coast of South America