Coastal marine ecosystems and Integrated Coastal Zone Management (ICZM); A way forward?

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Topic Session **S13:**
Risk management in coastal zone ecosystems around the North Pacific
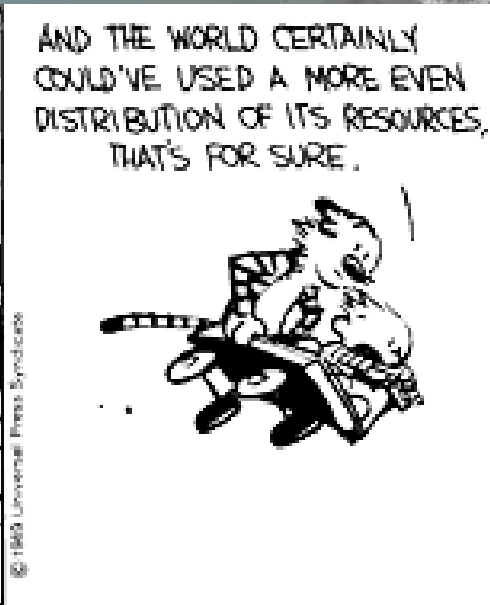PICES Annual Meeting , 17 October 2012, Hiroshima, Japan

Content

- **Background**
- **Lessons from the 2011 ICZM Symposium**
- **Approaches in Norway**
- **Summing up**

Background

- World population 7 billion today and will increase to 9 billion within the next 30 years
- The need for food will increase significantly within the same time period
- Antropocene time - many move from poverty to middleclass

A large part of the world population depend on marin protein

FAO Committee of Fisheries (COFI), Roma 9-13 juli 2012

- **Yield from world fishery (2009) ~ 90 mill tons**
- **~ 30% of fish stocks overexploited**
- **~ 57 % fully exploited**
- **~ 13 % under exploited**
- **Aquaculture ~ 60 mill tons**
- **Within 5 yrs; Aquaculture > 90 mill tons**

2ND INTERNATIONAL SYMPOSIUM ON
Integrated Coastal Zone Management
Arendal, Norway, 3–7 July 2011

Lessons

The 2011 ICZM Symposium

- **Coastal habitats and ecosystem services**

- **Adaptation/mitigation to change in coastal systems**

- **Coastal governance**

- **Linking science and management**

Main environmental challenges and habitat threats

- **Mangroves**
- **Coral reefs**
- **Sea-grass beds and sea-weeds**
- **Climate change**
- **Aquaculture and fishing**

MANGROVES

Main threads:

- **Land clearing**
- **Uncontrolled cutting**
- **Sedimentation (erosion)**
- **Pollution: dumping of waste and garbage**
- **Construction of shrimp and fish ponds**
- **Status: Considerable signs of destruction and deterioration of mangroves**

CORAL REEFS

Main threats:

- Pollution: waste, hazardous waste, eutrophication, oil, sediment/erosion

- Dynamite blasting, cyanide fishing

- Reef hunting

- High water turbidity (resulting from bauxite- and sand mining)

- **Status: Dramatic deterioration and threats**

Need to rebuild declining fish stocks and improve livelihoods

- Fisher livelihoods are threatened

- **Women are the most affected: Many of them are breadwinners in coastal rural households and fish trade is the mainstay**

Coastal governance

## Social and economic impacts linked to the environmental threats and changes

- Conflicts of interests between different stakeholders and sectors relating to land-use and utilisation of the marine resources
- Spatial conflicts between aquaculture activities and fishing; sea-sand mining and fishing; industry and tourism; etc.
- Challenges regarding sustainable management and development of the fisheries
- Social problems related to the rapid development of industry; tourism; other commercial enterprises; migration.

In general

- Lack of **finance**
- Lack of proper **training** for professionals
- **Poor information** system/unreliable data banks
- Lack of adequate **planning** and vision
- **Slow** government machinery – delay in projects
- **Fragmented** organizational structures
- **Lack of coordination** among research institutes and
  Government departments
- **Weak** administrative and legal frameworks
- **Corruption/misappropriation** of money
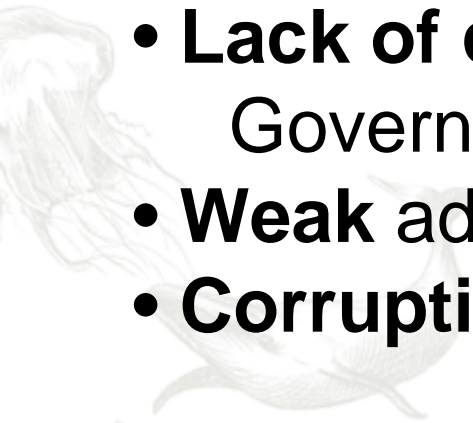
Developed vs. developing countries

- Tendency during the last decades: many plans are prepared by, and implemented by, private companies and actors.

- In developed countries, this private planning and implementation is taking place within the framework of very clear public regulations and control.

- In many developing countries, the legal framework, the procedures and baseline data is often inadequate or lacking, and the public institutions do not have the resources and capacity to carry out the necessary management and control in efficient manner.

Linking science and management

ICZM vs EBM

- Should integrated coastal zone management be more ecosystem-based?

- Is it also to be preferred?

- Are EBM and ICZM complementary concepts, or can/should they be integrated?

- When is one better than the other?

ICZM vs EBM

ICZM:

- Pragmatic arbitrating of user-conflicts
- Doing what is politically possible
- Requires less formal knowledge
  - Knowledge about uses, interest and conflicts
- Usually smaller scale
- Stakeholder-oriented
- Spatial problem-solving
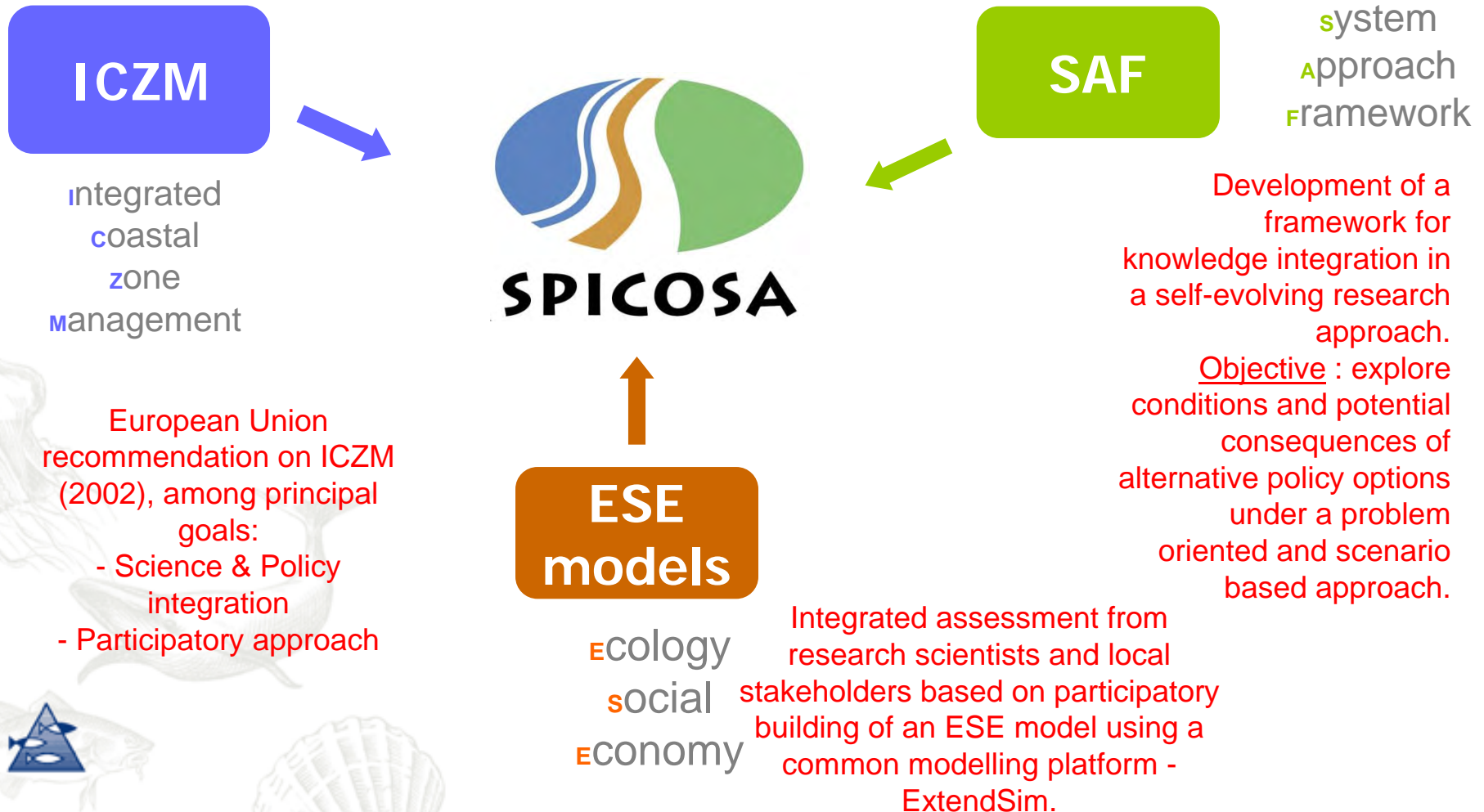- Planners/social science dominated

Ecosystem-based Management:

- Maintain eco-system functions and indentify trade-offs between ecosystem services
- Doing what is ecologically necessary
- Formal knowledge-intensive
  - Knowledge about ecosystems and interactions

- Usually larger scale
- Stakeholder-oriented
- Species interactions + place-based approaches
- Biology-/ecology dominated

Linking science and management

Science and Policy Integration for Coastal System Assessment: novative experiment

ICZM

system
Approach
Framework

SAF

integrated
coastal
zone
management

SPICOSA

Development of a framework for knowledge integration in a self-evolving research approach.
<u>Objective</u> : explore conditions and potential consequences of alternative policy options under a problem oriented and scenario based approach.

European Union recommendation on ICZM (2002), among principal goals:
- Science & Policy integration
- Participatory approach

ESE models

Ecology
social
Economy

Integrated assessment from research scientists and local stakeholders based on participatory building of an ESE model using a common modelling platform - ExtendSim.

SPICOSA

- Aim: Develop System Approach Framework (SAF)
- "Recycle" and reorganize best available science for management purposes
- Science-policy integration and experimental implementation through stakeholder participation

- SAF can be seen as EBM-inspired

Lessons

- **Lesson 1**: Data from large scale monitoring insufficient for small-scale studies

- **Lesson 2**: The smaller geographic scale the bigger difference between scientists and stakeholders/policymakers

- **Lesson 3**: Strong focus on quantifications and modeling reduces the room for necessary qualitative knowledge about cultural, social and political contexts and processes.

- **Lesson 4**: Local EBM requires close collaboration between stakeholders/policymakers and scientists
  - For knowledge production, legitimacy, and policy implementation

- **Lesson 5**: Local processes are often more complicated than regional and national processes – more context involved

- **Lesson 6:** ICZM and EBM should be viewed as different, but complementary approaches on a spectrum where policy issue, scale, urgency and knowledge requirements should determine the approach

General comment

- You can model some policy issues all the time, and you can model all policy issues some of the time. But you can't model all the policy issues all the time!
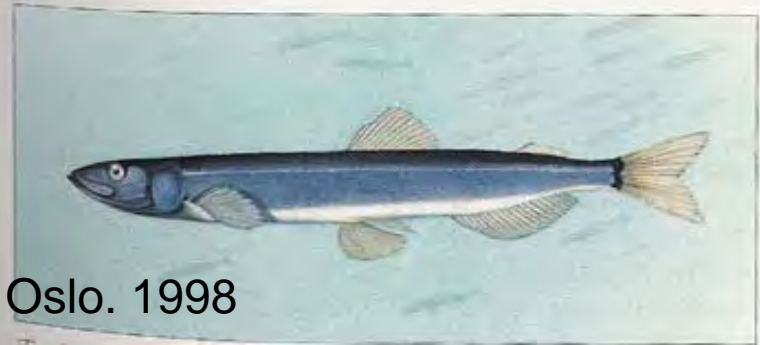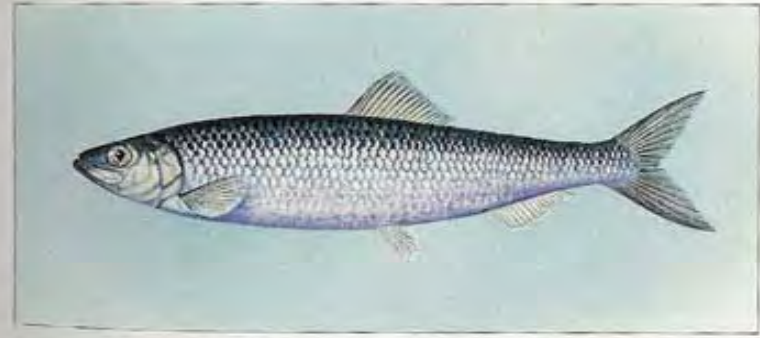
Approaches in Norway

"The world's most beautiful coast"

Cod Haddock Seith

Herring Capelin

From: Kystøkologi, Universitetsforlaget, Oslo. 1998

In the good old days

Two user groups:

- Fishers and sea transport

- Mutual adjustment

- Area management in fisheries to secure catching rights during the seasonal fisheries

- Transport lanes had priority

- No need for spatial planning at sea

Oil and gaz

"In cod
we trust"

Salmon production

Status 2012

- The UN Rio convention (1992) commits all countries to know and protect their biodiversity
- Norwegian white papers on sustainable development (1996-1997) and biodiversity (2000-2001)
- New Planning and Building Act in 2008 coastal areas included in most plans
- Coastal zone plans on county level
- Conservation plans on national and county level
- Coastal shipping lanes: a national responsibility
- Integrated management plan for the Barents Sea, the Norwegian Sea and the North Sea
- Consequence analysis for oil and gas development
- Management plans for fish stocks
- Nature Index for Norway
- Water directive (the EU)
- 2003: The start of the Norwegian national program for mapping and monitoring the biodiversity

The national program for mapping marine habitats;

scientific approaches giving coastal zone managers a tool

- Spawning areas for fish
- Large kelp forests
- Eelgrass meadows and other seagrass meadows
- Large scallop populations
- Oyster beds
- Ice marginal deposits
- Soft sediments in the coastal zone
- Carbonate sand deposits

New Management tools

Active management of marine coastal zones

- The main goal is to protect and increase the value of coastal resources

- Increase the use of local and regional knowledge by including "all" citizens in a municipality in process

- Collect additional data about the use of the sea-areas along the coast, both commercial and recreational

- Use of MPA/zones with regulations of fishing/catch to strengthen the population of selected species. Document effects.

Zonation of sea area
a tool for managment of coastal areas?

- Main issue to increase marine resources in coastal areas
- Local populations of marine species needs to be managed based on a local process
- We have so fare used 4 zones:

  > "No-catch" zone
  >
  > "Habitat"-zone
  >
  > "Aquaculture"-zone
  >
  > "No-restriction"-zone

Furuøya consevation zone – an example

- Area 1,5 km²
- No-catch zone for all marine organisms
- No scientific sampling with mortal result
- Covers the most important spawning area for coastal cod in the region
- Includes major area of nursery-grounds for cod (seagrass meadows)
- Fairly god population of lobster
- Relatively low conflict of interest according to user-registrations.
- Surrounded by habitat-zones (fishing only admitted use of fishing line)
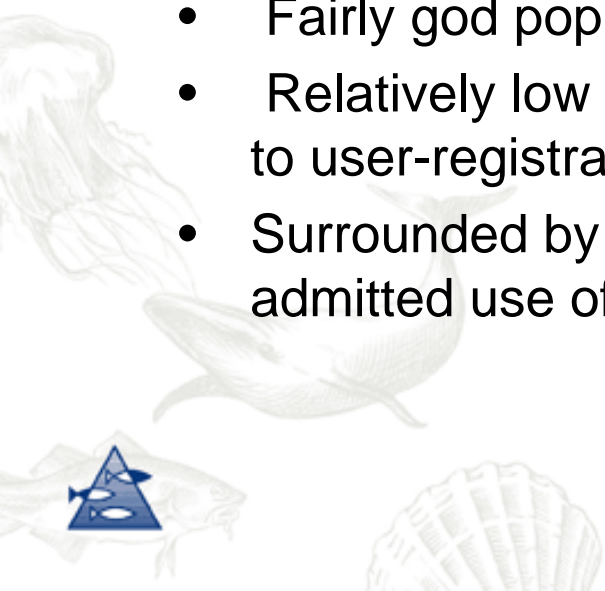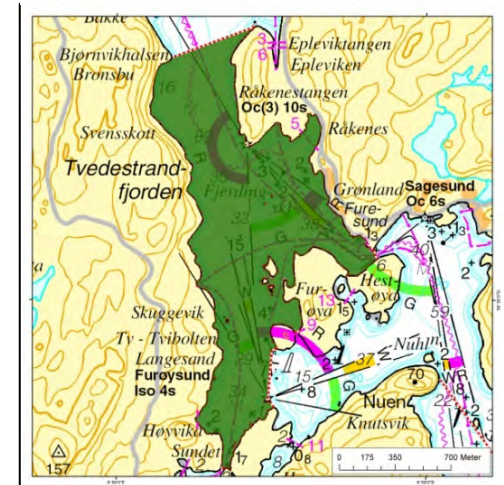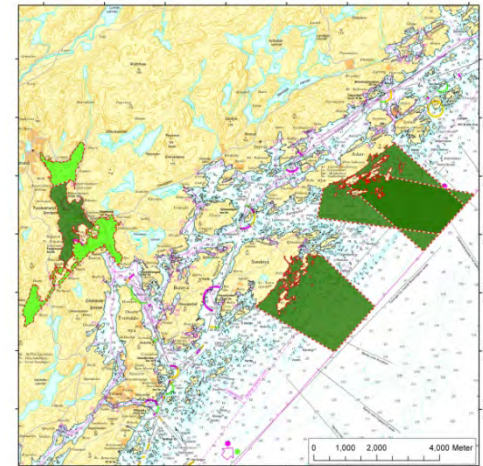
Summing up

- Identify and map biological values in the coastal area – Marine living resources and habitats

- Identify and map human activities in the coastal area

- Make the information available in a digitized format (GIS)

- Development of indicators for the coastal zone management

- Development of more complex ESE models with strong EBM influence

- More focus on capacity building world-wide

Global Challenges in Integrated Coastal Zone Management

Volume II

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18 chapters

Thank you