

# The COSMO-line: Interactive tools for ICZM

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## The introduction of COSMO

In 1993 the World Coast Conference took place in Noordwijk, the Netherlands and the principles of Integrated Coastal Zone Management (ICZM) were presented. During the conference, the Coastal Zone Management Centre/ Ministry I&E and the consultancy firm Resource Analysis introduced COSMO (COastal zone Simulation MODEL) to all the participants.

COSMO is a computer GIS-based model that helps familiarise coastal zone managers with methods for evaluating potential management strategies under different scenarios, including long-term climate change. The positive response from the participants, many of whom were high-level civil servants, led to further development of a family of similar software tools (the COSMO-line). These tools have been used to help managers to determine the advantages and disadvantages of alternative solutions for regional development and climate change adaptation. COSMO is also used worldwide for ICZM capacity building at 'hands on' workshops.

## COSMO facilitates a structured approach

COSMO demonstrates the main steps in the preparation, analysis and evaluation of Coastal Zone Management plans. Potential users are introduced to the various principles of ICZM. Long-term issues such as climate change are considered alongside short term and local effects such as regional economic development and other uses of the coastal zone. The strength of the tools is that the user is 'forced' to take a structured approach to problem solving.

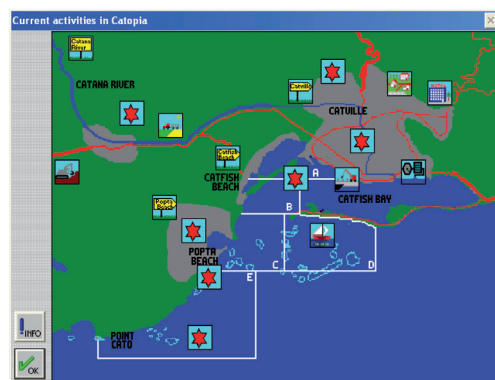


Figure 1: Example of COSMO output: current activities in the fictional territory of Catopia

Using the demo-application (learning by doing), involves explaining in simple terms the framework for policy analysis, the trade offs between different policy options and alternative strategies.

An interactive tool, it allows coastal zone managers to explore the impacts of development projects on the economy and environment. The user can also investigate a number of predefined cases as an educational tool, or specify new development scenarios and combinations of measures. COSMO-tools offer an opportunity to experience the power of an analytical approach to solve coastal problems.

## Steps of the Framework for Policy Analysis

The user interface of COSMO, and the members of its family, developed around the steps of analysis. These steps are now, more than fifteen years after the introduction of COSMO, as valid as they were in 1993:

- The first step is problem analysis. Before considering actions the coastal manager know the state of the coastal zone, its dynamics and all its challenges;
- The second step is the formulation of objectives and the criteria (variables) which can be evaluated if objectives are (or will be) met;
- Definitions of possible measures (strategies, e.g. CZM-plans including different coastal measures) follow and areas of uncertainty to the future situation (scenarios, including e.g. climate change) identified;
- The evaluation of various strategies under different scenarios is possible using a simple simulation tool. Tools, such as Multi Criteria Analysis, facilitate evaluation and valuation of strategies, are included in some members of the COSMO-line.

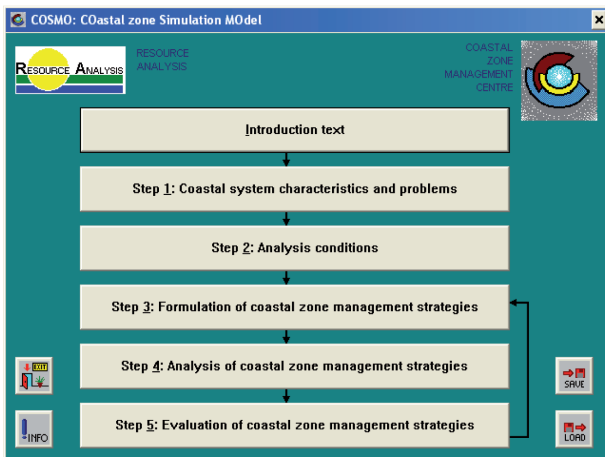


Figure 2: The steps of analysis

Define scenario

Population growth (%/YR) 2.00

Increase bauxite demand (%/YR) 0.00

Increase tourism demand (%/YR) 0.00

Climate change

Sea level rise (m/100YR) 0.20

Additional storm surge (m/100YR) 0.00

Reduction river discharge (%/100YR) 0.00

Climate Change Table Name Trend

Figure 3: Definition of scenarios

Strategy: ZERO.

Coastal zone development

☐ Residential Popta beach

0 Hotel beds Catfish beach

0 Hotel beds Popta beach

Regional development

☐ Bauxite port

0 km2 Irrigated agriculture

☐ Marine park

Environmental protection

☐ No additional protection

☐ Treatment plant (WWTP)

☐ WWTP + onsite treatment

☐ User defined

Response option

☐ Retreat

☐ Accommodate

☐ Protect

0.00100 /yr accepted risk level

Figure 4: The input of strategies in COSMO

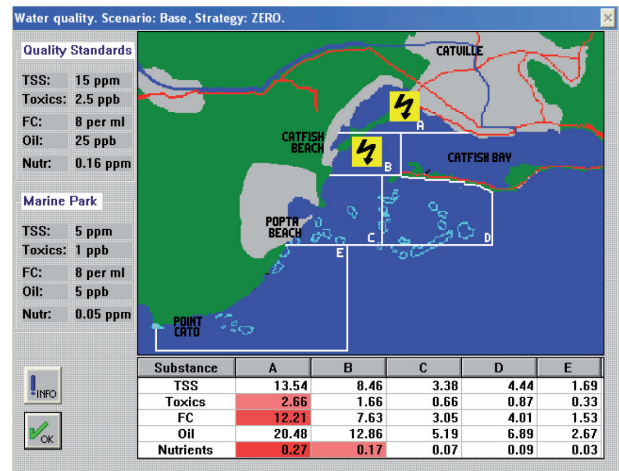


Figure 5: The evaluation of strategies in COSMO

Box: Overview of the different COSMO-tools used around the world:

- COSMO-W was developed for the area of the Western Scheldt. It also served as a prototype of a DSS for estuary management, focusing on typical West European CZM issues.
- NATWEST. This is an application following COSMO-W. It supports the evaluation and selection of projects for the Nature Rehabilitation Plan for the Scheldt Estuary.
- SAMPK. This was developed for training purposes, focusing on a typical situation in Thailand, with soft coasts and restoration of shrimp farming areas (CCC-II-7). In this tool a Multi-Criteria Analysis module is included. SAMPK has also been translated into Spanish.
- COSMOBIO. This tool was created to illustrate the role of biodiversity in coastal zone management and was introduced during the 1998 Jakarta UNBDC-Conference of Parties, and has been translated into Polish.
- COMA was the first version of a CZM Decision Support System for West Africa (from Senegal to Nigeria), to evaluate developments at a strategic level. It is available in both French and English.
- CORAL is a tool that incorporated a methodology for analysing the cost-effectiveness of coral reef protection and management. It was tested in Jamaica, Curaçao and the Republic of the Maldives.
- DSMOZ, is a training tool that was developed for the southern coast of Mozambique and Inhaca Island (near by Maputo), it is available in English and Portuguese.

#### COSMO-Demo available on CCC-website

The COSMO-Demo version will be made available on the CCC website, allowing you to practice with this ICZM tool. If you are interested and would you like to obtain more information please contact Marcel Taal, one of the developers of the COSMO-line: marcel.taal@deltares.nl