Introduction - Module Targets

At the end of the module the reader should be able to

- design a framework for ICZM process planning;
- set up an institutional/stakeholder analysis;
- identify different tools in support of spatial planning in ICZM.
At the end of the module the reader should be aware of

- the possible levels of participation of stakeholders and available methods;
- the institutional obstacles which can be in the way of a successful continuation of a ICZM process;
- the implications of sustainable development of Coastal Zones;
- the different techniques that exist for conflict management;
- the existing European policy and legislation affecting CZM;
- different spatial planning tools with their particular scope and application.

**Introduction - Institutional cooperation and coordination**

Imagine yourself living in a coastal area, and year-by-year you see activities increasing: more tourists are visiting, the city and the harbour are growing, and agricultural practices cause high nitrates loads in the water. You notice pollution of land and water increases, nature deteriorates, and the archaeological sites are being neglected. You decide to form an action group of concerned citizens and want to tell the government that they should make a plan to develop the area in a more sustainable manner.

The ICZM-process, as illustrated in figure 1-1, has the following management steps:

- problem assessment;
- planning;
- implementation and
- evaluation.

From the planning phase follow the technical and institutional measures to be implemented in an agreed time schedule. These measures should address the short-term coastal problems, and challenges and respond in an adaptive way to the anticipated long-term effects of global changes (such as climate change).

The implementation phase is followed by monitoring and evaluation of the state and functioning of both the coastal zone system components interactions and the related technical and institutional developments. This may in turn lead to the identification of problems (triggers), leading to the initiative to start a new cycle in the ICZM process.

Although the steps of management are presented sequential, a constant feedback is essential, including re-formulation of problems, adjusted planning, changes in implementation, etc. The result is an iterative, cyclic process. In time, its emphasis shifts slowly from problem recognition towards evaluation.
Planning is an integral part of the ICZM process. The purpose of planning is to produce a framework (or plan) to guide decision makers in the immediate and future allocation of scarce resources (e.g., space, land, capital investments, fish, water) among competing interests (stakeholders).

Implementation is the carrying out of a plan which specifies a set of measures (or strategy) to reach identified goals through the execution of a strategy. Implementation involves the detailed design of measures; the implementation of selected measures; operation, maintenance and adaptation of implemented measures; and monitoring and evaluation.

The challenge of ICZM

### Coastal Zone Management Tasks

<table>
<thead>
<tr>
<th>Problem Recognition</th>
<th>Planning</th>
<th>Implementation</th>
<th>Evaluation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Research Assessment</td>
<td>Data Collection</td>
<td>Policy Development</td>
<td>Decision Making</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Plan Execution</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Operation and Maintenance</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Monitoring</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Assessment and Outlook</td>
</tr>
</tbody>
</table>

**Figure 1-1 Overview of relevant phases in a cyclic ICZM process,**

see for more details the [ICZM scheme](#) from the module Principles of ICZM
The ICZM process deals with complex phenomena, complicated socio-economic and institutional situations, conflicting interests, and many different stakeholders. Long-term solutions are to be identified and implemented within a dynamic and rapidly changing society, subject to a high degree of uncertainty. Clearly, a great many obstacles are in the way of successful ICZM implementation. From various experiences, the primary challenge has been identified as one of governance and management, rather than knowledge or technology. The principal limiting factors are the institutional capacity to actually apply ICZM, and make it operational, as well as the building and sustenance of constituencies to support ICZM, both within and outside a government.

**Introduction - Spatial planning**

Estuaries and coastal zones serve many different functions such as economic activities, recreation, nature and flood protection. An integrated approach needs to be taken to their management, but such an approach is not (yet) automatically adopted in practice. A range of diverse and sometimes uncoordinated initiatives are more likely to be followed.

The primary task of a decision-maker in the field of natural resources allocation is to solve the problem by finding a spatial distribution of available resources, acceptable to all parties involved.

Important here is the difference between problem solving and decision-making, which can be understood as follows:

- Problem solving is a process in which we perceive and resolve a gap between a present situation and a desired goal, with the path to the goal blocked by known or unknown obstacles.

- In contrast, decision-making is a selection process where on the basis of sound problem analysis one out of two or more alternative solutions is chosen to reach a desired goal.

In such a dynamic social environment, driven by a host of competing players and interests, integrated policy-making for estuaries and coasts is a complex and generally time-consuming business. There is often a great deal of information available, but it tends to be fragmented, incomplete, scattered between authorities and by no means always traceable or organised. Even once it has been assembled, stakeholders must communicate the information available so that its use will not provoke resistance or conflict. This can be achieved by involving stakeholders in the policy making process at an early stage. An interactive open planning process meets these needs if it actively involves stakeholders in decision-making right from the initial
Planning processes are normally triggered by a need for change or prompted by a specific problem as it develops. In the course of the planning process, new situations constantly arise. The various stages in a (interactive) planning process can be supported by a variety of computer tools.

For more details see the section Tools under the chapter Practice in this Planning module.

Figure 1-2 @-LVIS is a tool purposely designed for information exchange to the stakeholders in the project: Sustainable development of the Scheldt Estuary (Belgium / The Netherlands)

The tools can assist policy development and decision-making at various levels, for a variety of potential users. Different types can be used. Some tools focus on the simulation of physical, biological, economical, etc. processes and are based on sophisticated mathematical relations and models. On the other end of the spectrum tools are found that primarily focus on supporting the ICZM-process. Their focus is on an integrated approach and facilitation of communication and discussion between stakeholders.
Planning: to formulate a purposeful, forward-looking strategy or design (a plan), often with coordinated priorities, options and measures, that elaborates and implements policy.

Stakeholder participation: part taking or involvement of all groups and individuals affecting, or being affected by, the project.

Institutional arrangements: arrangements ensuring a cooperative environment, e.g. a project organisation, in which all parties involved freely contribute and participate.

Conflict management: assisting people in conflict situations to develop an effective process for dealing with their differences.

**Concepts - Institutional analysis**

Given the specification of a concrete ICZM setting in terms of problem/area definition, phase(s) of the ICZM process, and identification of relevant actors, the basic approach involves the assessment of the status of the ICZM process and the role and position of the relevant actors. This can be assessed using four implementation requirement categories, (Resource Analysis, RA/01-456).

- "Mandate" or: what stakeholders are allowed (and expected) to do, in terms of the responsibilities and executive powers available in performing ICZM tasks, actions and decisions.

- "Capacity" or: what stakeholders are capable of doing in terms of available knowledge and expertise; specific skills related to the various ICZM tasks (such as analysis, evaluation, design and implementation); (human) resources; and facilities (various equipment).

- "Commitment" or: the degree to which relevant stakeholders are actually involved with and committed to the successful application of ICZM.

- "Financial potential" or: the extent of the financial resources available to stakeholders, or the actor's possibilities to raise money, for financing ICZM related tasks and activities.

In order to assess the status of the implementation requirement categories a number of implementation aspects have to be defined in relation to mandate, capacity, commitment and financial potential. Subsequently, qualitative scores can be provided for each implementation aspect. This should be done together with the stakeholders involved in the different phases of an ICZM programme.

**QUESTION 2**

Give at least five factors that lead to failure of an ICZM process

The above question shows that ICZM is a multi government level affair (local, regional, national and international). ICZM is not the exclusive domain of one of these levels, but gradually shifts from a national to a
Implementation aspects to be considered in relation to the specification of “mandate”:

- Planning initiation: the authority to initiate an ICZM planning exercise;
- Planning and assignment of planning tasks: the authority to execute;
- Technical design: the authority to undertake (or assign other parties to undertake) feasibility and design studies for technical measures or projects;
- Institutional design: the authority to undertake (or assign other parties to undertake) feasibility and design studies for institutional measures (legal, administrative and organisational changes with respect to rules, regulations, responsibilities and executive powers);
- Implementation and financing decisions; the authority to approve the actual; implementation and financing of technical aspects;
- Etc.

Implementation aspects to be considered in relation to the specification of “capacity”:

- Analysis facilities: computational framework and equipment and analytical tools required for ICZM analysis;
- Decision making capacity: experience in, and staff required, to interpret and evaluate ICZM planning options and to select the preferred option based on sound and objective judgement;
- Institutional design capacity: capabilities and staff required to design institutional measures/changes which are operationally, administratively and legally feasible;
- Monitoring capacity: capabilities, facilities and staff for monitoring and inspection of coastal areas, identification of coastal problems and the effectiveness of implementation of technical and institutional measures;
- Etc.

Implementation aspects considered in relation to the specification of “commitment”:

- Findings of major infrastructural projects or to enforce legal and financial measures, inputs of the national level will be required. On the local level and individual level management options have direct consequences for the quality of life of people.

**QUESTION 3**

Make a list of stakeholder groups (technical, institutional etc.) involved in ICZM in your country

**QUESTION 4**

Give at least 3 kinds of information that should be considered if you have to set up an overview of all relevant stakeholders (national, regional and local)?
- Actual involvement: limitations in the extent to which relevant stakeholders are actually involved with, or can exert their influence on, the ICZM process;
- Cooperation potential: limitations in the extent to which an actual cooperation 'culture' (willingness to cooperate, cooperation experiences) and inter-sectoral contacts exist, as well as in the extent to which stakeholders are aware of and convinced of the impact of coastal problems and ICZM potential to solve these problems, through strengthening of 'vertical and horizontal' communication and coordination;
- Integration potential: limitations in the extent to which the existing institutional and hierarchical structures allow for an actual integration of interests, responsibilities and executive powers;
- Etc.

Implementation aspects considered in relation to the specification of "financial potential":

- Structural existing financing capacity: the amounts actually available and used for ICZM tasks and activities based on firm budget allocations and financial commitments;
- Incidental existing financing capacities: the amounts actually available and used for ICZM tasks and activities based on temporary allocations and commitments;
- Potential financing capacities: the amounts which, in addition to existing financing capacity, could potentially be made available from national or regional financial resources, or could be raised from external sources (donor organisations, public private partnership constructions);
- Etc.

Concepts - Stakeholder participation

As was explained in the previous section, stakeholder analysis is a fundamental step in the ICZM process. Crucial, however, to the success of an ICZM plan will be the actual participation of the various stakeholders in the process. This means that besides co-operation between the various sectors of local, regional and national governments, also the non-governmental organisations, business and local people need to become involved in ICZM.

local people

Without the full participation of local stakeholders, coastal management strategies will never succeed. If people do not feel involved in decisions that affect their
Stakeholders can participate in many ways and at various levels. The level of participation as well as the methods selected should be carefully considered during the planning phase. It can make the difference between failure and success at the end of the ICZM project.

Region, they can come to resent policy-makers and reject plans to improve coastal zones. In 1993, for example, local residents rejected a management plan for the Exe estuary in the United Kingdom drawn up by a firm of consultants. The residents complained that the consultants had not asked them for their views on certain questions, particularly on issues related to charging estuary users for the provision of harbour services. This led policy-makers to rethink their whole strategy for the estuary and a series of local topic groups made up of local residents was set up. Following a broad consultation process, which included numerous local meetings, a new strategy for the region has been drawn up that everybody seems happy with. The residents still meet regularly to discuss local problems and have set up the Exe Estuary Forum to coordinate efforts to improve life in their coastal region.

(EU focus on coastal zones)
Figure 2-1 Levels of participation

Non-participation
At the bottom level one finds the most primitive form of participation: information. Strictly, there is no participation; the stakeholders are only being informed. It is a one-way direction.

Symbolic participation
The next two levels: Involvement and Consultation are being called symbolic participation. Stakeholders can give their views and opinions, however there is no guarantee that the decision maker will actually use this in the final decision or plan.

Real participation

QUESTION 5
Which level of participation is needed for real community participation?
The upper three levels are real participation: co-operation, delegation and self-governance. In this last level its actual the stakeholders who become the decision makers, this is in fact very rare. Co-operation and co-formulation are the most common types of real participation.

Methods can be selected in accordance with the chosen level of participation. Modern communication means, such as electronic mail or dedicated web sites, can be very supportive as a discussion or information method. Meetings, workshops and other face-to-face encounters remain nevertheless essential. Examples of more dedicated tools supporting stakeholder participation at various levels can be found in the section tools.

Concepts - Designing institutional arrangements

Many government ministries and associated departments are likely to be involved in the development of an ICZM plan. Figure 2 shows the various networks to be considered when arranging for coastal zone development. On the right the arrangements between different sectors at one level of government (in particular the national level) and on the left arrangements between different government levels, for government activities or within one specific sector. Horizontally displayed are the various scientific sectors, each of them contributing from their specific backgrounds. Fully integrated CZM is only achieved when the institutional integration, sectoral integration and integration between science (technical research) and policy development are entirely realized.

Depending on the existing situation and the management issues addressed, a structure should be developed for the planning and analysis phase, which fully accounts for the existing institutions and practices. This might prove a difficult and delicate task.

Planning can only be effective if the process of initiation, formulation and analysis is embedded in a proper institutional framework of stakeholders, which contribute to formulation, impact assessment, and evaluation of alternative strategies.

Getting institutions to cooperate in multi-sectoral activities towards ICZM goals that no single institution can accomplish alone is certainly one of the toughest jobs for an ICZM authority.
Institutional and sectoral integration enhance the necessary compromises among different sectors and government levels. Incentives for this integration are found in the common need to achieve objectives, the establishment of 'win-win' situations and the need to speed up the planning process.

**Figure 2-2:** Three different types of integration that have to be achieved for fully integrated CZM

**QUESTION 6**

Develop an organisation structure for the set up and execution of an ICZM program including overall coordination and different levels of government (think about the earlier stakeholder analysis)
Concepts - Conflict management

Conflict management has been called the greatest challenge for integrated coastal zone management. Almost any significant development of a coastal zone, be it for tourism, harbours, aquaculture or residence, is likely to infringe on the rights of others and lead to conflicts.

The high priority accorded to "ownership of projects" and "stakeholder participation in all program phases" is a typical success factor for all integrated resources and environmental management fields.

The benefits of conflict management may depend on the type of project and the type of conflict. Conflicts can either be pre-existing (and even be a primary cause of ICZM problems) or result from planned interventions and/or development projects in the coastal zone. Construction of a major international seaport will probably always displace other users and conflict management may not be able to mitigate those conflicts significantly. On the other hand, the favourable outcome of multiple-use coastal zone development projects, where objectives of fisheries, tourism and environmental protection are expected to be realised in conjunction may depend on effective conflict management.

Conflicts are not necessarily negative. The problem rather lies in how conflicts are managed. Thus, the goal of conflict management is not to avoid conflict, but to focus on the skills that can help people express their differences and solve their problems. Conflicts can either be real conflicts or conflicts that arise in case of miscommunication (e.g. not understanding of each other because of different perception of the problem). It is important to know the cause of a conflict so that an

**QUESTION 7**

Which of the following statements is correct?

- Community consultation does not play an important role in conflict management
- Conflict management should be an explicit element of project preparation
- Conflict management is not effective during project execution
appropriate conflict management technique can be used.

Conflict management techniques can be presented on a scale of increasingly directive initiatives. The scale moves from the extreme that leaves all initiative and authority with the parties themselves towards increased involvement and eventually interventions by third parties that provide assistance. A representation of this scale is given in figure 2-4.

<table>
<thead>
<tr>
<th>A</th>
<th>B</th>
</tr>
</thead>
<tbody>
<tr>
<td>Consensus building</td>
<td>Consensus building or conflict prevention. This group of approaches, often linked to participatory planning methods or stakeholder participation, focuses less on the resolution of a specific conflict than on fostering a cooperative (planning) process for complex, multi-issue, multi-user situations. The name, consensus building, should not be understood to imply that these approaches are only suitable when there are no conflicts of differing interests among parties. In fact, these methods often work well, even when the stakeholders disagree strongly with each other. The consensus building methods are appropriate in early - strategic - stages of the planning process, to develop directions or strategies that are supported by a large number of stakeholders.</td>
</tr>
<tr>
<td>Relationship building assistance</td>
<td>Relationship building. A relatively &quot;light&quot; form of intervention is when outside facilitators arrange some activities to (re-) build a working relationship among the parties, in cases of conflict where this does not exist or has deteriorated during a conflict. This leaves the responsibility for the conflict resolution process (i.e. identification, negotiation, and solution) to the parties themselves.</td>
</tr>
<tr>
<td>Procedural assistance</td>
<td>Procedural assistance. Facilitators or mediators may also provide procedural assistance to the communication process among parties in conflict, ranging from joint brainstorming sessions to parlaying information back and forth. When providing procedural assistance the facilitators explicitly do not involve themselves in the contents of the issues, and do not suggest solutions or negotiating positions. The responsibility for both designing solutions and finding agreement remains with the parties in conflict.</td>
</tr>
<tr>
<td>Substantive assistance</td>
<td></td>
</tr>
<tr>
<td>Advisory non-binding assistance</td>
<td></td>
</tr>
<tr>
<td>Binding assistance</td>
<td></td>
</tr>
</tbody>
</table>

Figure 2-4 A representation of the scale of different conflict management techniques

The involvement of third party assistance increases from point A to point B. Roughly at point C the power to resolve moves into the hands of outside parties. This is crucial because different relationships and communication patterns are established to the right as compared to the left of point C. To the right of point C the primary communication pattern is between the parties and the third-party decision maker. Each party presents its own case as well as possible and as much as possible to the detriment of the other parties. Information is legitimately withheld as much as possible and creative new win-win solutions are not very likely.

To the left of point C, parties are assisted to communicate directly with each other, jointly diagnose the problem, create alternatives, and own agreements.
Substantive assistance. Mediators can also involve themselves in the fashioning of the solutions, i.e. provide substantive assistance as well. In that case parties share (or turn over) with the mediator the responsibility for identification of the solutions, but maintain direct communication among themselves and retain the authority to determine what constitutes an agreement.

Advisory non-binding assistance. By this type of assistance often arbitration or expert panels take the bulk of the authority over a conflict, i.e. determining a solution and recommending what is "fair", to the outside parties. The communication pattern is between the arbiter/panel and the parties. Parties remain the power to accept or reject recommendations.

Binding assistance. Binding assistance, through arbitrage or judging, passes authority over the conflict completely over to the outside party.

QUESTION 8
Which approach(es) are best suitable for ICZM conflicts?

Concepts - Sustainable Development

The need for sustainable development has become increasingly important in coastal areas, as xx % of the world’s population is expected to be living in coastal areas by 2005.

Sustainable Development: the development that meets the needs of the present generations without compromising the needs of future generations to
Coastal areas are exceptionally productive environments, rich in natural resources, biological diversity and potential for commercial activity. But coastal areas are increasingly vulnerable to stress from both human activities and the forces of nature. Due to the complexity of human activities, natural systems and ownership in the coastal zone, an integrated management scheme is needed to allocate coastal resources efficiently and minimize environmental degradation. Choices have to be made between competing uses, and limits to resource exploitation must be set, if escalating conflicts and resource degradation are to be avoided.

Planning for sustainable resource management is based on weighing priorities, translating these priorities into policies, and finally defining goals. A management plan defines the steps required to achieve these goals, identifies the entities responsible for each step and establishes a time frame for action and review.

In order to practise effective coastal management, planners need to understand how natural environment and human activities are interconnected to form a system. Key aspects of the system include the environmental processes that create coastal ecosystems and maintain their health and productivity, the functioning of coastal ecosystems, the flows of resources that coastal systems generate, the potential use of these resources to fulfil social and economic development objectives, and the type and extent of existing and future conflicts in resource use within the context of changing social, economic and political circumstances.

Concepts - EU policy and legislation

EU Policy
Many of Europe's coastal zones face problems of deterioration of their environmental, socio-economic and cultural resources. Since 1996, the European Commission has been working to identify and promote measures to remedy this deterioration and to improve the overall situation in our coastal zones.

EU policies are of key importance in relation to ICZM, both in terms of direct impact that they can have on the physical environment on the coast, both maritime and terrestrial; and in respect of their influence on the scope for integrating separate policy measures. Currently, there are a wide range of EU policies that to varying degrees influence coastal development and their management.

EU Legislation
Unlike other intergovernmental institutions (e.g., the United Nations or the Organisation for Economic Co-operation and Development--OECD), the EU is provided with legislative powers. Among the legal instruments available to the EU there are (a) regulations, directly binding upon the Member States, and (2) directives, to be transposed in national legislation. From the 1970s, the EU has put in place over 300
instruments in 30 years to protect and enhance its marine and coastal environments.

Since 1996

From 1996 to 1999, the Commission run the Demonstration Programme on Integrated Coastal Zone Management (ICZM). This programme was aimed to:

- Provide technical information about sustainable coastal zone management;
- Stimulate a broad debate among the various actors involved in the planning, management or use of European coastal zones.

The programme was intended to lead to a consensus regarding the measures necessary in order to stimulate ICZM in Europe. In 2000, based on the experiences and outputs the Commission adopted two documents:

- A Communication from the Commission to the Council and the European Parliament on "Integrated Coastal Zone Management: A Strategy for Europe".

The Communication explains how the Commission will be working to promote ICZM through the use of Community instruments and programmes. The proposed Recommendation outlines steps which the Member States should take to develop national strategies for ICZM.

Relevant directives for ICZM are concerning the following topics:

- Quality of bathing water (76/160/EEC, modified by Directives 90/656/EEC and 91/692/EEC);
- Shellfish waters (79/923/EEC, amended by Directive 91/692/EEC);
- Urban wastewater treatment (91/271/EEC);
- Protection of water against pollution caused by nitrates from agricultural sources (91/676/EEC);
- Dangerous substances (76/464/EEC, amended by Directives 90/656/EEC and 91/692/EEC);
- Integrated pollution prevention and control (96/61/EC);
- Freedom of access to information on the environment (90/313/EEC);
- Conservation of wild birds (79/409/EEC);

Problems of Deterioration

Many of the problems faced by Europe's coastal regions involve more than one country. If an oil tanker were to sink in the English Channel, for example, the resulting slick would be likely to affect both the United Kingdom and France. Similarly, industrial and agricultural pollution that might find it's way into the Danube River in Austria would cross several national borders before finally flowing into the Black Sea thousands of miles away in Romania.

The EU's coastal zones can also find themselves influenced by policies that at first glance seem to have nothing at all to do with them. The EU's Common Agricultural Policy (CAP), for example, can influence how much excrement from intensive pig and cattle farms is regularly washed into streams and rivers. Nitrates found in manure and chemical fertilizers promote the growth of blue/green algae, which reproduce at a phenomenal rate choking many other forms of aquatic life. When it reaches the sea, this algae-rich water can cause severe problems for coastal regions, particularly in the form of polluted bathing beaches. Evolution of the CAP will hopefully help to reduce the problem of nitrate pollution.

Similarly, EU policies intended to influence the economic viability of rural and
• Conservation of natural habitats and wild flora and fauna (92/43/EEC);

Further reading on EU legislation.

Mountainous areas can have strong influence on the number of people migrating to the coast.

EU policies

Currently, there are a wide range of EU policies that to varying degrees influence coastal developments and their management:

• The Common Agricultural Policy (CAP);
• The Common Fisheries Policy (CFP);
• The Structural Funds, both 'mainstream' and Community Initiatives;
• Trans-European transport networks (TEN-T);
• The Habitats Directive;
• Renewable energy policy;
• Policy towards the accession of the applicant countries of central and eastern Europe.

Further reading The Influence of EU policies on the Evolution of Coastal Zones (Final Report).

Practice - Case Study

Concerted Actions for the Management of the Strymonikos Coastal Zone

Introduction

Strymonikos and Ierissos Gulfs, that belongs to 4 prefectures (Kavala, Serres, Thessaloniki, Chalkidiki). The Kavala and Serres Prefectures belong to the East Macedonia & Thrace Region and the Thessaloniki and Chalkidiki Prefectures belong to the Central Macedonia Region, Greece.

The project area covers 1076 km² of which 262 km² land and 813 km² sea. The coastline is 123 km long. The resident population is 15,360, but rises to over 150,000 in summer.

Pollution and environmental damage have increased in recent years and tourism is
expected to grow. Authorities are aware of the need for forward planning. However, the implementation of sustainable development is constrained by the complex jurisdictions of the various administrative bodies involved in the development of the area, the fragmented land-use planning and the insufficient environmental awareness at all levels of decision making.

The aim of the project is to demonstrate the benefits of coordinated action for the conservation of coastal zones, by promoting the concerted management of the Strymonikos coastal zone.

**Main issues**

Human activities in the area include mass tourism, uncontrolled building construction, fisheries, aquaculture, agriculture, forestry and mineral extraction. These activities are not always practised wisely leading to increasing environmental problems, such as pollution and landscape deterioration, which will become far more serious in the next decades, as a result of the expected increase of tourists from the Eastern European countries. Also, mining activities in Chalkidiki are changing and an industry for gold extraction is going to be created in the area, posing additional threats to the environment. The Egnatia highway which will connect the Ionian Sea with Asia is now under construction. Finally, it must be considered that River Strymon may carry pollutants from its Bulgarian and Greek watershed into Strymonikos Gulf.

The area's principal environmental problems are the lack of planning for urban and tourist development, the disposal of domestic sewage and rubbish, the degradation of surface and ground waters, as well as that of natural habitats, the declining fish stocks and, finally, the salt intrusion in the River Strymon.

The main problems for implementing ICZM in the area were:

1. the lack of data regarding the natural environment, the socio-economics and the human impacts,
2. the complex and conflicting jurisdictions of the bodies presently involved in the management of the area and
3. the insufficient level of environmental awareness.

**Institutional/stakeholder analysis**

Institutional settings with respect to ICZM:

<table>
<thead>
<tr>
<th>National level</th>
<th>Ministry of Environment, Planning and Public Works</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Ministry of Agriculture</td>
</tr>
<tr>
<td></td>
<td>East Macedonia &amp; Thrace Region</td>
</tr>
</tbody>
</table>
### Problems encountered
Complex and overlapping or conflicting jurisdiction (roles and responsibilities) of management bodies has been a problem.

### Designing institutional arrangements for planning and analysis
Besides the Ministry of Environment, Physical Planning and Public Works, other authorities which influence directly or indirectly the formulation of coastal policy are the Ministries of Merchant Marine, Agriculture, Development (Industry, Tourism), National Economy, Defence, Interior, Finance and the Ministry of Health. There is no provision for a mechanism at the national government level that could pursue coordination and arbitration, causing as a result several problems. Although from a legislative point of view the potential exists to pursue integrated coastal management, administrative structures are not always up to such a task.

### Problems encountered
Co-operation and co-ordination between local and sectoral administrations is an issue of multiple conflicts: extraction industries (gold mining)-tourism, urban development-nature conservation, tourism-nature conservation, agriculture-nature conservation, and coastal fishing- pelagic fisheries.

### Main achievements
The Steering Committee, which is made up of those Authorities with jurisdiction over the coastal area, including sectorally oriented ministries.

### Conflict management
Co-operation and co-ordination between local and sectoral administrations is an issue of multiple conflicts: extraction industries (gold mining)-tourism, urban development-nature conservation, tourism-nature conservation, agriculture-nature conservation, and coastal fishing - trawlers-pelagic fisheries. There was an effort to resolve conflicts by bilateral meetings with the presence of the decision makers and when needed with a small study of the problem by an expert. However after the thorough study of the area (abiotic, biotic in the terrestrial and marine part, social, economic and administrative features, etc) it was much more easier to answer to the problems and promote the "correct" solution.

---

**Fish sampling:** Sampling in the estuarine system of the Strymon river in order to record the fish abundance in the area (photo: Koutrakis E.)
Participation
The objective for participation was to involve as many as possible people in the ICZM process.

The environment and economic development stakeholders were involved in the broader group of stakeholders which meets on an annual basis.

Main achievements
A Co-ordination Scheme, involving bodies responsible for the project zone’s management (ministries, regions, prefectures, agencies formally involved), is established, which sets protection and management aims, decides on priority measures and coordinates their implementation. This group consists of less than 15 members in order to ensure good co-operation.

A broader group of stakeholders meets on an annual basis. The meetings were organised by the Co-ordination group which also proposed the representatives of all economic and environmental activities that should be involved.

The project includes environmental awareness activities, such as publication and distribution of awareness material, organization of conferences on concerted sustainable management of coastal zones, presentation of the project and of the EU policy regarding the sustainable use of coastal zone resources, media work etc.

Problems encountered
Convincing decision makers for the need of a Co-ordination Scheme for the management of the project coastal zone.

Conclusions
A preliminary management plan, including the description of the project area, has been prepared, regarding sites, habitats and species and it was delivered to all parties involved.

The establishment of the Information Centre.

Proposals have been made for the area and for implementation on the national level.

The informal Steering Committee has stopped the meetings because of lack of legal framework. However, the Information Centre, in order to ensure its operation after the end of the project, with all its equipment was granted to the local authorities. Its activities are continued and the attraction of visitors provides an additional income to the local community.
Efforts are currently made to ensure legal and management measures in order to ensure a follow up. The Steering Committee keeps contacts with all groups involved, keeps them informed on what is going on in the area and with ICZM in EU and to tries to find fundings for the emerging issues.

In order to have a follow-up of the project a legal framework for ICZM is needed, a Management Scheme legally binding and a complete management plan.

**Lessons learned**

Good knowledge of the environmental, social, economic and administrative features of the area to be managed is the first essential step in planning integrated management and sustainable development, while continuous monitoring is necessary to detect environmental changes.

Coordination in the form of a legally based management body is indispensable for the implementation of ICZM. The multi-agency partnership of the Steering Committee used in the Strymonikos project, was just an example for the good operation of a coordination management scheme, since it was informal.

The deficiencies in legislation will pose substantial obstacles to concerted management of the area.

Only a legal binding, either in the form of a directive (e.g. 92/43/EU, 79/409/EU) or of an engagement for the implementation of conventions (e.g. Barcelona Convention), or at a national level can promote sustainable management and environmental protection.

The Information Centre, that was created in the area, has been proven a very useful tool for supporting actions of environmental awareness raising, training, dissemination of information, and for promoting participation of the public and local authorities as well.

**Further information**

Dr. Emmanuil KOUTRAKIS  
FISHERIES RESEARCH INSTITUTE  
National Agricultural Research Foundation  
640 07 Nea Peramos, Kavala, Greece  
Tel: +30 594 22691-3, Fax: +30 594 22222  
Email: fri@otenet.gr, koutrman@otenet.gr
Practice - Tools

The tools can assist policy development and decision-making at various levels, for a variety of potential users. Different types can be used. Some tools focus on the simulation of physical, biological, economical, etc. processes and are based on sophisticated mathematical relations and models. On the other end of the spectrum tools are found that primarily focus on supporting the ICZM-process. Their focus is on an integrated approach and facilitation of communication and discussion between stakeholders.

In this section a number of tools for each phase is being presented, including links for further reading.

**Investigation and definition phases**
- The impact analysis of alternatives
- The development and choice of alternatives
- The development of the Action Plan
- Implementation and realisation
- Data and information management
- Communication and participation

Practice - Tools - Investigation and definition phases

The initial stage of the planning process focuses on the examination (assessment) of the planning issue.

The aim is to define planning objectives and various aspects of planning issues, partly through a discussion of benefits versus needs. External developments are examined and the future situation (scenario) is visualised. Specifications of the starting conditions and background situation are also prepared. An important aspect in this phase is to inform and build up mutual understanding. At the
At the beginning of an integrated planning process, the stakeholders are often still widely divided. They all look at the problem from their own point of view and have yet to develop a common language that will ultimately help them to understand each other’s position.

Different concepts and tools have been developed to support the development of common starting points and a shared understanding. These approaches give participants a rapid overview and understanding of issues and alternatives, so that they can study each of them in more detail before going into the next phase of the process.

Some examples of these tools are:

- **TOPIC** (Thematic Orientation on Project definition in an Interactive Context)
- **RAP** (Rapid Assessment Program)

![Figure 3-1](image-url) In the Rapid Assessment Program the structuring tool can help you organize your information
TOPIC enables users to record and structure information on the issue thematically and so helps support communication. The built-in GIS means that cartographic information can be processed. The purpose of TOPIC is therefore to support the initial phase of policy preparation in project situations. See for more information.

RAP (Rapid Assessment Program)

RAP, Rapid Assessment Program, is software which implements through a graphical interface a methodology to qualitatively evaluate the consequences of interaction of policies. The software guides the user or users through several steps in which the problem analysis is made and goals are defined. A representation model of the (natural) system is created and effects of measures and exogenous developments (scenarios) are evaluated.

Knowledge of the various components of land and water systems (biotic and otherwise) and their interrelationship is important as a basis for the development of sustainable coastal zone policies and management. The potential effects of interactions or changes in a land and water system are often difficult to estimate because of gaps in the knowledge concerning the way different components of system relate to each other. Many of these relationships are qualitative in nature and area-dependent.

The idea behind the development of RAP was to enable the users to visualise these complex and generally qualitative, relationships between these components and provide understanding of the impact of interventions on each other and on the system as a whole.

RAP can be used to produce an initial model (an example) on the basis of the qualitative relationship between system components. This makes it possible to identify whether current understanding of the system is complete and coherent. At a later stage, RAP can also be used to work out the effect of possible measures, combinations of measures (strategies) and autonomous developments (scenarios).

RAP is being developed and used by Resource Analysis and RIVM to deal with questions like:

- What are promising policy measures?
- What areas of expertise will benefit from further research to support policy decisions?
- What knowledge do non-experts have about the system?
- What are good indicators to measure the performance of the policy-makers?

See for a DEMO version.

Practice - Tools - The impact analysis of alternatives

After the investigation and definition phase, a number of (perhaps new) planning alternatives are listed and investigated. Impacts of alternatives can be investigated...
from a detailed (local) scale to a larger (river basin) scale. Examples are:

- **STREAM** (tool for river basin impact analysis) (link to explanation stream)
- **DR-EIA** (Document Retrieval and expert system for Environmental Impact Assessment)
- **MMARIE** (modelling of marine ecosystems)

**STREAM**

STREAM (Spatial Tools for River basins and Environment and Analysis of Management options) is an integrated river basin management tool based on GIS techniques for the purpose of analysing and developing management strategies in large transboundary river basins.

STREAM is an instrument for river basin studies with emphasis on management aspects. It can be used to assess the present water availability in the basin and compare these to future demands of water resources. It furthermore enables the analysis of water resource related 'issues and processes' in a river basin by identifying key interrelated water resource issues.

STREAM is built around a spatial distributed hydrological model, simulating the water balance. Current modules comprise saltwater intrusion in the delta, an ecological module for mangrove habitats and socio-economic scenario development. The raster GIS based model allows for the analysis of vulnerability to exogenous influences such as climate change and human interventions such as de- and afforestation, irrigation and dredging.

STREAM is used to assess the impacts of changes on the natural resources of the basin and the use of these resources by the population within the basin.

So far STREAM models have been developed for the Rhine, Ganges-Brahmaputra-Meghna, Zambezi, Niger, Nile and Yangtze river basins.

For more information see: [http://www.netcoast.nl/stream/index.htm](http://www.netcoast.nl/stream/index.htm) or contact Resource Analysis (ra@resource.nl) for a demo CD-ROM

**MMARIE**

Application of high performance computing techniques for the modelling of marine ecosystems.

**DR-EIA**

DR-EIA compares project data with relevant rules, regulations and procedures for Environmental Impact Assessment (EIA) to determine whether or not a formal EIA is required (screening). It uses expert knowledge to identify prospective bio-physical and socio-economic impacts of project activities (scoping). Finally, it facilitates formulation of a Terms of Reference for an EIA report.
ecosystems (MMARIE). MMARIE groups together 15 partners from 7 European countries, who are actively involved in both High Performance Computing (HPC) techniques and Marine Sciences: sea hydrodynamics, transport phenomena (sediments, pollutants, nutrients, etc), biological and biochemical processes and the interactions between them.

The general problems addressed in MMARIE are

1. The information exchange and the collaboration will focus on:
   - implementation of existing models to high performance computers;
   - refinement of the models and the algorithms;
   - benchmarking of the parallel software and validation of new models.

2. Organisation of electronic data exchange. Organisation of an easy access for all partners to information relevant for the project, stored in a central computer, such that a structured search and information retrieval is possible.

For more information the reader is referred to: http://www.kuleuven.ac.be/mmarie

Figure 3-3 DR-EIA helps you comparing and assessing projects or actions on their environmental impacts, using a large set of regulations and guidelines, as well as expert knowledge

DR-EIA offers the project proponent a dependable approach to the assessment of potential environmental impacts by systematically drawing on expert knowledge. It raises the efficiency of the assessment, while assuring its consistency and comprehensiveness, and serves the interests of the competent authority and financier by providing better information.

DR-EIA is a global project. Local centers of EIA expertise maintain their own knowledge bases and software packages and provide support to DR-EIA users. The instrument is thereby tuned into a locally adapted version to suit specific local user needs.

See for more information http://www.dr-eia.org
Practice - Tools - The development and choice of alternatives

After the investigation and definition phase, a number of (perhaps new) alternatives are listed and investigated. The most promising alternatives are then selected to tackle the issue. It is important that relevant pieces of information should be brought together, compared and considered in relation to each other.

To achieve this, however, equivalent and comparable aggregate information needs to be available on each alternative. The emphasis is on 'where?' and 'what?'

Decision Support System is a term used to refer to tools that are specifically designed to assist policy makers in the decision process. A DSS should at least contain -or be able to access- the following elements:

1. information elements that handle the information about the system:
   - databases; containing factual information, historical and present information about the system
   - numerical models; generating new information about the system
   - application tools; presenting and comparing information in different formats, depending on policy requirements

2. interface elements that help the user to access and manipulate the information elements:
   - presentation of information
   - guidance from question to answer

Designing DSS’s for ICZM must be done taking into account that the decisions are made under larger uncertainty, due to time scale and system-complexity. DSS’s are required that can deal with longer time scales and larger uncertainties. Analysis can often only be done, and is as well often only necessary, at a "scoping and screening" level. Decision makers on a planning level usually only need these type of results. Detailed deterministic modelling becomes inappropriate and time-consuming, but they are necessary to provide insight in the various processes (physical, ecological, socio-economic, institutional etc.). The insight and/or parameters and/or trends that are derived in that way are used in other modelling concepts that give results instantly (like linear approximation, analytical modelling based on quasi-steady states or fuzzy modelling). Results can have a forecasting character (impact assessment) or the character of presentation of ‘state of the system’ (using concepts above to derive values for the selected indicator for decision-making out of available data).

The DSS can never incorporate all issues. Comprehensiveness must be weighed against accuracy, when inclusion of more issues leads to more uncertainty on
the effect-calculation and a more difficult evaluation process. Selection of issues should be based on contact with as many stakeholders as possible. In a later stage of the ICZM process issues can be added (again). The design of a ICZM-DSS is, hence, also cyclic.

The issue 'Coastal Zones' determines the type of questions that the DSS will have to answer. Consequently it limits the scope of the databases, models and tools, as well as (the design of) the interface.

To build a functional DSS, the model developer has to ensure that the two elements, which were mentioned above, meet:

1. the information elements, i.e. the 'supplying' or 'bottom-up' part. This is the inventory and making available of data and models
2. the user-supporting part, i.e. the 'question' side or 'top-down' part. This requires a thorough inventory of the type of questions that the DSS has to answer. On the basis of a study of the decision making process

The emphasis is on policy development and consensus building. Characteristics and applications are:

- showing data in interaction with users perception
- relations with simulation model
- designed for supporting participatory policy making processes
- educational tools

Some examples of these tools are:

- **COSMO** (COastal zone Simulation MOdel)
- **COSMOBIO** (COastal zone Simulation Model BIOdiversity)
- **RAMCO** (Rapid Assessment Module for Coastal Zones)
- **The Nijhum Dwip DSS**
- **WADBOS** (Wadden Sea Policy Development Support System)

**RAMCO (Rapid Assessment Module for Coastal Zones)**

RAMCO (Rapid Assessment Module for Coastal Zones) is a prototype of an information system which is to evolve eventually into a Generic Decision Support Environment for the Rapid Assessement of Coastal Zone Management Problems.

The module consists of a number of tools, including GIS and a Constrained Cellular Automata Analysis Tool. A demonstration model of RamCo was made.

**COSMO (COastal zone Simulation MOdel)**

In 1993 Resource Analysis and the Coastal Zone Management Centre of the National Institute for Coastal and Marine Management developed COSMO and CORONA to raise the awareness of integrated coastal zone management issues for decision makers participating in the World Coast Conference ’93.

COSMO shows the main steps in the preparation, analysis and evaluation of Coastal Zone Management plans. The program is an interactive tool that allows coastal zone managers to explore the impacts of development projects and environmental and coastal protection measures. COSMO calculates various criteria, including long-term effects of climate change, reflecting different use of the coastal zone.

Simulation of CZM problems takes place in the fictional territory of Catopia, a developing region situated along the waters of Catfish Bay. In the first round, one can explore several predefined cases. In the second round, the user can specify new development scenarios and combinations of measures.

See [http://www.netcoast.nl/tools/cosmo.htm](http://www.netcoast.nl/tools/cosmo.htm) for a demo.
and tested for a specific case-study in Indonesia.  
See [http://www.netcost.nl/tools/ramco.htm](http://www.netcost.nl/tools/ramco.htm) for a demo

**WADBOS: A policy support system for the Wadden Sea**

Sustainable development of the Wadden Sea (coastal sea to the north of the Netherlands and Germany) requires an integrated vision on policy and management issues enabling the impact of human use to be assessed within the context of the area's natural function. The development of WadBOS (Dutch acronym for Wadden Sea Policy Development Support System) was motivated by the understanding that the improvement of policies for the Wadden Sea depends largely on the achievement of a better understanding of how the Wadden Sea operates as an integrated system. That is why WadBOS is based on a dynamic spatial model of the water system representing the ecological, social and economic functions of the area and the linkages between them. RAMCO was used to build WadBOS.

The processes and influences that produce constant changes in the area are represented as much as possible on appropriate real-life spatial and time scales. Wherever possible, use has been made of existing models and these have been tailored to the needs of the policy makers with the help of experts from scientific institutes that are active in the region. The nature development module is a good example of this. It compares planning alternatives on the basis of their effects on the local ecology, economy and perceived amenity.

See [http://www.riks.nl/RiksGeo/demos.htm](http://www.riks.nl/RiksGeo/demos.htm) for a demo

**COSMOBIO (COastal zone Simulation Model BIOdiversity)**

The structure of COSMO-BIO and the approach to ICZM analysis has been derived from the 'COSMO-line'.

Enthusiastic reactions from the participants, many of whom were senior civil servants who had not worked with computer based DSS before, have led to wider use as well as the further development of a family of decision support tools based on the same principles.

The development has proceeded since COSMO-BIO (developed in 1995). Newer tools are no longer training tools, but can be used for real decision-making. New features are the incorporation of GIS-applications and the supply of a standard interface, a rapid assessment tool and a methodology to deal with different estuaries or coastal zones.

In COSMO-BIO, coastal zone management plans are formulated, analysed and evaluated for a hypothetical study area (Whale Bay). It shows the interdependency of the users and the processes in the coastal zone. The multi disciplinary and dynamic character of ICZM is shown. It has special attention to the role of marine biodiversity and sea level rise. COSMO-BIO allows thorough investigation of the problems and issues in an area and an interactive simulation of the policy process. Knowledge is easily accessed and communication on analysis results to decision makers is supported.

See: [http://www.netcost.nl/tools/cosmobio/index.htm](http://www.netcost.nl/tools/cosmobio/index.htm) for a demo

**The Nijhum Dwip DSS**

A Decision Support System (DSS) has been developed by EGIS in co-operation with Resource Analysis of the Netherlands. The objective of building this demonstration DSS is to acquire experience in the development of DSSs and to demonstrate their potential for Integrated Coastal Zone Management in Bangladesh. It is not intended for use in support of any real-life decision-making process.

The Nijhum Dwip Integrated Development Project (NDIDP) was taken as a case study to demonstrate the utility of a DSS. The Meghna Estuary Study (MES) has done a feasibility study for an integrated development project for the South Hatia and Nijhum Dwip area.
The project includes construction of cross dams to enhance accretion, construction of embankments to protect land from tides and storms, landuse allocations for old and new land inside and outside embankments and development projects for settlements, aquaculture, livestock, etc. The feasibility study estimated costs involved in all the different components of the project and also estimated accretion due to construction of cross dams as well as impacts of the other components of the project. These data are used as the basis for the Nijhum Dwip DSS. However, many assumptions are made within the computational models of the DSS that do not actually match those of the feasibility study. As the demo-DSS focuses on interactive analysis of management options, the results of analysis are presented for comparison between the options rather than as absolute values.

During this phase, the most promising and acceptable alternative is further elaborated and turned into a definitive action plan. The emphasis now shifts to ‘how?’. Variants are investigated and worked out in detail, and their impact is assessed. Detailed plans and drawings are produced. Finally, the action plan is agreed with the public and private sectors. This commitment from relevant public and private bodies ensures that the alternative that has been developed can eventually be implemented and realized in practice. The specifications are updated. In many cases there is a need for more detailed and advanced models and tools.

Tools and techniques that can help the development of an Action Plan are:

- Role-plays
- Interactive Multi Criteria Analysis (MCA)
Practice - Tools - Implementation and realisation

This last phase involves the implementation of the Action Plan and its realization on the basis of the specifications. Implementation work is awarded to the contractors and other parties and the process of realization is set in motion. Depending on contents and character of the planning specific parts of a plan (technical, institutional) may be implemented. In the course of this phase, it may become clear that additional studies are needed in order to achieve the desired end result. At the end of this phase, a new situation will have been created and this will need to be managed and maintained.

After some time, the new situation may itself need to be re-examined as a result of changing social trend or the identification of new problems. The planning process can start again from the beginning, often with different starting points and conditions. All the work that will be set in motion by the authorities (e.g. research, discussion memo's etc.) will help the implementation and realisation of the ICZM-plan.

Practice - Tools - Data and information management

The limited availability of high quality and timely information has proven to be a major obstacle in the implementation of ICZM and for coordination and cooperation. An easily accessible facility is needed, where people can access and share their information on coastal management activities. Examples are:

- CoastBase
- COZMIS
- Eastern African Coastal Management Database
- InterWad

**CoastBase**

CoastBase will establish an internet based, open system architecture intended to help professionals involved in policy making, management, enforcement and research to query distributed data and information. The system will be linked to information stored in various formats, by organisations working on different horizontal levels all over Europe. The CoastBase architecture is designed to be modular and open, allowing future inclusion of new data, access functions or connections to other information sources.

The long-term objectives of the system are:

- to improve coastal zone management and planning throughout Europe by enhancing access to relevant information
to foster pan-European cooperation on information exchange
- to promote the standardisation of data
- to stimulate the assessment of indicators on European level

For more information see: http://www.coastbase.org

**COZMIS** (Coastal Zone Management Information System) COZMIS (Coastal Zone Management Information System) is designed to bring together all kind of information for a specific study area. All information is integrated and visualized by means of a map. The geographic interface assures easy and intuitive access to the information.

Information about all kinds of phenomena can be stored in COZMIS for the area of study. In the context of COZMIS we call such a phenomenon an object. An example is the information about a certain wastewater discharge point. This wastewater discharge point is an object. The object is represented in two ways. A marker on a map represents the objects position in the real world, whereas a card holds the descriptive information about the object (e.g. its name and the amount of waste water discharge). The card is a database that can be adjusted and extended depending on the available information. The card of an object can contain one or more links to other documents that hold more information about that specific object, e.g. a spreadsheet containing measured concentrations of a certain substance.

For more information see: http://www.netcoast.nl/tools/cozmis.htm

---

**The Eastern African Coastal Management Database**
The Eastern African countries are moving towards integrated management for their coastal zone. The limited availability of high quality and timely information has proven to be a major obstacle in the implementation of ICZM and for coordination and cooperation. An easily accessible facility is needed, where people can access and share their information on coastal management activities. The Eastern African Management Database offers such a facility. The database can be accessed through the Internet.

The database has been developed for policy makers, managers and everyone who is interested in the coast and coastal zone management of Eastern Africa.

The Eastern African Management Database can be accessed through the SEACAM...
InterWad

InterWad is the up to date, interactive and informative medium for complete information on the Wadden Sea Area. Within InterWad, the fascinating world of the Wadden Sea is revealed. You can find facts on flora, fauna, fishery, tourism and current topics.

InterWad is a project of four Dutch ministries: LNV (Agriculture, Nature management and Fisheries), V&W (Transport, Public works and Water management), EZ (Economic affairs) and VROM (Housing, Spatial planning and the Environment). Through InterWad, the Dutch authorities offer free access to all available knowledge and information concerning the Wadden Sea.

Practice - Tools - Communication and participation

ICZM is a planning process involving complex decision-making. The decisions are normally not taken by one stakeholder, but are the result of various actions and plans of stakeholders. These stakeholders are in various sectors and operate on different institutional levels. Each of them must be sufficiently informed. This requires excellent communication facilities. It must be avoided that policy makers, coastal zone specialists and stakeholder groups only use their own definitions and terms.

Role-plays are powerful tools to help stakeholders explore the consequences of day-to-day management decisions from the perspective of different stakeholders in the public and private sector, interactively. Participants play a role in small groups of people. They analyse options, take decisions, and receive feed-back on the consequences of both their own and other players’ decisions through a computer simulation model. Some examples are:
CORONA (role play for ICZM)
Fishman (role play for regional fisheries management)

CORONA
In 1993 Resource Analysis and the Coastal Zone Management Centre of the National Institute for Coastal and Marine Management developed COSMO and CORONA to raise the awareness of integrated coastal zone management issues for the decision makers participating in the World Coast Conference ’93.

CORONA is a training tool for ICZM courses, seminars or workshops. CORONA will usually be used together with COSMO. While COSMO focuses on ICZM planning over a twenty-year period, CORONA, in a way, takes over where COSMO ends in the sense that players in CORONA can be thought to implement a coastal zone management plan such as analysed and selected in COSMO.

The players of CORONA are confronted with the fact that there is usually not one single entity that takes all decisions necessary to implement a coastal zone management plan. Rather, the implementation of a plan depends on the institutional arrangements that are operational in a specific coastal zone system. That is, who or which agency or organisation is responsible for what and what is their mandate to try to achieve their objectives?

For more information please contact Resource Analysis (ra@resource.nl)

FISHMAN is an instructive simulation game: a combination of a simulation model fisheries and economic models, and is used in a role play facilitated by a game leader. FISHMAN centres on the fisheries activities in the imaginary setting of the ís Pesces.

The objective of FISHMAN is to show crucial dilemmas related to international fisheries management. The game is developed on the basis of several “starting

The role play includes many relevant functions, and enables each player to perceive the common fisheries resources according to characteristics that are typical for each pressure groups). The play then encourages the participants to pursue their objectives, using role specific means to achieve them. As a stakeholders attempt to reach their goals, they are confronted with a typical range of dilemmas, but their
Conclusion - Module Review

Now you have completed this module, you should be able to:

- Design a framework for ICZM process planning
- Set up a stakeholder analysis
- Identify different tools for spatial planning in ICZM

Now you have completed this module, you should aware of

- the institutional obstacles which can be in the way of a successful continuation of a ICZM process;
- the implications of sustainable development of Coastal Zones;
- the different techniques that exist for conflict management;
- the existing European policy and legislation affecting CZM;
- the fact that there are different spatial planning tools with different scope and application.

Sources - References

Literature cited

CZM-Centre, ICZM Case Egypt; in: Conference Report World Coast Conference 1994, Barbados.


Intergovernmental Panel on Climate Change: IPCC-1992: Common Methodology - Seven steps to Vulnerability Assessment.

Resource Analysis: Towards a methodology for evaluation of ICZM programmes - Results of initial application and literature search, April 2001, RA/01-456.

**Further reading**


**Internet links**

[http://www.netcoast.nl/tools/tools.htm](http://www.netcoast.nl/tools/tools.htm)
Netcoast. A guide to coastal zone management. Tools for implementation of ICZM or analyses associated with ICZM. Coastal Zone Management Centre, the Netherlands

European Union for Coastal Conservation

[http://www.unesco.org/csi/index.htm](http://www.unesco.org/csi/index.htm)
UNESCO, Environment and development in coastal regions and in small islands

**Case studies**

A Regional Approach to Capacity Building for Coastal Management (Eastern Africa): Emerging Lessons

The Niger Delta: A Stakeholder Approach to Environmental Development

**Answers**

**ANSWER 1**
- Who is (should be) involved and in what way (stakeholders participation)?
- Which institutions can (or should) work together towards sustainable coastal zone management and what are their mandates, capacities,  

**ANSWER 6**
An example of an organisation structure for an ICZM process is the structure used in the project “Sustainable development of the Scheldt Estuary: Building an integral long-term vision for the Scheldt Estuary”.
clarity on enforcement of decisions and jurisdiction in the coastal zone, as well as the reduction in actual commitment following from limitations in involvement and

- effectuated;
  Mandate: lack of clarity on implementation decisions and jurisdiction in coastal zone;
- Mandate: problems involved with landownership;
- Mandate/capacity: reduction in actual commitment due to limitations in process;
- Capacity: reduction of actual capacity from limitations in commitment and financing potential;
- Commitment: problems with commitment of crucial actors (local, national government involved with policy making (ministries)
  2. Regional/local government involved with policy making (such as autonomous regions, districts and municipalities).
  3. Government executing agencies (such as: water/irrigation boards, authorities, tourism).
  Donors and donor organisations; financing agencies; public private partnership options.

ANSWER 3

Potentially, a great many stakeholders could be considered. In general, the following actor groups are distinguished:

1. National government involved with policy making (ministries)
2. Regional/local government involved with policy making (such as autonomous regions, districts and municipalities).
3. Government executing agencies (such as: water/irrigation boards, authorities, tourism).

Introduction

major ports it is an important economic focal point and it is a fully tidal estuary on the North Sea, supporting precious habitats.

To facilitate policy planning in the Scheldt Estuary, integrating the various needs and demands of stakeholders, the Ministry of Transport, Public Works and Water

integral long-policy makers in both countries. Vision development on the scale of an estuary is a relatively new planning approach. The vision is developed over a two year period from a carefully created common understanding of the present and near future. The vision is built by bilateral officials representing the three perspectives most crucial to the estuary and its users: navigation, safety and environment. Most important result joint basis for future policy planning.

Stakeholder participation is recognised as crucial in the development of the vision. from stakeholder representatives. This design is reflected in the project organisation.

government agencies in Belgium and the Netherlands. In addition open communication with representatives of the local and national government and other stakeholders is participation in the development of the vision:

- The level of bilateral decision makers and politicians, giving their authorisation to the vision;
- The level of bilateral officials, working together in the various working groups informed and consulted on the planning and provisional results of the vision;
  A pool of leading scientists and communication experts, supporting the officials in the working groups.

The cooperation within each level is facilitated by a consultant. Officials chair the working groups. Communication between the levels is ensured by the regular exchange

A detailed work schedule describes the inputs and actions of all parties involved.
5. Non-government, study/analysis (knowledge)-related parties (universities, technical institutions, private companies, industries).
7. Non-government action groups and local stakeholders (population, private companies, land owners, fisherman).

**ANSWER 4**

Information of the following kinds should be considered:

- Mandates, tasks, needs and responsibilities of different stakeholders (stakeholder analysis)
- Authorities responsible for enforcement
- Possibly existing “internal” policies and objectives related to the problem at hand (e.g. masterplans)
- Possible international obligations or restrictions which limit the freedom to prepare and implement coastal zone management strategies (e.g. UNCLOS)
- The capacities, capabilities and limitations of different actors in terms of human, technical and financial resources
- Information transparency, who can access what, and why do access restrictions exist
- The institutional mechanisms that link the agencies from different sectors and on different levels, such as coordinating committees, advisory councils, etc.
- International commissions if they exist

**ANSWER 5**

Real community participation can be achieved by involving the community (the public) and non-governmental organisations (e.g. pressure groups) in a very early stage of the project. This means that a broad group of stakeholders is involved in the problem analysis as well as the formulation of proposed solutions. Real participation will help to reach a broad public support for the final plan and the bilateral Technical Scheldt Commission (TSC). This commission consists of the high officials of the administrations that deal with Scheldt issues in both countries. It advises on the technical management of the Scheldt and was made accountable for the development of the vision by the responsible ministers of the Netherlands and Belgium.

The provisional reports are prepared within the working groups of expert officials, that also advise the TSC. International scientists and communication experts support the working groups. Prior to their approval provisional reports are discussed with the bilateral steering group of high officials and shared with the local government and other stakeholders. In the Scheldt Estuary important stakeholders for consultation are the Governmental Confer Western Scheldt (BOWS) and the Flemish Integral Water Committee (VIWC) that represent regional and local governments in both countries. Figure 1 illustrates the project organisation and its responsibility.

**ANSWER 7**

- Effective community consultation, early on in the project cycle, not only creates ownership (shared responsibility, involvement) for the project but also plays an important role in conflict prevention; conflicts during project preparation are costly both in terms of delays as well as in projects not approved as a result of conflict among stakeholders
- Correct: When conflict management is an explicit element of project preparation, projects or programmes can become contributions towards resolving pre-existing conflicts among stakeholders
- Effective conflict management during project execution can prevent delays during execution as well as prevent sub-optimal project performance due to conflicts among stakeholders

**ANSWER 8**

From the above discussion it appears that procedures to the left of point C should be attractive for coastal management, where conflicts are very often multi-party and multi-issue.
reduce the public opposition in the execution phase of the project. This is the level of co-operation and co-formulation.

ANSWER 9

The emphasis is on the question: Why is this a problem; which issues constitute the problem?