18th Global Meeting of Regional Seas Conventions and Action plans

SDG 14 and the role of Science and Capacity Development

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Incheon (Korea)
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The Intergovernmental Oceanographic Commission of UNESCO
IOC: Building knowledge and capacity for sustainable ocean management

• Only intergovernmental organization mandated to promote marine science in all ocean basins
• Science, services, observations, data exchange and capacity development
• Apply knowledge to sustainable development of the marine environment
IOC Medium-Term Strategy

- Improving governance
- Applying knowledge for societal benefit
- Building scientific knowledge

- Sustainable management and governance
- Early warning and services
- Capacity development
- Assessment information for policy
- Observing system / data management
- Ocean research
We provide regional technical scientific networks to promote applied ocean sciences
17 objectives to transform our world: Agenda 2030

230 Global Indicators have been agreed
**Definition of the three indicators tiers**

**Tier 1:** Indicator conceptually clear, established methodology and standards available and data regularly produced by countries.

**Tier 2:** Indicator conceptually clear, established methodology and standards available but data are not regularly produced by countries.

**Tier 3:** Indicator for which there are no established methodology and standards or methodology/standards are being developed/tested. **Most SDG 14 indicators !!**
# Tier classification for SDG14 Indicators

<table>
<thead>
<tr>
<th>Target</th>
<th>Indicator</th>
<th>Tier</th>
<th>Lead agencies</th>
</tr>
</thead>
<tbody>
<tr>
<td>14.1 By 2025, prevent and significantly reduce marine pollution of all kinds, in particular from landbased activities, including marine debris and nutrient pollution</td>
<td>14.1.1 Index of coastal eutrophication and floating plastic debris density</td>
<td>III</td>
<td>UNEP IOC/UNESCO</td>
</tr>
<tr>
<td>14.2 By 2020, sustainably manage and protect marine and coastal ecosystems to avoid significant adverse impacts, including by strengthening their resilience, and take action for their restoration in order to achieve healthy and productive oceans</td>
<td>14.2.1 Proportion of national exclusive economic zones managed using ecosystem-based approaches</td>
<td>III</td>
<td>UNEP IOC/UNESCO</td>
</tr>
<tr>
<td>14.3 Minimize and address the impacts of ocean acidification, including through enhanced scientific cooperation at all levels</td>
<td>14.3.1 Average marine acidity (pH) measured at agreed suite of representative sampling stations</td>
<td>III</td>
<td>IOC/UNESCO UNEP</td>
</tr>
<tr>
<td>14.4 By 2020, effectively regulate harvesting and end overfishing, illegal, unreported and unregulated fishing and destructive fishing practices and implement science-based management plans, in order to restore fish stocks in the shortest time feasible, at least to levels that can produce maximum sustainable yield as determined by their biological characteristics</td>
<td>14.4.1 Proportion of fish stocks within biologically sustainable levels</td>
<td>I</td>
<td>FAO</td>
</tr>
<tr>
<td>Target</td>
<td>Indicator</td>
<td>Tier</td>
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<tr>
<td>14.5 By 2020, conserve at least 10 per cent of coastal and marine areas, consistent with national and international law and based on the best available scientific information</td>
<td>14.5.1 Coverage of protected areas in relation to marine areas</td>
<td>I</td>
<td>UNEP-WCMC UNEP</td>
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<td>14.6 By 2020, prohibit certain forms of fisheries subsidies which contribute to overcapacity and overfishing, eliminate subsidies that contribute to illegal, unreported and unregulated fishing and refrain from introducing new such subsidies, recognizing that appropriate and effective special and differential treatment for developing and least developed countries should be an integral part of the World Trade Organization fisheries subsidies negotiation[c]</td>
<td>14.6.1 Progress by countries in the degree of implementation of international instruments aiming to combat illegal, unreported and unregulated fishing</td>
<td>III</td>
<td>FAO</td>
</tr>
<tr>
<td>14.7 By 2030, increase the economic benefits to small island developing States and least developed countries from the sustainable use of marine resources, including through sustainable management of fisheries, aquaculture and tourism</td>
<td>14.7.1 Sustainable fisheries as a percentage of GDP in small island developing States, least developed countries and all countries</td>
<td>III</td>
<td></td>
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</tbody>
</table>
## Tier classification for SDG14 Indicators

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<tr>
<td>14.a Increase scientific knowledge, develop research capacity and transfer marine technology, taking into account the Intergovernmental Oceanographic Commission Criteria and Guidelines on the Transfer of Marine Technology, in order to improve ocean health and to enhance the contribution of marine biodiversity to the development of developing countries, in particular small island developing States and least developed countries</td>
<td>14.a.1 Proportion of total research budget allocated to research in the field of marine technology</td>
<td>III</td>
<td>IOC-UNESCO UNEP</td>
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<td></td>
<td>14.b Provide access for small-scale artisanal fishers to marine resources and markets</td>
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<td>FAO</td>
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<td></td>
<td>14.c Enhance the conservation and sustainable use of oceans and their resources by implementing international law as reflected in the United Nations Convention on the Law of the Sea, which provides the legal framework for the conservation and sustainable use of oceans and their resources, as recalled in paragraph 158 of “The future we want”</td>
<td></td>
<td>UN-DOALOS FAO UNEP ILO OTHER UN OCEAN AGENCIES</td>
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<tr>
<td></td>
<td>14.c.1 Number of countries making progress in ratifying, accepting and implementing through legal, policy and institutional frameworks, ocean-related instruments that implement international law, as reflected in the United Nation Convention on the Law of the Sea, for the conservation and sustainable use of the oceans and their resources</td>
<td></td>
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</tbody>
</table>
Multidimensional indicator framework architecture

- National
- Regional
- Global

Thematic

Sub-national
Next steps for SDG indicator development (Tier 3)

Methodological workplans prepared by agencies (2017-2018) (metadata, methodologies, how to report on existing data and produce new data)
- Technical expert groups
- Finalisation of draft methodology
- Testing in pilot countries
- Data validation by MS (National Statistical Systems)

Review of Tier 3 indicators by IAEG-SDG (2019-2020)
- Refinement vs Revision
- Adoption of indicator by the UN Statistical Commission
- Alignment of RS indicators with SDG global indicators
- Regular Reporting mechanism
Capacity development is essential to achieve the 2030 Agenda for oceans and coasts

14.1 by 2025, prevent and significantly reduce marine pollution of all kinds, particularly from land-based activities, including marine debris and nutrient pollution
14.2 by 2020, sustainably manage and protect marine and coastal ecosystems to avoid significant adverse impacts, including by strengthening their resilience, and take action for their restoration, to achieve healthy and productive oceans
14.3 minimize and address the impacts of ocean acidification, including through enhanced scientific cooperation at all levels
14.4 by 2020, effectively regulate harvesting, and end overfishing, illegal, unreported and unregulated (IUU) fishing and destructive fishing practices and implement science-based management plans, to restore fish stocks in the shortest time feasible at least to levels that can produce maximum sustainable yield as determined by their biological characteristics
14.5 by 2020, conserve at least 10 per cent of coastal and marine areas, consistent with national and international law and based on best available scientific information
14.6 by 2020, prohibit certain forms of fisheries subsidies which contribute to overcapacity and overfishing, and eliminate subsidies that contribute to IUU fishing, and refrain from introducing new such subsidies, recognizing that appropriate and effective special and differential treatment for developing and least developed countries should be an integral part of the WTO fisheries subsidies negotiation
14.7 by 2030 increase the economic benefits to SIDS and LDCs from the sustainable use of marine resources, including through sustainable management of fisheries, aquaculture and tourism
14.a increase scientific knowledge, develop research capacities and transfer marine technology taking into account the IOC-UNESCO Criteria and Guidelines on the Transfer of Marine Technology, in order to improve ocean health and to enhance the contribution of marine biodiversity to the development of developing countries, in particular SIDS and LDCs
14.b provide access of small-scale artisanal fishers to marine resources and markets
14.c ensure the full implementation of international law, as reflected in UNCLOS for states parties to it, including, where applicable, existing regional and international regimes for the conservation and sustainable use of oceans and their resources by their parties
What capacity development?
SDG14 catalyst for transition to marine ecosystem-based policies and plans

- Improve institutional coordination.
- Empower all stakeholders (multi-sector approach).
- Protection of the special coastal and marine ecosystems, landscapes and cultural heritage.
- Enhance the compatibility between development and conservation.
- Increasing public awareness and training.
- Achieve a sustainable management towards sustainable blue growth.

EBM, ICAM, MSP
### Concepts, methodologies and best practices on Integrated Coastal Area Management (ICAM)
2. Methods and strategies for sustainable management.
3. Methodologies for evaluation of Coastal ecosystem goods and services.
4. Coastal physical characterization, impact assessment and natural risks (including climate change).
5. Approaches to coastal hazards mitigation.
6. Ecosystem-based adaptation to address climate change impacts in the coast.
7. Socio-economic analysis and coastal human impacts.
8. Elaboration of recommendations and actions plans for ICAM.

### Ecological, Socio-economic and Governance Indicators
- Development and use of ecological, socio-economic and governance indicators to support coastal management/MSP processes.
- Methodologies for the conduct of integrated marine assessments.
- Coastal and marine protected areas' management and planning.
- Assessing coastal and marine biodiversity.
- Environmental economic analysis: Sectorial and integrated approach (Fisheries, Energy, Maritime Transportation, Tourism, etc.)
- Financing incentives and co-funding initiatives.
- Coastal and Marine Governance, Legal framework coordination and improvement.
- Stakeholder engagement, conflict resolution and negotiation skills in coastal management/MSP.
- Communication tools and strategies in the context of coastal and marine management and planning.
- Scenario development for planning and integrated management.

### Marine Spatial Planning (MSP)
1. Concepts, policies, international experiences and best practices on marine spatial planning.
2. Techniques for Marine ecosystem goods and services valuation.
3. Marine environmental characterization risks and impacts (including climate change).
5. Methodologies for step by step approach to the formulation of MSP plans.
6. Methodologies for evaluation and monitoring of MSP.

### Geographic Data Tools (DATA)
1. GIS Introduction, Data models, Data sources (Geoportals, SDI).
2. Spatial data component: Reference Coordinate System Management.
3. Spatial databases and thematic attributes modeling (Access / Postgress-PostGIS).
4. Data integration, analysis and representation (Licensed and open source software).
5. Creation of OGC interoperable services for web dissemination (Map server).
6. ODP and E-repositories.

### Decision Support Tools
1. Data compilation and OGC services.
2. Zoning and spatial conflict analysis.
3. Digitalization of proposals, conversion to OGC services for web dissemination.
4. Personalization of web-viewers and atlases. (API/HTML5, Smart Atlas, etc.)
5. Web viewers development for dissemination and public participation: Licensed software architecture and “tiles”: Google maps, Bin – OpenstreetMap Open source generalistic clients: (Html5).
14.1 by 2025, prevent and significantly **reduce** marine pollution of all kinds, particularly from land-based activities, including marine debris and nutrient pollution.

**COORDINATION & IMPLEMENTATION**

- Priority settings and leadership
- Interinstitutional coordination
- Pollution reduction plans
- Stakeholders’ engagement
- Mediation and conflict resolution
- Awareness campaigns and communication tools
- Strategies for sustainable actions and legal improvement.
- Reporting protocols

**TECHNICAL AND MONITORING**

- Monitoring system
- Standardisation of methods, sampling, monitoring
- Nutrient modelling techniques
- Tools and information systems
- Data reporting protocols

**INDICATOR:**

14.1.1 Index of coastal eutrophication and floating plastic debris density
14.3 **minimize and address the impacts of ocean acidification**, including through enhanced scientific cooperation at all levels.

**Coordination & implementation**
- Priority settings and leadership
- Forecasting and management
- Biological response approach
- Vulnerability assessments
- Effective communication
- Reporting protocols

**Technical and monitoring**
- Data and information integration, analysis and representation.
- Technology developments to help monitor and mitigate changes locally
- Modelling and scenario developments

**Aragonite saturation in 1850 and 2100**

**INDICATOR:**
14.3.1 Average marine acidity (pH) measured at agreed suite of representative sampling stations.
14.5 by 2020, conserve at least 10 per cent of coastal and marine areas, consistent with national and international law and based on best available scientific information.

**Coordination & implementation**

- Priority settings and leadership
- Interinstitutional coordination
- Sustainable development strategies for local populations
- Effective protection and conservation measures
- Stakeholders’ engagement and conflict resolution
- Effective communication strategies
- Implementation of reporting protocols

**Technical and monitoring**

- Data compilation and analysis
- Information development and dissemination
- Information to support public participation

**INDICATOR:**

14.5.1 Coverage of protected areas in relation to marine areas
14.a increase scientific knowledge, develop research capacities and transfer marine technology taking into account the IOC-UNESCO Criteria and Guidelines on the Transfer of Marine Technology, in order to improve ocean health and to enhance the contribution of marine biodiversity to the development of developing countries, in particular SIDS and LDCs.

**Integration of marine science/technology in marine and coastal management**
- Exploitation and exploration of marine resources
- Navigation safety
- Preservation of the marine environment
- Prevention of ocean-related hazards

**Use of Marine technology:**
- Information and data on marine sciences and related marine operations
- Manuals, guidelines, criterias, standards and reference materials
- Sampling and methodology equipment
- Observation facilities and equipment (including insitu and laboratorios)
- Knowledge sharing

**INDICATOR:**
14.a.1 Proportion of total research budget allocated to research in the field of marine technology
Main objectives:

- Highlight patterns on how and where science is produced
- Organization of scientific collaboration
- Identify the opportunities & benefits of international collaboration
- Reporting mechanisms for SDG 14.a

**Release of the first GOSR in 2017**
(SDG 14 conference 5-9 June 2017, New York)
## IOC CD Strategy (2015-2021)

<table>
<thead>
<tr>
<th>Output</th>
<th>Activity</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Human resources developed</td>
<td>1.1 Academic (higher) education</td>
</tr>
<tr>
<td></td>
<td>1.2 Continuous professional development</td>
</tr>
<tr>
<td></td>
<td>1.3 Sharing of knowledge and expertise/community building</td>
</tr>
<tr>
<td></td>
<td>1.4 Gender balance</td>
</tr>
<tr>
<td>2. Access to physical infrastructure established or improved</td>
<td>2.1 Facilitating access to infrastructure (facilities, instruments, vessels)</td>
</tr>
<tr>
<td>3. Global, regional and sub-regional mechanisms strengthened</td>
<td>3.1 Further strengthening and supporting secretariats of regional commissions</td>
</tr>
<tr>
<td></td>
<td>3.2 Enhance effective communication between regional sub-commission secretariats and global programmes as well as other communities of practice (incl. other organisations)</td>
</tr>
<tr>
<td>4. Development of ocean research policies in support of sustainable development objectives promoted</td>
<td>4.1 Sharing of information on ocean research priorities</td>
</tr>
<tr>
<td></td>
<td>4.2 Developing national marine science management procedures and national policies</td>
</tr>
<tr>
<td>5. Visibility and awareness increased</td>
<td>5.1 Public Information</td>
</tr>
<tr>
<td></td>
<td>5.2 Ocean Literacy</td>
</tr>
<tr>
<td>6. Sustained (long-term) resource mobilization reinforced</td>
<td>6.1 In-kind opportunities</td>
</tr>
<tr>
<td></td>
<td>6.2 Financial support by Member States to IOC activities</td>
</tr>
</tbody>
</table>
OceanTeacher: Learning platform

- **OceanTeacher Global Academy (OTGA) ([www.oceanteacher.org](http://www.oceanteacher.org))**

- (online) Learning Platform, supports training activities for several IOC Programmes

Web-based training system that supports:

- Classroom training (face-to-face)
- Blended training, online tutoring
- online self-learning

- Contents freely and openly available (but see Copyright)
SDG Indicators need to be supported by Sustained Ocean Observing System

Global approaches to regional action

Outreach, sign up: ioc-goos.org/join
Twitter: @GOOSocean
Promoting Ocean knowledge
GEF LME:LEARN Partnership

Strengthening Global Governance of Large Marine Ecosystems and Their Coasts through Enhanced Sharing and Application of LME/ICM/MPA Knowledge and Information Tools: LME:LEARN

What are some key benefits?

- **Guidance Toolkits and Training Modules** on governance, environmental economics, stakeholder participation, LME assessment, marine spatial planning, data and information management, capacity development
- **Global and Regional Training** to enhance project capacity
- **Support to Twinning Exchanges between Projects** including a match-making web-portal
An understanding of your influence on the ocean, and the ocean influence on you

An ocean literate person:
• Translate ocean knowledge into action;
• is capable of communicating about the interdependencies between humans and the ocean in a meaningful way;
• can make informed and responsible decisions.

Let’s not forget CD at societal level
So in conclusions…

- All SDG 14 targets have a strong science and CD dimension (both monitoring & implementation)

- Regionally driven CD needs to build on regional needs assessment

- Interagency cooperation (global and regional) – SDG 14 Resource & Toolkit package?

- RS renewed cooperation with IOC Regions

- UN Conference on SDG14 – Towards a dedicated partnership on capacity development
Thank you!
Merci beaucoup!
¡Muchas gracias!
Спасибо
شُكْرَا
谢谢

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http://unesco-ioc-marinesp.be
Re-envisioning capacity development:
IOC strongly support regional ocean governance

- Place capacity development in the service of the transformation of the ocean governance by achieving the goals of the Agenda 2030

- Promote a new paradigm of capacity development with a focus on donor coordination, effective development cooperation, long-term investment and regional ocean governance with bottom-up approach.

- Apply capacity development and ocean governance across boundaries and contexts, ecosystem-based management using regional seas and large marine ecosystems.

Source: Institute for Advanced Sustainability Studies Brief 3/2016
• Global transboundary issues involving the open ocean already have and will have increasing impact locally
• Our ability to monitor human impacts on the open ocean is limited but growing
• Transboundary global and regional scale governance solutions are needed to mitigate even local damage to ocean ecosystems - enhancing governance around regional clusters that cover territorial areas and ABNJ may be a solution
• Scientific monitoring and assessment processes can and should insert themselves in policy cycles: monitoring SDG progress, improved UNGA World Ocean Assessment
## Open ocean

Indicators and readiness to observe

<table>
<thead>
<tr>
<th>THEME</th>
<th>Expert Assessment</th>
<th>INDEX / INDICATOR (Baseline)</th>
<th>INDEX / INDICATOR (Projected to 2030, 2050, and/or 2100)</th>
<th>Sustained monitoring requirement for assessment includes both natural system and human data</th>
<th>Readiness of sustained observations (concept, pilot, mature, from least to most ready)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Governance</td>
<td>Existence of Open Ocean Governance Arrangements</td>
<td></td>
<td></td>
<td>Monitoring of governance arrangements covering ABNJ</td>
<td>concept</td>
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<tr>
<td>Climate</td>
<td>Climate and Ocean interactions</td>
<td>Ocean warming</td>
<td>Ocean warming</td>
<td>Physical / biogeochemical ocean variables</td>
<td>mature / pilot</td>
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<tr>
<td></td>
<td>Deoxygenation</td>
<td>Deoxygenation (to 2090)</td>
<td>Oxygen</td>
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<td>pilot</td>
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<tr>
<td></td>
<td>Aragonite saturation state</td>
<td>Aragonite saturation state</td>
<td>Carbonate system</td>
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<td>mature</td>
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<tr>
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<td>Sea Level Rise Risk Index (to 2100)</td>
<td>Sea level, temperature, cryosphere</td>
<td>human exposure and vulnerability to sea level</td>
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<td>mature</td>
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<tr>
<td>Ecosystems, habitats and biodiversity Risk</td>
<td>Ocean Acidification Risk</td>
<td>Primary productivity</td>
<td>ocean colour in situ validation</td>
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<td>mature pilot</td>
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<tr>
<td></td>
<td>Phytoplankton</td>
<td>phytoplankton</td>
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<td>concept</td>
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<td>Zooplankton</td>
<td>zooplankton</td>
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<td>pilot</td>
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<td></td>
<td>Coral reefs (tropical ecosystem)</td>
<td>Coral reefs (tropical ecosystem)</td>
<td>coral health</td>
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<td>pilot</td>
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<td>Pteropods (polar ecosystem)</td>
<td>Pteropods (polar ecosystem)</td>
<td>zooplankton</td>
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<td>pilot</td>
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<tr>
<td></td>
<td>Biodiversity (based on OBIS records)</td>
<td>Biodiversity (species records)</td>
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<td>concept</td>
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<tr>
<td>Fisheries</td>
<td>Sustainability of fisheries</td>
<td>Marine Trophic Index</td>
<td>Fish Catch Potential</td>
<td>fish catch data by taxonomic group and trophic level</td>
<td>mature</td>
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<td>Fishing in Balance Index</td>
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<td>Bottom Impacting Gear</td>
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<td>Demersal Fishing</td>
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<td>Tuna trends 1950 to 2010</td>
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<tr>
<td>Pollution</td>
<td>Pollution (general)</td>
<td>Plastics</td>
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<td>time series of ocean contaminants from strategically selected sites</td>
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Data and information needs

IODE VISION
Established in 1961 to enhance marine research, exploitation and development, by facilitating the exchange of oceanographic data and information between participating Member States, and by meeting the needs of users for data and information products.

>100 IODE DATA CENTRES
NODC + ADU (+OBIS)
GOOS: Global Ocean Observing System
Interaction with other policy processes: Climate Change

- GCOS: Global Climate Observing System
  - Lead on oceanic observations for climate (GOOS)
  - Lead on atmospheric observations for climate (WMO, GAW)
  - Lead on terrestrial observations for climate (GTOS)

- UN Framework Convention on Climate Change
  - Need for sustained climate observations
  - SBSTA standing agenda item on observations

- WCRP: World Climate Research Programme
  - Objective: Determine predictability of climate and effect of human activities
  - Strategy: to facilitate analysis and prediction of Earth system variability and change, for use in an increasing range of practical applications of direct relevance, benefit and value to society
  - Increasing published knowledge on the basis and predictions of climate change
  - Dialogue on research needs

- Intergovernmental Panel on Climate Change (IPCC)
  - Working Group I: Physical Basis for Climate Change
  - 91% of coordinating authors, 66% of lead authors were WCRP scientists

- UN Framework Convention on Climate Change
Developing and Sustaining the Ocean Observing System

Expanding Essential Ocean Variables

CONCEPT -> PILOT -> MATURE
Developing and Sustaining the Ocean Observing System

Global approaches to regional action

The Global Ocean Observing System

OUT|DATE

Outreach, sign up: ioc-goos.org/join
Twitter: @GOOSocean
Products, guidelines, standards and methods
EBM

Slide to be deleted
No area of the Ocean is untouched by human activity...

And ..... many marine areas are under increasing development pressures....
Single stressors

Climate change – temperatures, sea level & hypoxia

Pollution and waste

Invasive species
Multiple stressors

Possible effects of combining different stressors:

- Amplification
- Compensation
The ocean is priceless

Marine Fishery and Aquaculture

Marine Mining

Offshore oil and gas

Ports and shipping industry

Marine Tourism

Marine Construction and Marine Equipment manufacturing

Marine research and development, ocean literacy

Renewable energy

Biotechnology and bioproducts

Desalination

Marine administration

Marine business services
REGIONAL APPROACH OF IOC
Marine Policy and Regional Coordination Section

- Coordination of IOC’s external policy/science, communication and multi-agency partnership
- Development and dissemination of Coastal and Marine Management Tools (ICAM, MSP, LME)

Regional coordination
OceanTeacher Global Academy: Regional Training Centres

Headquarters:
- Ostend, Belgium

Africa:
- Senegal (French)
- South Africa (English)
- Mozambique (Portuguese)
- Kenya (English)

América/Caribbean:
- Colombia (Spanish)
- USA (English)

Asia:
- China (Chinese, English)
- India (Hindi, English)
- Malaysia (Malaysian, English)
- Samoa (English)

Other centres
WESTPAC Training and Research Centres:
- Ocean Dynamics and Climate Qingdao (China)
- Marine biodiversity and Ecos Jakarta (Indonesia)

Category 2 – UNESCO Regional Educational and Research Centre on Oceanography for Western Asia / Islamic Republic of Iran.
A “framework” of indicators?

Global indicators
Include:
• Elements of
disaggregation
• Special groups
• Inequality issues

Thematic/sectorial indicators
Include:
• Additional indicators on each of the elements covered by the global indicators
• Indicators that are only relevant at the national level

National indicators
Include:
• Some of the thematic indicators?
• Some (all?) of the global indicators

Sub-national indicators
Include:
• Global indicators
• National indicators
• Additional data sources (most innovative?)
Public managers need to provide more...