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for Beach Management:
A Methodological Approach**

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Integrated Environmental Study for Beach Management: A Methodological Approach

Summary

This paper aims to present a project convened by the University of Genoa and Fondazione Eni Enrico Mattei (FEEM), in collaboration with Local Authorities, concerning the development of tools for beach management in the Riviera del Beigua (Liguria Region, Italy). The aim of the first step of the project is to assess the environmental state of resort beaches examining them interdisciplinary, through a data analysis based on a sound understanding of the components of the physical and the human system. The following step will be the treatment of the data, through the use of various instruments, which use a synthesis analysis, such as the traditional SWOT (Strengths, Weaknesses, Opportunities and Threats) analysis, and the use of a set of environmental and socio-economic indicators. Finally, our ultimate target is to propose guidelines, which will supply an instrument to back up policies concerning beach planning and management.

Keywords: Coastal management, Sustainable tourist, Integrated assessment, Indicators

JEL Classification: Q20, Q26

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Introduction

Coastal areas are places where demographic, economic, and environmental pressures reach their maximum (Henoque and Denis, 2001). The plurality of uses and the growing littoralisation are the cause of environmental and socio-economic impacts; so, there is thus an urgent need to integrate the many uses which depend on coastal resources and to develop them in harmony with the environment, to achieve a commonly acceptable coastal management framework.

Tourism is considered as a sector of activity of an extreme importance in the Mediterranean Basin. With nearly 220 million tourists visiting the Mediterranean and generating over US \$ 120 million, this region accounts one third of the world's total international tourist arrivals and 26% of world tourism receipts (UNEP, 2003). Thus, it is evident that tourism has become a global financial power, moving huge amounts of money and generating great economic benefits for many countries and regions, as well as job opportunities. However, mass tourism generally has a negative impact on coastal areas, even if, when well managed, it has the potential to create beneficial effects on the environment by contributing to environmental protection and conservation. In this way, quality tourism can contribute to the sustainable development of coastal areas by improving the competitiveness of businesses, meeting social needs and preserving the cultural and natural environment (EC, 2000).

In coastal tourism activity, especially in the Liguria Region, beaches play a key role considering that most of all tourist revenues earned by the coastal communes are largely due to the attraction of beaches. Due to human activity beach ecosystems are also under continuous stress because of waste disposal, over-engineering, urbanisation and tourism pressure, as stated by many authors, such as Defeo and De Alava (1995), Lercari and Defeo (1999), Shoeman *et al.* (2000). Despite this, apart from specific studies on engineering and beach erosion aspects and water quality, little work has been done for improvement in beach management practices (James, 2000; Micaleff and Williams, 2002).

In the context of this project, which concerns mass concentration of bathing activities conducted on beaches presenting a low physical carrying capacity, a correct elaboration and use of management tools for these coastal areas is necessary. In view of these considerations and, keeping in mind the attitude undertaken by the Communes towards sustainability issues, this project has the ultimate aim to propose a tool for environmental assessment to back up management strategies for the beaches of the Riviera del Beigua, promoting the rational development and sustainable use of coastal resources with the hopeful event of their being enclosed in an integrated planning tool.

Study area

The Riviera del Beigua (Fig. 1) is a coastal area situated on the west side of the Liguria Region, and it is made up of six Communes (Albissola Marina, Albisola Superiore, Celle Ligure, Varazze, Cogoleto and Arenzano). Host to great tourist and bathing attractions, it is also favoured by the proximity to a few of Northern Italy's

main cities (Milan, Genoa, Turin).

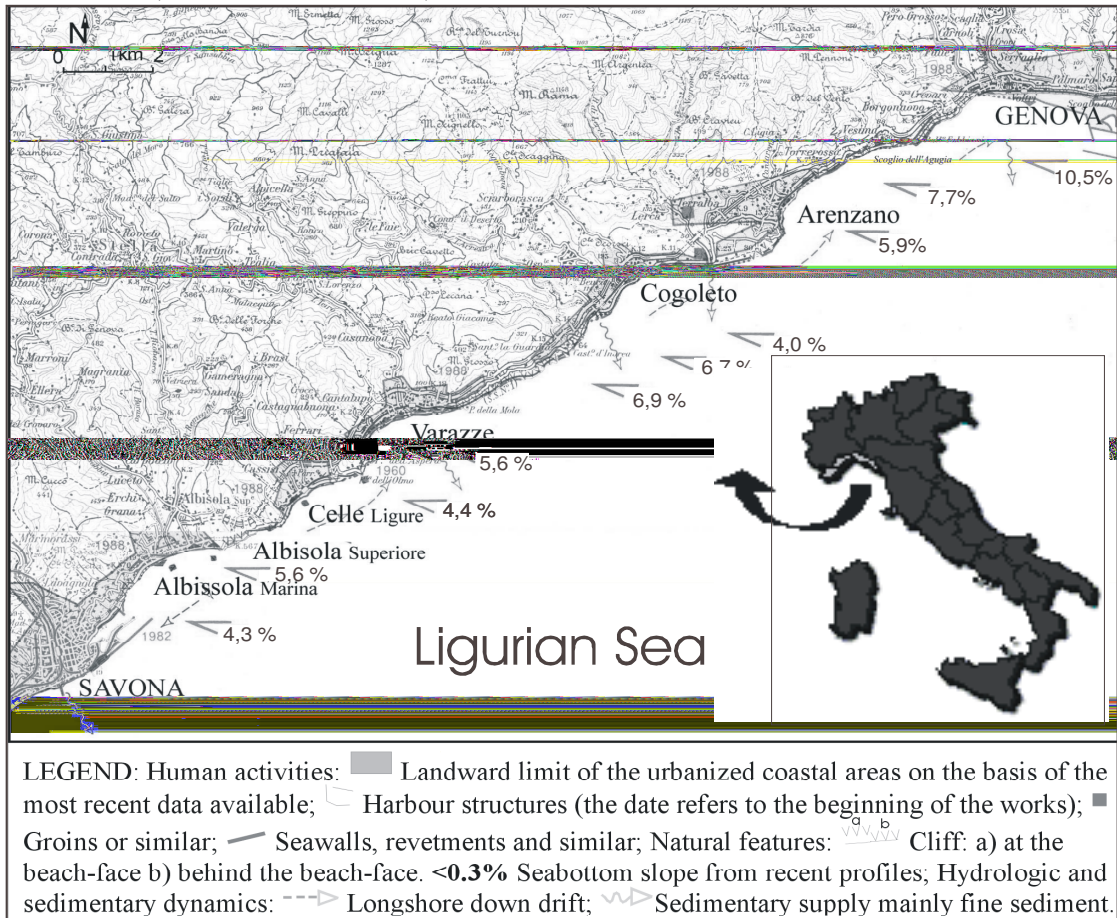


Fig. 1: Sheets no. 82 (Genova) and 92-93 (Albenga - Savona) modified from the Atlas of the Italian Beaches (AA.VV., 1999) show the Riviera del Beigua (western Liguria).

Closed between the sea and the mountains, this area is characterised by land scarcity. As a result, its population is mainly concentrated along the coastline and the high concentration of human activities, such as industries, harbour activities (both commercial harbours and marinas), fisheries and tourism, is often a major threat for the low carrying capacity of its coastal environment. The considered area has, in the past, been subject to a dramatic event, having the oil tanker Haven sunk therefore causing accidental pollution, this has led to considerable environmental and economic problems connected with tourism. Such an event, alongside the constant increase of the tourist sector, has brought the local communities to confront themselves with environmental problems, this is slowly leading to an integrated management of the whole area. The prospect of high quality eco-tourism has driven town councils in this area to promote a more sustainable use of tourism as an economic resource. By promoting general environmental initiatives, such as EMAS accreditation, ISO 14001 and Agenda 21, or specific beach accreditation, such as the Blue Flag, the Riviera del Beigua is trying to attain, amongst other objectives, a sustainable beach management.

Environmental aspects

The coast of the Riviera del Beigua is characterised by an approximately 23 km-

long coastline with a heterogeneous morphological face (beach 61%, cliff 39%), with pocket beaches between cliffs. There are mainly sandy and sand-cobble beaches (43%), and the pocket beaches are coarse sediment beaches (4%) (AA.VV., 1999). The Atlas of Italian Beaches shows a variable slope of the coast with a maximum value close to Varazze (6.9%) and a minimum (4.0%) at Arenzano, generally characterized by shoreface sandy sediment.

The geological and structural setting of the study area consists of the Savona crystalline massif, the tectonics units from the ocean floor called "Voltri Group", the crystalline outcrop of Arenzano, the sedimentary covers of the Tertiary Piedmont basin and alluvial-coastal Quaternary deposits (S.G.I., 1991). The evolution of the coastline feels the effects of the tectonic, morphologic settings and lithotypes of the area with a main sediment supply from the water courses. This coastline can be divided into five sectors for morphological and dynamical characteristics and human activities. In particular, the human activities can influence the environment and interact with the coastal dynamics (Piccazzo *et al.*, 1990; Cavallo, 1995). The study area wind/wave climate is characterised by a dominant wind coming from the southern sector. The prevailing winds have important effects on the coastal dynamics as they present the greatest geographical fetch: about 900 km from the south-western sector and 225 km from the south-eastern (Corradi *et al.*, 1994; Cortemiglia *et al.*, 2000). The orientation of the different sectors of the Riviera del Beigua conditions the developing wave motion from Southwest with marked refraction features causing a main littoral drift to the east. The presence of harbour structures, such as the Savona port and the tourist-oriented harbour of Varazze, invert the littoral drift to the west in a limited coastal sector of Albisola and Varazze (Piccazzo *et al.*, 1990; Cortemiglia *et al.*, 1999). The recent sedimentary supply data of the study area shows a coastal erosion not only of beaches but also of cliffs with the defence coastal structures (11%) and the indispensable nourishment and its monitoring with the aim to maintain the state of the beaches and their use (Fierro, 1997).

From an ecological point of view, main data available for the studied area have been collected in the regional Coastal Plan. Main benthonic biocoenoses are represented by *Posidonia oceanica* beds and *Cymodocea nodosa* meadows. Moreover, populations of Photophilic Algae, really common in the Ligurian marine environment, are well represented, while populations of Sciaphilic Algae and biocoenoses of Fine well-sorted Sands are less represented. In the whole area, with the exclusion of a little sector of well conservated rocky coastline, the natural value of the studied area is considered as medium-low, due to the degree of natural conservation of marine habitats and to the degree of anthropic alterations (Regione Liguria, 1999).

Due to the presence of *Posidonia oceanica*, one of the best-known as well as most endangered Mediterranean endemic species, two marine SCIs have been proposed in the studied area. Both this SCIs (Fondali Varazze - Albisola, 36 ha; Fondali Arenzano - Punta Invrea, 94 ha) are divided in three sub-areas where the *Posidonia oceanica* bed is still alive. Those patches are the remains of a wider bed, actually quite degraded mainly due to anthropic pressures, such as coastal settlements, nourishments, industries and illegal drawling fishery (Regione Liguria, 2002). Furthermore, it must be mentioned that the study area is within the recently stated Cetaceans' Sanctuary of the Mediterranean Sea, where the number of cetaceans is at

least twice as high as anywhere else in the Mediterranean (Ambrose, 1999).

In view of marine environmental quality in terms of pollution, as already mentioned, in 1991 the area was affected by one of the worst oil spills ever occurred in the Mediterranean, with 144.000 tons of oil spilled (ICRAM, 1999). After more than ten years, data obtained by the survey programme performed using bio-indicators revealed that, even if there are no more negative effects for the organisms in the water column, some benthonic species still show physiological alterations (Regione Liguria, 1999). Another big source of pollution in the area was caused by a chemical industry that in the past provoked an extensive pollution of heavy metals, which effects are still visible. After the closure of the industry, all the interested sites (inland, beaches and marine sediments) are now subjected to a reclamation plan. Other kinds of pollution, mainly of little extent or causing temporary alterations, have been recorded and they concern bacteriological parameters, nutrients concentration and hydrocarbons.

Finally, the inland of the Riviera del Beigua is characterised by the presence of one of the biggest regional natural areas (more than 18.000 ha) just behind the coastline: the Beigua Regional Park, also proposed as a SCIs in the NATURA 2000 framework for the presence of relevant habitats and endemic species.

Tourism development

Tourism is the main economic activity conducted in the Riviera del Beigua. The study area is mostly orientated towards domestic tourism (residents and tourists from the bordering regions) and, as such, it is a resort full of second homes. The presence of “occasional” or foreign tourists is mainly registered in peak periods (such as August), and they are distributed unequally in the six different Communes. The diversification in the tourist demand and offer renders the assessment of the carrying capacity of the entire zone extremely complex. At the same time the different tourist vocations between the Communes, calls for the elaboration of general and punctual strategies for each and every Commune.

A fundamental characteristic, which concerns the Riviera del Beigua, and tourism in the Liguria Region as a whole, is the predominance of bathing activities as a major tourist attraction in respect to all other forms of tourism. This important issue is connected to various concurrent factors:

- the particular conformation of the Ligurian territory (land scarcity);
- from a historical point of view, in the last century alongside the French Riviera, the Liguria Region was considered as an ideal tourist resort for bathing activities;
- the scarcity of initiatives with the tendency to create alternative types of tourism in respect to bathing activities (i.e. scarce development of infrastructures for tourism in the hinterland).

The main consequence is an unequal allocation of tourism resources on the coastline which generate a high concentration of all uses directly connected with tourism (recreational activities, services, structures) and indirectly connected with tourism (marinas, infrastructure, commercial activities, complementary activities) on

the beaches themselves. So, beaches are a fundamental economic resource for the Riviera del Beigua. They are heavily exploited due to the presence of activities (i.e. sports, bars, restaurants, swimming pools) which whilst contributing to the popularity of the beaches, are also the cause of their severe degradation and erosion problems.

Legislation and planning

If we are to look at the legislation concerning coastal management and protection, we must observe a great gap in our legal system and the institutional structure. The policy priorities and the legal and management tools available have been traditionally characterised by unclear objectives, fragmentation of competencies, insufficient levels of co-ordination and co-operation. So, we convene that there is not a framework law dealing specifically with coastal zones. However, there are some laws applied to coastal zones regarding some specific topics (safeguarding water quality from land-based pollution, preventing marine pollution, protecting marine areas, soil defence, planning and management) which include legal/operational definitions of coastal zone:

- National Law n. 979/1982, “Provision for sea defence”, which regulates, along with other decrees which naturally stem from it, the different forms of pollution which can affect the marine ecosystem. This law foresees that the Ministry of the Environment is the public authority responsible for the protection of the Sea and the coastal environment and, as such, is the authority competent for: the establishment and management of protected marine areas, the protection of marine biodiversity, monitoring marine waters, the promotion of safety in the marine environment, the authorisation of discharges in the sea from ships or from shore platforms, interventions for the integrated management of coastal zones, protection of the coasts, planning and co-ordination of interventions in cases of emergency due to pollution of the marine environment (Zama, 2001).
- DPR (Decreto Presidente della Repubblica) n. 470/1982 (from Water Directive 76/160/EC) concerning bathing water which foresees the necessary requirements that all bathing waters have to present. The Regions have to communicate to the local authorities which waters are suitable for bathing after having conducted the analyses before the beginning of the bathing season. The local authorities, as a consequence, have the obligation to inform the general public on the matter.
- National law n. 183/1989, “Regulations on soil defence”, containing provisions relating to coastal defence and watershed management plans (This law has prescribed that the Regions shall be the competent bodies, alongside and in negotiation with other local authorities, for the legislation concerning the protection of the land, and as such the Liguria Region has adopted the Regional law n.18/1999).
- Law n. 394/1991, “Framework law on protected areas”.
- National law 494/1993 concerning maritime domain. This is due to the fact that most of the coasts and beaches in Italy are used for recreational purposes and, as a consequence, the shores on our coasts have bathing establishments constructed on them. Any person who wants to occupy the areas along the coast, which are property of the State, with such structures, have to preventively obtain a special permit or authorisation.

- Regional law n. 13/1999 about coast defence, nourishment of the shores, protection of marine environment, maritime domain and ports, foreseen by the law 112/1998 which has conferred the Regions and other local authorities with the administrative duties which concern some coastal issues, such as monitoring the state of internal and marine waters from eutrophication and interventions for the protection of the coasts and for the nourishment of the shores. In view of such a national law, the Liguria Region adopted two decrees (Delibera Giunta Regionale n.1553/2001 and n.1176/2002) which dictate the general criteria which one must observe in planning the nourishment of the shores.
- Laws regulating the protection of marine water and marine ecosystems from anthropic pollution such as the Law n. 22/1997 concerning waste production and the law n. 152/1999 “The discipline of water discharges and the protection of water from pollution”, which has a global and systemic approach opposed to the old sectorial approach, thus regulating the protection of marine water from all forms of pollution (Beltrame, 2001).

Other important prescriptions and regulations on the coastal zones come from planning and urbanisation. National law 490/1985, modified in 1999, on cultural and natural heritage, defines the coastal zone boundary 300 mt. on land from the coastline (at sea: 12 m.n. from the baselines) and there prohibits building construction. Furthermore the regional law on planning (36/1997) foresees that the Regions will have to provide for the management and protection of coastal zones by adopting territorial plans, such as the PTR (Piano Territoriale Regionale) plan for territory prescriptions and the Territorial Coordination Plans (PTC) such as the PTCP (Piano Territoriale di Coordinamento Paesistico) plan for landscape protection and planning, the PTC of the Coasts at the regional level, the PTC of the Province at the sub-regional level and the PUC (Piano Urbanistico Comunale) plan at the municipality level. Others plans come from sectorial themes such as the Basin plans (measures for mitigation of extremes events concerning regional rivers), the plans for national and regional protected parks, the port planning schemes, the plans for local mountain communities and so on.

In this context, the Territorial Co-ordination Plan of the Coast (PTC of the Coast or PTCC) recently strengthened by the Regional Council, assumes an important reference for coastal management. This Plan was drawn up pending the definition of the Territorial Urban Planning Law (Legge Urbanistica Regionale n° 37/1997) which disciplined territorial planning instruments at a regional, provincial and municipal level, reallocating the authority of the respective administrations and attributing to the Region a basically strategic role. It represents in its highly individual configuration the first and most organic instrument of analysis and planning in the panorama of Italian coastal regions. The aims at a more general level are: protection of the coastal, terrestrial and human environment, recovery of the image of the coastal landscape, in its natural and anthropic components, increasing and diversifying the opportunities to use and enjoy the sea, reorganisation and upgrading of coastal tourism supply, creating fresh opportunities for sustainable tourism. At a concrete level, the PTCC takes into account 4 principal themes (protection of the coastline and nourishment of beaches, marinas, reclamation of the railway infrastructures and viability), some properly pertaining to the Regions (tourism, environment, transport, soil defence, etc.); others pertaining to authorities exercising powers directly delegated to the State (European Union, Property Office, Harbourmaster’s Office, Superintendence, Port Authorities, Corps of Civil

Engineers, Railways, etc). Looking at the section dedicated to beach protection and management, the plan takes into account the importance of recreational tourism on the beaches of the Liguria Region. As such, it aims to adjourn the classic methodologies of intervention with an adequate and integrated approach, combining the need of protection of coastal settlement to sea aggression (erosion of beaches, hazard events) more in keeping with environmental objectives, with the feasibility of more rational and sustainable use for tourism. Notwithstanding the variety of the issues, an effort of integration is still necessary, not only at the programme level, but also between the different instruments from the regional to the local level.

Finally, the RAMOGE Agreement must be considered. Ratified in 1981 by France, Italy and Monaco within the framework of the Barcelona Convention and the Action Plan for the Mediterranean, it concerns the protection of the coastline of these three countries, trying to prevent pollution and manage coastal development.

The project

In this frame, the present study is carried out by the University of Genoa and FEEM (Fondazione Eni Enrico Mattei) in collaboration with local authorities (Liguria Region, Provinces of Genoa and Savona and the six Communes of Riviera del Beigua). The aim is to propose guidelines for the management of the recreational beaches in this area and to supply an instrument to back up policies concerning beach planning and management.

To achieve this, the project foresees the following phases:

1. Collection of the existing data (environmental, socio-demographic, economic, tourist-oriented and political-managerial data) and eventually the integration of the missing information through surveys and sampling.

Actually the available data have come mainly from the environmental screenings carried out for ISO 14001 accreditations prepared by all the municipalities. Other general and specific data have been collected by: sectorial studies carried out by each municipality, such as impact assessments concerning ongoing projects; preliminary documents concerning planning tools, such as preliminary studies for the PTCC of Liguria, i.e. those concerning coastal erosion; finally, environmental information has been taken from existing scientific studies carried out for the University of Genoa. Moreover, a questionnaire has been drawn up and is presently being distributed to the beach users, in order to obtain further information related to people's perception about beach environment and its management.

2. Data treatment through the use of various instruments which use a synthesis analysis, such as the traditional qualitative SWOT analysis.

So as to render all data accessible, the project foresees the use of synthesis methodologies of all the information, which will be useful for a following environmental diagnosis of the area. Frequently, local authorities are in possession of a

great deal of data concerning the territory. This data originates from past studies, general or sectorial, however the use of such information is extremely difficult, as they are very much heterogeneous and fragmented. To avoid this problem it is necessary to analyse all data and then proceed to synthesise the information which will be useful in the understanding of the territory and which will be used to support all policies and regional and local planning.

The SWOT analysis is a tool which is largely used for this aim, as it can be used as a filter to reduce the information to a manageable quantity of key issues. The application of this methodology helps us to single out and highlight synthetically and efficiently all strengths, weaknesses and risks which concern a certain territory. In this way we will be able to define different scenarios, highlighting the opportunities whilst suggesting alternative managerial skills so as to mitigate the impacts, strengthen the qualities, addressing management towards a more sustainable development. The efficacy of the environmental diagnosis, accomplished through the use of this instrument, really depends upon the degree of knowledge in relation to the territory which one has considered. It also depends upon the amount and completeness of the data, however this method could have the tendency to oversimplify the situation, thus encountering in a great limit. The great flexibility of such a tool, and the possibility of its use at different levels (it can be applied to the territory in general or to a specific environment/sector), renders the SWOT analysis a potential tool in the process of territorial diagnosis and planning.

This project has the aim to apply the SWOT analysis at a general level, with regards to the principal environmental problems which concern the area. In any case we shall analyse all the environmental sectors *strictu sensu*, but we shall also be analysing some sectors strictly related to the concept of integrated management, such as the socio-economic and the political- management sector.

3. Formulation of a set of indicators chosen and adjusted from a selected bibliography and integrated through the elaboration of new indicators which are created specifically for the considered area.

The use of indicators as a tool to give scientific information to decision-makers and managers in a useable and succinct form is commonly accepted. A lot of environmental, socio-economic and tourist-oriented indicators have been proposed to help the management of coastal areas, and among them something has been proposed specifically for beaches. However, often standard indicators do not fit in well with local peculiarity and a wrong use of an indicator could bring to a wrong analysis. In this context, the project aims to develop a set of specific indicators for the evaluation of the beach status, using indicators mainly selected from the ones proposed in literature, but paying a specific attention to local problems and issues. The proposed and selected indicators will have to cover the environmental aspects of the beach ecosystem (from a sedimentological, biological, physical and chemical point of view), and those with an anthropic origin (presence of anthropogenic risks; cultural and landscape heritage, environmental conservation, pollution, effects of anthropic activities socio-economic values, etc.). In order to make their use easier, indicators should be selected on the basis of available information in the area. The use of this set of interdisciplinary indicators,

created specifically for the recreational beaches of this area, should give a scientific but synthetic information, that should be used both for an environmental assessment and for helping management policies.

4. Use this set of indicators for the assessment of the state of the beaches, for example through a quantitative and territorial SWOT analysis, for the beaches used for bathing (quantitative analysis performed using the selected set of indicators) adjusted and tested on the local reality.

The set of indicators implemented in the previous phase of the project will be used in order to carry out an environmental assessment of the quality of the studied beaches. To achieve this target the project proposes, amongst others tools, the use of a quantitative SWOT analysis. Although the SWOT analysis is traditionally used for territorial studies with a qualitative approach, as already mentioned, some authors have proposed a quantitative approach, based on quantitative indicators and on the use of quantitative matrixes. This kind of SWOT analysis, which allows obtaining numerical results, is based on the use of a set of indicators specific for the studied environment. Taking into account recreational beaches the quantitative methodology and the set of indicators have been implemented by an interdisciplinary team of experts and this tool has been applied only for beaches of international interest, mainly situated in Caribbean areas (Martinez, 2000; Sano', 2002). However, those beaches are deeply different from the ones in the Riviera del Beigua, both for the morphology and for the anthropic pressure, thus making necessary the adaptation of the methodology to the local situation. In order to obtain this, the set of indicators implemented in those areas will be integrated with the specific set of indicators implemented in the previous phase of the project.

The use of a quantitative SWOT analysis in the Riviera del Beigua should be an innovative tool, able to assure an analytical approach to the assessment of the quality of the recreational beaches in that area. This tool could both help one recognise the main environmental impacts and suggest opportunities for the improvement of beach management, from a sustainable point of view. Furthermore, one of the main advantages of the use of a quantitative SWOT analysis is the numerical evaluation of strengths, weaknesses and threats. On one hand, comparing data obtained for aspects (geological, biological, chemical, socio-economic, tourist-oriented, etc.) it is possible to prioritise problems for each studied beach, helping the management decision process. On the other hand, the numerical quantification allows evaluating the effects of such a management in time: applying the analysis periodically it is possible to recognise management faults and to intervene to correct them.

Conclusions

The final aim of the present project is to provide a tool to back up policies for beach planning and management. The need of this tool is strongly request by local authorities of the Riviera del Beigua, currently involved into several projects aimed to improve coastal management toward sustainable policies.

In the first phase of the study the six municipalities involved have actively

collaborated in collecting the existing data. In the next phases of the project, data collected will be used to create a set of specific indicators to provide a synthesis methodology for the assessment of beach environmental state and quality.

The output of the project will be made available to the local authorities and then divulged to stakeholder and end-users through public conferences and publications.

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- (lix) This paper was presented at the ENGIME Workshop on “Mapping Diversity”, Leuven, May 16-17, 2002
- (lx) This paper was presented at the EuroConference on “Auctions and Market Design: Theory, Evidence and Applications”, organised by the Fondazione Eni Enrico Mattei, Milan, September 26-28, 2002
- (lxi) This paper was presented at the Eighth Meeting of the Coalition Theory Network organised by the GREQAM, Aix-en-Provence, France, January 24-25, 2003
- (lxii) This paper was presented at the ENGIME Workshop on “Communication across Cultures in Multicultural Cities”, The Hague, November 7-8, 2002
- (lxiii) This paper was presented at the ENGIME Workshop on “Social dynamics and conflicts in multicultural cities”, Milan, March 20-21, 2003
- (lxiv) This paper was presented at the International Conference on “Theoretical Topics in Ecological Economics”, organised by the Abdus Salam International Centre for Theoretical Physics - ICTP, the Beijer International Institute of Ecological Economics, and Fondazione Eni Enrico Mattei – FEEM Trieste, February 10-21, 2003
- (lxv) This paper was presented at the EuroConference on “Auctions and Market Design: Theory, Evidence and Applications” organised by Fondazione Eni Enrico Mattei and sponsored by the EU, Milan, September 25-27, 2003
- (lxvi) This paper has been presented at the 4th BioEcon Workshop on “Economic Analysis of Policies for Biodiversity Conservation” organised on behalf of the BIOECON Network by Fondazione Eni Enrico Mattei, Venice International University (VIU) and University College London (UCL), Venice, August 28-29, 2003
- (lxvii) This paper has been presented at the international conference on “Tourism and Sustainable Economic Development – Macro and Micro Economic Issues” jointly organised by CRENoS (Università di Cagliari e Sassari, Italy) and Fondazione Eni Enrico Mattei, and supported by the World Bank, Sardinia, September 19-20, 2003
- (lxviii) This paper was presented at the ENGIME Workshop on “Governance and Policies in Multicultural Cities”, Rome, June 5-6, 2003
- (lxix) This paper was presented at the Fourth EEP Plenary Workshop and EEP Conference “The Future of Climate Policy”, Cagliari, Italy, 27-28 March 2003
- (lxx) This paper was presented at the 9th Coalition Theory Workshop on "Collective Decisions and Institutional Design" organised by the Universitat Autònoma de Barcelona and held in Barcelona, Spain, January 30-31, 2004

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