

Measuring the Progress and Outcomes of ICAM

Towards a Common Approach

Stefano Belfiore
Intergovernmental Oceanographic
Commission of UNESCO



The Growth of ICAM

- Since the early 1960s, over 700 ICAM efforts at the national and sub-national level initiated in 145 countries and semi-sovereign states (Sorensen 2002)
- Investments in ICAM and coastal- and marine-related projects are significant, for example:
 - World Bank: in 1997-2002, over \$770 million (including pipeline)
 - GEF: since 1992, over \$570 million (including pipeline and \$110 in preparation)
 - IADB: over \$250 million since 1995 (including \$100 in preparation)

Expert Meeting on Coastal Indicators
Sophia Antipolis, 15 December 2006



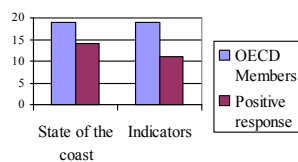
ICAM: “Results not Demonstrated”

- In spite of 40 years of experience and the codification of ICAM guidelines and good practices, “ICAM has not yet fully demonstrated its potential” (World Bank, 2003)
- Even long-standing and stably-funded ICAM programs are facing challenges in demonstrating achievement of goals – Rating of the U.S. Coastal Zone Management Programs by the Office of Management and Budget: “Results not demonstrated” (The White House, 2005)

Expert Meeting on Coastal Indicators
Sophia Antipolis, 15 December 2006

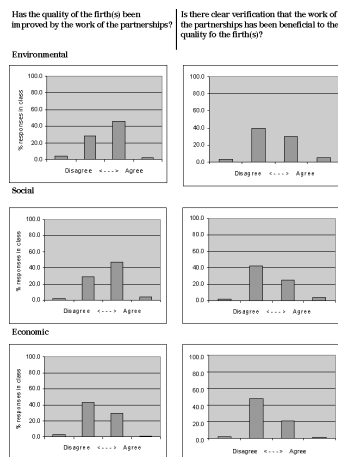


Verification of ICAM Benefits



OECD: survey on state of the coast reports and use of indicators for ICAM (1997)

Scotland: Perception and verification of benefits from ICAM (Scottish Coastal Forum 2002)



Expert Meeting on Coastal Indicators
Sophia Antipolis, 15 December 2006



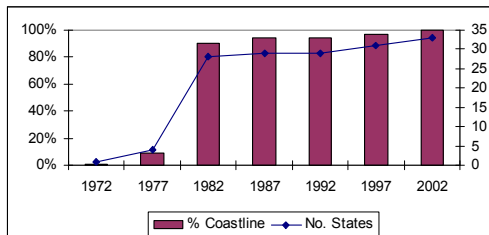
New ICAM Indicator Initiatives

- USA
 - National Coastal Management Performance Measurement System (2004)
- EU
 - Indicators for ICZM progress and coastal sustainability (2004)
- South Africa
 - State of Coasts and Coastal Policy indicators (2004)
- Southeast Asia (PEMSEA Project)
 - ICM Program Performance Indicators (2004)

Expert Meeting on Coastal Indicators
Sophia Antipolis, 15 December 2006



USA: NCMP and Indicators



- 1972: CZMA and NCMP
- Coverage and participation in the NCMP (100% coastline; 34 states)
- Biennial report to Congress
- 1995-97: CZMA effectiveness study
- 2000-: ICM indicator development initiatives by NOAA with the support of The Heinz Center

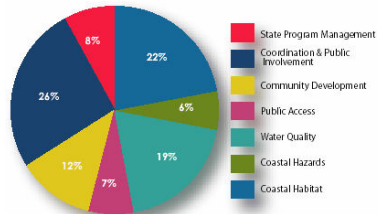
- National Coastal Management Performance Measurement System
 - National Coastal Management Program (NCMP)
 - National Estuarine Research Reserve System (NERRS)
- Implementation phases
 - 2004: Annual CZMA funding summary
 - 2005: Triennial performance measurement system report
 - 2006: Triennial national state of the coast report

Expert Meeting on Coastal Indicators
Sophia Antipolis, 15 December 2006



USA: CM Performance

FY 2003 CZMA Federal Funds to State Programs



In FY 2003, NOAA distributed \$79 million to states and territories for coastal management programs, with \$65 of matching funds from state and local programs (NOAA 2004)

- NOAA classes of performance indicators for the implementation of the CZMA through the NCMP

- Context (13 indicators)
- Priority focus areas
 - Coastal habitat (6)
 - Coastal hazards (5)
 - Coastal water quality (4)
 - Coastal dependent uses (2)
 - Coastal public access (4)
 - Coastal community development (3)
- Government coordination and decision making (16)

Expert Meeting on Coastal Indicators
Sophia Antipolis, 15 December 2006



PEMSEA: SD Strategy/1

- National indicators

- Institutional
 - Coastal and marine policy
 - Accession to international agreements
- Operational
 - Coastal and marine environmental strategy
 - National coastline with land- and sea-development plans
 - Ship waste reception facilities in ports
 - National marine and coastal areas under management
 - River basins under ecosystem development and management

- Local indicators

- Institutional
 - Local governments empowered to manage marine and coastal resources
- Operational
 - Local coastal strategies
 - Municipal coastline under integrated management
 - ISO 14000 certification of local government
 - Sewage treatment
 - Drinking water
 - Waste management

Expert Meeting on Coastal Indicators
Sophia Antipolis, 15 December 2006



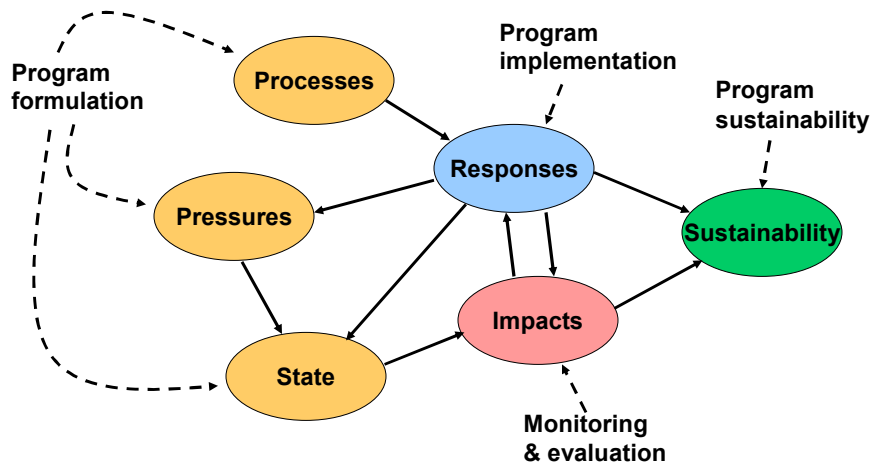
PEMSEA: SD Strategy/2

- Subregional indicators
 - Institutional
 - Intergovernmental environmental management mechanisms for transborder areas and LMEs
 - Operational
 - Transborder marine areas and LMEs under environmental management plans
 - Sea areas with regional contingency plans and compensation systems
- Other stakeholder indicators
 - Private sector
 - Number of ISO 14000 certification of industries and private enterprises
 - Civil society
 - Number of registered environmental NGOs
 - Academic / scientific community
 - Graduates from undergraduate or postgraduate programs
 - Graduates from short-term training programs
 - Funding of environmental research and development programs supported by national/international programs

Expert Meeting on Coastal Indicators
Sophia Antipolis, 15 December 2006



PEMSEA: ICM Cycle and PSR



Interpretation of Chua 2003

Expert Meeting on Coastal Indicators
Sophia Antipolis, 15 December 2006



Global Coastal and Water Agenda

- JPol: Coastal zone
 - Encourage the application by 2010 of the ecosystem approach
 - Promote integrated, multidisciplinary and multisectoral coastal and ocean management at the national level and mechanisms on ICM
 - Advance implementation of the GPA, with emphasis during the period 2002-2006 on municipal wastewaters, physical alteration of habitats, and nutrients
- JPol: Water
 - Develop integrated water resources management and water efficiency plans [and ICARM strategies and programs] by 2005
- WEHAB: Water indicators
 - Adequate sewage disposal
 - Access to piped water
 - Use of pesticides
 - Use of renewable water
 - BOD in water bodies

Expert Meeting on Coastal Indicators
Sophia Antipolis, 15 December 2006



IOC Indicator Project

- IOC-DFO-NOAA workshop on “The Role of Indicators in ICM” (Ottawa, 2002)
 - *Reference Guide on the Use of Indicators for ICM* (2003)
 - Special issue of *Ocean & Coastal Management* (2003)
- Follow-up project (2003-2005)
 - Two meetings of a group of experts (2003)
 - Draft handbook on indicators for ICM (2004)
 - Field-testing and validation of indicators in 8-10 ICM initiatives (2005)

Expert Meeting on Coastal Indicators
Sophia Antipolis, 15 December 2006



Project objectives and target

- Main objectives
 - Developing a common set of indicators—environmental, socioeconomic, governance performance—to assess and report on the progress and outcomes of ICM programs
 - Promoting result-based approaches, accountability and adaptive management in ICM programs
- Target
 - Managers and decision-makers, including donors
 - Researchers and evaluators

Expert Meeting on Coastal Indicators
Sophia Antipolis, 15 December 2006



Project focus

- Improving monitoring, evaluation and reporting on ICM through:
 - Institutionalization of monitoring and evaluation systems
 - Integrated consideration of environmental, socioeconomic and governance dimensions
 - Isolation of ICM outcomes
 - Linkages between reporting on ICM and state of the coast reporting
 - Consistency of approaches and comparability of results

Expert Meeting on Coastal Indicators
Sophia Antipolis, 15 December 2006



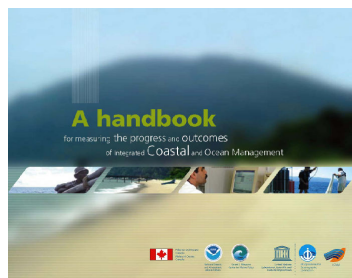
Project approach

- Method and guidelines for:
 - Clarifying, prioritizing and quantifying ICM goals and objectives
 - Measuring and reporting on ICM progress and outcomes through indicators
- No prescriptive character
 - Basis for designing customized sets of indicators
 - Menu of indicators to select from
 - Companion volume on testing at different sites

Expert Meeting on Coastal Indicators
Sophia Antipolis, 15 December 2006



Contents of the handbook



- Use of indicators in ICOM
- Governance performance indicators
- Ecological indicators
- Socioeconomic indicators
- Applying the indicators
- Summary, lessons learned and recommendations
- Indicators sheets

Expert Meeting on Coastal Indicators
Sophia Antipolis, 15 December 2006



Governance dimensions and indicators

Administrative coordination and coherence

1. Institutional coordination mechanism
2. Enabling legislation (existence and adequacy)
3. Environmental assessment (e.g. EIA, SEA, CCA)
4. Conflict resolution mechanism (functionality)

Management quality and effectiveness

5. Management (ICOM) plans (status and coverage)
6. Implementation of plans (e.g. legal tools, enforcement)
7. Monitoring and evaluation
8. Administrative resources (human, technical, financial)

Knowledge, awareness, and support

9. Inputs from scientific research
10. Stakeholder participation in decision-making
11. NGOs and community involvement
12. Educational and training in ICOM plans

Mainstreaming

13. Enabling technology (incl. environmental)
14. Economic instruments in support to ICOM
15. Incorporation of ICOM into SD strategy

Expert Meeting on Coastal Indicators
Sophia Antipolis, 15 December 2006



Socioeconomic dimensions and indicators

Healthy and productive economy

1. Total economic value (focus on economic activities)
2. Direct investment
3. Total employment (oceans-related jobs)
4. Sectoral diversification

Healthy and productive environment

5. Human pressure on habitats
6. Pollutants and introductions (impacts on humans)

Public health and safety

7. Diseases and illness
8. Weather and disasters

Social cohesion

9. Population dynamics
10. Marine dependency
11. Public access to the coast

Protecting human life and property

12. Traditional knowledge, innovation and practices
13. Protection of coastal cultural heritage

Expert Meeting on Coastal Indicators
Sophia Antipolis, 15 December 2006



Ecological dimensions and indicators

Conserving ecosystem structure

1. Biodiversity (genetic, species, ecosystems, invasive)
2. Distribution of species (spatial, trophic level)
3. Abundance of species (biomass, number, density)

Conserving ecosystem functions

4. Production and reproduction (incl., prim./second.)
5. Trophic interactions (e.g. predator-prey relationships)
6. Mortality (incl., fishing, incidental, natural causes)

Conserving ecosystem properties

7. Species health (at-risk, bioaccumulation, pathogens)
8. Water quality (oceanography and variability, sedimentation, contaminants and eutrophication)
9. Habitat quality (types and status, sea level change, sediment quality, land-/bottomscape integrity)

Expert Meeting on Coastal Indicators
Sophia Antipolis, 15 December 2006



Indicator sheets

Nature of indicator	Definition; unit of measurement
Relevance	Purpose; international conventions, agreements, and targets
Methodological description	Measurement approaches; limitations; status of methodology
Assessment of data	Data sources; collection methods; data analysis; reporting scale
Additional information	Organizations and programs; key references and web links

Expert Meeting on Coastal Indicators
Sophia Antipolis, 15 December 2006



Sample guideline process

- What do you want to achieve as your objective?
- Can you measure whether you have met your objective or the processes to meeting your objectives? Can you relate the objective to an indicator?
- How long will it take to meet your objectives?
- What are the steps and the needs to meet your objectives?
- Can you link an objective from one group (ecological, socioeconomic, governance) with one or more objectives from another group?
- Which changes of course are required?

Expert Meeting on Coastal Indicators
Sophia Antipolis, 15 December 2006



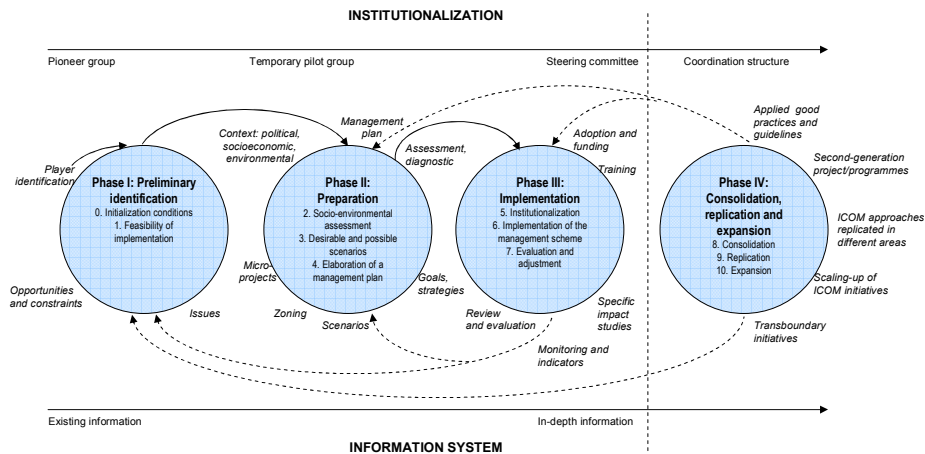
Different Conceptual Frameworks

	LFA	PSR	ICAM Cycle	ICAM Outcomes
Objective	To monitor project implementation	To report on the state of the environment	To monitor project implementation	To enhance project effectiveness
Focus	Progression from activities ... to high-level goals	Environmental consequences of human activities	Progression from preparation ... to adjustments	Intended and unintended outcomes
Methods	Internal monitoring, evaluations	Environmental monitoring	Internal monitoring	External evaluations
Conduct	Continuous and systematic	Periodic and systematic	Continuous and systematic	Periodic and in-depth
Use	Project managers	Policy makers, general public	Project managers	Project managers, beneficiaries

Expert Meeting on Coastal Indicators
Sophia Antipolis, 15 December 2006



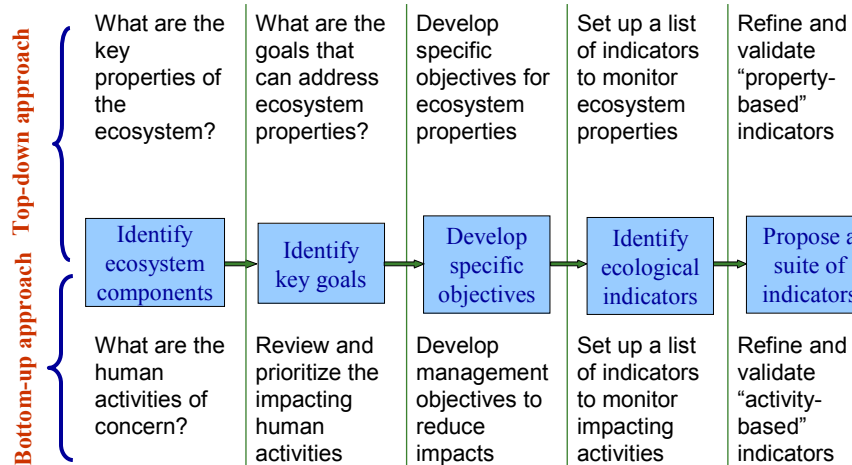
Phases of the ICAM process



Expert Meeting on Coastal Indicators
Sophia Antipolis, 15 December 2006



Integrating Top-down/Bottom-up Approaches



Expert Meeting on Coastal Indicators
Sophia Antipolis, 15 December 2006



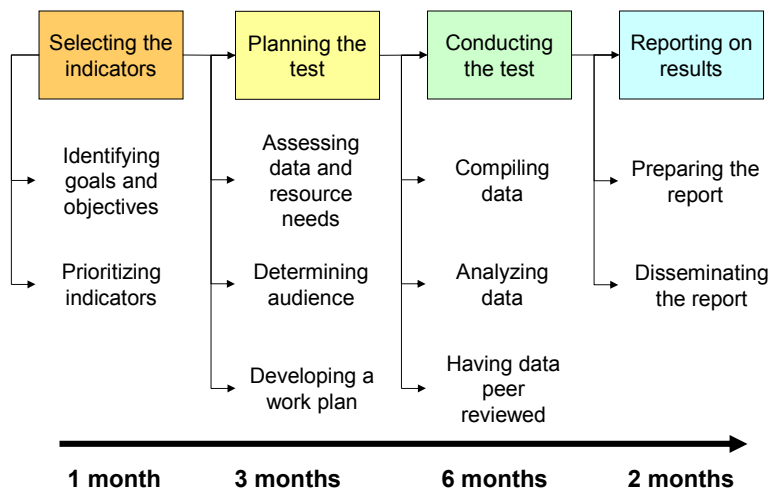
Integrating different dimensions

Governance	Socioeconomic	Ecological
Environ. assess. Monitoring and evaluation	Pollutants Diseases and illness <i>(Impacts on Humans)</i>	Water quality and Contaminants <i>(Impacts on Ecosystems)</i>
Enabling legislation Management plans Economic instruments (e.g. Fisheries Mgt)	Total employment Total economic value Sustainable use (e.g. commercial fishing)	Mortality (by fishing) Species health Water/sed. quality (Seafood quality)
Coord. and resources Sust. Dev. strategy	Population dynamics Habitat alterations	Water/habitat quality Land-/bottomscape integrity

Expert Meeting on Coastal Indicators
 Sophia Antipolis, 15 December 2006



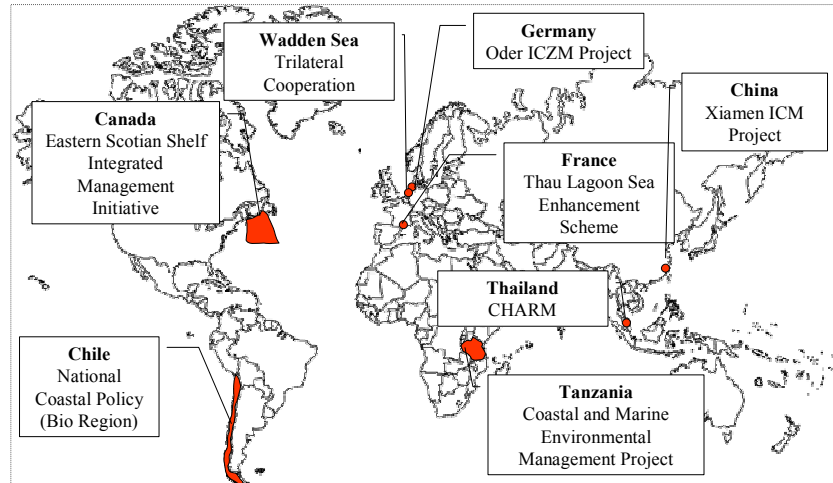
Process for testing the indicators



Expert Meeting on Coastal Indicators
 Sophia Antipolis, 15 December 2006



Pilot sites



Expert Meeting on Coastal Indicators
Sophia Antipolis, 15 December 2006



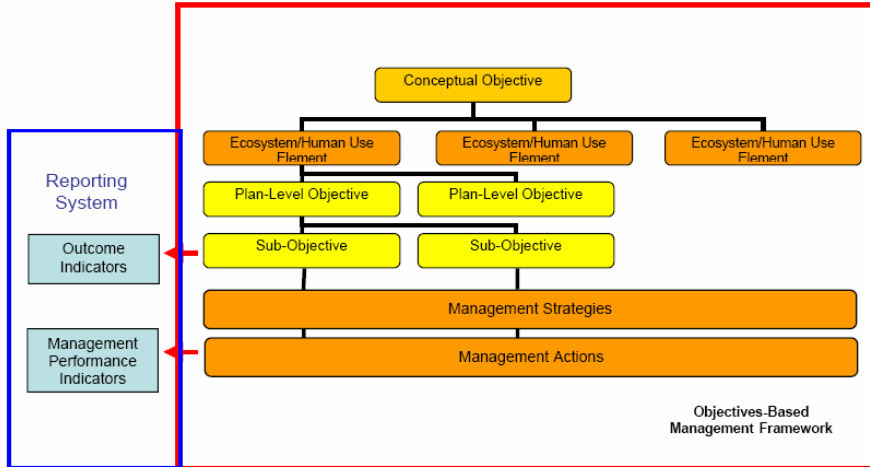
Variety of contexts

Case study	Ecosystem	Activities	Governance
ESSIM, Canada	Offshore area with high biodiversity	Fisheries, offshore oil and gas, shipping, etc.	Federal governance framework
Coastal Policy, Chile	Oceanic and littoral ecosystems	Fishing, aquaculture, industry, port services	National
Oder ICZM, Germany	Estuarine area	Tourism, shipping, fishing	Regional, EU WFD
Xiamen ICM, China	Bay, estuary and island ecosystems	Tourism, fishing, urban development	Regional
CHARM, Thailand	Mangrove forests	Fisheries, aquaculture, tourism	Local
Wadden Sea Trilateral Cooperation	Wetlands	Shipping, tourism, fisheries	Multinational
Thau Lagoon, France	Coastal lagoon	Tourism, shellfish cultivation	Local
MACEMP, Tanzania	Territorial waters, EEZ	Fisheries, tourism, shipping	National

Expert Meeting on Coastal Indicators
Sophia Antipolis, 15 December 2006



Defining objectives and indicators



Expert Meeting on Coastal Indicators
Sophia Antipolis, 15 December 2006



Ranking the indicators

Worksheet - Criteria for rating ICOM indicators

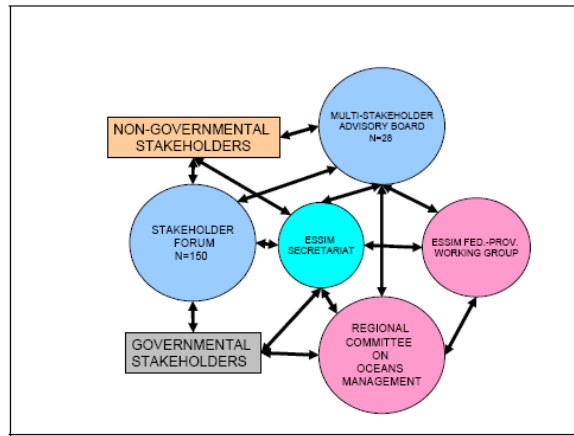
CRITERION	INSTITUTION	G1	G2	G3	G4	G5	G6	G7	G8	G9	G10	G11	G12	G13	G14	G15	
Relevance to ICOM	USM	3	2	0	2	2	0	1	0	0	1	0	0	0	0	0	2
	USF	3	2	2	1	1	2	1	2	1	0	1	2	3	2		
	NN, PP	2	3	2	0	2	2	2	2	2	0	0	0	0	0	0	0
	GDMT	2	3	3	3	1	2	2	3	3	2	0	2	2	0	0	0
	NCE	2	0	3	2	2	2	2	0	2	0	0	0	0	0	0	2
Data readiness and Feasibility	USM	3	2	0	2	2	0	1	0	0	1	0	0	0	0	0	1
	USF	1	2	2	1	1	2	1	1	2	1	0	0	1	2	1	
	NN, PP	2	2	3	0	2	2	1	2	1	0	0	0	0	0	0	0
	GDMT	1	3	3	2	1	1	3	2	2	0	1	1	0	0	0	
	NCE	1	0	3	1	2	2	1	0	1	0	0	0	0	0	0	1
Conceptual and methodological soundness	USM	3	1	0	2	2	0	1	0	0	1	0	0	0	0	0	1
	USF	2	2	2	1	1	2	1	2	1	0	1	1	2	1		
	NN, PP	2	2	2	0	3	3	2	2	2	0	0	0	0	0	0	0
	GDMT	2	3	2	2	1	1	2	3	3	2	0	2	1	0	0	0
	NCE	1	0	3	1	2	2	2	0	2	0	0	0	0	0	0	1
Management responsiveness	USM	2	2	0	2	2	0	1	0	0	1	0	0	0	0	0	1
	USF	2	1	1	1	1	2	1	1	1	2	0	1	1	1	1	
	NN, PP	3	2	3	0	2	3	2	2	1	0	0	0	0	0	0	0
	GDMT	3	3	3	2	1	1	3	3	2	0	1	1	0	2		
	NCE	2	0	3	1	2	2	2	0	2	0	0	0	0	0	2	
Transparency and understandability	USM	3	3	0	2	3	0	1	0	0	1	0	0	0	0	0	1
	USF	1	2	1	1	1	1	1	1	2	1	0	1	1	1	1	
	NN, PP	3	2	3	0	2	2	1	2	2	0	0	0	0	0	0	0
	GDMT	3	3	3	3	2	2	3	3	2	0	2	1	0	2		
	NCE	2	0	3	1	2	2	2	0	2	0	0	0	0	0	2	
TOTALS		54	45	50	35	43	36	37	30	40	21	0	12	12	9	24	
TOTAL AVGR.		2,2	1,8	2	1,4	1,7	1,4	1,5	1,2	1,6	0,84	0	0,5	0,5	0,4	1	

- Ranking indicators based on five criteria
 - Relevance to ICOM
 - Data readiness and feasibility
 - Conceptual and methodological soundness
 - Management responsiveness
 - Transparency and understandability

Expert Meeting on Coastal Indicators
Sophia Antipolis, 15 December 2006



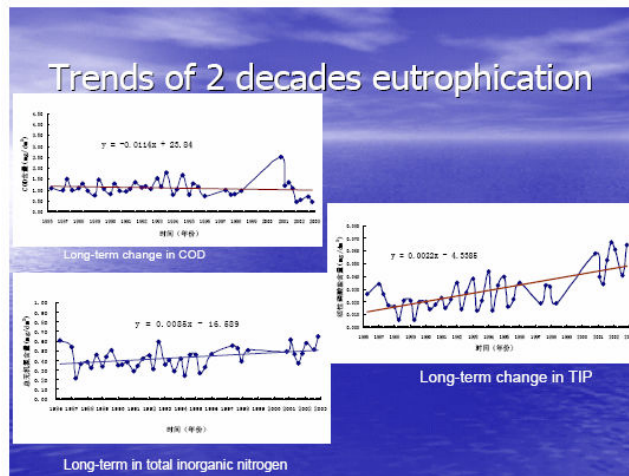
Analyzing coordination mechanisms



Expert Meeting on Coastal Indicators
Sophia Antipolis, 15 December 2006



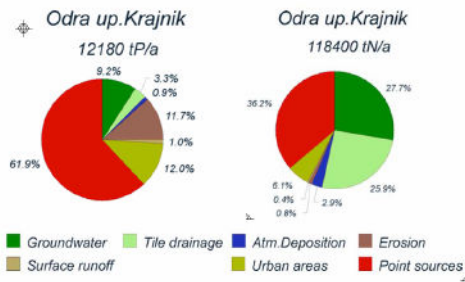
Measuring eutrophication



Expert Meeting on Coastal Indicators
Sophia Antipolis, 15 December 2006



Measuring sources of N and P



Expert Meeting on Coastal Indicators
Sophia Antipolis, 15 December 2006



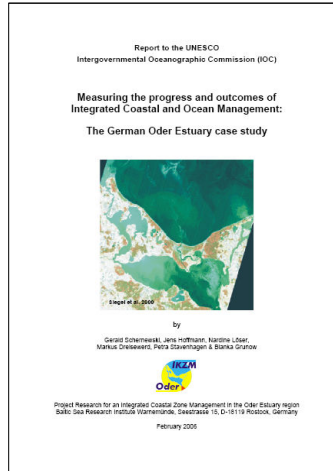
Summary assessment of key trends

Indicator	2006	2007	Change
1. Water quality: turbidity	☺	☹	↓
2. Litter and waste	☺	☺	↔
3. Pollution of estuarine mud	☺	☺	↔
4. Bio richness of estuarine mud	☹	☹	↔
5. Impact of aquaculture	☹	☹	↔
6. Mangrove health	☺	☺	↔
7. Inshore fishing livelihoods: Ease of income generation:			
a. Prawn fishing	☺	☺	↔
b. Crab fishing	☺	☺	↔
c. Push net	☺	☹	↓
8. Offshore fishing grounds:			
a. Sediment	☺	☺	↔
b. Water quality	☺	☺	↑
c. Ease of income generation	☺	☺	↑
9. Overall state of fishing	☺	☺	↔
10. Quality of landscape	☀	☾	↓
11. Well being	☺	☹	↓

Expert Meeting on Coastal Indicators
Sophia Antipolis, 15 December 2006



Reporting to the IOC



Expert Meeting on Coastal Indicators
Sophia Antipolis, 15 December 2006



Key results of the test

- Identification of issues and activities requiring attention
- Inter-agency cooperation
- Joint consideration of governance, socioeconomic and ecological dimensions
- Indicators linked to the different phases of the ICAM cycle
- Open process, evolving as new knowledge becomes available

Expert Meeting on Coastal Indicators
Sophia Antipolis, 15 December 2006



Lessons from the test/1

- Ecosystem / management area
 - Difficulties in defining ecosystem boundaries; better to focus on specific habitats
 - Coastal and marine areas with ecological objectives
 - Designation of management areas an incremental process
- Data collection and monitoring
 - General weakness of the data and information system
 - Need of strong scientific inputs but flexibility in focusing on a subset of indicators and using proxy indicators
 - Importance of linkages among indicators

Expert Meeting on Coastal Indicators
Sophia Antipolis, 15 December 2006



Lessons from the test/2

- Factors influencing the ICAM process
 - Using a multiplicity of instruments to build support and steer the ICAM process
 - Focusing on factors and actors that hinder management changes
 - External monitoring and evaluation
 - Role of an ICAM “guru”
- Recommendations
 - Exploring different analytical framework and M&E strategies
 - Focusing on the attributes of the ICAM cycle, especially early results
 - Different evaluation criteria depending on the stage of ICAM
 - Exchange of experiences

Expert Meeting on Coastal Indicators
Sophia Antipolis, 15 December 2006



Working subset of indicators

Governance	<ul style="list-style-type: none">■ Coordinating mechanism■ Legislation■ Conflict resolution mechanism■ Integrated management plan■ Monitoring and evaluation■ Administrative resources■ Stakeholder participation
Ecological	<ul style="list-style-type: none">■ Biodiversity■ Water quality■ Habitat quality
Socioeconomic	<ul style="list-style-type: none">■ Total economic value■ Total employment■ Pollutants and introduction■ Population dynamics■ Pressures on habitats■ Protection of cultural heritage

Expert Meeting on Coastal Indicators
Sophia Antipolis, 15 December 2006



Follow-up to the project

- IOC ICAM Pilot Project in Latin America
 - Colombia, Ecuador, Chile, Peru
 - Synergy with IOC IODE/ODIN framework
 - Key objectives
 - Strengthening ODINCARSA and ICAM in Latin America, along the southeast Pacific Coast
 - Supporting ICAM and IODE implementation in Latin America through networking, capacity enhancement and improved information delivery
 - Supporting the implementation of ICAM mechanism through the development of regional activities to improve capacity, knowledge, communication and networking
 - Stocktaking with stakeholders, a review of existing documents/literature, and assessment of existing capacity

Expert Meeting on Coastal Indicators
Sophia Antipolis, 15 December 2006

