

# Indicators as guides for Integrated Coastal Zone Management

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The final goal is a sustainable management of our coast with attention to all its aspects. The development of a set of indicators for the Belgian coast is one of the ways to control and to support a complex matter as sustainable coastal management. At the European level, Belgium has pioneered the development and implementation of a set of 20 indicators for the coast; an initiative of the Coordination centre for integrated coastal zone Management (ICZM). Through the development of an interactive website, a publication 'the coastal compass', a SWOT-analyses and evaluation of the indicators, the coordination centre tries to bring the indicators more closely to the pursued policy and reform them to a better tool for Integrated Coastal Zone Management

## Indicators for the Coastal zone

The final goal is a sustainable management of our coast. A management that not only places importance to the needs of the tourist sector but also takes other economical interests into account, where social concerns and a pleasant environment are appreciated and the unique nature and cultural patrimony are safeguarded. To achieve this goal, common future perspectives, operating the development and sustaining the formulation of the long-term strategic objectives, are needed. The development of a set of indicators is one of the ways to control and to support such a complex matter as sustainable coastal management.

To pursue effective policies for the coast, a wide variety of high-quality information and data is needed. Decision taking and good governance requires a sound scientific base in order to assess effects of policies at ecological, environmental and socio-economic level. The set of sustainability indicators (SI) can provide an answer in a format that is useful for policymakers

An indicator is a measured or observed parameter that provides information about a system. It is supposed to make certain phenomena perceptible that are not –at least not immediately- detectable. This means that an indicator has a significance extending beyond what is directly obtained from observations [1].

Indicators provide an extremely useful way to improve communication, transparency, effectiveness and accountability. They are a tool that helps make clear assessments of and comparisons between management measures through time. They also can be used to simplify the description of the extent to which the objectives for the management programs are being achieved.

## **The Belgian approach to the use of indicators within integrated coastal zone management**

### **The coastal area: finding the right balance**

At the European level, Belgium has pioneered the development and implementation of a set of 20 sustainability indicators for the coast, as an initiative of the Coordination Centre for Integrated Coastal Zone Management (ICZM)-Belgium.

The process to draw up a set of indicators for the Belgium coast started in 2000, under the impulse of the Flemish government and the province of West-Flanders. In a preliminary study, the Centre for Sustainable Development (CDO, University of Ghent, 2001) suggested an outline for what long-lasting management for the coastal area could mean and proposed a list of indicators which would be useful and efficient to check whether the area is indeed evolving in the desired direction. For this purpose dozens of civil servants both from provincial and Flemish administrations entered into intensive talks and were involved in a series of workshops [2].

In this phase, six equivalent priorities necessary to obtain a sustainable development of the coastal zone were put forward:

- quality improvement of living and housing environment,
- preserving and strengthening of the socio-cultural capital,
- improvement of environment and nature,
- strengthening of the economical texture,
- support of tourism and recreation,
- carry out governance renewal.

The review of useful measurements led to a list of over 200 indicators. An extensive list of indicators gives all those interested the possibility to observe in detail the strategically relevant evolutions at the coast. But such an extensive list is not realistic to measure the coast's sustainability neither does it lend itself for communication purposes towards a larger public. Therefore, starting from this extensive list a selection of 50 indicators was deduced so that it can be used as 'signboard' but also as a guidance for the management priorities, a communication tool as well as a basis on which efforts for data collection can be focussed on.

The goal, in the second phase was to obtain an elaborated list of more or less 20 indicators [3]. The extensive list was the object of critical analysis by civil servants and representatives of coastal actors gathered in two workshops (7 June 2002 and 20 January 2003). The results of these workshops were decisive for the final set of indicators.

Finally the participants drew up a list of 50 indicators that, in their opinion, can be used to observe in an efficient way the future perspective of the coastal zone. For the top 20 – the 20 most representative – exhaustive filing cards have been set up and data, where possible over several years, have been gathered. These 20 indicators are brought together in the website: [www.kustbeheer.be/indicatoren](http://www.kustbeheer.be/indicatoren).

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*The 20 selected indicators*

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Degree of unemployment  
Employment in the tourist sector  
Number of good renovations and restorations  
Change in employment in the sectors of fish and agriculture  
Fish stocks out of the biological limits  
Ratio of business started/bankrupt  
Value added per employee  
Efforts concerning integrated coastal zone management  
Pressure on incomes  
The population structure  
Housing quality  
Bathing water quality  
Domestic waste  
Number of pollutions (oil) observed/hour flying time  
Surface of typical seaside habitat  
Surface of the protected green area  
Number of accommodation with easy access  
Ratio resident/non-resident tourism  
Traffic pressure on the road  
Economic value of the shipping industry versus emission of toxic dust

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Figure 1: The indicator set for the Belgium coast.

### **Indicators as management support and communication device**

In order to provide a dynamic and useful instrument, the Coordination Centre brings the indicators actively and repeatedly to the attention of policy makers and potential end users. It is important to develop reporting products to ensure information reaches the broad user community and is understood by them.. To this end, an interactive Internet site ([www.kustbeheer.be/indicatoren](http://www.kustbeheer.be/indicatoren)), technical sheets and a recurrent publication: 'The Coastal Compass', are developed.

#### The interactive Internet site

Traditional forms of reporting (i.e. printed reports with data tables) have a limited life span. Based on the ability to inform the interested stakeholders, an interactive Internet site is developed. The Internet site gives unrestricted access to the data and the background information. The data is stored in an information management system that contains the raw data but also all the calculated information used for the indicator value. By the use of a dynamic Internet site, the indicators can be permanently actualised with the latest data and available for the general public.

#### The technical sheets

The technical sheets contain detailed information on each indicator from who is responsible for the data collection to how the indicator is build up. These sheets are designed to make the indicators more transparent.

## The Coastal Compass

The 'Coastal Compass' is a publication on paper that describes the state of the Belgian coast [4]. It reflects trends and phenomena that can be linked with strategic visions and objectives of ICZM and formulates suggestions for a more sustainable approach. The coastal compass, describes the 21 sustainability indicators for the Belgian coast by means of four questions: why use this indicator, what's the meaning of this indicator, what are the results, what for the future.

Over 50 scientists contributed to the Coastal Compass as an author, lector or as editorial staff. During the many contacts with the collaborators of the coastal compass, it was clear that the theme's, discussed by the indicators are very lively. The elaborate process makes that the publication is supported by a broad group of stakeholders.

The publication does not give an evaluation of the coast and the coast policies, but wants to give objective information to policymakers, environmental experts and interested public. The coastal compass does not aims to provide information about the coast, sustainable development or the coordination centre to the general public.

## The next step

The process prior to the publishing of the coastal compass showed that not all the used indicators are suitable for the Belgian coast. In 2006, a large-scale thorough evaluation of the indicator set is planned. Firstly the method of working with indicators will be evaluated by means of a strength weakness (SWOT) analysis and a confrontation matrix. The outcome, a strategy combined with concrete actions, will provide a guideline for the further work with the indicators for the Belgian coast.

Secondly, the indicators themselves will be evaluated. The indicators will be tested if they reflect the breadth of coastal interests and concerns, if they are easy to understand, sensitive to changes and relevant. They also will be evaluated to be scientifically sound and statistically valid, capable of providing quantitative information. By further improving the set of indicators, the instrument should fit more closely to the pursued policy and can serve as a better tool for ICZM.

## The relation between coastal indicators and the coastal atlas

The coastal atlas is the answer to a request by the Recommendation on ICZM: the national stocktaking [5]. The national stocktaking should provide a Member State with good quality, objective information that can inform the development of national strategies for implementing ICZM. The process of stocktaking should provide a better understanding of how the coastal zone is currently managed and what the main issues are.

The digital coastal atlas ([www.kustatlas.be](http://www.kustatlas.be)), integrates these sets of Sustainability Indicators with a link to coastal policies. It provides information for the Belgian coast, on themes such as nature, culture, the physical environment, tourism, industry, fishery, others...The website is available in English, French, German and Dutch.

## Spatial Analysis of the coastal indicators

To use the indicators optimally, the linking of different indicators and the relation with the governance of the coast is investigated. Between January and May 2006 a technique to analyse of the indicators used within the SAIL and DEDUCE projects (see below) was conducted. By using different techniques such as GIS spatial analysis and factorial analysis,

relations between indicators could be studied. Indicators that determine the most of the variance were identified by means of a principal component analysis and a component matrix.

Although only Belgium was considered with this technique, and the differences between coastal zone and hinterland, it became clear that data acquisition is an important part of this kind of research. Not only obtaining the data was important, but also an acceptable quality of the data is indispensable. The comparison of indicators can lead to obtain more information about the characteristics of a community, the differences between communities, as well as the difference between hinterland and coastal zone.

## **Interactions between Belgian and European set of indicators for the coastal zone**

### **Coastal Indicators at a European level**

Several international partnerships also underline the importance of indicators. For instance, the SAIL (Schéma d'Aménagement Intégré du Littoral) partnership uses a set of 27 indicators and 45 measurements to visualise the state of the coast of the Southern North Sea. This set was developed and calculated by Flanders Marine Institute (VLIZ). ([www.vliz.be/projects/SAIL](http://www.vliz.be/projects/SAIL)) [6].

This set of indicators also served as a blueprint to the list of indicators as approved in November 2004 by the Working Group on Indicators and Data, of the EU ICZM Expert group. The Recommendation concerning the implementation of Integrated Coastal Zone Management, (2002), calls for an integrated approach to monitoring and measuring the sustainable development of the coastal zone. The EU ICZM Expert Group established a Working Group on Indicators and Data (WG-ID) in 2002 to advise it on ways in which Member States can assess whether they are moving further towards, or away from, a more sustainable future for their coastal zones, and at what pace and to propose a method for measuring the extent to which ICZM is being implemented.

The WG-ID, led by the European Topic Centre on the Terrestrial Environment, subsequently drew up two indicator sets:

- an indicator measuring progress in implementing ICZM (the 'progress indicator')
- a set of 27 indicators of sustainable development of the coastal zone (the 'SD indicators')

Used together, the two sets should reveal the degree to which implementation of ICZM can be correlated with a more sustainable coast. That is, decisions using an integrated approach should see a positive improvement in the state of the coast with concomitant progress towards sustainable development. The indicators measuring progress in achieving sustainable development of the coast will in turn feed back to give policymakers an indication of the need for further action in ICZM. The EU-indicators support member states in the evaluation of sustainability in their coastal zones and in developing and reporting on Coastal Strategies (February 2006).

The co-ordination centre on ICZM, works together with 9 partners in the DEDUCE project. DEDUCE or the Développement Durable des Zones Côtières Européennes, is a transnational project, supported by the Interreg III-south Community Initiative Programme. Its main objective is to evaluate the utility of indicators for optimal decision making on the coast following the principles of the EU Recommendation on Integrated Coastal Zone Management. Nine partners from six countries (Poland, Spain, Malta, France, Latvia and Belgium) are

calculating, testing and validating the 27 indicators of sustainable development as agreed in the EU expert group [7].

Guidelines for an integrated analysis will be developed and the final reports will help the states and the regions to evaluate the state of their coasts and their progress towards sustainability.

The main objective of DEDUCE is to improve the tools and the information systems necessary for optimal decision making about the coast, at all levels: European, national, regional and local. According to DEDUCE this can be divided into five specific objectives:

- calculate and compare the 27 sustainability indicators and one progress indicator agreed;
- evaluate and compare the geographical information systems (GIS) for the analysis and viewing of the state of the environment of each of the coastal areas and the methodologies based on the use of the GIS through a website;
- establish a common model for reporting the state of sustainability of the coast, in which the effects of human activities and their impacts are evaluated and monitored;
- compose a guide for the use of the indicators of sustainability for examining the development of the state of the coast;
- study the possibility of setting a European regional information observatory.

Hopefully the outcome of this project will improve the tools and the information systems necessary for optimal decision-making about the coast, at all levels.

### **Coastal Indicators at a global level**

International instruments, such as Agenda 21, the Plan of Implementation of the World Summit on Sustainable Development (WSSD), the Convention on Biological Diversity and several other fora, are calling for a cross-sectoral/integrated approach to the management of coastal areas.

To this perspective, indicators appear as a tool to help the coastal area managers to install a sustainable approach for the coastal zone. In response to these developments, a Pilot Program was established in 2003 under the auspice of Intergovernmental Oceanographic Commission (IOC) of UNESCO to promote the development and use of ICOM indicators [1]. This IOC-Pilot Project intends to promote a more outcome-oriented approach to the selection and application of indicators to measure the progress and effectiveness of ICOM interventions.

To this extend, a *Handbook for Measuring the Progress and Outcomes of Integrated Coastal and Ocean Management*, is developed. This handbook provides a tool for developing, selecting, and applying indicators to measure, evaluate, and report on the progress and outcomes of integrated coastal and ocean management initiatives. The handbook is intended as a method and a series of guidelines that could assist coastal managers, decision makers, experts,... to establish an ICZM initiative. The handbook contains suggestions on how to prioritize ICOM issues, define measurable objectives for ICOM programs and projects, and identify meaningful indicators to monitor the implementation and results of such programs and projects.

The structure of the handbook is built around three main types of indicators -ecological, socioeconomic, and governance performance- and the ICM policy cycle, and includes an introduction to ICOM, suggestions on how to optimize relationships among these dimensions,

and elements for further research on indicators. In order to validate and receive feedbacks from potential users, the Handbook is being tested in existing ICOM programmes and projects around the world such as Chile, Tanzania,... Within this IOC-Pilot Project the indicators are promoted world wide as a tool to support ICZM projects..

## Conclusions

The process of working with indicators at the Belgian coast showed that not all the selected indicators are suitable. By evaluating and adjusting the set of indicators, the set should provide a more direct link to coastal policies. Evaluation and adjusting the set of indicators is useful, but beware of too frequent adjustments. A good evaluation needs a monitoring over several years.

There is an important difference within the setup of the list of indicators between the Belgian and European process. In Belgium, the list of indicators was drawn up by means of a broad public participation. This has taken a process of more than 2 years, but the indicators were chosen by different stakeholders. At European level the main issues in the coastal zone were identified by means of public participation and further completed by expert consultation.. This led to a balanced set of indicators. Throughout the discussion it became clear that there is no right method. Both processes have advantages and disadvantages.

Indicator based projects on an international level, can cause some difficulties that must be taken into account. Often there are problems regarding the collection of data, the determination of the definitions and the interpretation of results. But working with indicators in an international context can be very informative and offer a different perspective such as benchmarking.

When starting an indicator-based programme, one has to be aware that working with indicators can be very time consuming. A number of indicator programmes have stranded on this matter. To work in an efficient way with indicators and to stimulate them as a communication device, it is important to bring the indicators frequently to the attention of the target group. To develop an efficient indicator set, there has to be sufficient time to refresh the set, update the data and develop communication tools. By further improving the set of indicators, the instrument should fit more closely to the pursued policy and can serve as a better tool for ICZM. Because indicators give a quick scan of the coastal zone, they can certainly help to install a sustainable coastal zone management.

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