



## **BEACHMED-e**

**Strategic management of beach protection measures for the sustainable development of the Mediterranean coastal areas**

### **SUB-PROJET 3.2**

**Concerted actions, tools and criteria for the implementation of the Integrated Coastal Zones Management (ICZM) in the Mediterranean  
ICZM-MED**

#### **SUMMARY OF PHASE A REPORT**

*In English*



## Summary of Phase A Technical Report Summary

### 3.2. ICZM: Setting up of operational strategic studies for beach maintenance and reconstruction

#### Concerted actions, tools and criteria for the implementation of the Integrated Coastal Zones Management (ICZM) in the Mediterranean - ICZM-MED

Dr. Emmanuil Koutrakis<sup>1</sup> (Project leader), Argiris Sapounidis<sup>1</sup>, Valentino Giuliani<sup>2</sup>, Dr. Fulvio Cerfolli<sup>3</sup>, Prof. Giuseppe Nascetti<sup>3</sup>, Simone Martino<sup>3</sup>, Prof. Mauro Fabiano<sup>4</sup>, Dr. Emmanuele Roccatagliata<sup>5</sup>, Dr. H  l  ne Rey-Valette<sup>6</sup>, S  bastien Roussel<sup>6</sup>, Franck Bellet<sup>7</sup>, Silva Marzetti<sup>8</sup>

1. Fondation Nationale de Recherche Agronomique, Institut de Recherche Halieutique (N.AG.RE.F. – F.R.I.), Nea Peramos, Kavala, Greece, email: [koutrman@otenet.gr](mailto:koutrman@otenet.gr)
2. Litorale SPA, Via Bellini 22, 00198 Roma, email: [valentino.giuliani@litoralespa.it](mailto:valentino.giuliani@litoralespa.it)
3. D  partement d'Ecologie et d  veloppement   conomique supportalbe (DECOS), Via San Giovanni Decollato 1, 01100 Viterbo, email: [nascetti@unitus.it](mailto:nascetti@unitus.it)
4. Universit   degli Studi di Genova, Dipartimento per lo Studio del Territorio e delle Sue Risorse (DIP.TE.RIS.), C.so Europa, 26, Genova, email: [fabianom@unige.it](mailto:fabianom@unige.it)
5. International Center for Coastal and Ocean Policy Studies (ICCOPS), Via Piacenza, 54 16138 Genova, Genova, email: [roccatagliata@iccops.it](mailto:roccatagliata@iccops.it)
6. Univ. de Montpellier 1, Facult   des Sciences   conomiques, Avenue de la Mer - Site de Richter, CS 79706, 34960 Montpellier cedex 2, email: [roussel@lameta.univ-montp1.fr](mailto:roussel@lameta.univ-montp1.fr)
7. BRL, 1105 avenue P. Mendes-France, 30 001 Nimes, email: [Franck.Bellet@bri.fr](mailto:Franck.Bellet@bri.fr)
8. Universit   di Bologna, Facolt   di Economia, Dipartimento di Scienze Economiche, Piazza Scaravilli, 2, 40126 Bologna, Italy: [marzetti@economia.unibo.it](mailto:marzetti@economia.unibo.it)

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#### 1. Introduction

The coastal zone has been a major focus for the development of human society; moreover, large part of the world's living marine resources and the highest biodiversity is found in the coastal zone. However the diversity of coastal systems is affected directly and indirectly by thus numerous human activities concentrated at the coastal margins. When these activities develop together on the narrow coastal strip, problems tend to arise, creating conflicts over the use of renewable or non-renewable coastal resources. Defining and understanding the environmental issues associated with coastal zones are crucial, but the need to provide an effective executive structure for management is equally important. Coastal environments are dynamic, comprising continual fluxes of mass and energy. Coastal management should be prepared to endorse this dynamism and accommodate it within management structures.

The Bruntland report and the Rio Convention both identified the need for the sustainable development of the coastal zone. The multidisciplinary process "Integrated Coastal Zone Management" (ICZM) is seen as the means to achieve this. ICZM is a process which brings together all those involved in the development, management and use of the coast within the framework which facilitates the integration of their interests and responsibilities. ICZM is "a continuous, proactive and adaptive process with the general aim of implementing sustainable development in coastal zones and maintaining

their diversity. To this end, it aims, by more effective management, to establish and maintain optimum (sustainable) levels of use, development and activity in coastal zones, and eventually to improve the state of the coastal environment” (EC, 1997).

### **1.1. ICZM in European Union**

Europe has an extended continental shelf and a long coastline (89,000 km), in relation to its land area, that contains some of the most fragile and valuable natural habitats. Many of Europe's coastal zones face problems of deterioration of their environmental, socio-economic and cultural resources. Moreover the European coastal zones have problems which cannot be treated by individual countries separately, while the EU policies influence the evolution of the coastal zones. 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.

From 1996 to 1999, the Commission operated a Demonstration Programme on Integrated Coastal Zone Management (ICZM) designed around a series of 35 demonstration projects and 6 thematic studies (legislation and regulatory instruments, participation, technology, sectoral and territorial co-operation, role of EU policy and information). Thus, the demonstration programme was articulated around three key words: co-ordination, co-operation, concertation. This programme was aimed to provide technical information about sustainable coastal zone management, and 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 of the Demonstration Programme, 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" (COM/00/547 of 17 Sept. 2000)
- A proposal for a European Parliament and Council Recommendation concerning the implementation of Integrated Coastal Zone Management in Europe (COM/00/545 of 8 Sept. 2000). This Recommendation was adopted by Council and Parliament on 30 May 2002.

The Communication explains how the Commission will be working to promote ICZM through the use of Community instruments and programmes. The Recommendation outlines steps which the Member States should take to develop national strategies for ICZM. The national strategies, where all the coastal stakeholders should be involved, were due for spring 2006. According to these documents, the European Commission is not going to forward certain legislative measures for coastal zone management, but to promote the integration of ICZM principles and goals into the various sectoral policies.

Till now experience with environmental action programmes and regional planning work has clearly shown that sustainable development is being implemented too slowly in relation to the gravity and complexity of the problems of the coastal zones. Specific joint action by the Union and the Member States is therefore required in order to improve the effectiveness of legislation and of the existing financial and planning tools (EC, 2001).

### **1.2. ICZM in the Mediterranean**

The Mediterranean area plays a pivotal role within the definition of regional strategies for ICZM. In fact, due to the environmental and socio-cultural peculiarities of this geographic area, since early '70 the need to protect the marine environmental

quality in a co-operative way among coastal states has been strongly perceived. To address this issue, in 1975 the Mediterranean Action Plan (MAP) was adopted in the framework of the Barcelona Convention. The MAP was mainly implemented through the development of specific programmes by the Regional Centres. Among them, one of the most important is the Regional Activity Centre for the Priority Actions Programme (PAP/RAC). During the last years the activity of PAP/RAC mainly consists in the implementation of numerous ICZM pilot programmes, promoting since 1989 the Coastal Area Management Programme (CAMP) (UNEP/MAP/PAP, 2001).

Nevertheless, the pressing necessity to take one further step, ensuring a more effective application has become obvious. The first stage of this process was the attempt to create a new legal instrument on integrated coastal management in the Mediterranean. This purpose leads to the drawn of a Feasibly Study (PAP/RAC, 2002) that was subsequently accepted by all the Contracting Parties of Barcelona convention (CPs). On the basis of the results of the Study, the CPs adopted a recommendation to "...prepare a draft text of the regional protocol on integrated coastal management, on the basis of a broad process of consultation among experts and all other interested parties in view of its consideration by the CPs" (13th Meeting of CPs in Catania, November 2003). Consequently, different versions of the regional protocol have been elaborated. The most recent draft version of the protocol has been presented during the 14th Ordinary Meeting of the CPs with a view to its possible approval by the 15th Meeting of the CPs in 2007 and to convene a diplomatic conference for its adoption to be held immediately following the 15th Meeting of the CPs.

In view of the importance of PAP/RAC in the preparation of the Mediterranean protocol on integrated coastal management, contacts were made with PAP/RAC in order to discuss the possibilities of collaboration with the ICZM-MED sub-project, regarding the EU indicators which could be used by all the partners, the homogenisation of all partners activities and results and the preparation of a document that will contribute to the development of the regional protocol for ICZM in Mediterranean. Moreover collaboration with other relevant research projects (e.g. DEDUCE) will be sought.

### **1.3. Objectives**

The various efforts on ICZM have been carried out at a local district level; therefore a system that ensures a coordinated approach on a regional level is needed. The objectives of this sub-project is the collection of existing studies in this sector in order to create a structure for Integrated Coastal Zone Management on a regional level and to select study areas in each region that participate in the project (East Macedonia and Thrace, Lazio, Liguria and Languedoc-Roussillon), where different approaches to ICZM will be evaluated in a pilot approach to different sites, **related with beach protection measures**. The pilot sites will be described analytically, the coast evolution will be presented, the way ICZM principles can be applied will be also described and coastal integrated management scenario proposals will be developed, coastal state indicators will be measured, public policies will be evaluated, management intervention criteria will be established and tools that can be applied will be proposed or applied. Furthermore the process of concerted actions between different stakeholders will be evaluated. The conclusions from all the above activities and the international best practices and policies along with the practical experience acquired on the case study areas will contribute towards the setting up of a Mediterranean and national integrated management strategy.

## **2. Region of East Macedonia and Thrace**

### **2.1. General information**

Greece covers an area of approximately 130,000 km<sup>2</sup>, with 20% of it divided among its 3000 islands, and a little over 10.5 million inhabitants. The Greek coastal zone is of high ecological, cultural, recreational and economic value, playing an important role in the development of the country. However, Greek legislation does not provide a clear definition of the coastal zone. Specific legislation exists only for the shore and foreshore, which is part of a wider legislative framework on public property (public domain). This property is managed and directed as public ownership and not within a more integrated framework that takes into consideration environmental, cultural, socio-economic, physical planning and development characteristics (Theodoropoulos *et al.*, 2002).

The most recent national strategy for the protection of coastal zones was presented in the Report of Greece on Coastal Zone Management (YPEHODE, 2006) which describes the National strategy for the protection of coastal zone. On the basis of the research projects and studies carried out in previous years, a draft Ministerial Decision was prepared in 2002-2003 for a "Special Framework of Spatial Planning and Sustainable Development of the Coastal Areas". This would constitute a national strategy for the entire coastal space including continental and insular parts of Greece. The idea was to develop a policy for the coastal areas at three levels: a) at national level, there would be spatial planning objectives, orientations and criteria for a further concretisation of the policy at different lower-scale levels of management, b) at regional level, there would be identification of geographical zones where the policy could be more effectively applied, with more concrete orientations and targets, and c) at local/municipal level, within specific geographical zones, there would be concrete master-plans and regulatory measures for the management of the specific coastal zones, providing for all relevant sectoral policies and land-use in a sustainable perspective. Major purpose of this strategy was to identify mid-term actions and policies for inclusion in the Operational Programme 2000-2006, so that the Greek coastal areas could be managed in a rational way, sustaining the population and the necessary development activities and protecting, at the same time, the natural resources and ecosystems.

## **2.2. ICZM in the region**

Two of the 35 demonstration projects (see chapter 1.1) were carried out in the coastal zone of the Region of East Macedonia & Thrace. The first one was the Strymonikos project, entitled «Concerted Actions for the Management of the Strymonikos Coastal Zone», which was implemented in the west coasts of the Region (Koutrakis *et al.*, 2003). The project was funded by the LIFE instrument, with the purpose to contribute to the development and implementation of Community environmental policy, through concerted actions in the Strymonikos coastal zone. It was implemented by two research institutes, namely the Fisheries Research Institute and the Greek Biotope/Wetland Centre. The experience from the Strymonikos demonstration project showed that a good knowledge of the environmental, social, economic and administrative features of the area to be managed is the essential first step in planning integrated management and sustainable development. Also, continuous monitoring of the area is necessary to detect environmental changes. Moreover, the Information Centre that was created has proven to be a very useful tool for supporting actions of environmental awareness, training, dissemination of information, and for promoting participation of the public and local authorities as well. However, co-ordination in the form of a legally instituted management body is indispensable for the implementation of ICZM. The deficiencies in legislation are still present and pose substantial obstacles to concerted management of the area (Koutrakis, 2002).

The second project was carried out in the coastal zone of the Prefecture of Kavala. It was funded by the TERRA instrument. The TERRA CZM Project, entitled 'Integrated Management Plan for the Kavala Prefecture Coastal Zone', carried out by the Development Agency of the Prefectural Administration of Kavala (AENAK) S.A., the Prefecture of Kavala, and the Region of Eastern Macedonia and Thrace, through a planning contract in the context of the European TERRA Programme, which is co-financed by the Directorate-General for Regional Policy and Cohesion of the European Commission.

The Prefecture of Kavala was also partner of the TERRA CZM Network, formed by local and regional government organizations from three regions of the European Union (Prefecture of Kavala, Greece, Region of Flanders, Belgium and Region of Algarve, Portugal). Besides this project, the Prefecture of Kavala carried out the Demonstration Project 'Coast Observatory Office for the Kavala Prefecture' which records present and future activities in the coastal zone, using modern technologies (Kavala Prefecture, 2001).

### **2.3. Description of the pilot site**

The Region of Eastern Macedonia and Thrace occupies the north-eastern part of Greece and covers an area of approximately 1415.75 ha and a little over 561.838 inhabitants. The Region borders easternly on Turkey, northern on Bulgaria and westwards on the Region of Central Macedonia. Its south west boundary is North Aegean Sea. The Region is constituted by the following five prefectures: Kavala, Drama, Xanthi, Rodopi and Evros (**fig. 1**).

**Figure 1:** Map of the Region of East Macedonia and Thrace. Map (a) represents the coastal municipalities and indicative legal provisions and (b) represents population density in coastal municipalities.

The western coast extends for 50 km from the Delta of the Strymon eastward to the western edge of the city of Kavala, and is generally east-facing. The morphology of this shore is characterised by an alternation of rocky stretches and sandy beaches, and it is particularly exposed to wave action. In general, the western coastal district is where local tourism and holiday homes are concentrated, and construction is heavy and growing.

The eastern coast extends for 40 km westward from the Nestos Delta to the southwardthrusting promontory of Akroneri and the west-facing Agiasma shore. It is characterised by low sandy formations, and apart from the port of Keramoti has no harbours. Its road system features only roads running towards the coast, with nothing following the shoreline. One negative element is the presence of the airport very close to the lagoons in the area of Aghiasma.

The Delta of River Nestos (**fig 2**) is sited in the East side of the Kavala Gulf, which is an area with many problems related to beach erosion. The whole North Aegean Sea coast has a southward orientation extending on an E–W axis. Thus, the coastal zone is affected by the winds blowing from south directions (SE, S, SW and W) and, the related to them, sea waves and currents (Xeidakis *et al.*, 2006). The Nestos Delta is a protected area (National Park, Ramsar site, Natura 2000). The main uses of the coastal zone in the area are: agriculture, fisheries, aquaculture (lagoons, long line mussel culture) and tourism.

**Figure 2:** The River Nestos Delta (pilot site), sited in the East side of the Kavala Gulf.

### **2.3. Current and Future Activities**

The activity carried out by N.AG.RE.F. – F.R.I. in the Phase A mainly consisted in the gathering of bibliographic information for the area of interest including scientific papers, articles in national publications and books. There were contacts and meetings with local stakeholders in order to gather information relating the land use, information required for the preparation of the GIS map. Moreover there were contacts and meetings with local stakeholders such as in Municipality of Keramoti, Forest Inspection agency, Information Center of River Nestos Delta.

During the next phase of the project, a GIS map will be created that will contain all the available information related to coastal zone management of the selected site in different layers; the different coastal defense systems that can be used in the area will be evaluated and a questionnaire survey will be carried on in the selected area in order to evaluate the opinion of local people, users of the coastal zone (e.g. fishermen) and tourists about the different coastal defense systems to be used. Finally a selection of tools that can be used (according the PAP/RAC Protocol) and either apply them or describe how they can be applied in future projects.

## **3. Region Lazio (Italy)**

### **3.1. General Information**

Lazio Region appears at the Tyrrhenian Sea on the West, and borders Umbria, Toscana and (just with a little piece of land) Marche on the Nord, Abruzzi and Molise on the East, and Campania on the South. The Region has an extension of 17.227 km<sup>2</sup>, accounting for 5.140.371 inhabitants. It is widely and densely populated, being the average density 304 persons per square kilometres. Coastline is quite regular, low and sandy, especially North of Rome, despite of the presence of some cliffs such as “Capo Linaro, near Civitavecchia, and the mouth of the Tevere river, between Fiumicino and

Rome. South of Rome there is a succession of high coastal lands, such as the cliffs of Anzio and Gaeta, the Circeo Mountain, which stacks isolated among sea and land, and the Gaeta cliff, near the Campania edge.

### **3.2. ICZM in the region & previous economic valuation of the pilot site**

Lazio was one of the first Regions in Italy to apply the “integrated coastal zone management” methodology with the Integrated Action Programme (R.L. 01/01 – Action I.1.7), by setting up an ICZM Commission, consisting of the Lazio Region and the University of Tuscia, the University of Rome, the University of Cassino and Litorale S.p.A.. In 2005 the town councils of Tarquinia and Montalto di Castro were chosen by the ICZM Commission as one of the three pilot areas of the Lazio coastline in which to test and put into effect the ICZM methodology. This was brought about by setting up a permanent local Forum and by drawing up guidelines for starting integrated coastal management.

An analysis of direct and indirect economic effects, generated by beach tourism, is reported in the previous Beachmed project – phase C-, done by Eurobuilding srl and Nomisma in the 2004. It shows that average revenue for each bathing establishment was 58000 euros in that year, being the beach-related revenue 61% of the total, and the remainder quota of revenue stemming from bars and restaurants. The per square meter beach outcome is nearly 33 euros.

The suspicion of a variation in the total revenue of each bathing establishment has been tested this summer through a direct interview with the business owner, aimed at investigating the “average use” of the establishment services. The survey, conducted on 4 establishments, has shown that total average revenue rose about 11,000 euros compared to the Nomisma survey, ranging from 62,000 to 76,000 euros. This means that the 2004 Nomisma estimation included the economic effect of the nourishment. The survey has also shown that the revenue surplus generated by beach enlargement ranges between 28,000-36,000 euros, representing half of the total revenue of the establishments.

### **3.3. Description of the pilot site**

The pilot site chosen for testing the methodology above presented is the beach of Tarquinia Lido, along the Tyrrhenian coast of Lazio Region, 90 kilometres North of Rome. The city is part of the Municipality of Tarquinia localised 5 km landwards, famous for its Etruscan archaeological tombs (**fig 3**). The Tarquinia area is a strategic zone for testing the ICZM methodology. In fact it includes a series of elements that cover all the characteristics and issues involved in integrated management.



**Figure 3:** The beach of Tarquinia Lido, along the Tyrrhenian coast of Lazio Region.

The centrality of the coast and of the resources of the sea in the local community's choices can be seen also in the approval by the town council and by the Lazio Region of the P.U.A. (Plan for Use of Beaches). This is a series of regulations that up to now only 12 local governments on the Lazio coast have adopted.

As regards social and economic indicators we can say that Tarquinia accounts for 15162 inhabitants spread on 279 square kilometres. More precisely in Tarquinia Lido there are 551 residents (3.63% of the total). However during the summer the total population may be nearly thrice (nearly 35-40000).

The economy is mainly based on the tertiary sector (66%), even though the quota of agriculturists is still high (15%) compared to other areas of Lazio Region. The secondary sector accounts for 18,4% of the total employees. Total employees in 2001 were 5412 (Istat, 2001). Hotels represent 25% of the total receptive structures of the province. However since the middle 90s when arrivals and presences in the hotels were 17000 and 39000 respectively they dropped in 2004 to 5720 and 19463 respectively.

### **3.4. Future Activities**

The next planning steps to assess social dimension will require:

- bibliographic research with reference to projects regarding the integrated management and management of beaches, to end user satisfaction, to the indexes that can be applied within the planning analysis and to the planning instruments and management of existing beaches;
- formulation and distribution of questionnaires for the managers of the bathing establishments and for those who use the beaches; development of links with the local actors.

Despite of its large use in project analysis, CBA is not yet a current economic practice for beach nourishment in Europe, whilst it is a common procedure in the analysis done by US Army Corps of Engineers (USACE). The reason USACE promotes this approach is to determine primarily storm damage reduction benefits, and secondly recreation enhancement and regional economic development.

In the last years the use of CBA for shoreline management has been advised by the EU in the Eurosion project (2004), where a so called social CBA is framed. A Societal cost and benefit framework considers also non-market goods or services, on a broad time horizon (50 years), in the spatial scale of the sediment cell (area in which the sediment transport may be considered self-contained), and external environmental costs of the project occurring into the cell. The latter costs are useful to identify where benefits are spread and to make policy of equity distribution on cost of construction and maintenance. However, CBA focus is on the efficiency, underlying the Kaldor-Hick compensation test, and not if it should be separated from the issues of distributional incidence of costs and benefits. Applied to our research, the beach nourishment evaluation, CBA determines the efficiency of the intervention not only on the economic ground of tourism and recreation, but also on the field of environmental management. The aim is to avoid discrepancies between different contrasting and incompatible problems, such as tourism development and nature conservation.

The economic framework proposed consists in defining costs and benefits according to relevant and updated guidelines found in the literature (EU, 2004), and the most practical applications done by the NOAA (2006). Costs are relatively easy to define and regards constructions, monitoring, and maintenance of the beach, as well as mitigation and exploration of the marine sea bed. Main benefits for a defence work, such as nourishment, is the risk of loss due to erosion or flooding that is taken away from an area. However other important benefits have been recognized such as information, regulation and ecological functions (Eurosion project 2004).

In this work the most relevant issues assessed will be on storm damage reduction, recreational values and property asset valuation as well as economic analysis derived by direct and indirect impacts found in the literature, and updated by primary data recognition.

In addition, as a help for public administration, the methodology wants to propose a series of consideration and guidelines on how to address the choice of the exact economic lifespan of the project (beach nourishment), what might be the most appropriate discount rate (EU, 2003), whether to use a constant or a decreasing rate, and to include in the CBA framework concepts of equity and sustainability (OECD, 2006) as well as what is the sensitivity of technical and economic parameters on the estimate of CBA indicators (benefit-cost ratio, net present values) (EU, 2003).

#### **4. Region Liguria (Italy): Riviera del Beigua & Municipality of Porto Venere**

##### **4.1. General Information**

The Ligurian Region is situated in the North-Western part of Italy. From a geological perspective it is like a 315 Km narrow bow, characterized by a high rocky coastline broken by bays and beaches. The Ligurian coastline can be divided in two main zones. In the eastern one, due to the main rocky coastline, beaches are mainly narrow and pebbly pocket beaches. The western zone is mainly characterized by a flat coastal region, with wider sandy beaches.

Due to land scarcity, Ligurian population and human activities are mainly concentrated along the coastline generating significant impacts on the marine and coastal environment. Particularly, coastal tourism is the major economic activity in Liguria and its coasts attract the 89,2% of the total regional tourism. Within the coastal tourism industry, the yachting tourism plays a relevant role and marinas represent a considerable pressure on the coastline.

##### **4.2. ICZM in the region**

The Ligurian Regional Government, recognising the central importance of an appropriate management of the coastal zone for the regional future development, is seriously involved in monitoring, protecting and managing its littoral (REGIONE LIGURIA-ARPAL, 2004). A distinctive and particular tool developed in the regional contest is represented by the Territorial Co-ordination Plan of the Coast (PTCC), strengthened by the Regional Council in 1999. The PTCC aims at achieving an improved quality of the coastal zone in its natural and anthropic components, considering the protection of the coastal environment and the recovery of the coastal landscape together with the enhancement of economic activities in the Region. To this aims, the PTCC takes specifically into account four main themes: the protection of the coastline from the erosion, with particular attention to soft solutions (nourishment practices), the improvement of yachting tourism supply through the development of the regional marinas, the reclamation of the coastal areas interested by dismissed railway

infrastructures and the improvement of the efficiency of the coastal viability. The PTCC assumes an important reference for coastal management and constitutes the unique experience in this sense carried out at regional scale. Other relevant initiatives which can be included in the ICZM framework have been developed at a lower scale.

### **4.3. Riviera del Beigua**

#### **4.3.1. Description of the pilot site**

The first pilot area individuated for the study is a coastal zone situated between the cities of Genova and Savona (W Liguria Region). This area, which in 2002 was defined as a territorial district named Riviera del Beigua, is made up of six Municipalities of small-medium size (**fig. 4**).

**Figure 4:** Satellite image from the Riviera del Beigua. Source: Google Earth.

Inland, the area is characterised by the near presence of the Beigua Regional Park, also recognized of particular interests at the European level (NATURA 2000 network; UNESCO Global Geoparks Network). The marine and coastal environment has been considered of medium-low natural value in the whole area, due to the poor degree of natural conservation of marine habitats and to the high rate of anthropic alterations, with the exclusion of a little sector of well conserved rocky coastline and the presence of two marine SCI (Regione Liguria, 1999, 2002). The sea of the Riviera del Beigua belongs to the Cetaceans' Sanctuary of the Mediterranean Sea.

The environmental quality of the Riviera del Beigua has been affected by two relevant episodes: the extensive and chronic pollution of heavy metals provoked by a chemical industrial plant and the accidental pollution event of 1991, when the area was affected by one of the worst oil spills ever occurred in the Mediterranean caused by the sunk of the tanker Haven (ICRAM, 1999).

The tourist flow in the area is elevated (more than one million total tourists/year) with a strong seasonality showing a peak in July and August. Local bathing tourism is mostly domestic and family-oriented, composed by tourists from the bordering regions. The strong tourism presence during the peak season often generates tensions due to the adjunctive pressure on local resources (water, sewage treatment plants, etc.) and facilities (i.e. parking, traffic, etc).

In this contest, the Riviera del Beigua can be considered an optimal pilot area. In fact, the dramatic event related to the oil tank Haven in 1991 brought the local communities to confront themselves with environmental problems and to work together in order to pursue an integrated and more sustainable management of the whole area.

### **4.3.2. Current and Future Activities**

The activity carried out by DIP.TE.RIS. in the Phase A mainly consisted in an extensive bibliographic research on the ICZM themes and on the methodologies that will be applied in the following phases. Furthermore, a general description of the coastal zone proposed as pilot study together with main bibliographic references for that area has been drawn up.

The Phase B foresees data collection in the study area, the complete definition and adaptation of the study methodologies and a first application to the specific pilot areas. Particularly, three methodologies for the assessment of the coastal area will be applied: 1) beach users' perception analysis; 2) environmental sustainable analysis (emergy analysis) and 3) proposal of an integrated evaluation tools for the assessment of the sustainability level in the coastal area.

In July and August 2006 a beach users' survey has already been realised. In particular 600 questionnaires have been delivered in the six municipalities of the Riviera del Beigua. The survey aimed at investigating specific topics which play a key role in the framework of beach management at the local level.

## **4.4. Municipality of Porto Venere**

### **4.4.1. Description of pilot site**

The second pilot area considered is the Municipality of Porto Venere, an area protected since 1985, acknowledged as UNESCO World Heritage in 1997 and designated as Regional Park in 2001. The Portovenere Regional Park (279 ha) includes the islands Palmaria, Tino and Tinetto, Portovenere promontory, from Punta della Castagna to S. Pietro, Castellana and Muzzerone cliffs; it also includes two small villages: Le Grazie and Fezzano (**fig. 5**).

**Figure 5:** Map of the Liguria Region – Municipality of Porto Venere.

The area, characterized by insularity and a steep sloping morphology (**fig. 6a**), has a strong Mediterranean character. It represents the highest environmental value for the Province of La Spezia, due to the presence of interesting faunal species and relevant phytogeographic aspects. In a very small space, the high naturalistic values of islands and cliffs together with relevant historical and archaeological heritage contrast with deprived and abandoned areas, quarries and huge buildings.

(a)

(b)

**Figure 6:** The Municipality of Porto Venere. (a) a very strong tourism pressure is applied on the coastal area and (b) insularity and steep sloping morphology highlight the strong Mediterranean characters of the target area.

Main management issues in the area are related to:

- Tourist pressure, even on cliffs, which brings the need of urgently facing environmental topics (**fig 6b**)
- Social and economical potential conflicts due to the unbalance between limited available physical spaces and growing request of space, both on the land and on the sea.
- High coastal pressure (mainly tourism) vs abandon of rural villages in the hinterland.
- Presence of military zones which while contributing to environmental conservation, impedes the use of some coastal areas.

However, in spite of this present condition, there's a big potential for natural recovering and for achieving a more sustainable management of the area.

#### **4.4.2. Future Activities**

With reference to the materials sorted out during the bibliographic research, ICCOPS will establish the criteria for the precise delimitation of the study area. If possible, different criteria will be adopted (i.e. administrative boundaries + physical-environmental aspects + infrastructures development + tourism pressure, etc.), in order to set the basis for an actually integrated approach.

Following, a data bank, both cartographic and not, will be set up to gather and organise the information agreed in the previous phase and that includes different data access and updating options, according with the different users. Once the necessary information is collected, the study areas will be accurately defined. Here, the most critical features, as well as those with higher potentialities will be pointed out and, in the following phase, they will be object of specific intervention strategies.

## **5. Emilia-Romagna Region (Italy)**

### **5.1. General information**

The Emilia-Romagna region has an extension of 22,123 km<sup>2</sup>, about 4 million inhabitants and 400,000 enterprises. Main economic activities are food industry, mechanical engineering, industrial machinery, coastal tourism. Regional gross product per capita is about € 23,000, 29% more than the national average. Its coast on the North West Adriatic sea is about 130 km long, mainly light sandy beaches. Beaches are wide, and attract numerous visitors, tourists and day-visitors. Nevertheless, the strong

seasonal increase (Spring/Summer) of the population has altered the natural equilibrium and the environmental coastal system. Increase of subsidence, reduction of sand from rivers, building of beach defence structures, are causes of the present beach erosion in many areas of the Emilia-Romagna coast.

## 5.2. ICZM in the Emilia-Romagna Region

The ICZM project of the Emilia-Romagna coastal areas is one of the most important regional projects, because the ICZM constitutes a political response to sustainable coastal development. The coastal areas are considered as a whole system, where different human uses are interdependent. According to the EU objectives of ICZM (2000), the project started in 2002. An Institutional Committee, composed by the local territorial representatives, was created in order to establish the guidelines for the future coastal management. In 2005 the Regional Government published the Guidelines for the ICZM (Law No. 645, 20/01/2005). The implementation of the first public investments according to those Guidelines started in 2006. 13 investments for € 7.8 million will be financed by the *Piano di Azione Ambientale*. Their main characteristic is the integration of the different aspects of the coast in multidisciplinary projects (physical aspects, erosion, biodiversity, pollution, traditional economic activities such as fishery, tourism, public facilities, etc).

## 5.3. Characteristics of the study site.

Riccione beach that was selected as a pilot site, is a well-developed tourist resort on the North-West Adriatic sea near Rimini (**Fig. 7**). Residents are about 34,800. Its direct use value is justified by the well-developed local tourist sector, which is based on the recreational activities on the beach mainly in spring/summer. Its indirect use value is justified by its storm protection and flood control. While option use, bequest value and existence value are justified from the high ecological value of the coastal zone (Turner, 1999; Marzetti, 2006).

### Figure 7: Riccione beach on the Emilia-Romagna Coast

Tourists mainly stay in hotels; in 2004, the total tourist arrivals were just over 600,000 with a peak in July and August. They stay on average 6 days. Day-visitors are not officially recorded, but they are numerous, mainly during the week-end. (Emilia Romania, 2004). The Riccione beach is under erosion and needs to be artificially defended. Renourishment is frequently needed to maintain the sandy beach. **Figure 8** show the beach before and after erosion.

(a)

(b)

**Figure 8.** Riccione beach before (a) and after (b) erosion

#### **5.4 Future Activities**

In the objectives of the Emilia-Romagna region are to estimate in money terms of the sandy beach benefits of a defence project from erosion, in order to obtain data for the CBA. In particular, the Riccione beach is considered as case-study. More specifically, as regards this Region, the aims are:

- i) As regards beach visitors, to collect information on the indirect use value, option value and non-use values - that the market does not furnishes - for the Cost-benefit analysis of an artificial defense project about the Riccione beach;
- ii) As regards sunbathing establishment managers, to collect information on their willingness to contribute to the yearly beach maintenance, in particular through specific maintenance works.

Two surveys by questionnaire will be carried out in Riccione. The economic method used is the CVM. The basic idea under these CVM surveys is: if the benefits in money terms (indirect use value, option value, and non-use values) for a re-nourishment project against beach erosion have to be estimated, the best thing is to ask beach visitors and sunbathing establishment managers to express these non-marketable values by means of a survey. The CVM is applied in the willingness to pay (WTP) version.

Phase B) - From July 2006 to June 2007 two questionnaires (survey designs) will be created according to the research objectives and the characteristics of the tourist site. In particular, as regards the sunbathing establishment managers' survey, specific questions about beach maintenance works will be added to the CVM questionnaire. Two pilot surveys will be carried out in order to test the questionnaire wordings (questionnaire preliminary drafts).

Phase C) - According to the sampling designs, from July 2007 to December 2007, the two main surveys will be carried out by using the final questionnaires. The descriptive statistics and the aggregate values will be computed. The coefficients of the explanatory variables of the willingness to pay will be estimated through regression analysis. Conclusions will be drawn about the survey results, and suggestions about coastal policy-making will be presented.

## **6. Région Languedoc-Roussillon (France)**

### **6.1. General Information**

Regarding ICZM requirements and EU Recommendations to European countries (Parlement européen et Conseil de l'Europe, 2002 ; DIACT et SGMer, 2006), mandatory and legal tools have evolved in French coastal public policies (Lozachmeur, 2005). The Comité Interministériel d'Aménagement et de Développement du Territoire (CIADT)

(July 9<sup>th</sup>, 2001) has set ICZM at the national level (DIACT et SGMer, 2006) and has promoted projects and partnerships in coastal public policies. In February 2004, the government has finally approved a *“new framework based on ICZM principles with incentives and legal tools to promote a contractual approach; this involves all the stakeholders within local integrated projects”* (DATAR, 2004; Lozachmeur, 2005). The process is the one of *“one territory, one project, one contract”*. ICZM local experiments are promoted and supported with a national program towards a sustainable development of coastal territories (CIADT September 14<sup>th</sup>, 2004; CIMer, April 29<sup>th</sup>, 2003 and February 16<sup>th</sup>, 2004). Furthermore, a recent law has created the Coastal Zone National Council (Conseil National Littoral (CNL)) (January 25<sup>th</sup>, 2005) which has been settled on July 13<sup>th</sup>, 2006. The French national strategy is stated at three spatial scales, i.e., national, regional and local, and the ICZM process includes coastal territory schemes with common objectives at the local level (DIACT et SGMer, 2006).

## **6.2. ICZM in the region**

From the ICZM national program on the sustainable development of coastal territories (DIACT et SGMer, 2006), 2 projects are currently underway in the Region Languedoc-Roussillon, i.e., the Thau lagoon pilot site and the “Narbonnaise” Regional Natural Park.

Primarily sandy, the Region Languedoc Roussillon coastal zone is subject to coastal erosion because of human pressure which took place in the years 1960: creation of independent sedimentary cells decreasing the transit of the sediments, damming up of the littoral rivers, piers harbour, urbanization of the dune cords, visiting of the beaches. Until 1990, the response to coastal erosion was local by protection tools which made only defer erosion a little further. It is fundamental to manage coastal erosion in an integrated way. This step passes by management techniques shared by all the actors of the littoral. In 2001, the French government decided to reinforce its involvement by creating a planning agency MIAL-LR (Mission Interministérielle d’Aménagement du Littoral en Région Languedoc-Roussillon), a partnership tool of reflexion, coordination and support for coastal planning and management. MIAL-LR had a triple objective: to federate the actors of the littoral around a coastal zone sustainable development plan; to facilitate the implementation of the plan; to bring a response to the identified stakes. A 27.8 million € budget was allocated for the implementation of the coastal zone sustainable development plan between 2000 and 2006.

## **6.3. Description of the pilot site**

Pilot sites are located in the Département de l’Hérault (**fig. 7**). These sites should be: (a) Lido from Sète to Marseillan, (b) the coastline from Orb to Aude, (c) the Gulf of Aigues Mortes, (d) Lido from Villeneuve-lès-Maguelone to Frontignan la Peyrade. However, next meetings with our local coordinator, i.e., Conseil Général de l’Hérault, should set the pilot sites.



**Figure 9:** The pilot sites located in the Region Languedoc-Roussillon.

#### **6.4. Future Activities**

Université de Montpellier 1 during the Phase A of the sub-project has gathered bibliographic information on erosion processes, ICZM requirements and French national coastal policy including scientific papers, books, and national and local reports. During the next phases of the project, a common methodology will be set with some participants of sub-measure 3.2 in order to evaluate the perceptions of local population, users of the coastal zone and tourists about erosion processes and coastal defence systems to be used. The objectives are to carry on survey by questionnaires, to construct ICZM indicators and to test these indicators.

For Partner 8 (BRL), the following activities during Phase A were : the inventory of the data available with four sources of information were identified : regional numerical data, data resulting from regional documents of planning and general studies, data resulting from studies local sets of themes, the construction of an important bibliographical data base on the ICZM in Languedoc Roussillon. A reflexion on the classification and the synthesis of the was created considering the functional objectives of the final tools. Possibilities of interrogation will be geographical, by themes (physical and human themes), and will treat about ICZM themes. On this last point, themes would make it possible to answer littoral actors problematics. Exchanges and meetings with the General Council of Hérault and the University of Montpellier 1 were carried out for the definition of indicators on the economic value of the beaches, where several relevant topics were identified: beach attendance, the beach management unit, the ground added value.

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