Indicators of Coastal and Marine Resources

JEROME GUEFACK

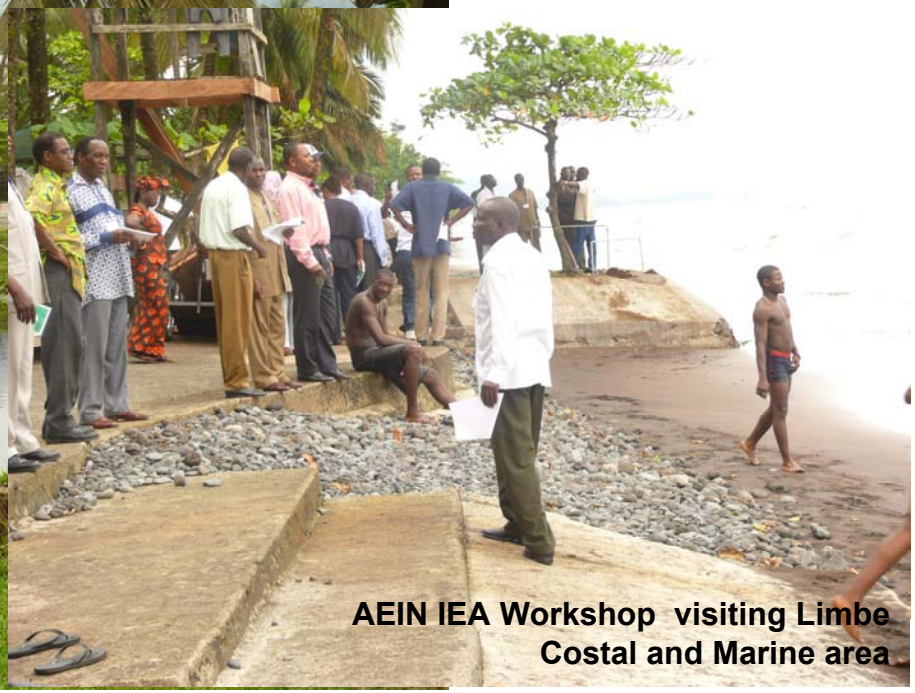
ICT OFFICER

IUCN- CENTRAL AND WEST AFRICA PROGRAM

Indicators of Coastal and Marine Ressources

- Table of contents
  - IUCN vision and Mission
  - IUCN global Marine Programme
  - Summary of challenges and treats in coastal and Marine ecosystems
  - Summary Proposed strategic focus for the IUCN response strategy
  - Coastal and Marines Indicators
  - Exemple: Large Marine Ecosystem Approach to the Assessment and Governance of Ocean Coastal Resources
  - Conclusion: Some Key aspects to be consider and assessed

Limbe-Cameroon Costal and Marine



AEIN IEA Workshop visiting Limbe Costal and Marine area

IUCN's vision and Mission

Our vision is a just world that values and conserves nature.

Our mission is to influence, encourage and assist societies throughout the world to conserve the integrity and diversity of nature and to ensure that any use of natural resources is equitable and ecologically

1000 government and NGO members organizations,

Some 10 000 volunteer scientists in more than 160 countries.

IUCN - Global Marine Program

Goals

1- Conserving marine biodiversity by promoting, influencing and catalyzing sustainable uses and equitable sharing of resources while protecting the ecosystems

2- To achieve significant improvement in the conservation of marine biodiversity and sustainable use of natural resources in marine and coastal ecosystems, throughout the world.

IUCN - Global Marine Program

Objectives

1 **Knowledge:** Promote the knowledge of marine ecosystems and their functioning for effective ecosystem management and restoration

2 **Empowerment:** Promote the social and economic aspects of Sustainable Development trough Capacity Building in Marine Resources Management

3 **Governance:** Support and Strength and institutional and legal frameworks for conservation and sustainable resource management thru working with communeties, business, governments and international regiemes

4 **Operations:** Strengthening of networks, working groups and partnerships in the worlds seas.

Summary of challenges and threats in coastal and marine ecosystems include:

- Overexploitation of coastal & marine resources
- Loss of biodiversity
- Environmental degradation
- Pollution
- Coastal erosion
- Low levels of investment in alternative coastal
- livelihood programs
- Mariculture
- Tourism
- Governance

Summary of challenges and threats in coastal and marine ecosystems include (next):

- Lack of institutional coordination
- Monitoring, control and surveillance (MCS) of
- fishing operations
- Illegal, unregulated and unreported (IUU) catches

Those threats are further exacerbated by impacts of climate changes and recent evidence of the regions propensity to extreme events such the tsunami and other natural disasters.

Summary Proposed strategic focus for the IUCN response strategy includes:

- Community livelihoods in coastal areas
- Coastal planning
- Coastal erosion
- Coastal/marine pollution and solid waste management
- Climate change impacts
- Interaction of fresh water and coastal/marine systems – *environmental flows*
- Governance issues around coastal and marine issues – *governance in high seas*

Other responses:

- WCC resolutions,The next WCC-Barcelona, October 2008
- Positions papers ,
- Recommandations of the SBSTTA (Subsidiary Body on Scientific, Technical, and Technological Advice) to the Convention on Biological Diversity, and other international and regional fora.
- IUCN-World Commission on Protected Areas
- Etc.

Other responses:

- During the 3rd WCC, Bankok Thailand there have been roughly **one hundred thirty-five** resolutions mentioning costal and marine issues. These fall into six general groups:
  - marine species conservation (marine mammals, seabirds, sea turtles, sharks);
  - at-sea uses like fishing, marine pollution from ships, deep seabed mining, offshore oil & gas development, floating atomic power stations;
  - regional conservation where marine issues are a substantial component (e.g., Antarctic, Oceania, Arctic, Mediterranean);
  - marine and coastal protected areas (MCPAs);
  - topics where the marine aspect is also an issue (e.g., sustainable use, invasive species, ecosystem management, genetic resources, GMOs); and
  - IUCN's marine programme and promotion of capacity-building in coastal and marine management.
  - Conservation and sustainable use of marine Biodiversity beyond National Jurisdiction.

  For example:
  - REC 3.116 on Shark finning, urges states to support the development and adoption of a new resolution of the United Nations General Assembly to ban all shark finning in international waters.
  - **RES 3.036 (Antarctica and the Southern Ocean)**
  - **undersea noise pollution (Res. 3.068)** (SSC: noise pollution impacts; WCPA: anthropogenic noise in MPAs;

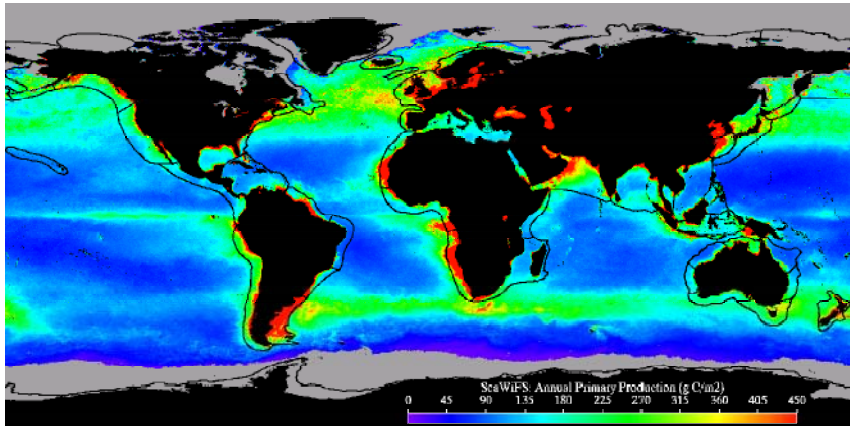
Other responses:

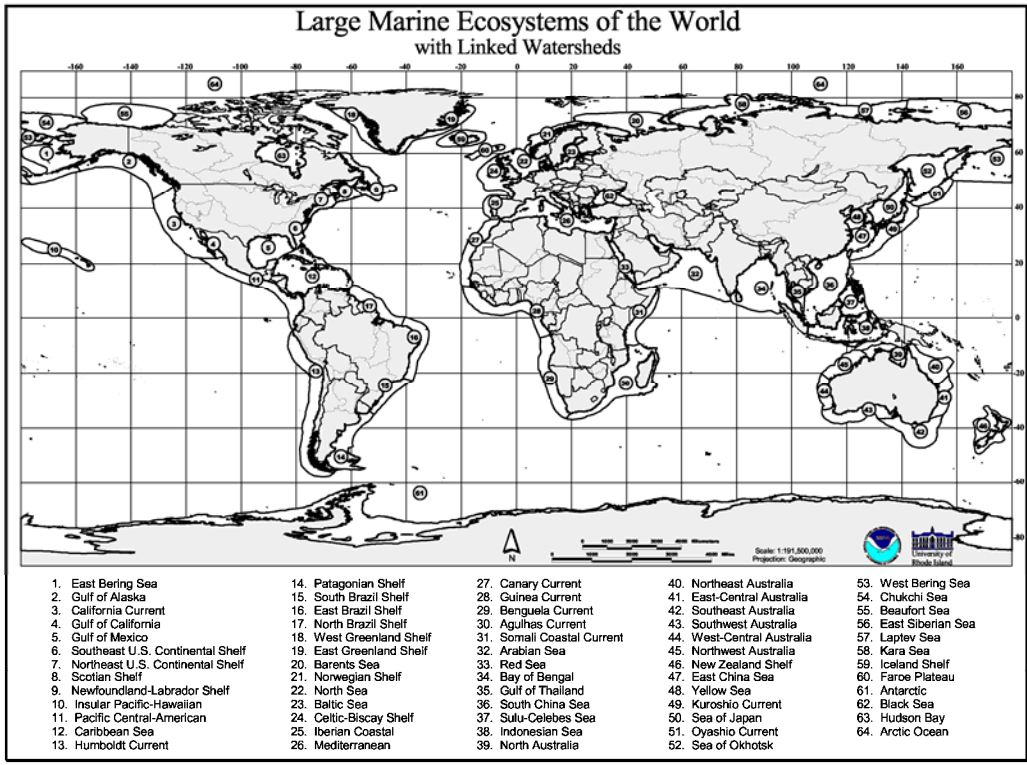
- The 8th meeting of the (SBSTTA) Advice to the Convention on Biological Diversity - Montreal, Canada 10-14 March 2003 ,
  - IUCN, WWF and The Nature Conservancy (TNC) recommended to establish a global goal and role for MCPAs in the conservation of marine biodiversity, which is consistent with the commitments made by governments at WSSD; Etc.
  - APPLY MCPA NETWORKS AS ESSENTIAL ELEMENTS OF NATIONAL FRAMEWORKS FOR THE CONSERVATION AND SUSTAINABLE USE OF BIOLOGICAL RESOURCES

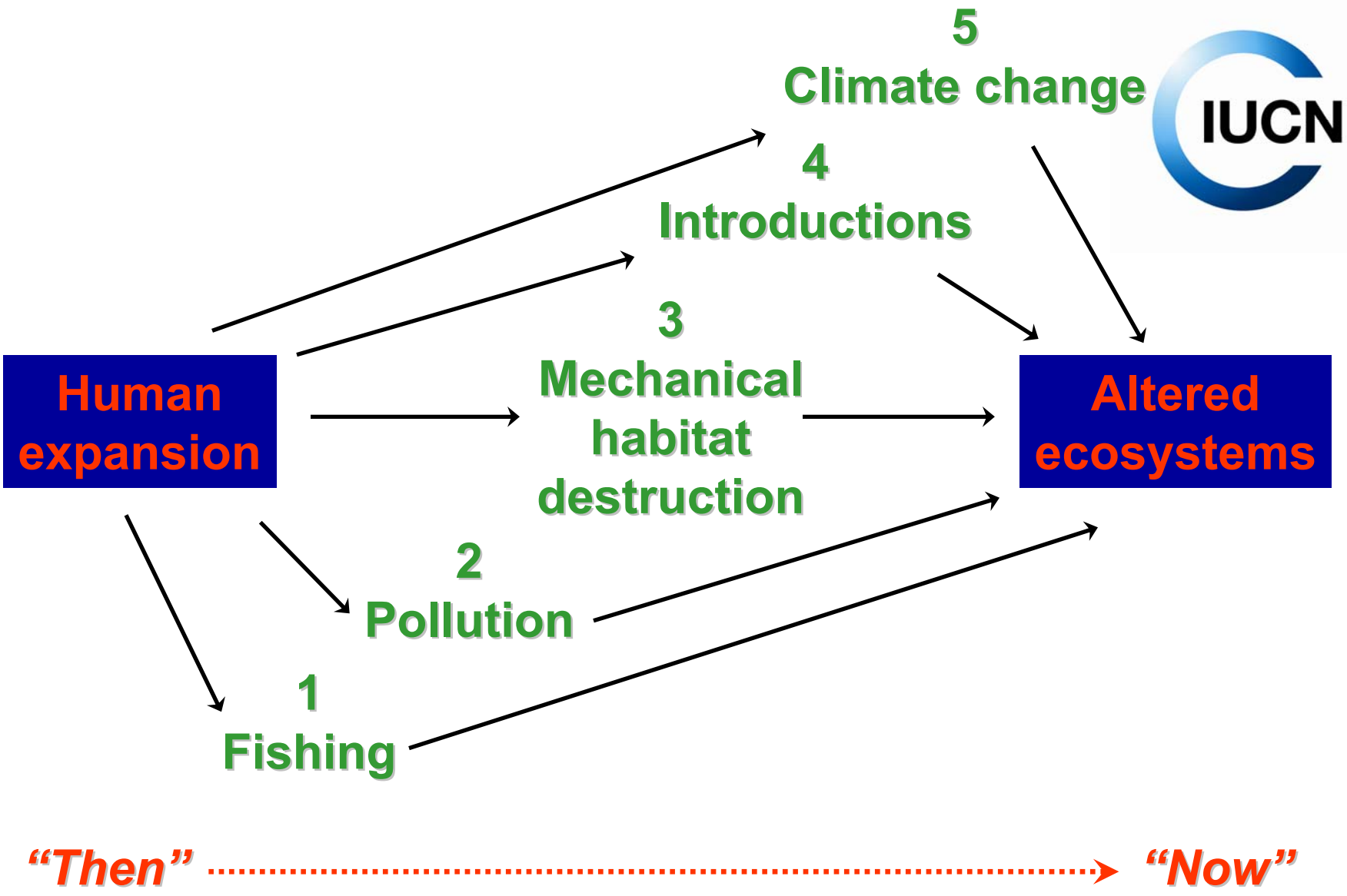
As Example: The Large Marine Ecosystem Approach to the Assessment and Governance of Ocean Coastal Resources

- Ecological criteria used to determine apeal extend of Large marine ecosystem (LME)
  - Bathymetry
  - Hydrography
  - Productivity
  - Trophodynamics

95% of the World's Annual Marine Fishery Catches are Produced in 64 LMEs

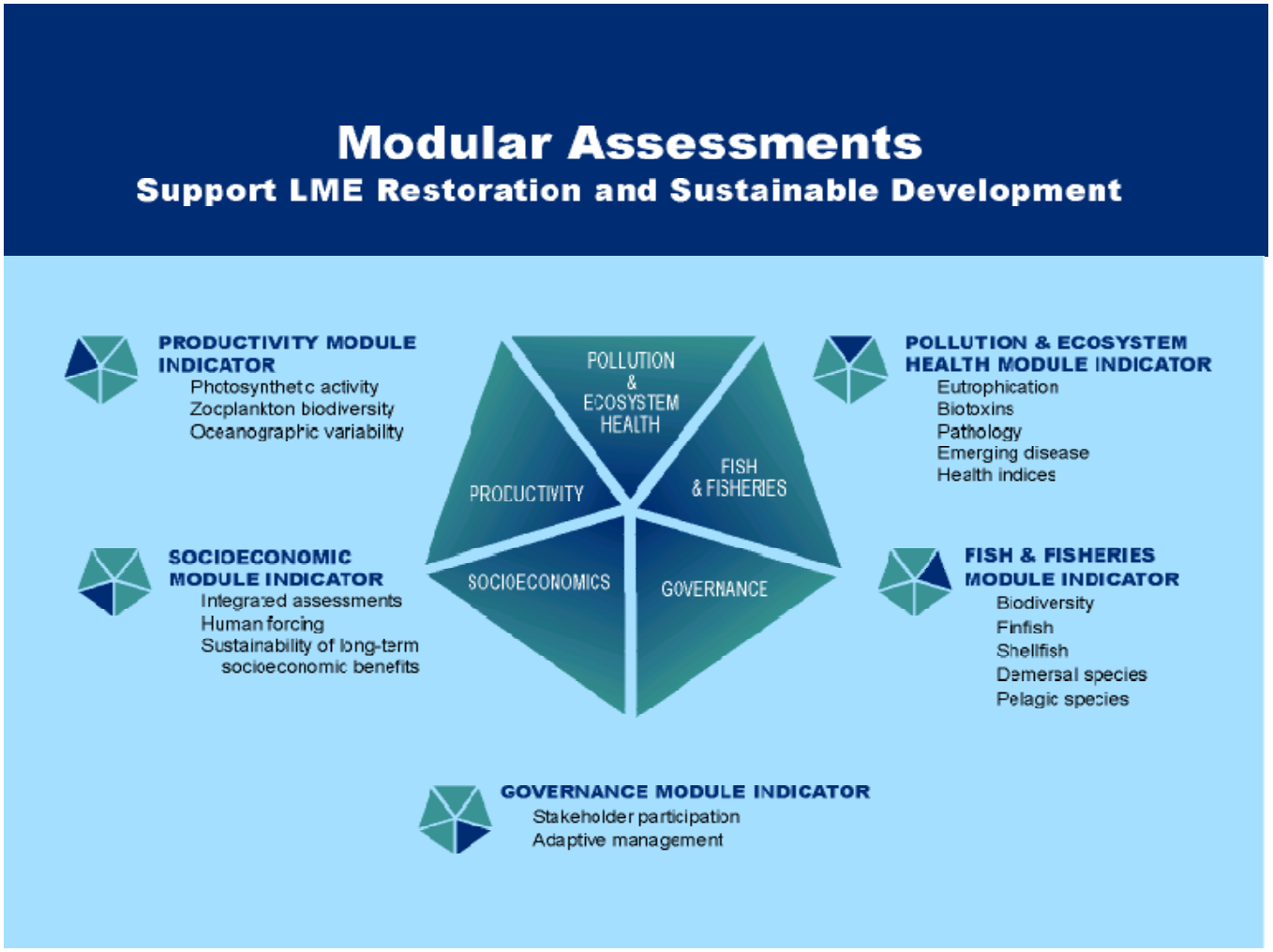






(from Jackson *et al.*, *Science* vol. 293, 27 July 2001)

05 Modules with indicators



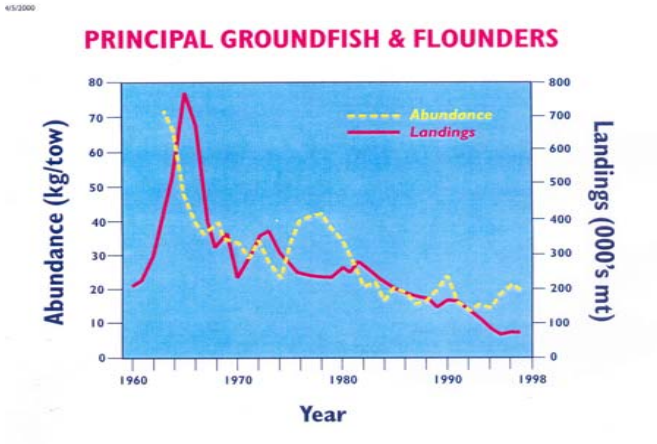
Indicators of changing Ecosystem state

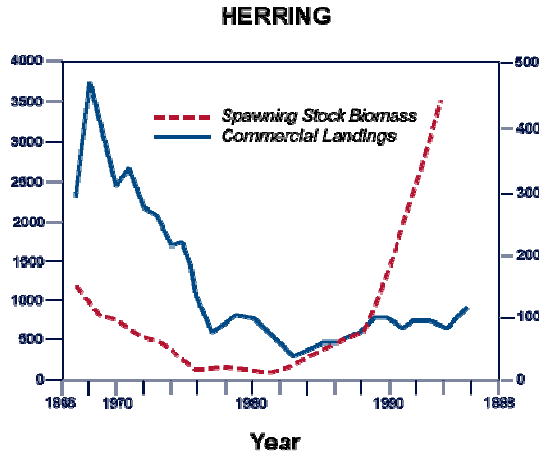
- Productivity
- Fish and Fisheries
- Pollution
- Socioeconomic
- Governance

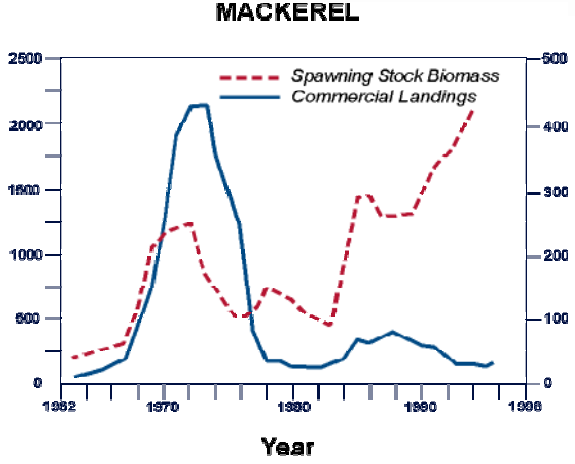
FISH AND FISHERIES INDICATORS

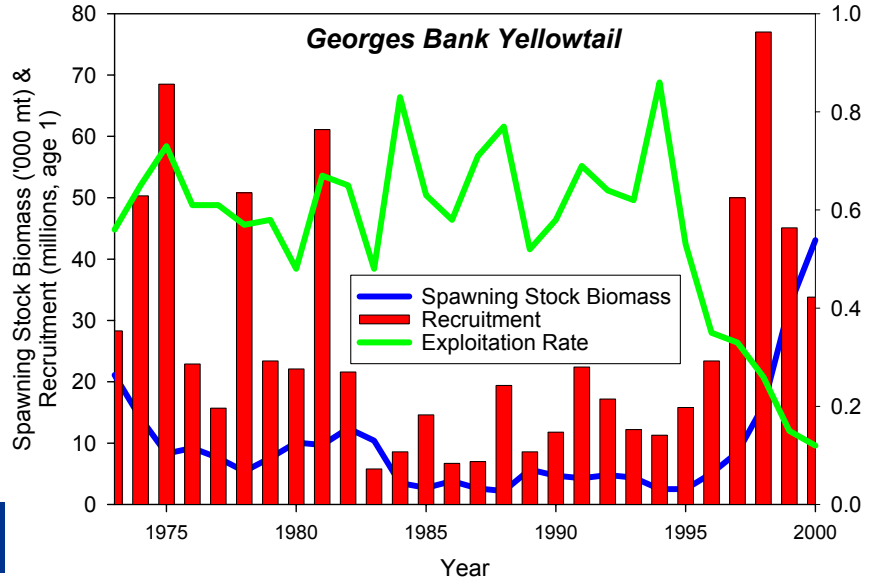
- Demersal species surveys
- Pelagic species surveys
- Ichthyoplankton surveys
- Invertebrate surveys (clams, scallops, shrimp, lobster, squid)
- Essential fish habitat
- Marine protected areas

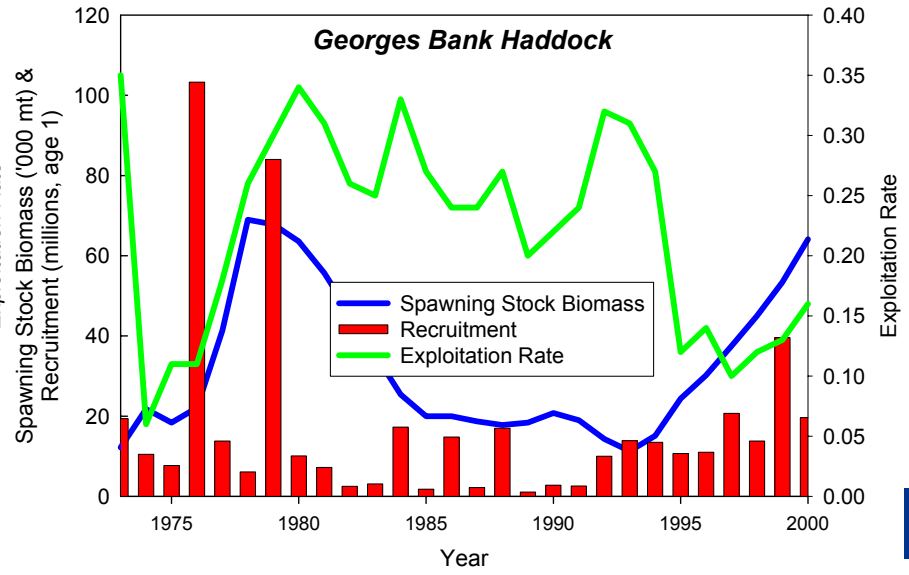
Fish and Fisheries Indicators (by www.lme.noaa.gov)











POLLUTION AND ECOSYSTEM HEALTH INDICATORS (by www.lme.noaa.gov)

Indicators:

- *Water Clarity*
- *Dissolved Oxygen*
- *Coastal Wetland Loss*
- *Eutrophic Condition*
- *Sediment Contamination*
- *Benthic Index*
- *Fish Tissue Contaminants*
- *Multiple Marine Ecological Disturbances*

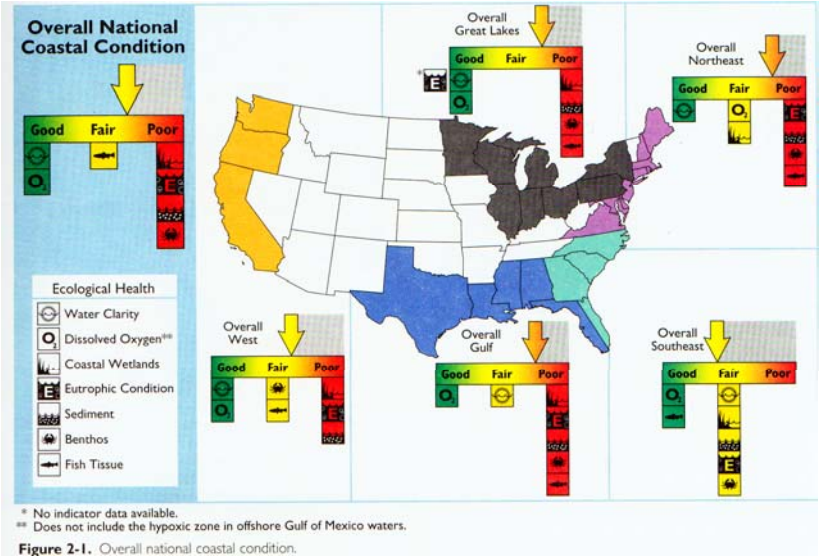
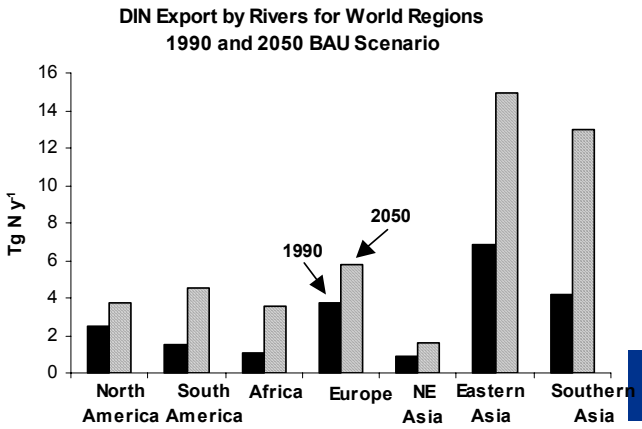
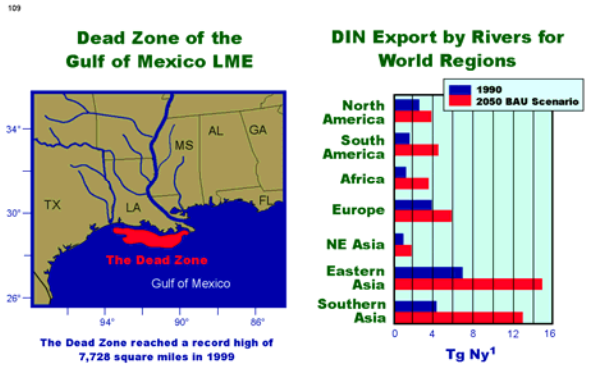


Figure 2-1. Overall national coastal condition.





In some cases, Transboundary mayor problems: Benguela Current LME

- Decline in commercial fish stocks, over- harvesting
- Highly variable ecosystem status and yields
- Deterioration in water quality, chronic and catastrophic
- Habitat destruction and alteration
- Threats to biotic integrity and biodiversity
- Limited resources for monitoring and assessment
- Harmful algal blooms

(Need of regional networks and/or commissions)

PLANNING ACTIONS

1. Transboundary Diagnostic Analysis (TDA) – provides consensus priorities from analysis and ranking of water-related resourcesissues, their environmental and socioeconomic impacts, immediate and root causes and possible remedies

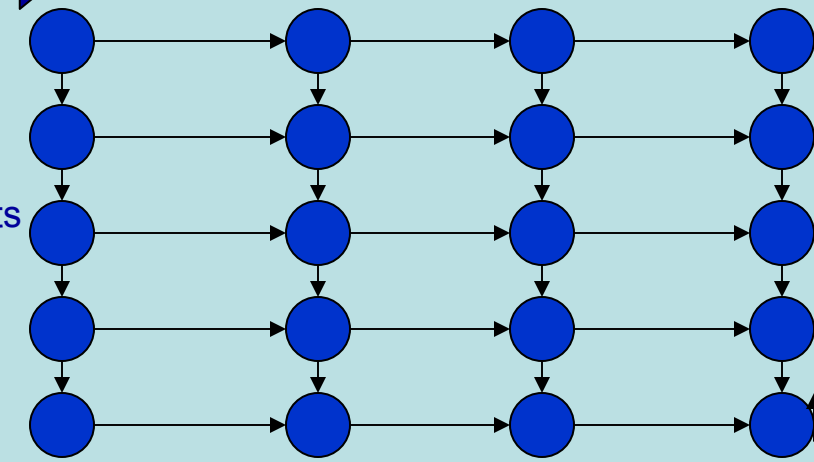
2. Strategic Action Program (SAP) – provides national and regional commitments to policy, legal and institutional reforms, and investments to remedy root causes of priority transboundary issues identified in TDA

IMPLEMENTATION ACTIONS

3. Ecosystem-based assessment and management strategy for TDA and SAP

- 3.1 Productivity indicators and assessments
- 3.2 Fish and fisheries indicators and assessments
- 3.3 Pollution and ecosystem health indicators and assessments
- 3.4 Socioeconomic indicators and assessments
- 3.5 Governance indicators and assessments

Ecosystem-Based Assessment and Adaptive Management



Year 1	Year 2	Year 3	Year 4	Years 5-10
	Assessments & Management Actions	Assessments & Management Actions	Assessments & Management Actions	Toward Self-financing Assessments and adaptive management

Coastal and Marines indicators (DPSIR)

- Name
- Definition
- Unit
- Placement in CSD indicators set
- Type in the DPSIR model
- Policy relevance
- International Conventions and Agreements
- International targets/recommended standards
- Methodology descripton

Coastal and Marines indicators- List

Priority Areas	Agreed Set of ECA Regional Indicators
Urbanization of coastal zones	Percentage of total population living in coastal areas [CSD]
Coastal and marine pollution	Proportion of coastal areas affected by pollution
	Coastal water quality
	Number and area of marine aquaculture sites
Coastal erosion/ sedimentation	% change in coastal areas lost
Marine biodiversity	Number of marine species (mangroves, fisheries, etc) threatened and extinct
	Change in area under mangrove forest
	Proportion of marine area protected [CSD]
	Total & per capita marine fish catch
	Total & per capita marine aquaculture fish catch
	Proportion of fish stocks within safe biological limits [MDG]
Poverty eradication	Number of people making a living from marine resources

Percentage of total population living in coastal areas

- **Source:** http://www.un.org/esa/sustdev/natlinfo/indicators/isd.htm
- Name :Percentage of total population living in coastal areas [CSD]
- Definition:Percentage of total population living within 100 kilometers of the coastline. A country might also consider percentage of population in the low elevation coastal zone (<10 meters elevation or 50 meters?) or percentage of population in river deltas.
- Unit of Measurement: %.
- Placement in the CSD Indicator Set: Ocean, Seas and Coasts/Coastal Zone.
- Type in the DPSIR model: driven force/pressure

Percentage of total population living in coastal areas (next)

POLICY RELEVANCE

- (a) **Purpose:** This indicator serves two purposes. It quantifies an important driver of coastal ecosystem pressure, and it also quantifies an important component of vulnerability to sea-level rise and other coastal hazards.
- (b) **Relevance to Sustainable/Unsustainable Development (theme/sub-theme):** Because of the economic benefits that accrue from access to ocean navigation, coastal fisheries, tourism and recreation, human settlements are often more concentrated in the coastal zone than elsewhere. Presently about 40% of the world's population lives within 100 kilometers of the coast. As population density and economic activity in the coastal zone increases, pressures on coastal ecosystems increase. Among the most important pressures are habitat conversion, land cover change, pollutant loads, and introduction of invasive species. These pressures can lead to loss of biodiversity, coral reef bleaching, new diseases among organisms, hypoxia, harmful algal blooms, siltation, reduced water quality, and a threat to human health through toxins in fish and shellfish and pathogens such as cholera and hepatitis A residing in polluted water.

Percentage of total population living in coastal areas (next)

- **International Conventions and Agreements:** The Millennium Ecosystem Assessment identified a number of international agreements relevant to coastal zone management, including the following:
- United Nations Convention on the Law of the Sea
- UN Regional Seas and Action Plans
- Global Programme of Action for the Protection of the Marine Environment from Land-based Activities
- Jakarta Mandate on the Conservation and Sustainable Use of Marine and Coast Biological Diversity
- Ramsar Convention on Wetlands of International Importance
- Chapter 17 of Agenda 21
- Paragraph 29 of the World Summit on Sustainable Development Plan of Implementation
- In addition, there are 76 international coastal management plans in place which are relevant.
- The conservation of biological diversity and the sustainable use of its components are among the primary objectives of the Convention on Biological Diversity (CBD). This indicator is of particular relevance to several articles of the CBD, e.g.: Article 6 - General measures for conservation and sustainable use; Article 7 - Identification and monitoring.
- (d) **International Targets/Recommended Standards:** None.
- (e) **Linkages to Other Indicators:** Many of the CSD core environmental indicators can be linked to this one, particularly those relating to urbanization, biodiversity, agriculture, fisheries, algae concentration, and fresh water quality. A directly linked social indicator is the population growth rate. It also may have implications for economic performance and GDP per capita.
- **Methodology :** Need of GIS (Spatial repartition of the population)

PROPORTION OF COASTAL AREAS AFFECTED BY POLLUTION

- **Source:** http://themes.eea.europa.eu/Specific_media/water/indicators/WHS07%2C2004.05/WHS7_LoadsTCM_180504.pdf
- Name :Proportion of coastal areas affected by pollution.
- Definition:The indictor underlines the sum of direct and riverine inputs of dangerous substances (Cadmium, mercury, lead, DDT, lindane and PCB) to the sea regions.
- Unit of Measurement: Percentage.
- Placement in the CSD Indicator Set: Ocean, Seas and Coasts/Coastal Zone.
- Type in the DPSIR model: pressure/State

PROPORTION OF COASTAL AREAS AFFECTED BY POLLUTION(next)

POLICY RELEVANCE

- **(a) Purpose:** Reduction of cadmium, mercury, lead, lindane and PCB inputs to the Sea.
- **(b) Relevance to Sustainable/Unsustainable Development (theme/sub-theme):** Cadmium, lead and mercury are found at low concentrations in the earth's crust and occurs naturally in seawater. DDT, lindane and PCB are synthetic substances that are not found naturally in the environment. Human activities have caused a general mobilisation of these hazardous substances in aquatic and terrestrial environments.
- **(d) International Targets/Recommended Standards:** NA.
- **(e) Linkages to Other Indicators:** NA.

METHODOLOGICAL DESCRIPTION

- **(a) Underlying Definitions and Concepts:** NA.
- **(b) Measurement Methods:** NA.
- **(c) Limitations of the Indicator:** NA.
- **(d) Status of the Methodology:** NA.
- **(e) Alternative Definitions:** NA.

ASSESSMENT OF DATA:

- **(a) Data Needed to Compile the Indicator:** NA.
- **(b) National and International Data Availability and Sources:** NA.
- **(c) Data References:** NA.

COASTAL WATER QUALITY

- **Source:** http://www.un.org/esa/sustdev/natlinfo/indicators/isd.htm
- Name :Bathing Water Quality
- Definition: The data are expressed in terms of percentage of inland and marine water bathing waters complying with the mandatory standards and guide levels for microbiological and physicochemical parameters.
- **Placement in the CSD Indicator Set:** Ocean, Seas and Coasts/Coastal Zone
- Unit of Measurement: %.
- Placement in the CSD Indicator Set: Ocean, Seas and Coasts/Coastal Zone.
- Type in the DPSIR model: State

COASTAL WATER QUALITY (Next)

International Conventions and Agreements:

- The EU directive on the quality of bathing waters (76/160/EEC) aims to ensure that coastal and inland waters commonly used for bathing do not contain bacteriological or chemical contamination at levels that could pose a health risk.

International Targets/Recommended Standards:

- Standards from EU Directive on bathing water (2006/7/EC), EEC Directive on quality of bathing waters 76/160/EEC and criteria of the World Health Organization (WHO).

Methodology: Underlying Definitions and Concepts: The bathing water are classified as following:

- C(I): percentage of bathing areas sufficiently sampled which comply with mandatory values
- C(G): percentage of bathing areas sufficiently sampled which comply with both guide values and mandatory values
- NF: percentage or number of bathing areas not sufficiently sampled
- NB: percentage or number of bathing areas where bathing was prohibited throughout the bathing season
- NC: percentage or number of bathing areas that do not comply with mandatory values
- NS: percentage or number of bathing areas not sampled or for which no data are available
- DY percentage or number of bathing areas de-listed during this bathing season (year) with respect to the previous one
- DA percentage or number of bathing areas de-listed during previous bathing seasons (accumulated)

PROPORTION OF COASTAL AREAS AFFECTED BY POLLUTION

- **Source:** http://themes.eea.europa.eu/Specific_media/water/indicators/WHS07%2C2004.05/WHS7_LoadsTCM_180504.pdf
- Name :Proportion of coastal areas affected by pollution.
- Definition:The indictor underlines the sum of direct and riverine inputs of dangerous substances (Cadmium, mercury, lead, DDT, lindane and PCB) to the sea regions.
- Unit of Measurement: Percentage.
- Placement in the CSD Indicator Set: Ocean, Seas and Coasts/Coastal Zone.
- Type in the DPSIR model: pressure/State

NUMBER AND AREA OF MARINE AQUACULTURE SITES

- **Source:** http://themes.eea.europa.eu/IMS/ISpecs/ISpecification20041007132239/IAssessment1116508902166/view_content
- **(a) Name:** Number and area of marine aquaculture sites.
- **(b) Brief Definition:** The indicator quantifies the development of European aquaculture production by major sea area and country as well as the contribution of aquaculture discharges of nutrients relative to the total discharges of nutrients into coastal zones.
- **(c) Unit of Measurement:** Production is measured in thousand tonnes, while marine aquaculture production relative to coastline length is given in tonnes/km.
- **(d) Placement in the CSD Indicators Set:** Ocean, Seas and Coasts/Coastal Zone.
- Type in the model DPSIR: Response
- Methodology:

NUMBER AND AREA OF MARINE AQUACULTURE SITES

- **2. POLICY RELEVANCE**
- **(a) Purpose:** The new Reformed Common Fisheries Policy (CFP) aims to improve the management of aquaculture.
- The strategy has 3 main objectives:
- -Creating secure employment
- -Providing safe and good quality fisheries products and promoting animal health and welfare standards.
- -Ensuring an environmentally sound industry.
- **(b) Relevance to Sustainable/Unsustainable Development (theme/sub-theme):**
- Different types of aquaculture generate very different pressures on the environment, the main ones being discharges of nutrients, antibiotics and fungicides.

PERCENTAGE OF CHANGE IN COASTAL AREAS LOST

- **Source:** http://earthtrends.wri.org/searchable_db/index.php?theme=1
- **(a) Name:** Percentage of change in Coastal areas lost.
- **(b) Brief Definition:** The indicator measures the percentage of change in Coastal areas lost.
- **(c) Unit of Measurement:** Percentage.
- **(d) Placement in the CSD Indicators Set:** Ocean, Seas and Coasts/Coastal Zone.
- **DPSIR type: State**
- **2. POLICY RELEVANCE**
- **(a) Purpose:** NA.
- **(b) Relevance to Sustainable/Unsustainable Development (theme/sub-theme):** NA.
- **(c) International Conventions and Agreements:** NA.
- **(d) International Targets/Recommended Standards:** NA.
- **(e) Linkages to Other Indicators:** NA.

NUMBER OF MARINE SPECIES (MANGROVES, FISHERIES,ETC)

THREATENED AND EXTINCT

- **Source:** http://earthtrends.wri.org/text/coastal-marine/variables.html
- **1. INDICATOR:**
- **(a) Name:** Number of marine species (mangroves, fisheries, etc) threatened and extinct.
- **(b) Brief Definition:** Fish species, number threatened, includes all species of freshwater and marine fish that are listed as threatened by the World Conservation Union (IUCN) and that are known to occur the territory of a given country. Threatened species data include species that are categorized as either "Critically Endangered", "Endangered", or "Vulnerable." Data include unconfirmed species occurrences and regionally extinct species, but exclude sub-species and introduced species.
- **(c) Unit of Measurement:** Number.
- **(d) Placement in the CSD Indicators Set:** Ocean, seas and coasts/Marine environment and Biodiversity / Ecosystems.
- **DPSIR:** Impact

CHANGE IN AREA UNDER MANGROVE FOREST

- **Source:** http://earthtrends.wri.org/searchable_db/index.php?theme=9&variable_ID=64&action=select_countries
- **1. INDICATOR:**
- **(a) Name:** Change in area under mangrove forest.
- **(b) Brief Definition:** Mangrove trees and shrubs, including ferns and palms, are found along river banks and coastlines in tropical and subtropical countries. Their main characteristic is that they can tolerate salt and brackish water environments. Globally, there are seventy known species of mangroves. Australia and Southeast Asia have the highest number of mangrove species.
- **(c) Unit of Measurement:** Percentage / mangrove area in hectares.
- **(d) Placement in the CSD Indicators Set:** Ocean, seas and coasts/Marine environment and Biodiversity / Ecosystems.
- DPSIR: Impact

PROPORTION OF MARINE AREAS PROTECTED

- Source: http://www.un.org/esa/sustdev/natlinfo/indicators/isd.htm
- (a) **Name:** Proportion of marine areas protected.
- **Brief Definition:** This indicator is expressed as percentage protected of total surface area of national waters.
- The marine area indicator can be expressed by different zones under national jurisdiction (e.g. territorial waters, exclusive economic zones etc.). It may also be possible and desirable to disaggregate the indicator further, for example by protected area category (i.e. using the IUCN protected area management categorisation system).
- This indicator can also be separately expressed as the percentage protected of marine ecological region
- (c) **Unit of Measurement:** % of total marine area. / % of marine ecological region
- (d) **Placement in the CSD Indicator Set:** Ocean, seas and coasts/Marine environment and Biodiversity / Ecosystems.
- DPSIR : Response

PROPORTION OF MARINE AREAS PROTECTED

- **POLICY RELEVANCE**
- (a) **Purpose:** The indicator represents the extent to which marine areas important for conserving biodiversity, cultural heritage, scientific research (including baseline monitoring), recreation, natural resource maintenance, and other values, are protected from incompatible uses. It shows how much of each major ecosystem and habitat is dedicated to maintaining its diversity and integrity.
- (b) **Relevance to Sustainable/Unsustainable Development (theme/sub-theme):** Sustainable development depends on a sound environment, which in turn depends on ecosystem diversity. Protected areas are essential for maintaining ecosystem diversity, in conjunction with management of human impacts on the environment.
- (c) **International Conventions and Agreements:** Marine protected areas are increasingly presented as important spatial management tools to reduce or prevent ongoing declines in marine biodiversity and subsequently are key among the suite of biodiversity indicators that are being elaborated for several international targets and processes, including those under the following global processes and agreements:
- The Millennium Development Goals, and
- The World Summit on Sustainable Development (WSSD).
- A **marine protected area** is defined as: *'Any area of intertidal or subtidal terrain, together with its overlying water and associated flora, fauna, historical and cultural features, which has been reserved by law or other effective means to protect part or all of the enclosed environment'* (IUCN, 1988).

PROPORTION OF MARINE AREAS PROTECTED (next)

The World Conservation Union (IUCN) defines six management categories of protected areas.

- I. Protected area managed mainly for science of wilderness protection (e.g. Strict Nature Reserve/Wilderness Area)
- II. Protected area managed mainly for ecosystem protection and recreation (e.g. National Park)
- III. Protected area managed mainly for conservation of specific natural features (e.g. Natural Monument)
- IV. Protected area managed mainly for conservation through management intervention (e.g. Habitat/Species Management Area)
- V. Protected area managed mainly for landscape/seascape protection and recreation (e.g. Protected Landscape/Seascape)
- VI. Protected area managed mainly for the sustainable use of natural ecosystems (e.g. Managed Resource Protected Area)

COASTAL TOTAL & PER CAPITA MARINE FISH CATCH (Next)

- **Source:** http://earthtrends.wri.org/register.php?raction=form&theme=6&tool=1&mod_ref_href=searchable_db/index.php|||theme||6|variable_ID||274|action||select_countries
- **(a) Name:** Total & per capita marine fish catch.
- **(b) Brief Definition:**
- Fish catch data relate to nominal catch of fish (FAOSTAT categories: demersal marine fish, pelagic marine fish, marine fish not elsewhere included, freshwater and diadromous fish), taken for commercial, industrial, recreational and subsistence purposes from marine waters. The harvest from mariculture, aquaculture and other kinds of fish farming is excluded. Data include all quantities caught and landed for both food and feed purposes but exclude discards. Catches of fish are expressed in live weight, that is the nominal weight of the aquatic organisms at the time of capture. To assign nationality to catches, the flag of the fishing vessel is used, unless the wording of chartering and joint operation contracts indicates otherwise.
- **(c) Unit of Measurement:** Number.
- **(d) Placement in the CSD Indicators Set:** Coastal and marine Resources / Marine biodiversity.
- DPSIR: Pressure
- Methodology: **(a) Underlying Definitions and Concepts:** *Capture Production: Marine fish* refers to fish caught or trapped for commercial, industrial, and subsistence use in marine waters, including brackish environments. Catches from recreational activities are included where available. Statistics for mariculture, aquaculture and other kinds of farming are excluded.
- **(b) Measurement Methods:** Aquatic organisms included in the FAO FISHSTAT aquaculture production database have been classified according to approximately 1581 commercial species items, further arranged within the 50 groups of species constituting the nine divisions of the FAO International Standard Statistical Classification of Aquatic Animals and Plants (ISSCAAP).

TOTAL & PER CAPITA MARINE AQUACULTURE

FISH CATCH

- Source: **http://earthtrends.wri.org/text/coastal-marine/variables.html**
- **(a) Name:** TOTAL & PER CAPITA MARINE FISH CATCH
- **(b) Brief Definition:**
- *Aquaculture Production by Environment: Total* refers to fish, molluscs, crustaceans, miscellaneous aquatic animals, and other aquatic organisms cultivated in freshwater, brackish, and marine environments (all areas). Data do not include aquatic plants or capture production. For a more detailed listing of the species categories mentioned above, please refer to the Food and Agricultural Organization's (FAO) "Groups of Species."

- Aquaculture is defined by FAO as "the farming of aquatic organisms, including fish, molluscs, crustaceans, and aquatic plants. Farming implies some form of intervention in the rearing process to enhance production, such as regular stocking, feeding, protection from predators, etc. Farming also implies individual or corporate ownership of the stock being cultivated." Aquatic organisms that are exploitable by the public as a common property resource do not count as aquaculture production.

(c) Unit of Measurement: Number.

- **(d) Placement in the CSD Indicators Set:** Coastal and marine Resources / Marine biodiversity.
- Type in the DPSIR model: State/response
- **2. POLICY RELEVANCE**
- **(a) Purpose:**
- **(b) Relevance to Sustainable/Unsustainable Development (theme/sub-theme):**
- **(c) International Conventions and Agreements**
- **(d) International Targets/Recommended Standards:**
- **(e) Linkages to Other Indicators:**

PROPORTION OF FISH STOCKS WITHIN SAFE BIOLOGICAL LIMITS

- **Source: http://www.un.org/esa/sustdev/natlinfo/indicators/isd.htm**
- **Proportion of fish stocks within safe biological limits**
- **1. INDICATOR**
- **(a) Name: Proportion of fish stocks within their safe biological limits**
- **(b) Brief definition: Percentage of fish stocks exploited within their level of maximum biological productivity**
- **(c) Unit of Measurement: %**
- **(d) Placement in the CSD Indicator Set: Ocean, Seas and Coasts/Fisheries.**
- **DPSIR: State**
- **2. POLICY RELEVANCE**
- **(a) Purpose: To provide information on the state of exploitation of fishery resources at the global, regional and national levels.**
- **(b) Relevance to Sustainable/Unsustainable Development (theme/subtheme) : This indicator will provide an important reference for policy making related to sustainable management of fish stocks at the national level, regionally (e.g. regional fisheries bodies and LMEs) and at the global level (COFI and other relevant international bodies such as the CBD).**
- **(c) International Conventions and Agreements: The Food and Agriculture Organization of the United Nations (FAO) Code of Conduct for Responsible Fisheries and the UN Fish Stock Agreement.**
- **(d) International Targets/Recommended Standards: With the aim of maximizing sustainable production from capture fisheries, and therefore contributing to increased food security, the target for this indicator should be a value close to 100% fish stocks exploited within their safe biological limits.**
- **(e) Linkages to other indicators: This indicator is related to "Annual catch by major species".**

ANNUAL SEA LEVEL CHANGE

- **Source: http://www.nbi.ac.uk/psmsl/datainfo/psmsl.hel**
- **(a) Name: TOTAL & PER CAPITA MARINE FISH CATCH**
- **(b) Brief Definition: The indicator underlines the annual change in the sea level change.**
- **(c) Unit of Measurement: metres, rarely feet.**
-
- **(d) Placement in the CSD Indicators Set: Coastal and marine Resources / Climate change-sea level rise.**
- **DPSIR: State/impact**
- **2. POLICY RELEVANCE**
- **(a) Purpose:**
- **(b) Relevance to Sustainable/Unsustainable Development (theme/sub-theme):**
- **(c) International Conventions and Agreements**
- **(d) International Targets/Recommended Standards:**
- **One of the most important things for users of the mean sea level data bank to know is the accuracy of the published figures. Details of the treatment of gaps in the tidal record are of particular interest. Therefore, the PSMSL makes the following recommendations:**
  - **small gaps in observed tidal records should be interpolated, if possible before computing monthly and annual means,**
  - **the interpolation should be performed at an early stage in the processing.**
- **One principle to adopt is that of a comparison with the complete records from a nearby station. However we would stress that predicted values are not suitable for interpolation because of meteorological effects,**

NUMBER OF PEOPLE MAKING A LIVING FROM MARINE RESOURCES

- **Source: http://earthtrends.wri.org/text/coastal-marine/variable-54.html**
- **(a) Name: Number of people making a living from marine resources.**
- **(b) Brief Definition: People employed in fishing and aquaculture includes the number of people employed in commercial and subsistence fishing (both personnel on fishing vessels and on shore), operating in freshwater, brackish and marine areas, and in aquaculture production activities.**
- **(c) Unit of Measurement: Number.**
- **(d) Placement in the CSD Indicators Set: Coastal and marine Resources / Poverty eradication.**
- **DPSIR: Pressure/state**

- **2. POLICY RELEVANCE**
- **(a) Purpose: The intention of the statistical compilation is to provide complete coverage of fishery employment statistics throughout the world.**
- **(b) Relevance to Sustainable/Unsustainable Development (theme/sub-theme): NA.**
- **(c) International Conventions and Agreements: NA.**
- **(d) International Targets/Recommended Standards: NA.**
- **(e) Linkages to Other Indicators: NA.**
- **3. METHODOLOGICAL DESCRIPTION**
- **(a) Underlying Definitions and Concepts: NA.**
- **(b) Measurement Methods: Data on People employed in fishing and aquaculture are collected by the FAO through annual questionnaires submitted to the national reporting offices of the member countries. When possible other national and/or regional published sources are also used to estimate figures.**
  Please refer to the original source for further information on collection methodologies or to the following publication: "Number of Fishers 1970-1996", FAO Fisheries Circular No. 929, Revision 1, Fishery Information, Data and Statistics Unit (FAO, Rome, 1999).

SOME KEY ASPECTS TO CONSIDER AND TO ADDRESS

- Coastal and Marine Protected Areas :On MPAs both within and beyond national jurisdiction, IUCN should continue to contribute both to international policy discussions and practical applications. IUCN can also help foster a more integrated, ecosystem-based approach to ocean management, including fisheries conservation and management, at the regional level.

- to address conservation of marine biodiversity beyond national jurisdiction

- On sharks, IUCN can take a more prominent role than the one it played so far in promoting the development of a UNGA resolution calling on a global ban of shark fining, including in international waters.

- Policy & assessment of Trans boundary Coastal and marine ecosystems
- issue

Waza Logone Floodplain, Cameroon

Thank you

Jerome GUEFACK
ICT Officer

IUCN-Central and West

Africa Program (PACO)

Jerome.guefack@iucn.org