

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

PHASE B REPORT

In English



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Summary of Phase B 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 Koutrakis¹ (Project leader), Argiris Sapounidis¹, Silva Marzetti², Valentino Giuliani³, Dr. Fulvio Cerfolli⁴, Prof. Giuseppe Nascetti⁴, Simone Martino⁴, Prof. Mauro Fabiano⁵, Valentina Marin⁵, Chiara Paoli⁵, Paolo Vassallo⁵, Dr. Emmanuele Roccatagliata⁶, Paola Salmona⁶, Dr. H el ene Rey-Valette⁷, S ebastien Roussel⁷, Fran ois Carnus⁸, Franck Bellet⁸

1. Fondation Nationale de Recherche Agronomique, Institut de Recherche Halieutique (FRI), Nea Peramos, Kavala, Greece, email: manosk@inale.gr
2. Universit  di Bologna, Facolt  di Economia, Dipartimento di Scienze Economiche (DISTART), Piazza Scaravilli, 2, 40126 Bologna, Italy: marzetti@economia.unibo.it
3. Litorale SPA, Via Bellini 22, 00198 Roma, email: valentino.giuliani@litoralespa.it
4. D partement d'Ecologie et d veloppement  conomique supportalbe (DECOS), Via San Giovanni Decollato 1, 01100 Viterbo, email: nascetti@unitus.it
5. Universit  degli Studi di Genova, Dipartimento per lo Studio del Territorio e delle Sue Risorse (DIPTERIS), C.so Europa, 26, Genova, email: fabianom@unige.it
6. ICCOPS-Landscape, Natural and Cultural Heritage Observatory, Via Piacenza, 54 16138 Genoa, email: roccatagliata@iccops.it
7. Univ. de Montpellier 1, Facult  des Sciences  conomiques (UM1), Avenue de la Mer - Site de Richter, CS 79706, 34960 Montpellier cedex 2, email: roussel@lameta.univ-montp1.fr
8. BRL, 1105 avenue P. Mendes-France, 30 001 Nimes, email: Franck.Bellet@brl.fr

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1. Introduction

During Phase A of the Beachmed-e subproject 3.2 ICZM-Med all partners involved, selected the pilot sites where they were going to work and described the current situation as regards the Integrated Coastal Zone Management (ICZM) aspects in all pilot sites. Moreover the methodology of each partner activities was given. Overall 4 pilot sites were selected in 3 countries (Greece: Nestos Delta coastal zone; Italy: Riccione on the coast of the Emilia-Romagna Region, Tarquinia beach in Region Lazio, Riviera del Beigua & Porto Venere in Region Liguria, France: R gion Languedoc-Roussillon).

The Phase B of the Beachmed-e subproject 3.2 ICZM-Med was dedicated to the identification and use of the coastal state indicators to describe the state of the area, to establish management intervention criteria and to select tools (e.g. GIS, economic tools, etc.) that can be used in the Integrated Coastal Zone Management (ICZM) of the pilot sites selected during Phase A. The indicators or tools selected by each partner were mostly based on the expertise (ecological, biologic or economic) of each partner. However, common activities were also chosen in collaboration between all partners (e.g. common questions in questionnaires) in order to see the perspective of the users and stakeholders of these areas on the coastal zone, its management and the impact of erosion.

During this phase, a preliminary GIS map was created by FRI, ICCOPS and BRL (partners 1, 2 and 8 respectively) that contain all the available information related to coastal zone management of the selected site in different layers. Questionnaire surveys were carried out by FRI, DISTART, DIPTERIS, ICCOPS and UM1 (partners 1, 2, 5, 6 and 7) in the selected areas in order to evaluate the stakeholders' perceptions of coastal erosion, ICZM Economic evaluation, public policies. Lastly, DISTART, Litorale SPA, DECOS and UM1 investigate the study of beach use value and how beach protection policies could be financed and the social and economic benefits generated by the beach nourishment. Sustainable development and environmental sustainability

have been investigated in term of identification of critical locations as well as locations with high potential for sustainable development (ICCOPS) and characterisation of indicators (DIPTERIS). Moreover DIPTERIS developed a set of indicator specifically addressed to beach management assessment. UM1 also defined the methodological tools regarding the research protocol and questionnaire survey. Finally, the creation of a coastal zone monitoring system in order to view easily knowledge elements to help the institutional managers in the Integrated Coastal Zone Management is essential.

2. Methodology

At the beginning of the project it was proposed that each partner should investigate different aspects of the beach management, such as ICZM perception, economic evaluation and benefits of beach nourishment projects. However, as mentioned before common activities for ICZM and coastal zone erosion perception was decided (Alexandroupoli, November 2006) and formulated in questionnaires in a meeting held in Genoa (February 2007) to be applied by all the partners of the 3.2 ICZM-Med subproject. In order to investigate the perception of ICZM and coastal zone erosion, questionnaires with common questions for all partners was decided to be applied to Beach Users and Public Stakeholders in each pilot site.

2.1. Beach Users' survey

End-users' perception play a pivotal role for a sound environmental planning and management and thus beach users analysis constitutes an important component in defining beach management policies (DAHM, 2003). Thus, it was decided that the questionnaires of all partners, regarding the beach users, will include 12 common questions related with the "perception" of different parameters related with ICZM and with the "Willingness To Pay" (WTP) aspect. The "perception" aspect will be described in 4 different sections: a) Coastal Zone perception, b) Integrated Coastal Zone Management perception, c) Coastal erosion perception and d) Coastal Defence Systems perception. The survey (at least 150 questionnaires) will be implemented during the summer months when most visitors go to the beaches.

Some partners (P3, P4 and P5) already did it during summer 2006, each one with specific aims mainly related with local issues. During the Genoa meeting, thus, it was decided that the questionnaires of all partners, regarding the beach users, will include 12 common questions related with the "perception" of different parameters related with ICZM and with the "Willingness To Pay" (WTP) aspect. The "perception" aspect will be described in 4 different sections: a) Coastal Zone perception, b) Integrated Coastal Zone Management perception, c) Coastal erosion perception and d) Coastal Defence Systems perception.

2.2. Stakeholders' survey

Regarding the Public Stakeholders it was decided that the questionnaire will also have the same sections, but the questions will be more detailed. Main goal of all partners was to apply a "pilot" stakeholders' questionnaire until the end of March in order to see the drawbacks of the methodology and of the questionnaires in order to correct them. The questionnaires will be used firstly in face-to-face interviews with people from the a) Region, b) Prefecture c) Municipality involved with the coastal zone. If the necessary number of questionnaires were not collected then the survey would be extended to other institutions such as Universities and Research Institutes.

At the beginning of the interview a small introduction – presentation of the Beachmed-e project should be done. This should include the purpose of the project and indicate on the fact that it is an international programme with collaboration between the Mediterranean countries for the protection of the coastal zone and the loss of sand. Also the introduction should emphasize on ICZM and the purpose of it. The interviews would be face-to-face and should last approximately 15 min. At all points the interviewee should be informed that the questionnaires are anonymous and it is only to survey the perception of the stakeholders on ICZM. It was decided that each partner was going to apply a minimum number of stakeholders' questionnaires (20) till the end of Phase B and to present preliminary results.

2.3. Willingness to contribute of sunbathing establishment managers

Apart from the above common questionnaires, DISTART has created two specific questionnaires with the aim to collect data about the voluntarily willingness to contribute of beach visitors and sunbathing establishment managers for coastal defence projects (MARZETTI and LAMBERTI, 2003; POLOMÉ, MARZETTI and VAN DER VEEN, 2005; MARZETTI, 2007). This kind of survey is the first applied in the Region of Emilia - Romagna. Another innovation is the inclusion of specific questions about what beach visitors and sunbathing establishment managers know and think about the ICZM and its application in the Region. Through this methodology, the Region aims to collect information on the possibility to create a public fund for beach defence, and to understand what these stakeholders think and suggest about the implementation of coastal defence projects which also satisfy stakeholders' needs.

2.4. Indicators for the assessment of coastal state

Another step in the project consists in the proposal and first application of specific indicators for the assessment of coastal state. Particularly, DIPTERIS applied two different approaches, one referred to specific indicators for beach management assessment and the other one focused on the environmental sustainability level of coastal municipalities and bathing activities.

As regards the indicators with local relevance ICCOPS is calculating them for the municipalities of the "enlarged" study area in order to allow a comparison. To better fit the specific features of the selected coastal area, some of the indicators have been customised, also introducing slight changes to the indicator's measurement.

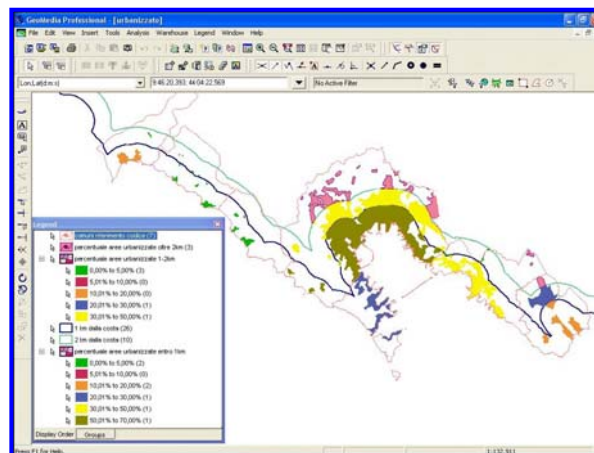


Figure 2.4.1. Example of how an indicator has been calculated for the Region Liguria

In Fig 2.4.1 is an example of how an indicator has been calculated, trying fit the specific study area and at the same time to comply with the need to be applicable to different coastal areas. The indicators have been calculated with alternative geographic criteria in order to find the one most consistent with the geographic features and morphology of the examined area

2.5. Society / beach interactions

ICZM offers an adequate framework to analyse the interactions between the coastal activities and ecosystems. However, coastal erosion and marine floods management policies have been solely focused on beach maintenance and uses with the associated economic flows over the past 20 years. Sustainable development goals lead to a widened recognition of the functions of the beaches to evaluate the carrying capacity and the beach economic and ecological components. In

Tab. 1, a synthesis of the functions of the beaches, the various characteristics of the associated uses and policies aiming at protecting beaches are proposed.

Tab. 2.5.1. Beach functions and public policies with regard to beach protection.

	Direct use	Indirect use
Market use	Beach protection to promote tourism activities	Environmental risks protection (agricultural land, dunes, etc.) Renewable natural resource protection (fish, etc.)
Non-market use	Beach protection to promote leisure activities	Landscape conservation Renewable natural resource protection (fish, etc.) Habitat loss protection (posidonia, etc.) Biodiversity conservation Sediment flows conservation Marine floods assessment

In the following sub-chapters, a brief description of the pilot sites regarding motivations and their characteristics are proposed.

2.5.1. Motivations regarding the choice of the pilot sites

The following pilot sites have been selected by UM1 (Partner 7):

- Valras-Plage with the districts of Orb Hérault and Orb Aude;
- the Sète – Marseillan-Plage lido;
- the beaches of Palavas-les-Flots.

A trade-off concerning the choice of the pilot sites was carried out during the workshop organized with the Conseil Général de l'Hérault (CG34) on January 16, 2007. During this meeting, a selection of four sites (including le Grau du Roi) had been retained. Nevertheless, during the Genoa meeting last February, the discussions with the other European partners implied in sub-measure 3.2 (ICZM-MED), emphasized the lack of relevance of retaining too many pilot sites. This led UM1 to retain three pilot sites. However in order to get a representativeness of the sandy beaches, it was decided to include the natural beach of Villeneuve lès Maguelone. This offers indeed an extension of the study on the site of Palavas-les-Flots with their joint sediment cell. Moreover, this makes it possible to work on a natural beach in complement of the urban beaches of the other sites in order to compare the results obtained.

Several factors took part in the choice of the pilot sites, namely:

- the extent of coastal erosion and marine floods, as well as the presupposed public perception; in Tab. 2.5.1.1, we gather this information by site with a qualitative description of the local population awareness (from a meeting with the Service Maritime et de Navigation du Languedoc-Roussillon (SMNLR (SAIL et ALE)) / Direction Régionale de l'Équipement (DRE-SEL), December 14, 2006);

Tab. 2.5.1.1. Local population awareness of coastal risks on each pilot site.

Pilot sites	Awareness of coastal risks
Palavas-les-Flots	Low (<i>especially regarding marine floods</i>)
Valras-Plage	High
Sète – Marseillan - Plage lido	Work in progress with a recent public pool

- the superposition of the scales of the sedimentary cells (ecosystem) and the units of management (socio-system). The unit of management gathers the administrative unit of management as the number of municipalities concerned with the sedimentary cell, and the ray

of attraction of the beaches for the local population (geographical homogeneity of the local users) (from a meeting with BRL (P8), July 4, 2006);

- from a governance point of view, the stress must be laid on the contribution of the conciliation procedures in particular in the case of the strategic withdrawal operations. This makes it possible to identify the Sète – Marseillan - Plage lido as a pilot site where an operation of strategic withdrawal is evoked with the highway relocation towards the railway (MIAL-LR, 2003);
- finally, to evaluate the conciliation procedures, it is worth having areas where the uses are diversified. In Tab. 2.5.1.2, we present a classification with a scale from 0 to 3 according to our pilot sites.

Tab. 2.5.1.2. Extent of the uses and activities in our pilot sites

	Aigues Mortes Gulf	Sète – Marseillan- Plage lido	Orb Hérault and Orb Aude districts
Fisheries	1	3	1
Agriculture and industry	1	3	0
Habitat and infrastructure	1	1 and 3	1
Coastal erosion	3	3	3
Marine floods	2	2	2
Sea-level rise	1	1	1
Flora and fauna	0	3	1
Landscape	0	3	2
Cultural heritage	0	0	0

Source: *Fourrier (2005)*

In Tab. 2.5.1.3, we synthesise the characteristics of our pilot sites in terms of coastal erosion management policies with the whole process including the various meetings.

Tab. 2.5.1.3. Analysis of concerted actions to cope with coastal erosion

	Aigues Mortes Gulf	Sète – Marseillan-Plage lido	Orb Hérault district	Orb Aude district
Shoreline length	30 km	11 km	13 km	6 km
Municipalities	Palavas, Carnon, Grande-Motte, Grau du Roi – Port Camargue, Saintes-Maries de la Mer	Sète, Marseillan-Plage	Agde, Vias, Sérignan, Valras-Plage, Portiragnes	Valras-Plage, Vendres
Leader institution (MO)	SIVOM, municipalities	Sète	Communauté d'Agglomération Hérault Méditerranée	Valras-Plage
Leader Assistant Institution (AMO)	SMNLR / DRE-SEL	SMNLR / DRE-SEL	SMNLR / DRE-SEL	SMNLR / DRE-SEL
Institutions that implemented the preparatory studies	SOGREAH	BCEOM	SOGREAH	BCEOM
Period of the studies	2002-2003	2000-2001	On going process	2003
Costs of the studies in €	141 300 €	113 117 €		50 050 €
Number of meetings	12	10		5
Concertation procedures	47 months: December 1999 – October 2003	33 months : September 1999 – May 2002		12 months : November 2002 – October 2003
Workshop	9	5		1
Steering committee	3	3		2
Technical committee	-	2		2
Number of implied institutions	13	15		11
Of which private stakeholders	0	3 companies		0
Of which local population representatives	Yes	Yes		No
Information towards population	None	None		None

Source: arranged from Fourrier (2005)

In the following sub-section, we present the layout of our field investigations.

2.5.2. Layout of the field investigations

To carry out our analysis of the perception of coastal erosion and marine floods, and our analysis of the perception of public policies and ICZM, several questionnaires will be implemented, that is to say:

- a “Stakeholder” questionnaire with two alternatives: the institutional stakeholders of which public representatives implied in coastal erosion management policies; the other stakeholders who are not represented in the steering committees and directly implied in coastal erosion management but which contribute to coastal zone management;
- a “Beach user” questionnaire with two alternatives: local populations and tourists. These surveys by means of questionnaires will be carried out from March to August 2007. In Tab. 2.5.2.1, we provide the tasks which will be undertaken until the end of this period.

Tab. 2.5.2.1. Timetable of the tasks that will be carried out from March to August 2007

	Month					
	03	04	05	06	07	08
Typology and methodology						
Stakeholder survey						
Beach user survey						

The “Stakeholder” investigation will be carried out by the researchers of the University of Montpellier 1. The “Beach User” investigation will be mainly carried out by trainees who began their training sessions in March 2007. The investigations will be concentrated mainly over July, June and August, and a representativeness of the days of the week will be required. Common questions set at the Genoa meeting were included.

We present in Section 3 the overall logics respectively associated within these questionnaires.

3. Results: ICZM activities and Tools

3.1 ICZM – Coastal erosion –Defence system perception (Tools – questionnaires)

3.1.1. Institutional coastal stakeholders' survey

During the second phase (Phase B) of the project the stakeholders' survey was carried out by FRI during May – June 2007 using the common questionnaires that were formed during the meeting in Genoa. These questionnaires were addressed to key institutional stakeholders involved in coastal management and were focused on ICZM, coastal erosion and defence systems. Since it was difficult to find public servants to work especially on coastal zones, there was an effort to find people that are work on environmental and water resources issues. These stakeholders were identified in the three-tier administrative structure, based on "General Regional Secretariats" ("the Regions"), "Prefectural Authorities" ("the Prefectures") and the Municipalities. In general 7 people in the Region of East Macedonia and Thrace that are related to environmental and water resources issues (2 in the Department of Environment, 2 the Department of Fisheries and 2 in the Department of Water resources) were identified. In the Prefecture of Kavala 1 person was found in the Department of Environment and finally another 8 people in the Municipalities of Kavala, Chrisoupoli and Keramoti (2, 3 and 3 respectively). Unfortunately, not all of them were willing to be interviewed using the questionnaires (the request was forwarded from the FRI and not from the Region of East Macedonia & Thrace). In total 9 questionnaires were filled in, 8 from the Municipalities of Kavala, Chrisoupoli and Keramoti and 1 from the Region of East Macedonia and Thrace.

As preliminary results the general impression is that the majority of the public servants knew in general what coastal zone is, since the 75% of the interviewed gave a partially correct answer of what coastal zone is, while the 55.56% of them gave a partially correct answer of what coastal erosion is. Unfortunately, the majority of them didn't know what ICZM is as only the 33.33% of them answered positive of what ICZM is, providing also a correct definition of ICZM. However, on the question which organization is working on ICZM the percentages of the answers were approximately the same (44.4% negative and 55.6% positive answer). The same result occurred also in the questions on the knowledge on the existence of relative legislation on ICZM in the country. However all of them believed that there is a need to enact new laws for the protection of the coastal zone. On the other hand all of the interviewee agreed that all the actions that have been taken on the coastal zone management are not sufficient; in contrast the 80% of them believed that there is a good collaboration between the institution/organizations dealing with the Coastal Zone Management.

As far as it concerns the coastal erosion is the 77.8% of the interviewee knew what coastal erosion and the 83.3% of them gave the correct or partial correct definition of it. Regarding the awareness of problems caused by erosion the answers were diverged. The 44.4% of them answered negatively while the 55.6% positively. On the other hand the majority of the public servants weren't aware of any other areas that face any problem caused by erosion (88.9%). Also they believe that coastal erosion don't cause any problem to the professionals of the area. The majority believes that the lack of knowledge on the ICZM is due to the little or no acquaintance from organizations that work on coastal zones (85.89%) and there is the suggestion of a closer co-operation between the Municipalities, the Region and the Ministries.

As far as it concerns the Coastal defence systems, in the question concerning the existence of defence systems from erosion, there was again a diverged in the answers (44.4% negative and 55.6% positive), while in the question concerning the knowledge of the coastal defence systems that could be applied in their area the majority answered negatively (85.71%). However, the 66.67% of they interviewee preferred the soft defence system (addition of new sediment) and the 25% of them a composite intervention defence system and only a 8.33% parallel hard submerged system, but in contrast they didn't know the drawbacks of these systems. Finally everybody believed that there is a need for the installation of a Coastal Defense system in the area (Nestos Delta River).

The survey about regional stakeholders was administered by DISTART (P2) in May/June 2007. 20 interviews were made by trained personnel. Interviewees are employed by the following regional public Agencies: Servizio Difesa del Suolo, della Costa e Bonifica, Servizio Tecnico di Bacino Po di Volano, Servizio Tecnico di Bacino Fiumi Romagnoli, Servizio Tecnico di Bacino

Conca e Marecchia, Servizio Geologico Sismico e dei Suoli, Provincia di Ferrara, Provincia di Ravenna, Provincia di Rimini, Provincia di Forlì and Cesena, Comune di Cattolica, Comune di Riccione, Comune di Rimini, Comune di Cesenatico, Comune di Cervia, Comune di Ravenna, Comune di Comacchio, Comune di Goro, ARPA (Ingegneria ambientale, Servizio Idrometeorologico, Struttura Oceanografica Daphne), Capitaneria di Porto di Rimini, and Direzione Marittima di Ravenna. As preliminary results, we highlight that in the Emilia-Romagna Region the great majority of these respondents are familiar with ICZM, and they are aware that improved legislation (also at national level) on the topic is needed to coordinate the implementation of coastal defence projects in the Region. A certain number of these respondents highlight the need for more coordination between the Emilia-Romagna Regional authorities and local policy-makers about the implementation of projects according to the ICZM guidelines. In addition, to the question about how people (and more specifically private stakeholders) could be involved in the ICZM, about 40% of respondents reply that private stakeholders could give monetary contributions, while about 30% reply that stakeholders, such as sunbathing establishment managers, should also contribute by doing some maintenance work.

About the stakeholders' questionnaire, Litorale SPA (P3) and DECOS (P4) sent it to 20-30 relevant institutional stakeholders in Lazio Region (Tarquinia beach) during the month of April, but the majority of them considered it quite long and just 2 people answered it. Moreover the difficulty to answering the questionnaire is due to the place at regional tier of decisional power about coastal management, while municipalities can define plan for the management of the beach. Therefore local stakeholders had many difficulties in managing the questionnaire. As a consequence of the scarce information till now obtained, there has not been any elaboration, being considered insignificant and capable to be better improved.

The survey will be repeated during the period June – July 2007 with the aim of increasing the number of participants (associations of other relevant stakeholders must be included such as fishermen).

Regarding the survey towards institutional coastal stakeholders, DIP.TE.RIS, in agreement with the other Italian partners, contacted key stakeholders of different administrative levels: the Ligurian Region (Departments of Territorial Planning, Environment and Tourism), the Regional Environmental Agency (ARPAL), the Coast Guard, the 4 Liguria Provinces and the 6 Municipalities of the pilot study area (Riviera del Beigua). According to the common schedule, 20 face-to-face interviews were carried out from April to June.

As preliminary results it is possible to highlight an optimum level of knowledge and awareness about the topics investigated (Tab. 3.1.1.1). All the respondents said:

- i) to know what ICZM is, even if the definitions given vary a lot in terms of completeness and contents;
- ii) to know what coastal erosion is;
- iii) to be aware of the presence of problems caused by coastal erosion in their area;
- iv) to be aware of the existence of methods to defend the beach from erosion.

The majority of the respondents knew the existence of several laws and regulations concerning the management of different aspect of the coastal zone, but they often highlighted the need for a better coordination among different sectoral laws, suggesting sometimes a unique framework regulation.

A lack of coordination between the stakeholders that work on the Coastal Zone Management has been highlighted by the great majority of the respondent, which also thought that the actions that have been taken in the area for the Coastal Zone Management as well as those that have been taken especially in the protection of the coastal from erosion are insufficient.

Tab. 3.1.1.1 – Preliminary results from coastal institutional stakeholders’ survey in Regione Liguria

QUESTIONS		YES	NO
Do you know...	...what ICZM is?	100%	0%
	...what Coastal Erosion is?	100%	0%
	...methods to defend the beach from erosion?	100%	0%
Are you aware...	...of Coastal Erosion problems in your area?	100%	0%
	...if Coastal Erosion affected professionals in your area?	94%	6%
In your opinion...	...the collaboration between stakeholders that work on the ICZM is efficient?	22%	78%
	...the actions taken in your area for ICZM are sufficient?	22%	78%
	...the actions taken in your area for the protection of the coastal from erosion are sufficient?	33%	67%

These results just constitute a preliminary analysis of the main topics addressed by the interviews, which actually contain other interesting suggestions, such as relations between different institutional stakeholders in ICZM, opinion on the level of implementation and on the utility of participatory methodologies, suggestion for the improvement of collaborations between stakeholders and efficacy of interventions, opinion on the drawbacks of coastal defense methods, etc.

During the sub-project meeting, hosted in Barcelona at the end of June, a common strategy for further data elaboration and comparison among differences in the study areas was discussed. Furthermore, DIPTERIS already planned with the Ligurian Regional coordinator a meeting for the presentation of the results to the institutional stakeholders interviewed, in order to highlight and discuss critical points in the implementation of ICZM at the regional level and to propose possible solutions for the improvement.

The stakeholders perception on ICZM and coastal erosion issues was applied in Portovenere by ICCOPS although the pilot site is characterized by a mostly high and rocky coast and where beach tourism, even if is an important issue, is not the main resource of local economy. The questionnaire is going to be submitted to public and private, commercial or not operators from the municipality of Portovenere or from its outskirts, without considering agencies or bodies with a larger territorial competence (Regione Liguria, Province of La Spezia, etc.). That because, dealing with a small and extremely peculiar area, they seemed the most suitable to supply a correct outline. At this regard, ICCOPS has asked the Portovenere local administration to supply a list of those stakeholders more interested in the issue and it is presently contacting the suggested people.

This investigation tries to assess public and stakeholder awareness of coastal risks, and studies how public policies fall under the requirements of an Integrated Coastal Zone Management (ICZM). It is also the opportunity to collect stakeholder representations of coastal risks, ICZM and sustainable development.

This survey is carried out with key stakeholders and public administration representatives such as the State offices, local authorities, professionals, user representatives, etc. The stakeholders are questioned on various scales, i.e., local and regional. About ten or so stakeholders per site are surveyed to which we can add ten key stakeholders on the regional scale. For the stakeholders implied in the steering committees and operations, quantitative information on the costs and a retrospective assessment of the coastal defence structures are also collected. The stakeholders must be selected judiciously and must be willing to spend time for the interview. The talks must be retranscribed accurately and precisely, in particular with the correct terminology of the words used. Thus, as far as possible it is preferable to record the talks. Moreover, it is necessary to clarify what are the individual position and the institutional position of the interviewee. The questionnaire covers successively:

- the identification of the stakeholder;
- the analysis of the position and the stakes of the stakeholder’s institution through the analysis of the public policy cycle, the meetings of the steering and technical committees, the scales of management, the consultation and the communication towards citizens;

- the analysis of the representations of coastal erosion processes and its management, beaches, sustainable development and ICZM;
- the assessment of public policies related to coastal erosion;
- the access and the level of information with collected information, the sources of information and the indicators of management;
- the perspectives.

At the end of the interview, it is requested as far as possible to ask the stakeholder her representation of the consequences of coastal erosion in the shape of a flow chart as a mental chart.

The stakeholders include the participants of the steering committees and operations, that is the representatives of the following institutions: CG34, SMNLR (SAIL et ALE) / Direction Régionale de l'Équipement (DRE), Direction Départementale de l'Équipement (DDE), Mission Interministérielle d'Aménagement du Littoral de la Région Languedoc-Roussillon (MIAL-LR) / Service Général des Affaires Régionales (SGAR), Entente Interdépartementale pour la Démoustication du littoral méditerranéen (EID), Bureau de Recherches Géologiques et Minières (BRGM), Ports, Prefecture, Syndicat Intercommunal des Etangs Littoraux (SIEL), Conservatoire de l'Espace Littoral et des Rivages Lacustres (CELRL), Region, Universities, Communauté d'Agglomération du Bassin de Thau (CABT), Chambres de Commerce et d'Industrie (CCI), Domaine de Listel, Salins du Midi, Camping le Castellas, SNCF, Direction Départementale des Affaires Maritimes (DDAM), Direction Régionale de l'Environnement (DIREN). It is also required to add municipal representatives from the pilot sites (FOURRIER, 2005).

3.1.2. Beach Users' survey

Regarding the Beach Users' survey, a pilot survey with 10 questionnaires was conducted by students of various Universities (Dimokritio University of Thrace, Aristotle University of Thessaloniki, etc.). The purpose of this survey, which is not indicative of the pilot site, was to test the questionnaire wording and correct any error that was identified before the application of the survey in July – August 2007.

As preliminary results we could say that:

- B) 80% of the interviewee answered correct the question what coastal zone is, while the 40% of them knew what Integrated Coastal Zone Management is giving also a correct definition of it. Everybody agreed that all the actions taken in the area for the Coastal Zone Management are not sufficient because the general opinion is that there is not any integrated management of the coastal zone.
- C) Concerning the coastal erosion all the interviewee answered that they knew what it is giving also a correct or partial correct definition. Moreover, everybody answered positively in the question if they knew any problem caused by the coastal erosion.
- D) As far as it concerns the coastal defence systems the 80% of the interviewees answered that they knew the various types of coastal defence systems that exist. However, the 50% of them did not want the installation of a defence system, while the rest 50% showed a preference to the soft defence system, which include the beach nourishment and the Composite interventions (submerged breakwaters, groynes and nourishment). Also the majority them was aware of the negative impacts of these systems on the ecosystem. On the other hand the 70% of the interviewees believed that the cost of construction of such a system is justified.
- E) Regarding the Willingness To Pay (WTP) of the beach visitors for the protection of the coast, the 80% of the of the interviewees consider that the protection of the coast is of high importance or even priority and the 90% of them were willing to contribute economically (1,5 – 3,0 €) for protection systems from erosion. 60% of the student believed that everyone must deal with this issue and the funds for beach protection have to remain public. On the other hand the 30% believed that beach users must contribute to beach protection funding and the funds for the protection systems should be half public, half private and finally a 10% answered that they don't know.

From January to May 2007 three pilot surveys for beach users' were administrated by DISTART to students (who are beach visitors) of the University of Bologna in order to test the questionnaire wording about beach visitors for the Riccione/Misano case-study. Students were chosen because in general they are beach visitors, and interviewing them at the University is without cost. As regards the first pilot survey, 21 students of the Faculty of Sciences (postgraduates) were asked to state their WTP (every 5 years) to a non-profit agency for the defence from erosion of the beach they visit. Some improvements to the questionnaire wording were made. As regards the second survey, 38 students of the Faculty of Economics (undergraduates) were interviewed in particular to test again the WTP wording of the questionnaire. Finally, as regards the third survey, 40 students of the Faculty of Economics (undergraduates) were interviewed for testing the wording of questions about different kinds of coastal structures. These tests suggested very few modifications to the Riccione/Misano questionnaire. Even if the three samples of university students are not representative of the relevant population of beach visitors in Riccione/Misano, it is interesting to present some results:

As regards the first and second pilot surveys, the majority of students are in favour of beach defence mainly for visiting the beach in the future (option value) and for future generations (bequest value). The two different groups of university students are on average willing to pay about the same amount every 5 years. Their mean WTP for a beach defence project is shown in Tab. 3.1.2.1, where it is also computed per year.

Tab. 3.1.2.1. Mean WTP for Beach defence

	Mean WTP (5 years)	Mean WTP (per years)
First Pilot Survey (No. 21 students)(€ 33.0	€ 6.6
Second Pilot Survey (No. 38 students)(€ 35.0	€ 7.0

Those who are unwilling to pay mainly state that sunbathing establishment managers should pay, while others do not state their WTP due to lack of information.

As regards the third pilot survey, amongst the different defence structures the majority of students prefer composite intervention (nourishment, groynes and submerged breakwaters). The second most preferred structure is parallel breakwaters. In addition, the great majority of students stated that the costs for beach defence are justified.

According to the results of these pilot surveys, the final version of the questionnaire for the beach visitors was created. Beach visitors' questionnaire and sunbathing establishment managers' questionnaire will be administered on the Riccione/Misano beach by a market research firm.

Regarding the Users' questionnaire, Litorale SPA and DECOS are focus on the economic benefits generated from beach nourishment (see chapter 3.5). The common questions of the questionnaire formulated in the Genoa meeting will be applied in the period from July to August 2007.

In order to assess beach users' perception, a questionnaire based survey was performed by DIPTERIS, in July and August 2006 in the six municipalities of the Riviera del Beigua. The questionnaire was properly defined in order to be comparable with previous studies in the area (MARIN *et al.*, 2004) and was structured as follow:

- a) *a first general section for the identification of users' profile*
 - general information (gender, age, level of education, profession)
 - habits (time spent at the beach, other activities, mean of transportation)
 - tourist profile (provenance, choice motivation, frequency and length of stay, level of satisfaction, cost of the holiday, relationship with residents)
 - resident profile (relationship with tourists, opinion about tourism impact)
- b) *a second more detailed section for assessing users' perception and attitude about the beach*
 - preferences and dislikes factors
 - specific opinion on different aspects of local beaches

c) *a further section aimed at investigating user awareness and knowledge about themes related to beach management and other territorial issues*

- Blue Flag, environmental awards, waste recycling, resource saving at the beach, defence systems and nourishment practices.

A total of 600 questionnaires (100 for each municipality) were distributed uniformly along the beaches and filled in by beach users in private beach establishment (80%), non-equipped public beaches (15%) and equipped public beaches (5%). The survey was carried out during both the week and the week-end. Data from the questionnaires have been inserted in a specific database and treated with descriptive statistic. Results have been analysed for the whole district and differences among the 6 municipalities have been highlighted.

Results can be considered typical for big resort beaches, in accordance with specific literature, even if they also highlight specific features, confirming findings of previous study in the area which are of great interest for beach managers. An extensive report containing all the results will be delivered to the Ligurian Region and to local institutional stakeholders. Following, main results are reported.

Beach users' profile. Results on demographics allow to draw up the profile of the "typical beach user" of the Riviera (Tab. 3.1.2.2). In fact, the majority of the interviewed is women, is aged between 35-60 and hold a secondary school degree. Most of the beach users of the Riviera say to visit the beach every day or at least more days in a week (32%), both during the midweek days and week-ends, even if 23% of them go to the beach only in the week-end, and generally spend at the beach 2 to 6 hours per day.

The 75% of beach users' interviewed in the whole Riviera were tourists, but at Celle Ligure this percentage was even higher (93%). Tourists come habitually in the Riviera essentially from the adjacent northern Region, Lombardia (46%, most of them from the Province of Milano, 33%), from the Ligurian Region itself (19%, most of them from the near city of Genova, 17%) and from the Piemonte Region (17%). They generally come with the family, chose the Riviera mainly because of home closeness or because they hold a second home and usually stay more than 15 days. The majority of them said to be satisfied by their stay or at least almost satisfied.

Tab. 3.1.2.2. Main characteristics and attitude of beach users (left) and specifically of tourists (right) in the Riviera del Beigua.

BEACH USERS' PROFILE	%
Woman	61
36-50 years old	40
Secondary school	48
Every day at the beach	39
Midweek and week-ends	63
2 to 6 h	73

TOURISTS' PROFILE	%
Tourist	75
Extra regional provenance	67
Habitually coming	65
With family	45
Because: close to home	23
2° home	13
Stay > 15 days	37
Satisfied: yes	29
almost	36

Relationships between tourists and residents. These relationships have been considered in order to assess some feature related with the social impact of tourism in the Riviera. Among the 66% of tourists who said to have contacts with residents (including a 27% which say to have contacts only with tourism operators and shopkeepers) the majority (55%) of the respondents think that residents have a cordial approach toward them. Similarly, among the 74% of residents which said to have relationships with tourists, 53% consider that tourists have a friendly approach. Furthermore, the majority (52%) of the residents believes that tourism have a positive impact on the resort, even if the 22% think the contrary, a percentage which rise to 50% in the Municipality of Varazze, highlighting a relevant critical issue for this resort.

Preferences and dislikes factors at the beach. Interviewed were asked to indicate their general preferences at the beach (Tab. 3.1.2.3) and main dislike factors (Tab. 3.1.2.4), prioritizing the three main aspects. Beach users clearly indicated sea/beach cleanliness as the most important aspect. The presence of services and facilities at the beach play an important role too, even if not

as first choice. It is worthy to highlight the high importance ascribed to the type of sediment as well as the poor role of environmental awards as preference factors and the indication of crowding as a main factor of disturbance.

Tab. 3.1.2.3. Results on general preferences indicated by beach users.

% of respondents	clean water	clean beach	services & facilities	type of sediment	landscape	safety	good aesthetic of beach structures	sport / other activities	env. awards	other
1° choice	77	12	4	1	1	2	0	0	0	1
2° choice	10	50	13	14	4	5	1	1	1	2
3° choice	4	19	32	7	15	11	4	3	2	2
TOT	91	81	49	22	20	18	5	5	4	5

Tab. 3.1.2.4. Results on general dislike factors indicated by beach users.

% of respondents	dirty sea	litters	crowding	poor facilities	noise	algae debris	type of sediment (uncomfortable)	poor aesthetic of beach structures	boats	other
1° choice	63	20	11	1	2	1	1	1	0	0
2° choice	17	42	19	5	4	5	5	2	0	0
3° choice	8	20	19	17	11	8	7	4	4	3
TOT	89	81	49	22	16	14	13	7	5	4

Opinion on the frequented beaches. On average, most of the interviewed have a positive opinion on several aspects of the beach (Fig. 3.1.2.1), considering good both beach quality and cleanliness and water quality, even if seawater was judged just sufficient by the 39% of the respondents. Also submarine landscape is considered by the majority of the respondents just sufficient or even poor, while scenery is mostly perceived to be good. A high percentage of people also consider the aesthetic of the bathing structure as nice at their beach (60%) and in the whole resort (55%). Concerning services offered at the beach, the majority of users consider essentially good both public safety and services and facilities, even if the percentage of people who judge it just sufficient is quite high in both cases. A prevalent negative opinion was recorded regarding the offer of recreational activities, which is judged poor by almost the half of the beach users of the Riviera.

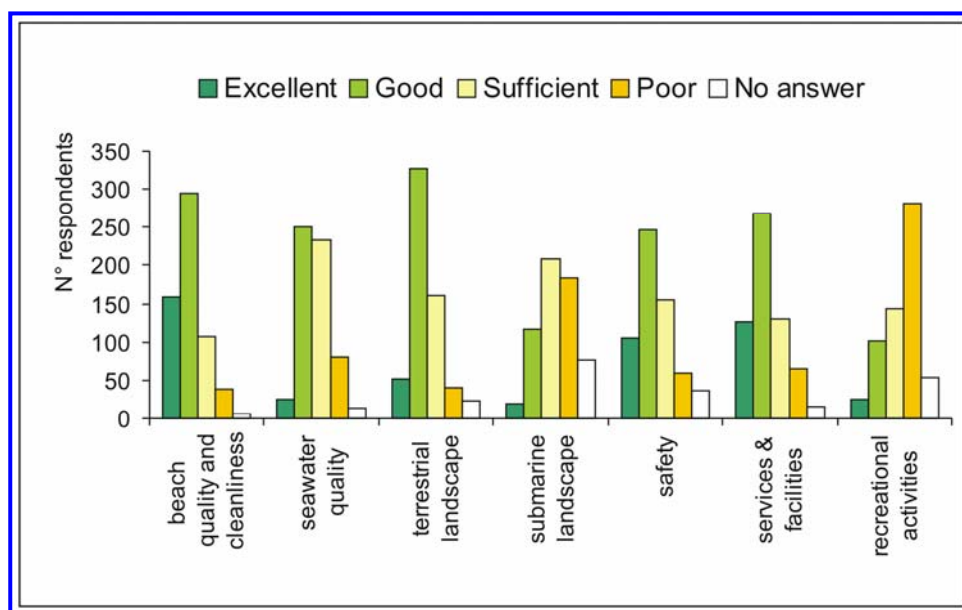


Figure 3.1.2.1. Results of users' opinion on some aspects of the frequented beaches.

Users' opinion about crowding at the beach was also investigated. The level of crowding is considered "medium" by majority of the respondents (51%), even if a slightly increase in the percentage of people with a negative perception ("excessive" and "elevated") was observed in the

week-end (11% and 27% respectively) and, above all, in the public beaches (18% and 30% respectively). In confirmation of this data, 40% of the interviewed judge the available space at the beach as insufficient, even if remarkable differences have been observed among the six municipalities (ranging from 24% to 52%). Almost the half of the respondents considers medium the noise connected with crowding at the beach and low the traffic noise.

Environmental sound management at the beach. In order to investigate the level of environmental sound management practices at the beach and users' perception on this topic, specific questions were formulated regarding waste management and resource consumption. Almost one third of the interviewed do not know if wastes collection for recycling is available in the beach they are. The percentage of people who said it is available varies a lot in the six municipalities (Tab. 3.1.2.5.), ranging from a minimum of 17% to a maximum of 62% and thus reflecting the different level of local development about this topic. It is important to highlight that where people say it is possible to do it, just a little percentage of them assert they do not recycle and, vice versa, when they say it is not possible to do it, the great majority of them affirm they would like to have the possibility to recycle.

Tab 3.1.2.5. Results on the possibility of collecting recyclable waste at the beach in the Riviera.

Municipalities (% of respondents)	Yes and I recycle	Yes, but I don't recycle	No, but I would like it	No, but I don't care	I don't know	No answer
Arenzano	35	5	32	1	28	0
Cogoleto	26	10	29	6	27	2
Varazze	41	6	26	1	27	0
Celle Ligure	54	8	13	0	21	4
Alb. Superiore	21	6	36	6	27	4
Alb. Marina	13	4	33	6	38	6
TOT	32	6	28	3	28	3

The presence of systems to reduce water or energy consumption (as alternative power sources to heat water for showers, such as solar panels) was also investigated (tab. 3.1.2.6). Again, around one third of the interviewed said they do not know if these systems were applied at the beach. Considering water saving systems, among who answered that they are applied at their beach (32% in average with few differences among municipalities), the 75% think it is a useful practice while a 14% said that this systems disturb them; where people said these systems were not applied, the 83% of them affirmed that it would be necessary. A minor percentage of interviewed said that sustainable water heating systems for showers were used at their beach (ranging between the municipalities from a 40% to a 6%). Among who answered that they are used, the 90% thinks it is a useful practice and where people said these systems were not used, the 88% affirmed that it would be necessary.

Tab 3.1.2.6. Results on the presence of resource saving systems at the beach in the Riviera.

	Yes and it is useful	Yes, but I don't care	Yes, but it disturb me	No, but I don't care	No, but it would be useful	I don't know	No answer
water saving systems	24	3	4	4	21	39	3
sustainable water heating systems	19	2	0	5	40	31	2

Generally, the 69% of beach users said to consider useful to apply at least one of the two investigated resource saving systems, with a higher preference for sustainable water heating systems for showers (59%) respect to water consumption reducing systems (45%), and globally the 36% of the interviewed said to consider useful both of them.

Beach users' expenses. Both residents and tourists were asked about the daily cost at the beach, in terms of access, food/drink and other expenses. The most interesting results concern the expenditures for daily access at the beach, which clearly strongly vary between visitors of free access public beaches, equipped public beaches and private establishments (Fig. 3.1.2.2.).

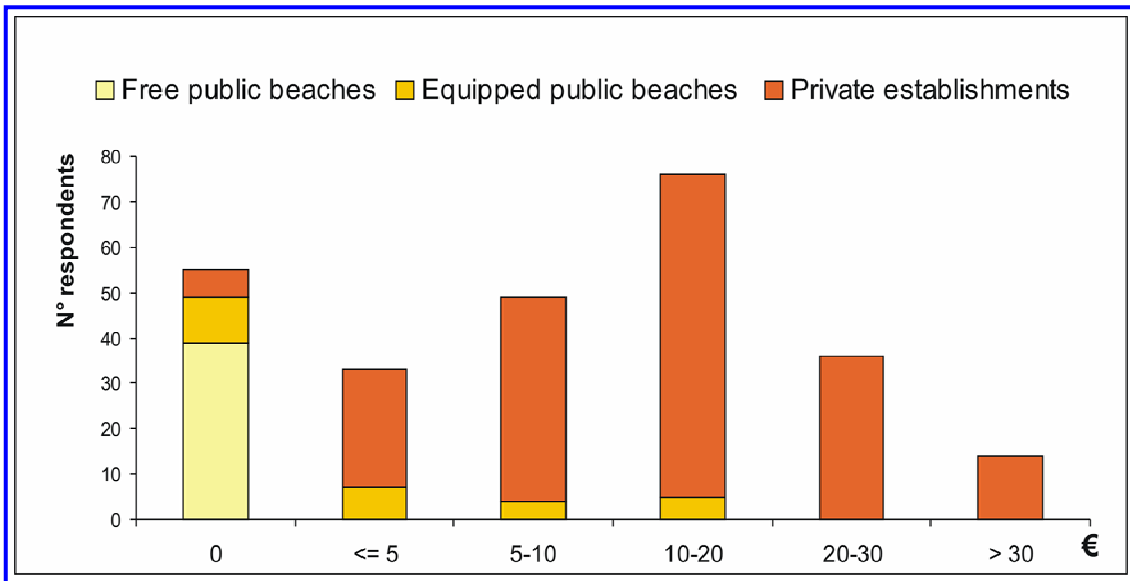


Figure 3.1.2.2. Daily costs for beach access in public beaches, equipped public beaches and private establishments.

The overall cost of the holidays for tourists varies depending on several factors, particularly on the length of the stay (Tab. 3.1.2.7), for the majority of the respondent being higher than 2000€.

Tab. 3.1.2.7. Overall cost of the holiday for tourist in the Riviera del Beigua

stay/cost (%)	< 500€	500-1000€	1000-2000€	>2000€
today	93.2	2.3	4.5	0.0
2-7 days	62.5	27.1	4.2	6.3
8-15 days	18.3	40.0	25.0	16.7
> 15 days	4.8	21.3	24.5	49.5
TOT	26.8	22.9	19.1	31.2

Knowledge and awareness on beach management issues: Some questions regarding coastal erosion, defense systems and nourishment have been formulated to obtain a first picture on users' knowledge and perception on these topics. A high percentage of people said not to know what nourishment is (74%) even if this practice is really common in that area. Among people who thought to know what nourishment is, the majority showed a good knowledge about the issue: 48% gave a correct answer, 30% a good an almost correct answer even if uncompleted or generic and the rest gave a wrong definition, the most frequent being related with restoration of flora and fauna (11%). Furthermore, 31% of them gave a positive judgment concerning the benefits related to nourishments practices while 54% think that it could have some drawbacks. Among the ones who claims possible negative effects, the 34% did not gave further indications, 22% said it is not resolute and the rest indicated as a possible risk the reduction in sediment quality (13%), the risk of contamination (7%) and the reduction in the water quality (3%) and other drawbacks. Finally, only 3% of them indicated the excessiveness of the related costs as a possible problem.

Concerning the perception about the presence of jetties and groynes, spread in the whole Riviera, the 47% of the beach users' likes them, the 28% considers they have no relevance and only the 20% says they don't like them. However, when they were asked to indicate the coastal defense system they would prefer in case of beach erosion, jetties were chosen only by the 15% of the respondents, while a slightly higher percentage of users indicated the emerged breakwaters (23%), sand nourishment (23%) and submerged breakwaters (18%).

Further questions aimed at investigating the level of knowledge and awareness of beach users' about environmental awards of the beach, the bathing establishment and the whole municipality.

The Blue Flag award resulted the most well known: a high percentage of people said to know what it is (82%) and to be aware of the presence or not of this award in the beach they were (the percentage varies among the resorts, but it must be highlighted that only 4 of the 6 municipalities have the Blue Flag), but among the respondents only few people could give an exact definition.

The Quality Chart for bathing establishments specifically created in the Riviera del Beigua and applied since 2004 in order to promote a more sustainable tourism in the area encouraging environmental sound management practices, resulted to be known only by the 27% of the interviewed.

Since 2002, the six municipalities of the Riviera del Beigua have initiated a path to obtain the EMAS certification for the whole district. Despite the fact that in 2006 all the six municipalities had the ISO 14001, just 40% of the beach users' said to know what ISO 14001 accreditation and/or EMAS registration are and only 15% of them was aware of the fact that the municipality had it.

Opinion on beach management: Public beaches in the Ligurian Region are really few compared with beaches in concession to privates and thus the ways they are managed by the municipalities constitute a central issue. Particularly, in the last years many municipalities started to transform free access public beaches in "partially equipped" beaches, where in some cases beach users have to pay an entrance fee, in other cases they pay just for services (showers, toilets, rent of chairs, etc.) or in some other cases the basic services offered (showers and toilets) are totally free. Results on beach users' perception on this issue are reported in Tab. 3.1.2.8, where is it possible to notice some differences about preferences indicated by beach users' depending on the type of beach they frequent.

Tab. 3.1.2.8. Beach users' preferences about alternative management options for public beaches.

Beach typology / Public beach management option (% of respondents)	Free & not equipped	Equipped with low entrance ticked	No answer
Public beach	51	48	1
Equipped public beach	25	75	0
Private beach (equipped establishment)	23	74	2
TOT	28	70	2

Another focal issue in beach management in Liguria concerns the massive presence of bathing structures on the beach. Beach users' opinion on this topic is that bathing structures should have just a fixed portion (i.e. bar/restaurant or cement base for cabins) (39% of respondents) or even being totally removable at the end of the bathing season (this option was chosen on average by the 32% of respondents, with a maximum of 56% in Celle Ligure). Totally fixed structures were indicated as option just by the 3% of the interviewed.

Willingness to Pay for using the beach in order to improve management and maintenance was also investigated. Among the 42% of respondents who said they would pay, the majority indicated the access fee as the best way of payment. Just the half of them indicated the sum they consider most appropriated, which for the majority of respondents is 2-5 € per visit.

Results allowed obtaining a first clear picture on "subjective" issues and their integration with results coming from the other "expert knowledge" based analysis will support the definition of local beach management.

In the Genoa Meeting, a new common questionnaire for beach users was prepared, which specifically focus on users' perception and level of awareness about ICZM, beach erosion, coastal defence systems and nourishment practices as well as users WTP. This new questionnaires will be applied in a new survey in the Riviera del Beigua during summer 2007.

The new common questionnaire for beach users, which specifically focus on users' perception and level of awareness about ICZM, beach erosion, coastal defence systems and

nourishment practices as well as users WTP will be applied in a new survey in the chosen study area of Portovenere Riviera by ICCOPS during summer 2007.

The “Beach user” questionnaire that is applied by UM1 will provide information related to beach uses according to socioeconomic features, representations of coastal risks, ICZM and sustainable development, as well as the monetary amounts that people would be willing to pay to protect beaches.

The questionnaire covers successively:

- the identification of the users with socioeconomic features;
- the type of residents by separating people as local residents from coastal municipalities, local residents from non-coastal municipalities / daily visitors, owners of second homes, and tourists;
- the representations associated with the coastal zone and the uses of the beaches, and goods and services associated with the beaches;
- the perception of coastal erosion processes;
- the public policies dealing with coastal erosion processes;
- the perception of the marine floods processes and required policies;
- the Willingness To Pay (WTP) as the daily maximum amount that people would be willing to pay to protect the beaches or the maximum surplus of additional fees which they would be willing to pay.

3.2. Indicators

3.2.1. Identification of indicators for beach management assessment

During Phase B DIPTERIS also worked on the adaptation of some key concepts and tools of ICZM to beach management. In fact, as highlighted in the bibliographic report of PHASE A, the attention of researchers and managers has been mostly focused on specific and sectoral issues of beaches, while the need for an integrated approach to beach management has been highlighted only recently (JAMES, 2000) and just few examples of integrated beach management tools and practices are available in literature (MICALLEF and WILLIAMS, 2002; 2004).

Particularly, considering the central importance of indicators in ICZM, a possible set of indicators to be specifically adopted for beach management assessment was defined, selected on the basis of results from general coastal and beach management literature and previous local studies carried out in the area (PALMISANI *et al.*, 2004). The approach adopted in this phase of the project rise from the results obtained by a previous application of a specific indicators-based tool defined to perform beach quality assessment in the Riviera del Beigua (MARIN, 2006). In fact, even if the central aim of that previous project was the definition and application of an evaluating tool for beach quality (physical, ecological and environmental quality of the beach, but also quality of the tourism industry), one of the more interesting findings consisted in a first attempt to evaluate also beach management practices. In that occasion, both during the data collection process and the evaluation phase, a general lack of organization, coordination, tools and efficacy in beach management practices at the municipality level was registered.

Thus, basing on those previous findings and with the aim of applying to beach management the same approach and tools generally recommended for ICZM practices, in the Phase B of this project particular attention has been given to the definition and upgrading of indicators referring to management and planning activities, both related to private (bathing establishments) and public (administration) management (Fig.3.2.1.1). The aim is to propose a tool able to identify weaknesses and vulnerabilities in beach management practices, in order to support local policies and identify priority interventions.

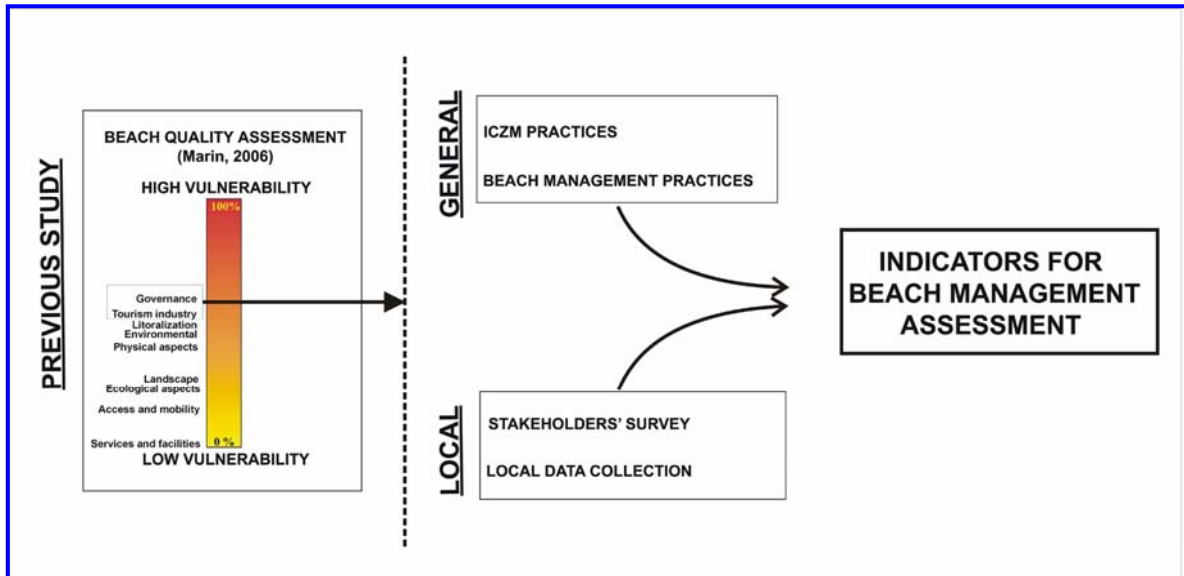


Figure 3.2.1.1. Conceptual scheme for the proposal of indicators for beach management assessment

Data collection in the pilot area has been carried out for a first test of some of the proposed indicators. Information obtained with the administrative stakeholders' survey were also considered for the formulation and application of indicators. The indicators identified and the results of their application should be discussed with local managers in order to guarantee better and useful results. To this aim, both public and private local managers will be contacted during Phase C and a selected set of beach management assessment indicators will be proposed as a tool to be annually applied in the Riviera del Beigua (i.e. within the certified Environmental Management Systems).

3.2.2. Environmental sustainable analysis

Coastal zones have to be evaluated in relation with their ability to maintain it in the long run. Thus every approach to the problem needs to be faced in term of sustainability, considering with a whole system approach, all the three basic pillars: economy, society and environment (Cicin-Sain, 1993). The environmental sustainability of coastal zone has been faced by DIPTERIS by means of two different systemic methodologies: emergy analysis and ecological footprint. The former is based on the determination of the quantity and typology of exploited resources; the latter is a method able to assess the overexploitation of environment due to human activities.

Emergy analysis of Riviera del Beigua

Emergy evaluates the work previously done to make a product or service. Emergy is a measure of energy used in the past and thus is different from a measure of energy now. The unit of emergy (past available energy use) is the emjoule to distinguish it from joules used for available energy remaining now. Like energy, emergy is measured in relation to a reference level. As in the greatest part of cases, in these applications we have expressed everything in units of solar emergy joules.

Emergy analysis is based on an accurate inventory of resources requested by a process or an activity in a fixed time period (generally a year).

In this study an application of the emergy analysis to the coastal zone has been realised aiming to assess the importance of the sea in the sustainability of the coastal zone. This approach required some modifications to the standard guidelines draught by H.T. ODUM (1996).

The first step of the emergy analysis methodology is represented by the drawing of a system diagram by means of appropriate symbols developed by ODUM (1996). These systems diagrams are used to clarify the simplifications that humans need in their window of attention. The diagram in Fig. 3.2.2.1 has been suitably developed aiming to represent the fluxes maintained for the activity of a common seaside municipalities along the Ligurian coast.

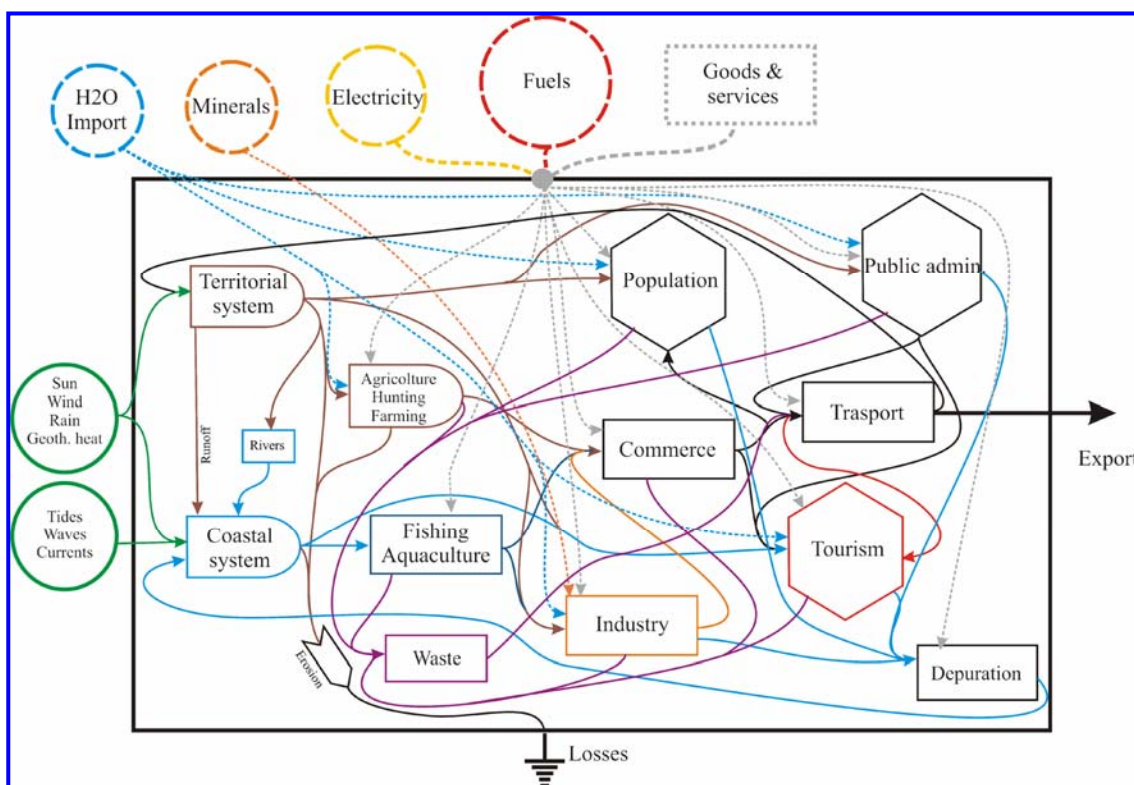


Figure 3.2.2.1 Systemic diagram of fluxes acting in the Riviera del Beigua

Main activities performed in the area are reported in the diagram and have been considered in the energy analysis. The following step of an energy analysis is the drawn up of a table where sources values are reported and converted in energy terms. At this purpose demographic, economic, geographic and social information have been collected in the six municipalities of the Riviera del Beigua. Table with calculations involved in this study is here reported (Tab. 3.2.2.1). Items' values have been obtained from direct survey or from statistical collection performed by Ligurian Region (<http://www.regione.liguria.it/>) or by the Italian institute for statistical production (<http://www.istat.it/>). Emergy values for each item have been calculated by means of transformity multiplication; for each line in the table an appropriate conversion factor has been identified to obtain the emergy value of each flux and the total emergy requested for the activities performed in the study area. Suitable transformities for each item were identified from published researches or previously performed studies.

Tab. 3.2.2.1 - Data involved in the emergy evaluation of the six municipalities of Riviera del Beigua.

Item	Value						UofM	Transf.		Emergy					
	Arenzano	Cogoleto	Varazze	Celle	Alb.Sup.	Alb.Mar		Arenzano	Cogoleto	Varazze	Celle	Alb.Sup.	Alb.Mar		
Sun	1.39E+1	1.07E+1	2.57E+1	7.04E+1	2.51E+1	1.26E+1	joule	1.00E+	1.39E+1	1.07E+1	2.57E+1	7.04E+1	2.51E+1	1.26E+1	
Wind	3.01E+1	2.31E+1	5.56E+1	1.52E+1	5.42E+1	2.72E+1	joule	2.45E+	7.36E+1	5.66E+1	1.36E+1	3.73E+1	1.33E+1	6.67E+1	
Rain (kin.en.)	1.16E+1	9.23E+1	1.78E+1	4.24E+1	1.47E+1	9.69E+1	joule	3.05E+	3.54E+1	2.82E+1	5.42E+1	1.29E+1	4.48E+1	2.96E+1	
Rain	1.93E+1	1.61E+1	3.32E+1	2.34E+1	7.56E+1	1.31E+1	joule	4.70E+	9.08E+1	7.58E+1	1.56E+1	1.10E+1	3.55E+1	6.16E+1	
Wave	6.25E+1	3.85E+1	9.86E+1	5.02E+1	1.94E+1	1.19E+1	joule	5.10E+	3.19E+1	1.96E+1	5.03E+1	2.56E+1	9.90E+1	6.05E+1	
Tide	7.81E+1	4.81E+1	1.23E+1	6.28E+1	2.43E+1	1.48E+1	joule	7.39E+	5.77E+1	3.56E+1	9.11E+1	4.64E+1	1.79E+1	1.10E+1	
Geoth.heat	2.31E+1	1.92E+1	4.52E+1	9.06E+1	3.01E+1	2.73E+1	joule	5.80E+	1.34E+1	1.11E+1	2.62E+1	5.26E+1	1.75E+1	1.59E+1	
Crop prod.															
corn	6.77E+0	0.00E+0	1.29E+1	0.00E+0	1.02E+1	1.13E+1	joule	2.67E+	1.81E+1	0.00E+0	3.43E+1	0.00E+0	2.71E+1	3.01E+1	
vegetables	1.00E+1	2.36E+1	8.55E+1	7.55E+1	5.91E+1	4.00E+1	joule	7.08E+	7.11E+1	1.67E+1	6.05E+1	5.35E+1	4.19E+1	2.83E+1	
vine	3.01E+1	3.36E+1	5.12E+1	4.16E+1	3.44E+1	4.91E+1	joule	4.82E+	1.45E+1	1.62E+1	2.47E+1	2.01E+1	1.66E+1	2.37E+1	
Farming	1.80E+1	1.40E+1	4.58E+1	2.12E+1	4.07E+0	9.97E+1	joule	5.33E+	9.59E+1	7.45E+1	2.44E+1	1.13E+1	2.17E+1	5.31E+1	
Fishing	2.37E+0	1.46E+0	3.73E+0	1.90E+0	7.35E+0	4.49E+0	gram	2.27E+	5.37E+1	3.31E+1	8.48E+1	4.32E+1	1.67E+1	1.02E+1	
Human labour	1.24E+1	9.93E+1	1.57E+1	6.24E+1	1.21E+1	6.60E+1	joule	4.50E+	5.57E+1	4.47E+1	7.08E+1	2.81E+1	5.45E+1	2.97E+1	
Soil erosion	1.01E+1	3.29E+1	8.03E+1	2.26E+1	2.27E+1	2.30E+1	joule	7.38E+	7.44E+1	2.43E+1	5.92E+1	1.67E+1	1.67E+1	1.70E+1	
Water	1.52E+1	1.14E+1	1.99E+1	8.32E+1	1.34E+1	6.93E+1	gram	1.95E+	2.97E+1	2.23E+1	3.87E+1	1.62E+1	2.61E+1	1.35E+1	
Solid waste	5.07E+1	3.81E+1	6.61E+1	2.77E+1	4.47E+1	2.31E+1	Joule	1.04E+	5.27E+1	3.96E+1	6.87E+1	2.88E+1	4.65E+1	2.41E+1	
Waste water	1.40E+1	1.05E+1	1.83E+1	7.65E+1	1.24E+1	6.39E+1	gram	7.06E+	9.89E+1	7.43E+1	1.29E+1	5.40E+1	8.73E+1	4.51E+1	
Electricity	1.57E+1	1.25E+1	2.50E+1	1.05E+1	1.99E+1	1.00E+1	joule	1.59E+	2.50E+1	1.99E+1	3.98E+1	1.66E+1	3.17E+1	1.60E+1	
Fuel															
Gasoline	1.81E+1	1.44E+1	2.14E+1	8.42E+1	1.74E+1	8.93E+1	joule	1.10E+	2.00E+1	1.59E+1	2.35E+1	9.26E+1	1.91E+1	9.82E+1	
Diesel	2.39E+1	1.90E+1	2.81E+1	1.11E+1	2.29E+1	1.18E+1	joule	1.10E+	2.63E+1	2.09E+1	3.10E+1	1.22E+1	2.51E+1	1.29E+1	
Oil	1.25E+1	9.92E+1	1.47E+1	5.79E+1	1.19E+1	6.14E+1	joule	9.12E+	1.14E+1	9.05E+1	1.34E+1	5.28E+1	1.09E+1	5.60E+1	
Gas	2.83E+1	2.25E+1	3.33E+1	1.31E+1	2.71E+1	1.39E+1	joule	8.11E+	2.29E+1	1.83E+1	2.70E+1	1.06E+1	2.20E+1	1.13E+1	
Import	4.58E+0	3.64E+0	1.03E+0	4.06E+0	8.36E+0	4.30E+0	€	2.22E+	1.02E+2	8.09E+1	2.29E+2	9.01E+1	1.85E+2	9.55E+1	
Tourism															
Bathing	2.03E+0	2.22E+0	6.29E+0	3.88E+0	2.59E+0	1.67E+0	€	2.22E+	4.52E+1	4.93E+1	1.40E+1	8.62E+1	5.75E+1	3.70E+1	
Small	8.69E+0	0.00E+0	1.11E+0	2.16E+0	0.00E+0	0.00E+0	€	2.22E+	1.93E+1	0.00E+0	2.46E+1	4.80E+1	0.00E+0	0.00E+0	
Beach	1.50E+1	9.21E+0	2.36E+1	1.20E+1	4.65E+0	2.84E+0	gram	1.00E+	1.50E+1	9.21E+1	2.36E+1	1.20E+1	4.65E+1	2.84E+1	
Export	9.45E+0	7.52E+0	9.91E+0	3.91E+0	8.04E+0	4.14E+0	€	2.22E+	2.10E+1	1.67E+1	2.20E+2	8.67E+1	1.79E+2	9.19E+1	

The algebraic sum of all the fluxes listed in the table, counting both renewable and non-renewable resources of each municipality, brings to the emergy required by the Riviera del Beigua during a year. In Fig. 3.2.2.2 emergy trend in the six municipalities is reported moving from East (Arenzano) to West (Albissola Marina).

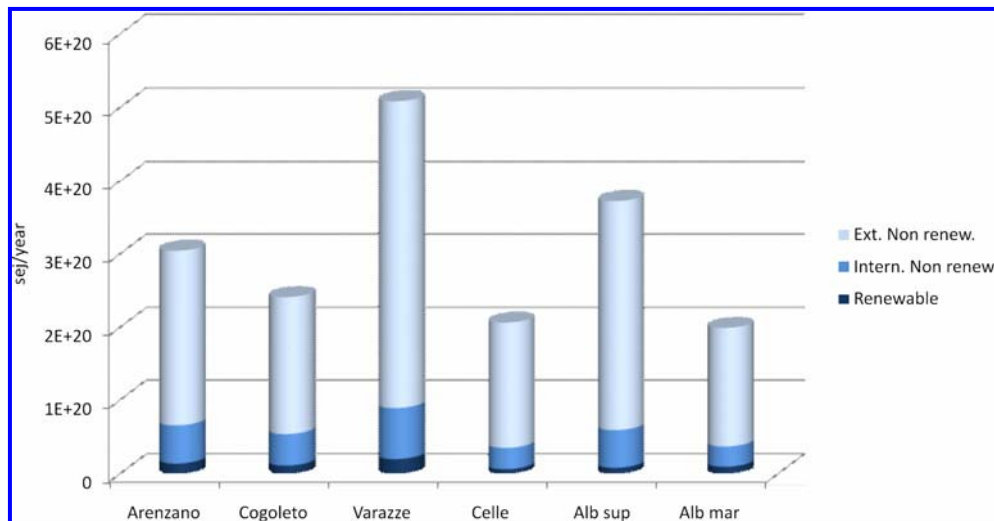


Figure 3.2.2.2 Total emergy values and resources use in Riviera del Beigua municipalities.

Total emergy requested by the system resulted dependent on the territory extension ($\rho=0.96$, $n=6$, $r=0.71$) but more interesting is the analysis of different contribution to total emergy. In fact, resources exploited by the system are conventionally grouped into two types, depending on their origin and replacement rate: group F comprises resources imported from outside the system, while group L refers to those of local origin. This latter group may be further subdivided into subgroup R for renewable local resources and N for non-renewable local resources. In Fig. 3.2.2.2 the relative weight of the three kinds of resources is shown for each commune in the Riviera del Beigua.

External and non renewable resources play a major role in all the six communes of the Riviera del Beigua as clearly stated in Fig. 3.2.2.2 and ranging from 78% in Cogoleto to 84% in Albisola Superiore. Indigenous non renewable resources counts for the second most important contribution (from 13% in Albissola Marina to 18% in Cogoleto) while renewable fluxes matter for the lowest part ranging from 2% in Albisola Superiore to 4% in Cogoleto. As a consequence total emergy variations are almost completely driven by non renewable external resources ($\rho=0.99$, $n=6$, $r=0.71$), while variations in relative weight of indigenous renewable and non renewable resources could give some further information on the ability of the municipalities in exploiting available renewable fluxes.

Emergy of tourism activities: Tourism influence is reported to be one of the main forcing functions driving the economy and the activity in the Riviera del Beigua. As a matter of fact, a significant number of fluxes are forced by tourism activity both in a direct way (item “tourism” in table) and in an indirect way (such as food, fuel and energy consumption, waste production, human labor etc). In Fig. 3.2.2.3 a schematic representation of the tourism influence in the coastal zone is reported. Tourism development forces the system as diagrammed with broken lines. Tourism direct fluxes

(line f_a from right side source in the diagram) are counted in the system and their relative weight is reported in Tab. 10. Nonetheless variations in coastal zone fluxes (f_d) due to the feedback (f_b) are hardly detectable due to lack in data collection or to the impossibility of comparison with the previous situation of Riviera del Beigua.

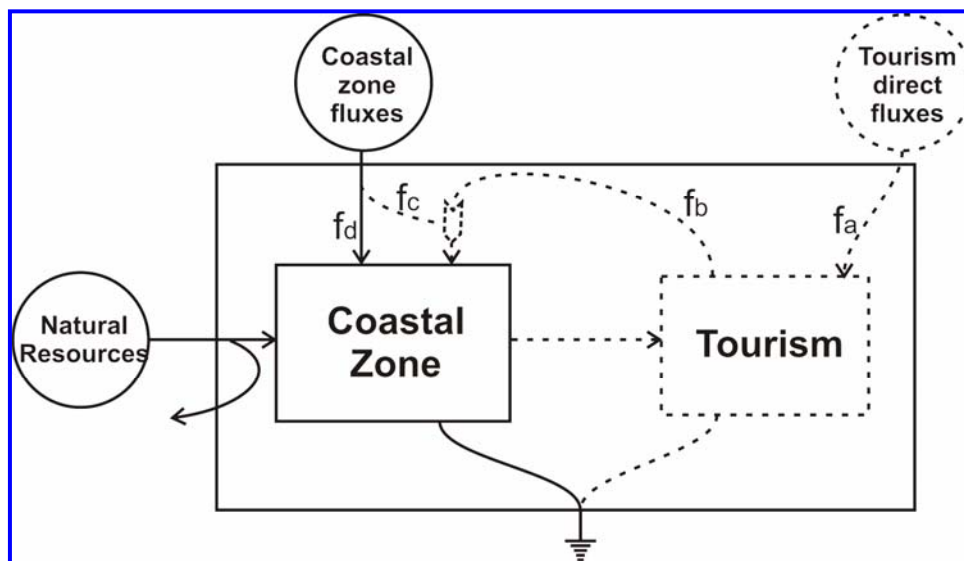


Figure 3.2.2.3. Tourism influence system diagram

Assuming to split f_c and f_d paths in proportion to the quantity of tourists and population respectively, the percentages of tourism related energy reported in Tab. 3.2.2.2 strongly increase reaching in some cases percentages significantly higher than 50%.

Tab. 3.2.2.2. Ratio of energy for tourist facilities and energy for other items.

	Arenzano	Cogoleto	Varazze	Celle	Alb sup	Alb mar
Direct fluxes (f_a)	0.08	0.06	0.09	0.12	0.03	0.03
Indirect fluxes ($f_a+f_b+f_c$)	0.32	0.21	0.58	0.85	0.14	0.15

Ecological Footprint

The Ligurian coastal zone is suffering huge urbanization and high tourism pressure. This condition is mirrored by an overexploitation of territory resources and an overloading on the environment due to the carrying capacity threshold crossing. In fact coastal strip is a highly complex system involving both ecological and anthropic components. All these elements mutually intersect causing potential conflicts between many different and sometimes opposing uses. The resolution of this issue lies in the identification of proper policies for territory management. The suggested approach tackles this topic with a bottom-up design aiming to lead different stakeholders (fishermen, marinas managers, beach managers etc.) to an environmentally sound management of their activities. At this purpose a sustainability analysis of a key sector of the Ligurian coast economy (bathing establishments and beach recreational activities managed by privates) has been achieved.

The study has been carried out by means of the application of the Ecological Footprint methodology. This method foresees the calculation of an area-based indicator able to measure the demand of natural capital needed for human activities

(WACKERNAGEL & REES, 1996). This evaluation is achieved by the count of resources consumption and waste assimilation that are, directly and indirectly, necessary to maintain a certain process, in terms of biologically productive land required to support these flows. Thus inputs of different kind are accounted into a common basis by using conversion factors and expressing results in a common standardized unit termed global hectare (NICCOLUCCI *et al.*, 2007) and intended as an hectare having world average productivity (WACKERNEGEL, 2005).

The methodology has been applied for the first time to coastal zone issues. In particular a first analysis application has been performed on several establishments located along the Ligurian coast. The establishments have been intentionally chosen with different degrees of anthropic pressure on surrounding coastal environment. Data collection has been realised by means of face to face interviews suitably developed and addressed to the establishment managers. The interview focused on themes as resources (energy, fuels, water, wood, etc.) consumption, energy saving techniques, users' facilities and data were collected on a yearly base. Inputs not entirely consumed within the period of a year were considered on the basis of their lifetime.

All gathered data were converted into different kind of territories (Fig. 3.2.2.4) and later in average equivalent productive territory through conversion factors directly accessible in literature. This conversion allowed obtaining the typological assessment of requested territories and calculating global hectares.

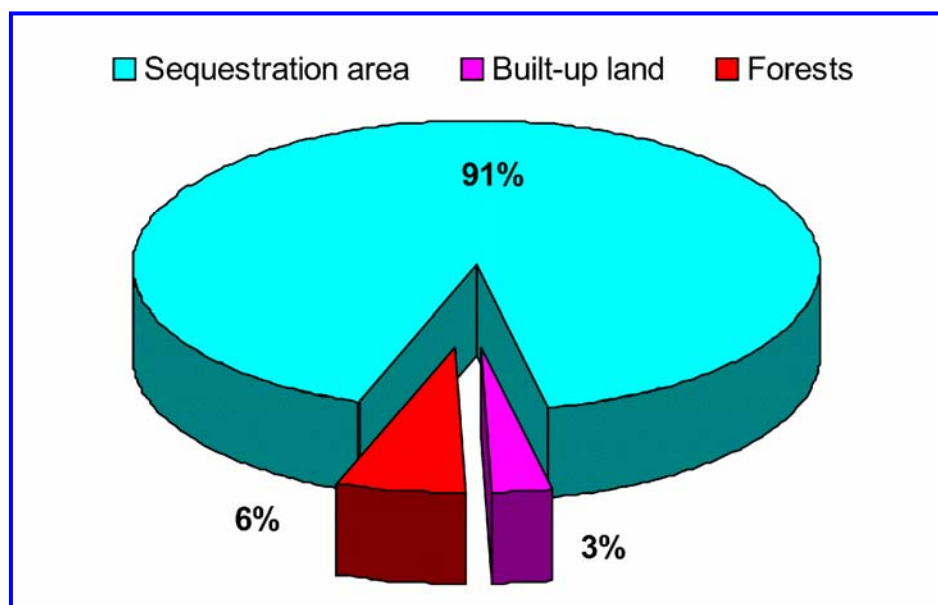


Figure 3.2.2.4. Typological assessment of territories demand

Different types of territory are in fact needed in order to furnish different essential ecological services:

- Sequestration area: additional biologically productive area needed to sequester atmospheric CO₂ through afforestation. The sequestration area is calculated by deducting the approximately one-third of anthropogenic emissions absorbed by the oceans calculated as forest area necessary in order to absorb the equivalent amount of CO₂ emitted. A world-average carbon absorption factor was used.
- Built-up land: human settlement and infrastructure occupied area

- Forests: area for roundwood and fuelwood production

The average assessment for bathing establishment is reported in Fig. 3.2.2.4

Moreover analysis results (comparison among different situations, conceiving of specific indicators) will provide a number of best practices and suggestions for the achievement of a more sustainable management of bathing establishments and beach recreational activities and for a characterisation of critical phases of the process. These latter will be deepened in detail in the next phases of the project considering the ability of this tool to achieve holistic but also easily intelligible measures useful in order to involve managers and population in the adoption of good practices.

3.3. Land planning and GIS

Ordinary maps, adapted by various public services, and orthophotomaps were used in order to represent the current status of the study area (the west part of Nestos River Delta). The maps were digitized and several layers were created such as coastline, contour lines, River Nestos, lagoons, residence areas, municipality borders, roads, Natura 2000 and Ramsar Sites. A Greek coordinate system (Greek EGSA GRS 80) was used in order to register and digitize the maps. The scale of the most maps that were used was 1 to 50,000.

An overview of the study area is presented in Figure 3.3.1. Two municipalities are located into the study area: Chrysoupoli (16,000 residents) and Keramoti (6,000 residents). Nestos River is at the east boundary, while Nestos Delta Lagoons are at the south part of the study area. North Aegean Sea is the sea boundary of the region. A national road (Egnatia) goes across the study area.

Waste from fertilizers, pesticides as well as the waste from the towns of Keramoti and Chrysoupoli and some surrounding villages results in polluting the water of the wetland. Although the industries concerning garment/footwear, food and chemicals use waste treatment systems, these ones do not always function properly, and thus they contribute to environmental pollution. Negative ecological changes include: intensification of agriculture; a new hydroelectric dam up river which will alter the water regime of the Delta considerably; overgrazing, fishing, illegal cutting of woods, burning, beach dredging, tourism and hunting. A significant part of Nestos Delta and Keramoti lagoons have been converted into cultivated agricultural land by reclamation schemes. An extensive water extraction from the river also happens.

The study area includes four proposed Natura 2000 Network Sites: GR1120004 and GR1150001 (SPA) and GR1120005 and GR1150010 (pSCI). These sites are presented in Figure 3.3.2.

The Greek legislation, considering the Ramsar Convention, comprised the study area into the 'National Park of East Macedonia and Thrace'. Land use areas (3 zones and the airport) determined by this legislation, which are presented in Figure 3.3.3. Zone A is the core of the protection area and almost no human activities are permitted. Zone B includes the lagoons and is a well protected zone too. In Zone G several human activities which are not harmful to the ecosystem are permitted if they complete the Environmental Impact Assessment procedure according to the Greek and European Legislation.



Figure 3.3.1. Overview of the study area

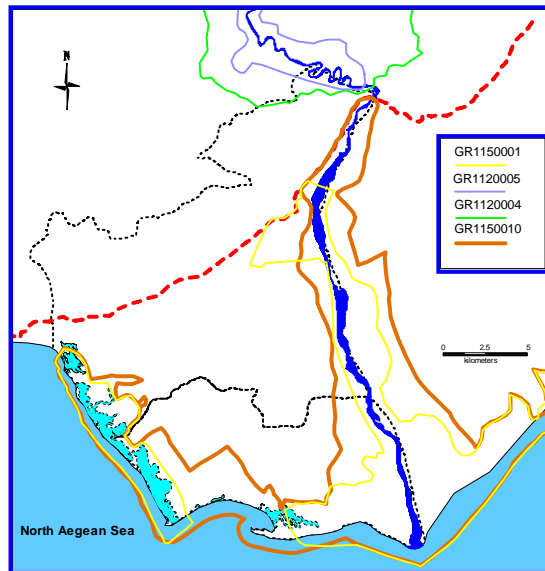


Figure 3.3.2. Natura 2000 sites

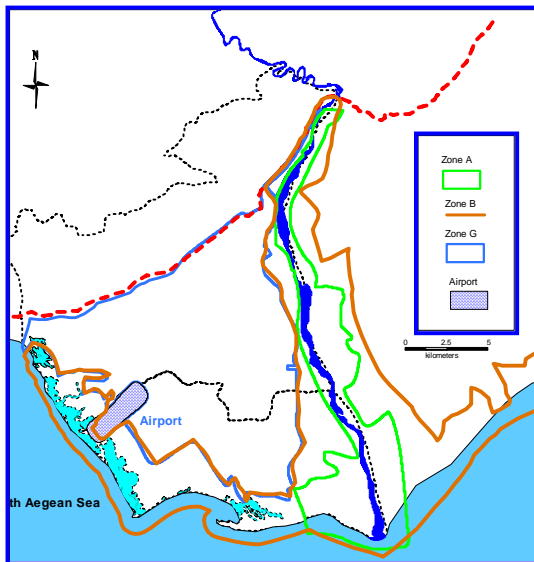


Figure 3.3.3. Land use areas according to Greek legislation

Another study area that was chosen by ICCOPS to use GIS for land planning is the Regional Park of Portovenere, Palmaria, Tino and Tinetto, within the Municipality of Portovenere. However, in order to have a clear view / understanding of the actual issues it is necessary to extend the analysis to a larger area. Whilst in territorial planning administrative boundaries are usually the base units for interventions, in ICZM more general criteria are needed in order to delimitate the intervention areas. Geomorphological, ecological and human features were considered and boundaries drafted, according with catchment basins, altimetry, ridges, coastal ecosystems (natural and semi-natural), coastal settlements, administrative boundaries and maritime jurisdictional boundaries.

In order to facilitate the visualisation and comparison of the acquired information, a GIS has been set up, using the software Geomedia Professional by Intergraph. Such decision has been taken also to conform this work to the information system used by the

Regione Liguria administration, and to support the subsequent use and diffusion, also via web, of the project's results. The delimitation of the study area has been set up mostly using shareware data downloaded from the internet and some already available materials. In such a way, a general framework base has been created, on which to tune the acquisition of more specific data and materials from the owner agencies. This part of the analysis refers basically to the scale 1:100000.

Analysis methodology

A lot of information relevant to coastal issues is already available in some national and local administrations repertories. So, a survey of the available data banks about the study area has been led to organise the existing useful materials in order to elaborate an innovative contribution according with the guidelines of the ICZM and the European Landscape Convention. The examined on-line data repertories were examined according with a schema where specific relevance was given to the information related to the conservation of landscape quality. Three typologies of land use defined in the project proposal have been identified and mapped: urbanised areas (residential settlements, industrial areas, and services), farm and rural areas, areas mainly characterised by low human pressure (e.g. protected or, more generally, none urbanised areas). It is important to point out that a large part of farm lands has been abandoned during the last thirty years, so there are many "transitional" areas, where the original wood is taking the place of the former cultivations.

At this stage, most of land use information has been drawn from the vector Lacoast and Corine maps, optimised for the scale 1:100000. Actually it is quite a small scale and there is some error in the obtained results. The reason for this choice is that such data sources allow comparing land use in the years 1975, 1992 and 2000. To get an up to date and detailed view of the study area land use, the specific map at the scale 1:10000 by Regione Liguria will be used, in a subsequent step. At the same time the acquisition of general data has been continued, to enlarge the information base where to integrate the materials related to specific issues.

Statistic data have been collected referring to different aggregations (hamlet, municipality, province and other functional aggregations) and they have been linked to cartographic data. When possible, such data have been visualized as a whole through thematic maps (i.e. land use and related changes, population density, etc.). On such base, the cartographic materials to complete the analysis at scale 1:25.000 and 1:10.000 have been identified and required to the charged agencies. The acquisition and the upload in the GIS of such local materials is presently in course.

Some analysis ambits have been already defined, to which refer to identify the more critical situations and the best potentialities. Those ambits refer to natural features, human activities, cultural aspects, planning: existing tools and the relationship between planning, landscape and ICZM. When and going in details, the analysis is expected to restrict the addressed area to focus the original one (Portovenere Regional Park). Finally the information included and elaborated in the GIS will be synthesised to identify some situations where a management intervention would be more suitable and the related context.

In its end the work is expected, according with the already defined directions, to suggest some ways of implementing the existing planning tools, to make them as consistent as possible with the ICZM principles and objectives.

If in the first part of the research information has been collected "from outside" in order to outline an as objective as possible panorama, in the final phase a view "from inside" becomes necessary to identify the action fields where a management action is required, possible or desirable. At this regard the Municipality of Portovenere, that is also

the Agency charged of the Portovenere Regional Park management, has been contacted, to collaborate in validating the analysis methodology and to supply some local data very important for the project.

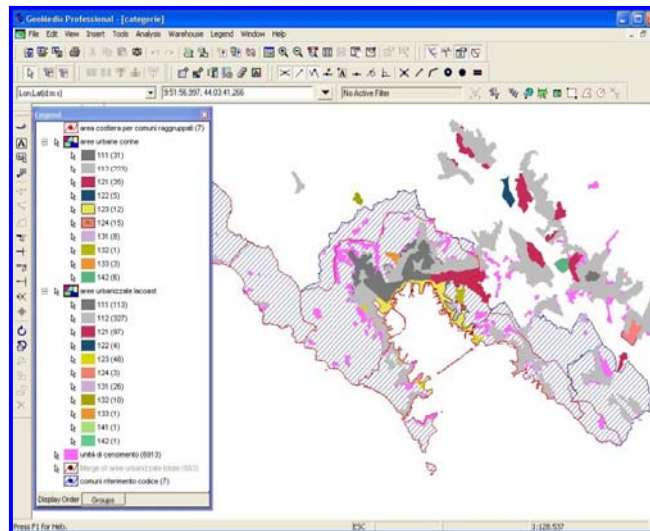


Figure 3.3.4. Outputs: The image is an example of output from the GIS database that has been set up. Urbanised areas have been identified joining on a map the related features from different sources

3.4. Development of the Coastal Zone Monitoring System

3.4.1. Collection of the complementary data

Data collected for the phase A were synthesized in a grid in order to estimate topics and geographical coverage. According to this grid, missing data's were collected and digitized in the GIS. The following grid list data topics collected in the studies and organism witch spread data's.

Commentaries:

- Redundancy between data's studies and data coming from organism,
- On certain topics (erosion studies for instance), not spatial homogeneity,
- Missing was corrected: water beach quality, tourism activity.

Tab. 3.4.1.1. Synthesis of collected data's

	Bases de données													Etudes éolien	Erosion	AQUA	Emprise géographique	Format	Echelle de saisie			
	DRE	DIREN	SMNLR	BRGM	SANDRE	IFEN	SMNLR	SHOM	CETMEF	Météo Fr	DRAM	BRL	Etat							IGN		
Milieu Physique																						
Occupation du sol																	X	Région Languedoc Roussillon	Mapinfo	1/25 000		
Bathymétrie							X									X	X	Région Languedoc Roussillon	Mapinfo	1/50 000		
Traits de côte							X									X		Région Languedoc Roussillon	Mapinfo	1/50 000		
Erosion																X		Partie du 30, 34, 11, 66	Mapinfo	1/50 000		
Cellules sédimentaire							X									X		Région Languedoc Roussillon	Mapinfo	1/50 000		
Sédiments																X		Région Languedoc Roussillon	Mapinfo	1/50 000		
Géomorphologie																X		Région Languedoc Roussillon	Mapinfo	1/25 000		
Courants marins																X		Région Languedoc Roussillon	Mapinfo	1/100 000		
Houle																X		Sète	Mapinfo	1/100 000		
Vent																X		Fréjorques, Sète, Perpignan	Mapinfo			
Marée																X		Entre Cap d'Agde et Marseille,	Mapinfo	1/100 000		
Relief							X								X	X		Région Languedoc Roussillon	Mapinfo	1/25 000		
Hydrologie																	X	Région Languedoc Roussillon	Mapinfo	1/25 000		
Masse d'eau							X										X	Ag Eau RMC				
Inondation																	X	Région Languedoc Roussillon	ESRI	1/25 000		
Hydrographie							X										X	Région Languedoc Roussillon	Mapinfo	1/25 000		
Milieu naturel																						
Ressource halieutique																	X	Région Languedoc Roussillon	Mapinfo	1/100 000		
Avifaune																	X	Région Languedoc Roussillon	Mapinfo	1/100 000		
Mamifères marins																	X	Région Languedoc Roussillon	Mapinfo	1/100 000		
Protection env.		X				X		X		X							X	Région Languedoc Roussillon	Mapinfo	1/25 000		
Inondation		X				X		X		X							X	Région Languedoc Roussillon	Mapinfo	Du 1/2500 au 1/25 000		
Paysage		X															X	Région Languedoc Roussillon	Mapinfo	1/50 000		
Impact paysager éolien																	X	Région Languedoc Roussillon	Mapinfo	1/50 000		
Milieu Humain																						
Loi littoral - Urbanisme		X	X			X	X	X		X							X	X	X	Région Languedoc Roussillon	Mapinfo	-
Nautisme																	X		Région Languedoc Roussillon	Mapinfo	1/50 000	
Assainissement		X				X		X		X								X	Région Languedoc Roussillon	Mapinfo	1/50 000	
Administratif	X														X			X	Région Languedoc Roussillon	Mapinfo	1/50 000	
Urbanisme	X																	X	Région Languedoc Roussillon	Mapinfo	-	
Ports				X															Région Languedoc Roussillon	PDF	-	
Conchyliculture					X													France	Mapinfo	1/50 000		
Ressource en eau											X							Région Languedoc Roussillon	Mapinfo	1/25 000 ou 1/50 000		
DCE							X											Région Languedoc Roussillon	Mapinfo	1/25 000 ou 1/50 000		
Ouvrages hydrauliques											X							Région Languedoc Roussillon	Mapinfo	1/25 000		
Pêche											X						X	Région Languedoc Roussillon	Mapinfo	1/25 000		
Zones réglementées									X								X	Région Languedoc Roussillon	Mapinfo			
Baignade																	X	Région Languedoc Roussillon	Mapinfo			
Obstacles marins									X								X	Région Languedoc Roussillon	Mapinfo			
Ouvrages de protection									X								X	Région Languedoc Roussillon	Mapinfo			
Ouvrages caractéristiques									X								X	Région Languedoc Roussillon	Mapinfo			
Servitudes													X				X	Région Languedoc Roussillon	Mapinfo			

3.4.2. Structuring and data preparation

The data collected in phase A were harmonized geographically and in their structure: file format, file projection, topology correction, work on files reattachment in order to have a correct view of the phenomena and for a full integration in ArcGis. Many important data's were digitized from existing maps or draft maps for their integration: sedimentary cells, water beach quality, harbour activities, shellfish farming.

3.4.3. Preliminary analysis for the creation of a coastal zone monitoring system

Meetings were held with institutional actors of the littoral to discuss and decide about principal functionalities of the monitoring system. Concept and functionalities of the monitoring system were built with institutional actors of the littoral in region Languedoc Roussillon : Conseil Général de l'Hérault and SMNLR. Work meetings and exchanges allowed defining the main needs:

- To reach the geographical area easily : zoom function on administrative entities like department, commune, sedimentary cells,
- To cross GIS layers easily in order to compare topics,
- To have a documentary database about ICZM based on validated studies certified by institutional actors : state, regional and department administration,
- To have a permanent coastal atlas witch contains the main ICZM topics,
- To calculate and cartography the most important indicators,
- To update the tool easily by the system administrator responsible.

Indicators functions and permanent coastal atlas will treat in the phase C.

3.4.4. Development of the GIS database and its associated dictionary

Functionalities were developed in the language Visual Basic 6; they appear like drop-down menus in the GIS and exploit the geodatabase developed for this project.

The geodatabase is structured in topics. A geodatabase is in the access database format and it is linked to ArcGis. This possibility presents any advantages:

- The geodatabase could be edited both in ArcGis and Access and this possibility allow a greater flexibility in computer developments and tool personalization,
- Alphanumeric data's at the beginning could be mapped more easily by the addition of relations between classes of entity,
- A geodatabase makes it possible to gather and classify by topics the whole layers of a GIS in a single file.
-

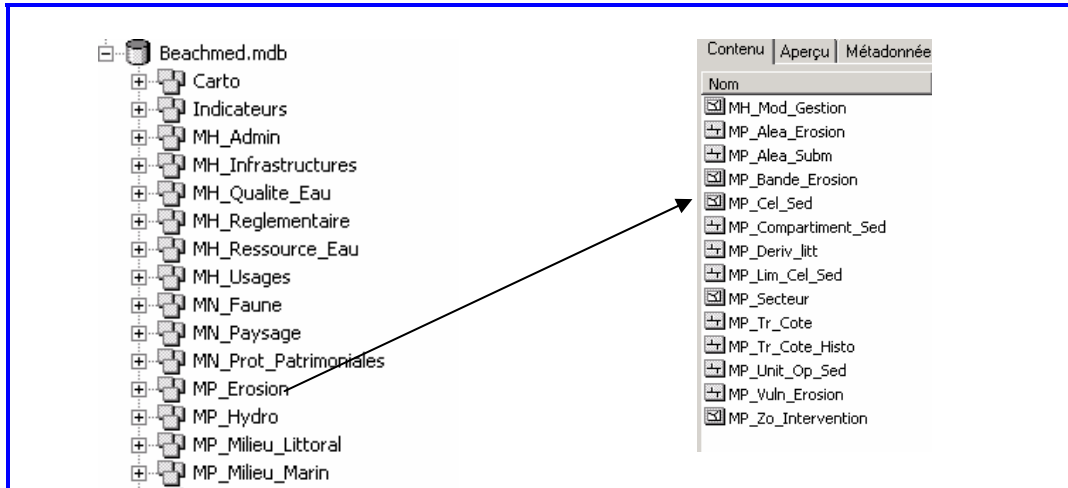


Fig 3.4.4.1. Topics gathering
(set of entity class)

Fig 3.4.4.2. Topics, level 2 (entity
class or GIS layer)

The classification and naming rule for the GIS layers is the following :

- MP = Milieu Physique (Physical Environment)
- MH = Milieu Humain (Human Environment)
- MN = Milieu Naturel (Natural Environment)

A dictionary data was created ; it describes all the integrated datas in the monitoring system ; it is at the same time a tool of knowledge and reflexion : it informs metadata which that ensures data quality, level of reliability (date, source...) and perennality of the tool for the application of the directive INSPIRE (Directive 2007/2/EC of the European Parliament and of the council of 14 March 2007 establishing an Infrastructure for Spatial Information in the European Community). It makes possible the evolution of the base of data and the continuation of work through the integration of new GIS layers in the monitoring system.

Finally it gives access to the alphanumeric contents of a layer (attributes) and thus project the representation we could affect to it. With attributes we could create indicators, cross information and make it possible relations between tables.

3.4.5. Development of the ICZM document base

ICZM document base was developed from a bibliographic study which take inventory all the studies, organisms, resource people and data sources about ICZM in Languedoc Roussillon. This study was creating by BRL for the Mission Interministérielle d'Aménagement du Littoral (MIAL) in 2005: "Preparatory study for the elaboration of the

reference document for durable littoral development". This report takes inventory 20 strategic orientations for ICZM:

- 1) To specify the modes of enforcement of the littoral law,
- 2) To engage a land policy in the long run,
- 3) To propose indicators in order to define the reception capacity of the shore line,
- 4) To have regard for natural and technological disasters,
- 5) To register strategic orientations for the management of the shore line erosion,
- 6) To define strategic orientations for water management resource,
- 7) To establish the principal distribution of uses by fragile area and to specify the means for the resolution of the conflicts (management methods),
- 8) To build the maritime part of the SCOT (Territorial Coherence Scheme),
- 9) To have regard for wind power plant schemes,
- 10) To take inventory patrimonial built up, to organize its enhancement,
- 11) To define a statute, mode of campsite management,
- 12) To propose a policy of the habitat and management of the illegal habitat,
- 13) To draw up the list of the landscape black spots and the principal identity landscapes to preserve,
- 14) To specify regional orientations on the principal economic development poles,
- 15) To specify the priority areas for the coastal agriculture,
- 16) To specify quality water objectives for water beach and ponds,
- 17) To propose the general framework of maritime public domain occupation,
- 18) To specify beach uses and vocation,
- 19) To improve the cycle track scheme,
- 20) To have regard for the scheme of regional displacements.

In the study, strategic orientations can be consulting in the form of illustrated sheet, interview sheet with the institution of the littoral, bibliographical list, meeting reports

This study is interesting because we can exploit this precious resource of information validated by the Mission Interministérielle du Littoral (MIAL) and we can integrate it in the monitoring system which is very easy to consult and which allow to share the information.

For reasons of coherence and easiest uses in the monitoring system, it was decided with the GG34 to gather these 20 sets of themes in 11 main strategic ICZM orientations :

- 1) Land policy and littoral urbanization,
- 2) Maritime public domain and regulation,
- 3) ICZM methodology,
- 4) Littoral tourism,
- 5) Maritime economy,
- 6) Littoral economy,
- 7) Littoral built heritage,
- 8) Water quality,
- 9) Water resource,
- 10) Natural and technological disasters,
- 11) Displacements.

These 11 topics will be designed as unrolling menus in the monitoring system.

3.4.6. Development of a functional model of the monitoring system

Functionalities were created in the Visual Basic language and they use the database created for this project. They take the shape of a tool bar built into ArcGis.

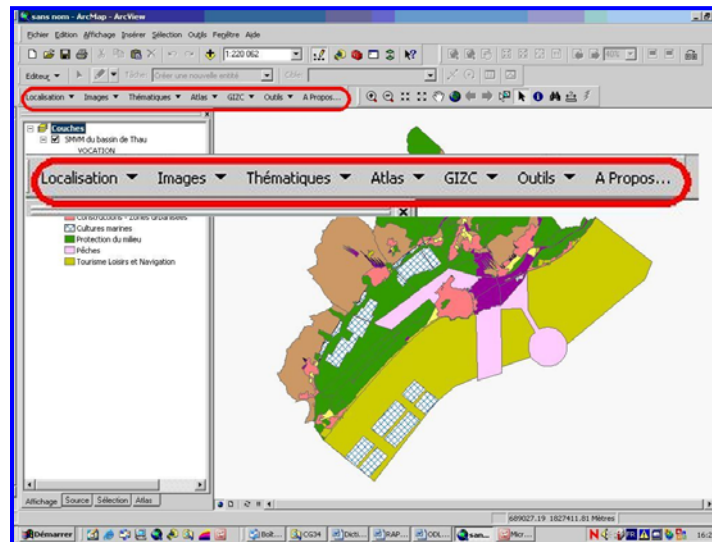


Fig 3.4.6.1. Toolbar «Coastal Zone Monitoring System »

Unrolling menus are the following:

- Unrolling menu « localisation » allows the user to make zooms centered on administrative entities (department, communes) or physical entities (sedimentary cells).

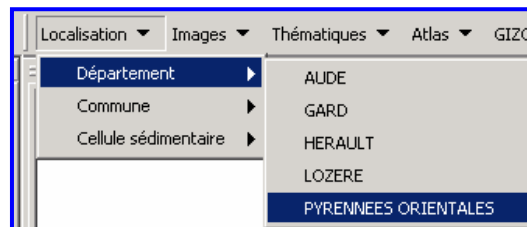


Figure 3.4.6.2. Localisation menu

- Unrolling menu « Physical environment », « Human environment », « Natural environment ». Users could display 125 cartographic layers and their associated legend.

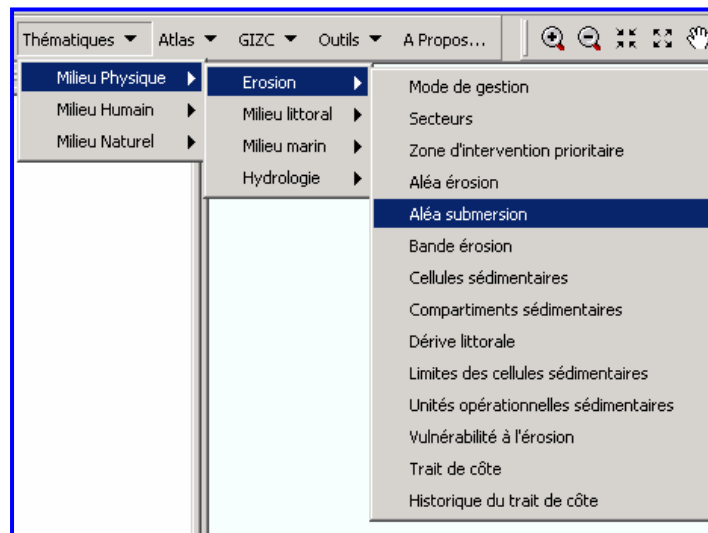


Figure 3.4.6.3. Topic menu.

- ICZM menu consist of an alphanumeric documentary database wich allow to consult 11 ICZM themes defined before.

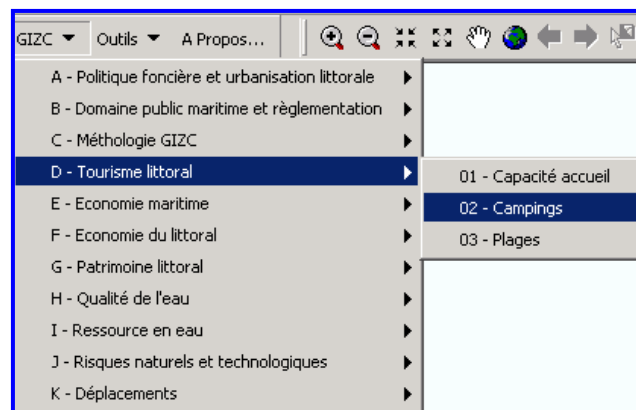


Figure 3.4.6.4. ICZM documentary database

A presentation html sheet illustrated with photos introduces themes. Many hyperlinks allow consulting studies, reports, and interviews with the manager of the littoral, bibliographic references.

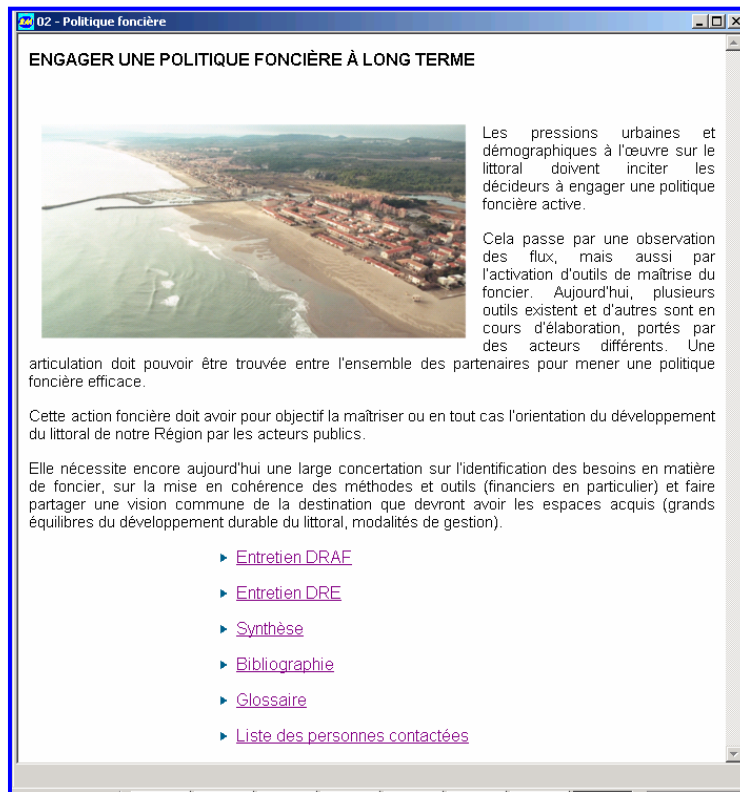


Figure 3.4.6.5. Sheet for introduce themes, and hyperlinks to associated documents

- “Tools” drop-down menu allow the user to create his own set of themes and to add it in the drop-down menus.

3.4.7. Conclusion

All data acquired during phase A were very useful for the creation of the GIS and the documentary database linked. This double contribution is integrated in the monitoring system which proposes both fixed GIS data and documents. This innovating step of diversification of topics and sources finds its place in the vision of ICZM. The realization of the Geodatabase and its use as a source of information for the observatory shows the viability of the conceptual model based on geographical relations (topological). Classical relations will be implemented in the tool, mainly for the integration of indicators. However, indicators will have to comprise an identifier compatible with geographical data (commune, sedimentary cell, port). The data dictionary realized for the phase B is an important support for the use and the perennality of the coastal zone monitoring system. It ensures its opening and its evolution. The GIS database is carried out on the whole Languedocian littoral and covers the whole sets of themes updated by the data-gathering. These data can be crossed and displayed easily. These map layers will be used for the realization of the permanent coastal.

Many monitoring systems of the littoral exist but they do not make it possible to have such a complete vision of phenomena. In particular, the vision by sedimentary cells and sector of management had never been implemented. In addition, the monitoring system capitalizes geographical information (charts and layers consultation) but also

alphanumeric data (consultation of studies and all types of documents). User can easily personalize the application by adding additional data and drop down menus without being a specialist in information systems. The system was made for littoral managers who will use themselves this tool for decision-making aid and the communication for the decision makers.

3.5. Economic values: benefits generated from beach nourishment

Partners 3 and 4 were involved in the estimation of the benefits generated by a nourishment project by using Economic values.

3.5.1. Incremented economic value of hotels induced by the nourishment

To show what could be the additional benefit of hotels after the nourishment, it is possible to apply the producer surplus analysis. The marginal social benefit could be assessed as the number of additional nights times the price of the room (Polomé et al., 2005). The number of presences after the nourishment (20,000) is quite low compared to the average presences of the last 10 years (40,000). As a consequence, it seems that the nourishment project has not determined any increase in the demand of additional nights in Tarquinia Lido, so we cannot expect that there is an additional producer surplus induced by the nourishment for the hotels.

3.5.2. Incremented economic value of the bathing establishments induced by the nourishment

In order to estimate the direct economic impact of the nourishment, a survey has been conducted in four bathing establishments, during the summer 2006, by interview of their managers. From the data obtained by the survey emerged an average revenue per establishment of € 68,970, and an incremental revenue related to the nourishment project close to 46% of this value (€ 31,965). The average revenue assessed by Nomisma survey (EUROBUILDING and NOMISMA, 2004) was € 58,513¹. For the whole Lido (26 establishments) nearly 1 million euros (€ 1,000,000) may be considered the average producer surplus generated by the project. The value per square metre of the beach is close to € 20, as already assessed by Nomisma for the summer season 2003-2004.

3.5.3. Storm damage reduction and coastal erosion benefits arising from the nourishment

In this report the ecosystem regulation function assessed is the flood and storm protection (EU 2004). The damage reduction of properties at stake by analysing the probability of erosion of the land with and without the nourishment intervention is assessed. The benefit of coastal protection is assessed as the delay of the loss of land and assets fixed to the land (DEFRA, 2005; PENNING-ROWSELL *et al*, 1992).

The total value of the potential loss, discounted at 6% (this rate of discount is chosen because is considered the most appropriate for project of a great environmental interest, both in USA and in Europe) (NOAA, 2006; EU 2003b), after 15 years (period of loss of the beach without nourishment; Several authors, 2006) is € 17,240,000. With the hypothesis of three nourishment scenarios, delaying the erosion of 13, 26, and 39 years,

¹ This value refers to the direct economy of the eroded beach, because assessed in the year 2003 by Nomisma, preceding the nourishment. Therefore this value is quite higher than our estimate, and they are not properly comparable. This is probably due to the very good weather in 2003, while the year of our survey was cloudy and rainy.

respectively, the expected damage becomes € 8,080,000, € 3,790,000 and € 1,780,000, respectively. So the damage avoided by the project is 9-16 million euros, according to the different beach nourishment scenarios proposed.

3.5.4. Incremental value of the beach for consumers

Part of the benefits of the nourishment project accrues directly to the consumers: the beach visitors. As regards the assessment of the recreational activity on the beach, the two most used empirical methods are the travel cost (TCM) and the contingent valuation method (CVM) (EU 2003a; HAAB and MCCONNELL, 2003). Two values are assessed here: the access value to the beach, using the TCM, and the marginal value of the beach replenished, using the CVM.

A simple version of TC is the single site model that works like a conventional sloping demand function (a negative relationship between trip demanded and price) (PARSON, 2003). Conversely, the Bell and Leeworthy model (1990) could be appropriately defined the on site cost method. In this model beach days and trip cost per trip are positively related, while beach days are inversely related to on site expenditures (BELL and LEEWORTHY, 1990).

In our research is adopted the on site cost model of Bell and Leeworthy, modified to resolve the problems arising from the on site survey: endogenous stratification and truncated bias. The econometric model is a count data model, the Poisson model (PARSON, 2003; MCCONNELL and HAAB, 2003). More than 250 people have been face to face interviewed last summer (2006) on the beach, but finally just 74 observations were completed and used for the consumer surplus (CS) analysis. The results shows that the Poisson model is high significant ($p < 0.000$) and the overall adjusted fit is 48%. The dependent variable (beach days) has a positive and significant correlation with beach expenses; moreover it is negatively correlated with travel cost, as explained by Bell and Leeworthy (1990).

The beach expenditure coefficient is used to estimate the mean consumer surplus (CS) for the site, i.e. the economic benefit to the consumer. Using the whole sample the per person per day CS is € 53.48. By dividing the sample in two groups, beach day and overnight visitors, CS is € 23.85 for overnights and € 5.53 for daily visitors, respectively. The access value for the whole beach is € 3,100,00, according to our beach presences estimate.

3.5.5. Willingness To Pay and preference for the beach nourishment

By asking the visitors what is their WTP for maintaining the beach at a certain extension, chosen by the respondent, it is possible to assess the preferred beach width or enlargement.

The procedure to derive the marginal WTP for maintaining the beach at the preferred dimension is explained in Bell (1986). The best non-linear fitting among WTP and beach width is given by a parabolic equation, as already described in Bell (1986). The maximum willingness to pay is obtained for a beach width of 50-60 metres.

The equation is:

$$y = -0.01278x^2 + 1.37326x$$

(-1.68) (2.19)

where y is WTP and x is the beach width. T stat are reported in parenthesis. Coefficients are significant at 0.10 p-level. The number of observations is 9, the adjusted R squared is 0,33 and F test [1, 7] = 2.23. Considering the low F-test value, the significance of the whole model is 0.1.

The first derivative of the above equation gives the marginal utility of the beach for an additional increase (1 metre) of the beach. The marginal willingness to pay is zero (i.e. there is not economic utility) at the 54th metre. For an optimal beach enlargement of 54 metres the consumer surplus of the sample is € 36.83, while the per day CS is € 1.05. Considering that one ticket is bought for a household, whose average number of people is 3.27, it means that the per person per day CS is nearly € 0.32.

3.5.6. Analysis of the P.U.A. regulation

The introduction by Lazio Region of regulation D.G.R. 2816/1999 contains the code for the management of beaches (Plans for the Use of beaches, hereinafter "P.U.A."). The regulation highlights its nature as a planning and socio-economic instrument, dispelling any doubt as to its possible town planning validity. D.G.R. 1161/2001 identifies the following concession typologies: Bathing establishment; Beach with facilities; Public Beach with facilities; Mooring points.

The P.U.A. thus becomes the qualifying instrument for the regulation of coastal resources by means of: rules for use, identifying the various typologies of use (beach establishments, public beaches with facilities, public beaches, mooring points); defining the coherence of the general principles for planning (the minimum distances between rows and rows and between columns and columns; the dimensions and the positioning of the fencing; the possibility where necessary of spaces for the laying up of sports craft and for fishing craft; etc); the typology of movable and non movable facilities on the shores; the use of eco-compatible materials; the arrangement of access to the shores by the public in general and in particular with reference to disadvantaged categories; the correlation between coastal shores and the city by means of a coherent revision with town planning and mobility planning instruments (for example P.U.T.). The achievement of the above mentioned objectives is given by a set of compulsory elements, aimed towards sustainable development of the resource, included in the technical guide called "Disciplinare Tecnico".

3.5.7. Net Value State property parameters

The Tarquinia P.U.A. consists of 18,70 kilometres of coast, out of them 2,63 in domain concession. The concessions for establishments are 58 and during 2005 they have created a domain income of 86.222,53 euro. The ratio coastal extension/areas in concession (7,1) is very low compared to other coastal municipalities. This is mainly due to the fact that on the Tarquinia territory there are certain areas which are subject both to environmental and safety (military firing round) restrictions. The average shore length in concession is 45,34 metres, which is less than the most part of municipal districts on the Lazio coast. This implies serious consequences for the profitability of the concessions. In addition, the surface area in relation to the extension is very scarce if compared to other municipalities. This result is due to two apparently contrasting causes: in certain cases erosion has strongly damaged the depth of concessions, in other cases precisely thanks to nourishment the depth of certain stretches has increased, but concessionaries have not requested an increase of the concession surface, which would not bring a satisfactory economic result in relation to the payment of the royalty rent.

District	Coast (KM)	Beach concession (KM)	Concessions Beach	Concession area (mq)	Tax income for non bathing concessions	Tax income for bathing concessions
Tarquinia	18,70	2,63	58	17651,67	13.601,28	72.621,25

In the analysis of the various indicators concerning the “Demanio” beach assets it is interesting to note that the average concession cost per square metre is equal to 4,88 euros per year. This figure, if compared to the producer and consumer surplus estimate (see paragraphs 3 and 5), concerning tourist expenditure, access value of the beach and revenue of the establishments, highlights a situation in which the amount of State property royalty rents is paltry compared to the productivity of bathing establishment. This calls for thought at a time in which costs for nourishment are increasing.

3.5.8. P.U.A. load capacity

The Tarquinia P.U.A. regulates approximately 21 kilometres of coast starting from the Arrone torrent (which borders with the municipal district of Montalto di Castro) and ending at Torre S. Agostino (which borders with the municipal district of Civitavecchia).

At the moment the total gross load capacity is very low; this fact is substantially influenced by the great extension of the coast and the low number of inhabitants (15.162). One must in fact remember that the Municipal district of Tarquinia is one of the largest in Italy and at the same time the tourist movement which is not completely consolidated, has seen a drop in arrivals. The net capacity calculated for coasts in concession increases more than proportionally with respect to the gross capacity, but it is always less than in other Lazio coast resorts. All this can represent a good starting point for the implementation of integrated coastal management policies. It must be noted that in the gross and the net capacity the movement of day-trippers is not included in the computation (it can only be obtained through estimates).

Gross load capacity	1.11
Net load capacity	7.93

Source: Elaborazione Litorale spa

One must now reconsider the load capacity on the basis of the provisions of the P.U.A. for the areas in concession. In fact, the provisions establish a distance of 3 metres between columns and of 4,5 between rows. Given these figures and calculating an average usable depth (i.e. excluding the water’s edge) of 40 metres, the P.U.A. has a positioning capacity of 7,792 shadow points in the existing concession areas.

3.5.9. Blue Flag Parameters

In order to achieve the aims set by the project, it is important to implement, within the instrument for the planning of beaches (P.U.A.), the parameters for obtaining the Blue Flag. This allows for an instrument for the planning of beaches which is coherent with sustainable development policies.

The blue flag awards for the Tarquinia beach would represent a first indication of the implementation of the methodology of integrated coastal management policies, by developing a single common course between planning instrument, beach management and sustainable environmental policies, within a territorial context where nourishment has been carried out. The monitoring of the Mandatory and Guide criteria in the “beach system” of Tarquinia, carried out by Litorale spa, has highlighted strong points and weaknesses, as follows.

What emerges from the monitoring of the Blue Flag parameters is that the “beach system” is able to obtain certification following a series of measures. The analysis highlights that the system of beach concessionaries has a greater observance of the Blue Flag parameters than public beaches. The local administration has to reinforce the

system of sustainable mobility in the territory, including the coastlines and consolidate the safety and the right to use the public beaches according to the existing P.U.A.. The context is nevertheless positive if one considers the extension of the shoreline of the municipal district of Tarquinia which, in terms of costs, weighs upon the economic and accounting policies of the local administration during a moment of financial hardship for many public administrations.

3.5.10. Perception by end users and customers of satisfaction level

During the summer 2006 “Litorale spa” carried out a survey in the Tarquinia area, with regards both to concessionaries and to tourists. The survey aims at disclosing the level of satisfaction of both residents and tourists with regards to policies for the use and the nourishment of shores. The survey, which was carried out during the months of July and August, has highlighted problems and critical points.

Level of preference for beaches. The analysis of the interviews highlights a trend which points preferences towards beaches with facilities, both by tourists and locals, the latter having a higher propensity towards public beaches. This data confirms what is happening at a national level where, during the last two decades, equipped beaches are ever more becoming the epicentre of the tourist beach system. This brings about an economic optimization of the beach resource, which becomes the decisive factor of many economies.

	Customers	End users
Beach with facilities	80%	20%
Public Beach	70%	30%

Level of beach facilities. The indirect benefits of nourishment projects can be seen in the results of a survey conducted in the summer 2006. In fact, over 66,66% of respondents find the level of facilities to be good or excellent and only 10% find the facilities unsatisfactory. It must be noted that, within the data as whole, there is a difference in perception between tourists and residents. In fact, the number of interviewees from the local community which consider the level of the facilities as unsatisfactory or satisfactory is approximately 40%.

Level of perception of beach services. Besides beach facilities, another element studied by the survey is the one linked to the main variables of the “beach system” : cleanliness, accessibility, safety, activities. All these variables are strongly influenced by the planning choices of the P.U.A. and by the nourishment project. In fact, the nourishment intervention which has involved the localization of groins along the coast could have led to serious repercussions, especially for cleanliness and accessibility. The technical success of the intervention, has thus had as an indirect effect the improvement of cleanliness, accessibility and safety.

	beach cleanliness	Accessibility	Safety and assistance
Excellent	10%	10%	10%
Good	50%	60%	55%
Satisfactory	30%	20%	30%
Unsatisfactory	10%	10%	5%

Level of perception of nourishment policies. A positive perception of the nourishment intervention emerges from the survey; in fact, it is interesting to notice how both the local community and tourists give the nourishment intervention a positive

evaluation, also from an aesthetic point of view. Unlike the level of perception of the facilities, the questions concerning the nourishment do not show a great difference in answers between residents and tourists.

	Yes	No
Has the shore improved after nourishment?	90%	10%
Is the nourishment aesthetically valid?	85%	15%

Level of perception of inconvenience factors. According to the survey, the main factors of inconvenience perceived by beach users, are mainly concerned with two variables: the cost of services and the lack of entertainment offer. With dealing with the cost of services factor, one must understand that in tourist sociology, especially the Italian one, beaches are considered a public utility and, therefore, independently from the demand for services, the need to pay for beach services always encounters latent hostility (even if ultimately users choose beaches with facilities rather than public beaches). The other negative element perceived by beach users is the lack of entertainment; however, to be noted that this deficit has indirect effects on other variables such as noise and over-crowding.

Service cost	40%	Over-crowding	5%
Lack of entertainment offer	35%	Cleanliness	5%
Noise	10%	Other	5%

The level of motivation towards spending highlights two completely different figures; whilst expenditure for beach use is accepted with a medium to high grade by 90% of tourists, acceptance goes down to 60% for residents. From a sociological point of view, this data shows how local communities perceive beaches as their own property and hence, in general terms, their use as being free. This low motivation on behalf of residents towards expenditure for use of beaches does not, however, find correspondence at the moment of beach choice: in fact, this figure decreases to 30% of interviewees when one asks a preference for the type of beach.

Degree of knowledge concerning beaches. The survey indicates a high degree of ignorance concerning the methods of beach use and relative applicable laws. Knowledge of the P.U.A. issuing by the Administration is registered in only 10% of non residents but, the same residents reach 60% of total interviewees, which shows how the same residents have not yet perceived the existence and the importance of the P.U.A. . The second question concerning who is competent to regulate the use of beaches, highlights a significant discrepancy between tourists and residents; indeed, amongst the former only 50% affirms that competence is municipal. Of interest in this case is how the perception of the Harbour Office as a competent body is still strong both for tourists (20%) and for residents (10%).

	Customers	End users		Customers	End users
Municipality	50%	60%	Harbor Office	20%	10%
Region	20%	20%	Other	10	0%

3.5.11. Synthesis of the benefits assessed

Summing up the present value of the producer and consumer surplus gives a total benefit of 49-80 million euros, for a nourishment project lasting 15-45 years. The discount rate used is 6%.

Conversely, in the analysis of the various indicators concerning the “Demanio” beach assets it is interesting to note that the average concession cost is equal to 4,88 euro per square metre per year. The concessions for establishments (58), during 2005, have created a total income of 86.222,53 euros. This figure, if compared to the producer and consumer surplus estimate of the bathing establishments (see paragraph 3 and 5), highlights a situation in which the amount of State property royalty is paltry compared to the productivity of bathing establishment. This calls for thought at a time in which costs for nourishment are increasing.

A final consideration regards who should pay for the nourishment project. If the nourishment costs should be paid proportionally to the benefits (Pompe and Rinehart, 1999), from the results of the producer and consumer surplus (benefits), consumers should contribute about 30% more than producers, i.e. 60% of the yearly cost of beach maintenance (€200,000).

According to the additional beach visitors estimate after the nourishment (4,700 people per day), the incremental benefit to the consumers arising from the optimal enlargement of the beach is €50,000-80,000. This benefit could be picked up by an increase of the ticket price (the fair ticket increment being estimated €1.05 per day). This is nearly 30% of the total cost of maintenance. Another fraction of the costs should be paid by the “second house” owners, benefiting from the increase value of the property. However, there is not any primary and secondary data about the rise of the house value induced by the nourishment. The remaining quota should be paid by the producers.

4. Future activities

During Phase C the work will be finalised to meet the actual needs of each area. The main activities of the ICZM-MED partners will be: users' face-to-face interview with common questionnaires in summer 2007 in the pilot area; identification of a common methodology for data treatment of the results from both users' and stakeholders survey; designation of a common contribution for the definition of a specific indicators on ICZM performance and for general guidelines for beach management, with the support of PAP/RAC. Results will be divulged and discussed with key local stakeholders in order to identify future policies and possible management interventions.

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ANNEX

Proceedings of the 1st BeachMed-e 3.2 ICZM-MED Meeting
Alexandroupolis 9/11/2006
Alexander Beach Hotel Convention Centre

During the conference of the BeachMed-e project that was held in Alexandroupolis from 9 to 11 November 2006, a meeting between the partners of the sub-measure 3.2 ICZM-MED took place.

The participants of the meeting were Dr. Manos Koutrakis (Chef de file) and Argyrios Sapounidis from N.AG.RE.F. – F.R.I. (Partner 1), Luca Martinelli on behalf of Silva Marzetti from DISTART (Partner 2), Simone Martino from DECOS (Partner 4), Prof. Mauro Fabiano for DIP.TER.IS. (Partner 5), Sebastien Roussel representing Université de Montpellier 1 CEP/LASER (Partner 7), Frank Bellet from BRL (Partner 8) and finally Daria Povh representing PAP/RAC. Mrs Povh was invited in order to seek possible collaboration between the ICZM-MED sub-project with the Regional Activity Centre for the Priority Actions Programme (PAP/RAC).

After a short introduction from Dr. Koutrakis and the acquaintance of the participants, each partner presented the future activities and the methodology that each partner has set for the next phases of the project.

The first presentation was from Luca Martinelli on behalf of Silva Marzetti (P2). The aim of their work is to find out if the beach visitors and sunbathing establishment managers are willing to voluntarily contribute for the artificial defense of a sandy beach in order to preserve its indirect use value, option value, bequest value and existence value. Here, direct beach use value is not considered. In particular the Riccione beach is chosen as case-study. This beach is under erosion, and it is visited by tourists and day-visitors. Tourists are people who stay on the site at least one night, while day-visitors return home at the end of the day-visit. In order to achieve this aim, two Contingent Valuation surveys will be carried out, one for beach visitors and the other for sunbathing establishment managers. Visitors will be asked if they are willing to make a monetary donation per year to a non-profit agency; sunbathing establishment managers will be asked if they are willing to contribute through voluntary works for beach maintenance. During Phase B a pilot survey will be carried out in order to test the questionnaires wording; while the main surveys will be carried out during July-September 2007 (Phase C). During the presentation Sebastien Roussel suggested that voluntary donation can also be done by indirect payment such as “car parking payment”.

The presentation about the aims, the methodology and the future activities of the University of Montpellier (P7) was made by Sebastien Roussel. He talked about the Use

Value of a beach. The Use value of a beach can be obtained if we take into consideration the direct use (fisheries, recreation) and the indirect use (Environmental value and Economic value) of the beach. Also he suggested that the questionnaire must focus on the peoples' perception on the coastal zone and the coastal erosion. According to the framework that University of Montpellier 1, there are two questionnaires, one with two parts, one for the managers of private beaches and one for the public and a second questionnaire for the decision makers, which will be carried out in January. Moreover, he suggested that the indicators that are going to be used during the project could be already existing, new or even both existing and new indicators could be created. Finally he said that at the end of the Beachmed-e project we should be able to suggest some Guidelines for a national strategy

Then a presentation about the BRL (P8) activities was done by Frank Bellet. The main goal for BRL is to create an information system, where all relevant data for ICZM for the whole Region of Languedoc-Roussillon will be available. Also they will develop a database, an Atlas and indicators as tool for the economic evaluation of the beaches. The work will be done in collaboration with Partner 7. The work will be applied in the whole region.

As concerns DIP.TER.IS. (P5), Prof. Fabiano talked about the methodology that they are going to use in order to evaluate the beach. He described the Holistic indicators, which includes thermodynamic principles. These indicators include the Energy Analysis, Ecological footprint and CO₂ balance. The term "Emergy" includes "All the energy used to produce work". He also talked about the survey that was carried out last summer and 600 questionnaires were filled in. The final goal of their work is to produce an indicator for the Coastal Zone that will integrate Environmental and socio-economic aspects.

Simone Martino on behalf of DECOS (P4) presented the activities done and he described the principles and some results of the beach nourishment that took place in Tarquinia beach and also he talked about the Cost Benefit Analysis, which is based on the "Willingness To Pay" analysis.

Then Dr. Manos Koutrakis presented to the partners the activities of P1 in the Nestos Delta pilot site, which is the only site that have also a strong environmental value, apart from the tourist activities. These activities are related to the understanding of the coastal zone and defense systems perception by visitors and stakeholders, the training of managers and the mapping of land uses in the pilot site. Finally Dr Koutrakis described the ICZM-Med Phase A presentation, that would be done the next day, so as the partners to check the information shown.

After the presentations from different partners, there was a greeting by Daria Povh, who described the state of art in the ICZM in the Mediterranean and the current activities of PAP/RAC related to the protocol for integrated management of Mediterranean coastal areas and she hoped that this project will be a motive for a better exploitation of ICZM in Mediterranean. Daria Povh presented the possibilities of collaboration with PAP/RAC. Because not all the partners were present there wasn't a final decision and because of that all partners should express their opinion on the aspect of collaborating with PAP/RAC. Moreover, Mrs Povh expressed the opinion that the project focus on the Beach management, which is a only part of ICZM, and that the local level of management is very important for the protocol. Finally, there was a common opinion that the questionnaires that each partner will use, should have common questions in order to have comparable results.

Finally there was a briefing from Dr. Aftias, who represented the Region of East Macedonia and Thrace, about the needs of the Region and he pointed out that common principles should be used by the partners. As a result a new table was prepared to be presented to the Beachmed Conference, where all common activities were summarized.

At the end of the meeting Mr. Argyrios Sapounidis made a PowerPoint presentation concerning the BeachMed ICZM-Med internet site and its possible uses. Also there was a briefing on the *ftp area*, which will be a useful tool for the collaboration of the partners. Finally there was a discussion on the logo of the sub-project and description of the principles used to create it.

The conclusion of the meeting was that questionnaires with common points should be prepared. For this reason it was decided that the questionnaires or better the questions that every partner think that should be included in the final questionnaire, will be uploaded in the ftp area. The same procedure will be used also for the indicators. Moreover it should be decided what the requirements for making the questionnaire survey will be, i.e. who is going to make the interviews, if he/she had to be trained on surveys etc. Also there must be a reference by each partner to what nourishment activities have been done in each pilot site.

Finally it was decided to held a meeting in Genova in December 2006 or January 2007 in order to elaborate the questionnaires and find common points, and as far as it concerns the PAP/RAC Daria Povh will see the procedure that is necessary to follow for the preparation of contracts.

2nd BeachMed-e 3.2 ICZM-MED Meeting Minutes

Genova 8/02/2007

Universita degli Studi di Genova, DIP.TER.IS.

The participants of the meeting were Dr. Manos Koutrakis (Chef de file) and Argyris Sapounidis from N.AG.RE.F.–F.R.I. (Partner 1), Simone Martino from DECOS (Partner 4), Prof. Mauro Fabiano, Dr. Valentina Marin and Chiara Paoli for DIP.TER.IS. (Partner 5), Paola Salmona for ICCOPS (Partner 6), Sébastien Roussel representing Université de Montpellier 1 CEP/LASER (Partner 7), Prof. Emmanuel Aftias as technical consultant of the East Macedonia and Thrace Region (OCR for sub-project 3.2. ICZM-MED), and Daria Povh representing PAP/RAC. Mrs Povh was invited as an external expert on behalf of PAP/RAC, in order to attend the meeting, formulate a Memorandum of Understanding between BeachMed-ICZM-MED and PAP/RAC and assist in the formation of the questionnaires. Partner 2 was not able to attend the meeting, but Prof. Silva Marzetti send a presentation in order to in order to justify the reasons why they will deal with option and non-use values. On the other hand Partner 3 was represented by Mr Simone Martino and Partner 8 by Mr. Sébastien Roussel.

In the beginning of the meeting there was a briefing regarding the Barcelona meeting (February 2nd 2007) that was related on the ICZM technologies used by the project **DEDUCE** (scientific supervisor Xavier Marti Rogue) and the possibility of collaboration with the 3.2 ICZM-MED sub-project. Prof. Fabiano informed the participants about the meeting and the intension of the BeachMed-e Secretary to create Observatories for the observation of the coasts. Also, he mentioned that indicators 25, 26, 27 (sustainable development of the coastal zone) will be used by another BeachMed-e subproject (2.1 OPTIMAL). As far as concerning the **indicator 28** (ICZM: progress of implementation of ICZM), which was suggested to our sub-project (*Recommandations et Observations sur la 1ère Version du Cahier Technique; projet 3.2 ICZM-MED; 2. Relations avec les autres expériences de GIZC*), Prof. Fabiano informed the group that the DEDUCE project has not described it adequately yet, which will be ready until the end of February, since the final meeting of the project will be held in Saragossa in early March 2007. On the other hand DEDUCE is not using indicators for the “perception” of different parameters, so they are interested about the results of our questionnaires that include this parameter and they are also interested on the “holistic indicator” that Prof. Fabiano is intending to elaborate in the ICZM-Med project.

Mrs. Daria Povh informed the group that she will meet Mr. Marti in Cairo and she will try to gather some preliminary data on the Indicator 28. Prof. Fabiano will attend the

final meeting of DEDUCE in Saragossa, Spain (2-3/3/2007), where he will present the ICZM-MED sub-project.

Regarding the indicators that will be used by the ICZM-MED sub-project, it was decided that as soon as the indicator 28 is described adequately by DEDUCE, and taking into consideration that DEDUCE will provide us all the appropriate information about it, there will be an effort to be applied by all partners on a regional level.

The discussion for the indicators was followed by the discussion on the formation of a final questionnaire for stakeholders and beach visitors and the methodology that will be used in order to apply and elaborate them. Prof. Fabiano suggested having a questionnaire divided in two parts, one on the Economic value (use / non-use value) and one on the people's perception. His suggestion was that all partners could have 2-3 questions on Economic value as Valentina Marin did last year and then to be evaluated by an expert, such as Sébastien Roussel and Simone Martino. On the other hand there can be a small description of the results for each region and the results will be based on the characteristics of each pilot site.

Valentina Marin described the methodology that she used to apply 600 questionnaires the previous year and she mentioned that nobody answered the questions concerning the economic aspects. She used to give the questionnaires personally and then she collected those 15 minutes later. Also she said that she is planning to apply some face-to-face questionnaires, which will have some questions on coastal erosion.

On the other hand, Sébastien Roussel applies face-to-face interviews for 150-200 questionnaires. He will send to all partners the methodology of face-to-face interviews (1-2 pages). He mentioned also that the number of the interviews should be at least 150-200 questionnaires for beach visitors and at least 80 questionnaires for stakeholders. Moreover Sébastien informed us that they have selected the pilot site in their region (an activity that was pending from the previous Phase A).

Regarding the questionnaires it was decided that the beach visitor's questionnaire will include 12 common questions related with the "perception" of different parameters related with ICZM and with the "Willingness To Pay" aspect. The "perception" aspect will be described in 4 different sections: a) Coastal Zone perception, b) Integrated Coastal Zone Management perception, c) Coastal erosion perception and d) Coastal Defence Systems perception. A discussion followed where the common questions were formulated based on the questionnaires of partners 5, 7 and 4 (see Annex I, Questionnaires for Beach Visitors). These questions will be used by all partners.

Regarding the Stakeholders' questionnaires it was decided that they will also have the same sections, but the questions will be more detailed. A discussion followed where the questionnaire was formulated based on the questionnaires of partner 1 (see Annex II, Questionnaires for Stakeholders). Main goal of all partners will be to apply the "pilot" stakeholders' questionnaire formulated during the meeting until the end of March in order to see the drawbacks of the methodology and the questionnaires and try to correct them. The questionnaires will be used firstly in face-to-face interviews with people from the a) Region, b) Prefecture c) Municipality; if the necessary number of questionnaires is not collected the next institutions will be: Universities and Research Institutes. There was a discussion to use also NGO's, Companies (such as National Company of Electricity), professionals and media of the pilot site, which however would need new questionnaires, since the one formulated targets public institutions. However a press release was considered necessary in order to prepare people (stakeholders or visitors) for the use of the questionnaires in their area.

The number of stakeholders' questionnaires that each partner will apply, will depend on its possibilities, even though it was suggested that the number should not be less than 50. Since we don't have time to use the visitors questionnaires till the end of Phase B (May 2007), it was decided that all partners will apply a minimum number of stakeholders questionnaires (20) till the end of Phase B, in order to present preliminary results. The rest of the questionnaires will be collected during Phase C.

During the discussion on the formation of the questionnaires it was decided to have a categorization of the beaches according their characteristics in order to compare the results of each region. Mrs Povh will provide the group with the relevant references. Regarding the "Willingness to Pay" questions, they will be mainly used by Partners 2, 4 and 7 and as far as it concerns the rest of the Partners, they will use these questions in the preliminary questionnaire survey that will be held until the end of Phase B. Since not all partners have the possibility to elaborate economic data, it was decided that three of the partners (Prof. Silva Marzetti, Partner 2, Simone Martino, Partner 4 and Sébastien Roussel, Partner 7) will make an effort to elaborate the results of the questionnaire questions, related with "Willingness to Pay". Partner 1 also asked from other partners to provide methodology for the questionnaires elaboration.

Finally there was a discussion on the definition of the role of PAP/RAC in the ICZM-MED project. The recommandations to our sub-project (*Recommandations et Observations sur la 1ère Version du Cahier Technique; projet 3.2 ICZM-MED; 2. Relations avec les autres expériences de GIZC*) was to collaborate with PAP/RAC, since this organisation is elaborating the protocol on ICZM in the Mediterranean. In order to

help this collaboration Dr Lupino offered 8,000 €, on behalf of the Lazio Region (message received in the same day). Partner 1 offered another 2,000 € and the rest of the amount needed (5,000 €), will be divided between the rest of the 7 partners that are willing to participate (700-1500 €). Partner 6 had a problem related with the way of payment, which will be discussed with the BeachMed secretary. The discussion was mainly in defining who is willing to participate and contribute to a contract with PAP/RAC and define the type of the contract. The “Chef de file” will elaborate a Memorandum Of Understanding (MOU) in collaboration with Mrs Povh and will forward this to Dr. Lupino (along with our sincere thanks) and to the other partners to comment. Moreover the “Chef de file” will investigate if it is possible to have a central arrangement of this budget from the BeachMed secretary (and the necessary reduction of all partners budget) in order to avoid the different contracts of partners with PAP/RAC.



Summary of Future Activities

ACTIVITIES	P1	P2	P3	P4	P5	P6	P7	P8	PAP/ RAC
Meeting minutes (February 15 th 2007)	X								
Meeting minutes corrections (February 20 th 2007)	X	X	X	X	X	X	X	X	
Saragossa meeting (March 2007)					X				
Contacts DEDUCE for indicator 28					X				X
Indicator 28 application (end 2007)	X	X	X	X	X	X	X	X	
Beach categorisation documentation (March 2007)									X
Methodology of face-to-face questionnaires (end of February 2007)				X			X		
Pilot questionnaires (visitors and stakeholders) survey (end March 2007)	X	X	X	X	X	X	X	X	
Press release for the Stakeholders questionnaires application (March-April 2007)	X	X	X	X	X	X	X	X	
20 Stakeholders interviews (end April 2007)	X	X	X	X	X	X	X	X	
50-80 Stakeholders interviews (end 2007)	X	X	X	X	X		X	X	
Elaboration of Stakeholders questionnaires (end 2007)		X		X	X		X		X
Press release for the visitors questionnaire application (June-July 2007)	X	X	X	X	X		X	X	
Common questionnaire questions (summer 2007)	X	X	X	X	X		X	X	
Elaboration of WTP questions (end of 2007)		X		X			X		
Elaboration of visitors questionnaire (end 2007)		X		X	X		X		X
Elaboration of a draft MOU with PAP/RAC (February 16 th 2007)	X								X
MOU with PAP/RAC (March 2007)	X	?	?	X	X	X	X	?	

Minutes of the 3rd BeachMed-e 3.2 ICZM-MED Meeting
Barcelona 28/06/2007
Consorci El Far -Moll de la Barceloneta

During the Phase B Conference for Components 3 and 4 of the BeachMed-e project that was held in Barcelona, Spain, from 29 to 30 June 2007, the third meeting between the partners of the sub-measure 3.2 ICZM-MED took place (see Annex).

The participants of the meeting (see also Annex) were Dr. Manos Koutrakis (Chef de file) and Argyrios Sapounidis from NAGREF – FRI (Partner 1), Silva Marzetti from DISTART (Partner 2), Prof. Mauro Fabiano and Valentina Marin for DIPTERIS. (Partner 5), Dr. Emanuele Roccatagliata from ICCOPS, Dr. H  l  ne Rey-Valette, S  bastien Roussel, Henichart Laura-Mars and Durand Gwenna  lle representing Universit   de Montpellier 1 CEP/LASER (Partner 7), Frank Bellet, Fran  ois Carnus and Coste Silvan from BRL (Partner 8) and finally Ivica Trumbic representing PAP/RAC.

The meeting started at 14.30 with a short introduction from Dr. Koutrakis, who emphasized on the importance of common activities between partners in order to have comparable results and the importance of the application of the stakeholders' questionnaire, which will give an indication related to the state of the art of ICZM in each pilot site involved in the 3.2 sub-project. Also he proposed that common terminology should be used by all partners (the creation of glossary with all terms used in the reports should also be discussed and applied).

After the acquaintance of the participants with the Director of PAP/RAC, each partner presented the preliminary results of phase B and the methodology that each partner has used in order to achieve these results and the future activities that are going to take place in Phase C.

The first presentation was made by Prof. Silva Marzetti (P2). Prof. Marzetti mentioned in her presentation that they prepared three questionnaires. The first one for public stakeholders (at least 20 interviews), which contained also the common questions that were set by all partners, and the other two for beach visitors (600 interviews) and sunbathing building establishment (private) stakeholders (about 160 interviews). In addition, Prof. Marzetti presented the preliminary results of the three pilot surveys that took place in the period from January to May 2007 and were applied to students (who are beach visitors) of the University of Bologna in order to test the questionnaire wording about beach visitors for the Riccione/Misano case-study. These tests suggested some modifications to the questionnaire. Prof. Marzetti, suggested that some questions that were included in the beach visitors / users questionnaire, should be added or modified.

More specific, she suggested the modification of question n° 2 and the addition of two new questions. As it concerns question n° 2 the suggestion was to be modified in a “close” question using 4 choices of what ICZM is, three of which should be wrong answers. The next suggestion was to insert a new question between questions 4 and 6 concerning the problems caused by coastal erosion. This question was numbered as 4a because has a direct connection to question 4. Also a new question concerning the preference on the coastal defence was proposed to be set between 7 and 8. Since one of the partner (P7) had already applied circa 80 questionnaires to beach visitors of the Languedoc – Roussillon region, it was decided that the two new questions will be inserted in the questionnaire, but only as optional questions (the same with the changes of question n°2) to be used only from who think it is necessary. Thus their numbers would be 4a and 7a respectively (the numbering of the rest of the questions should remain the same in order to be confronted with the results of P7).

After the presentation of Prof. Marzetti there was a short discussion on the common methodology that the partners should use for the users survey. The methodology proposed by Sébastien Roussel was that the interviews should be face-to-face and should last approximately 15 min. Also before the interview start a small introduction / presentation of the Beachmed-e project, emphasizing on ICZM-Med sub-project, should be made. In the presentation, the purpose of the project, ICZM perception, Coastal zone erosion and coastal defence systems perception, should be presented. Another point was that the interviewer should state to the interviewee that the survey is anonymous. There was also the suggestion by P2, that the interviewer should have a badge in order to be identified easily. Photographs of the interview process and of the beach visited should be taken by all partners. Finally it was decided that the Users’ survey should take place in the period from July 2007 to August 2007. all the above were accepted and the Chef de file will include them at the end of the questionnaire in order to be easy accessible by the interviewer.

As regards the stakeholders’ questionnaire survey, Silva Marzetti, Valentina Marin and Sébastien Roussel (Partners P2, P5 and P7 respectively) mentioned that they were planning (P2 and P7) or they have already applied the questionnaires (P5) to private stakeholders such as sunbathing establishment managers in order to examine the sustainability of the sunbathing activities.

The next presentation was made by Valentina Marin (P5). In her presentation she mentioned that they are not planning to have more interviews from the public stakeholders but they are planning to take interview from private stakeholders such as sunbathing establishment managers in order to examine the sustainability of the

sunbathing activities. This is very important because in Italy the 90% of the beaches are managed by private stakeholders. Prof. Fabiano indicated that despite the fact that DEDUCE haven't managed to end up in a final decision for Indicator 28, the results from the stakeholders' interview of all partners to give results that could be used to calculate Indicator 28.

The next presentation was by Dr. Emanuele Roccatagliata (P6), who indicated that they will also try to use the indicators from the project DEDUCE. However, there are indications on how to calculate them only for 10. It was agreed to communicate to inform all the partners for the indicators that will be used in order for the partners to try to use these indicators also in their pilot site something which will help to describe the state of the art, as was emphasised by Dr. Koutrakis. Concerning the stakeholders' questionnaire, ICCOPS will apply it during September and the results will be available till the end of the month. In addition he also mentioned that they were planning to prepare a GIS map not only of the pilot site but for a larger area due to the fact that in order to have a clear view / understanding of the actual issues of the area.

Frank Bellet representing partner 8, who is not going to use the questionnaires survey since the pilot site (Languedoc – Roussillon coast) is already covered by the other French partner (P7), presented their work related with the GIS system that it is created for the coast of the Languedoc – Roussillon region. Also, it was decided to change the title “creation of coastal observatory system” to “coastal zone monitoring system”. This change was made in order to avoid any interference with measure 4 of the Beachmed-e project.

After the presentation made by Frank Bellet, there was a discussion on the way that the data from the questionnaire surveys will be homogenised and evaluated. It was decided that descriptive statistics will be used for the analysis of the data (mean values, standard deviation and percentages). Later for the final report of the sub-project it will be discussed if in some cases (e.g. economics) regression models are needed.

Moreover, the matrix that will be used to enter the data from the stakeholders questionnaires will be prepared and send to the partners for comments the latest at 20 July. By the end of the month the matrix completed with the results from the stakeholders' survey will be send to PAP/RAC. This matrix will contain the data from all partners that will apply the questionnaire, except partner 6 (ICCOPS) because they are planning to apply it in September. On the other hand the matrix for the visitors' survey will be prepared and send to the partners for comments by the end of July while the complete one with the results and conclusions will be prepared by the end of September.

On this part Ivica Trumbic also commented that it is of great importance to make a description of each pilot site and compare them. It was decided to send to PAP the description of the pilot site in order to produce the typology of the areas. Moreover PAP/RAC will evaluate the results that will be send by all partners for the stakeholders survey (by the end of July) and will try to propose conclusions. Moreover the same will happen after the gathering and results evaluation of all partners Beach Users' survey, by the end of September.

Mrs Daria Povh was not possible to attend the meeting, but she send a very fruitfull email with ideas and comments on the progress at the ICZM-Med sub-project (see Annex)

Finally the presentation of the preliminary results of Phase B for subproject 3.2 ICZM-Med was made by Dr. Koutrakis. The presentation was made in order for the partners to see what was going to be presented in the Steering Committee and make any comments for corrections or improvements of the presenting data. The meeting had ended at 19.45.

Agenda of the 3rd BeachMed-e 3.2 ICZM-MED Meeting

Barcelona 28/6/2007

Consorci El Far -Moll de la Barceloneta

- h 14.30 – 15.30 1. Short presentation of the results of each partner: Discussion & comments**

(5 min each X 8 = 40 min + 3 X 8 =24 min questions & discussion)

- h 15.30 – 16.00 2. Discussion on how to integrate all the results and provide an integrated framework for the beach management**

- h 16.00 – 17.00 3. Discussion on the Users questionnaire (problems, ideas, data elaboration)**

As agreed in Genova, all partners (apart P8) will use common questions in a questionnaire for beach users. This activity is very important for our sub-project, since it is one of the two that will give comparable results.

During this session, we know who will elaborate the data (Simone, Sebastian and who else have the experience), but we have to discuss the problems and how the final elaboration of data will done (matrix to use, etc.)

- h 17.00 – 17.30 Coffee break**

- h 17.30 – 18.30 4. Discussion on the stakeholders questionnaire (problems, ideas, data elaboration)**

As agreed in Genova, all partners (apart P8) will use a questionnaire to interview stakeholders. During this session we have to discuss the problems from the preliminary application and how the final elaboration of data will done (matrix to use, who will elaborate data, etc.)

- h 18.30 – 19.30 5. Presentation of the PPT that will be going to be presented the next day in the Steering Committee (comments)**

Participants at the Meeting

Partner	Name	Organisation
P1	Dr. Manos. Koutrakis	N.AG.RE.F. – F.R.I.
P1	Argyrios Sapounidis	N.AG.RE.F. – F.R.I.
P2	Prof. Silva Marzetti	DISTART
P5	Prof. Mauro Fabiano	DIPTERIS
P5	Valentina Marin	DIPTERIS
P6	Dr. Emanuele Roccatagliata	ICCOPS
P7	Dr. H��l��ne Rey-Valette	Universit�� de Montpellier 1 CEP/LASER
P7	S��bastien Roussel	Universit�� de Montpellier 1 CEP/LASER
P7	Henichart Laura-Mars	Universit�� de Montpellier 1 CEP/LASER
P7	Durand Gwennaelle	Universit�� de Montpellier 1 CEP/LASER
P8	Frank Bellet	BRL
P8	Fran��ois Carnus	BRL
P8	Coste Silvan	BRL
	Ivica Trumbic	PAP/RAC

Email of Daria Povh regarding the state-of-the-art of Beachmed-e ICZM sub-project.

Dear all,

As agreed with Manos, here is my comment on the state-of-the-art of the Beachmed-e ICZM sub-project.

Most often beach management is perceived from two angles, protection/defence subject or tourism/recreation resource. Accordingly, beach management was often presented as an engineering discipline or as a social/landscape discipline. Large scale environmental consequences of the maintenance works were placed into the second prospective. Having in mind the size of the coastal erosion in Europe, as well as the threat of the sea level rise, the crucial question of beach management becomes cost and financing. Since all of these elements are deeply interrelated, the integration of approaches is indispensable.

It was common practice that the beach was considered as a separate space to be protected or managed. Unfortunately, this still happens today. Such an approach could not be considered sustainable, since the beach is an important part of a larger system - coast. Whatever is done on the beach has repercussions in the surrounding environment whether it is about the maintenance/engineering work, introducing economic instruments (fees and similar) or development that is changing the original landscape. In the same manner, all that is happening in the beach surroundings has an impact on the beach, like for example, marina's development, fish farming or road development.

Therefore, the only appropriate framework for the beach management is integrated coastal zone management (ICZM). Within this framework, all components of the coastal system should be integrated, in particular taking into account traditional uses and values. Fundamental to ICZM is a comprehensive understanding of the relationships between coastal resources, their users, uses, and the mutual impacts of development on the economy, society and the environment. These relationships need to be understood and expressed in physical, environmental and economic terms. As coastal resources are used simultaneously by different economic and social sectors, integrated management can only be accomplished when all these uses, users and relationships are clearly known. It is, therefore, far wider than static land-use planning, requiring an interdisciplinary approach to the management of dynamic processes in the terrestrial and marine environments.

Taking into account all the above mentioned, this sub-project should, in my opinion, be the central sub-project of the Beachmed-e, and its objective should be integration of the overall results. Even if this is not the case, we should still strive towards providing the appropriate ICZM framework for beach management.

ICZM should, among the rest, result in integration of scientific results and making those user friendly for the managers. Therefore, besides providing an integrated framework for the beach management, this sub-project should bridge the science and practice gap and provide some useful and friendly guidance for the managers.

Recognising that all the partners in the Beachmed-e ICZM sub-project are performing a very valuable research and using interesting methodologies, their final goal should be to find a way to compare the obtained results, combine them into a whole and to provide a useful guidance resource for managers.

So, for now, questionnaires may be used as the way of comparing the results. Crucial for the beach management interventions is actually financing, and through willingness to pay all the partners are involved in this issue. It seems, however, that one important ring of the chain, and that is the beach establishment managers/concessionaires, is missing in order to compare the results and provide some guidance. Manos, Valentina and Mauro, we have discussed about how to present and use the results of the Tarquinia beach. For doing so we need to know the sort and amount of the actual fee as well as the concession rates for different types of the beaches. Once we are in possession of these data, we will be able to compare the results obtained in all pilot sites of this sub-project. Comparing the data referring to daily fees amount, number of visitors, trends and concessions for all pilot sites could give us interesting results and would be useful for better understanding and evaluation of the conclusions like the one for Tarquinia beach presented in this report.

Valentina actually has discovered similar results between their project and the Tarquinia project. So I do believe that you will find some new options for the integration and comparison of the results in Barcelona.

STRUCTURE

As regards the structure of the report, I would not separate beach management from ICZM. I read some articles classifying beach management closer to the natural resources management than to ICZM. In addition to that, we must admit that in some most important ICZM books beach management was not given the space it actually deserves. Beaches are economically the most important part of the coastal zone. Managing the beaches separately makes both, ICZM and beach management less

effective. When emphasising the importance of integration, or even more of a holistic approach, spatial dimension is one of the first to consider, as linearly along the coastline, so vertically in the hinterlands. Therefore, I would always avoid separating beach management from management of all other forms of the coastline.

ICZM TOOLS

You may check a simple diagram of ICZM tools prepared several years ago. Attached to this mail is another more recent ICZM toolkit, prepared by my colleague. As you may see, questionnaire is not considered as an ICZM tool, it is just a method of social evaluation. Anyway, I would avoid using the term "tool" for the questionnaire.

COMMENTS

1. As we have agreed, pilot stakeholders questionnaires will be finalised by the end of March so as to see the drawbacks of the methodology and to correct them. Do we have some feedback on this?
2. It is necessary to use the same terminology by all the partners (beach users, end users, users, consumers, etc.).
3. Data on the number of hotel visitors after the beach nourishment can hardly be valuable if 1 year only is available.
4. The crucial objective of the Barcelona meeting is to reach the agreement on the common objective and joint result.

IDEAS ON USEFUL OUTPUTS

1. comparison of the beach type and state, daily fees, number of visitors, trends in visitors number and concession price for all pilot sites
2. proposals on how to improve establishment of concessions rates including updating of the rates related to the new beach size
3. legislative analysis: Are the concessions given only by the regional level? Should some guidance be given at the national level, if the difference between the regions is too big?
4. raising awareness of about who and how much is benefiting from the beach nourishment
5. all environmental, engineering, socio-economic, cultural and all other factors to be taken into consideration for the larger coastal zone prior to any intervention
6. specific beach management indicators

I wish you all a fruitful meeting!
Best wishes,
Daria

Photos of the Barcelona Meeting

